

FIRE ESCAPES IN URBAN AMERICA: HISTORY AND  
PRESERVATION

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## Abstract

For roughly seventy years, iron balcony fire escapes played a major role in shaping urban areas in the United States. However, we continually take these features for granted. In their presence, we fail to care for them, they deteriorate, and become unsafe. When they disappear, we hardly miss them. Too often, building owners, developers, architects, and historic preservationists consider the fire escape a rusty iron eyesore obstructing beautiful building façades. Although the number is growing, not enough people have interest in saving these white elephants of urban America.

Back in 1860, however, when the Department of Buildings first ordered the erection of fire escapes on tenement houses in New York City, these now-forgotten contrivances captivated public attention and fueled a debate that would rage well into the twentieth century. By the end of their seventy-year heyday, rarely a building in New York City, and many other major American cities, could be found that did not have at least one small fire escape.

Arguably, no other form of emergency egress has impacted the architectural, social, and political context in metropolitan America more than the balcony fire escape. Lining building façades in urban streetscapes, the fire escape is still a predominant feature in major American cities, and one has difficulty strolling through historic city streets without spotting an entire neighborhood hidden behind these iron contraptions.

This thesis intends to demonstrate the significance of the balcony fire escape, as introduced in the nineteenth century in New York City, and advocates for their preservation and conservation thereof. The history of the fire escape is traced through *New York Times* articles, detailing landmark fires, public outcry, and the ensuing legislation, and through historical photos and nineteenth- and twentieth-century art and literature, illustrating the social and cultural impact of fire escapes on the daily lives of the tenement dwellers in New York City. Design and construction of the fire escape is looked at through patents and manufacturers' trade journals, emphasizing the fire escape as a significant architectural feature. The thesis concludes with basic information of the care and maintenance of fire escapes and a discussion of actual preservation work being done to save these important pieces of the built environment.

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## Introduction

A fire escape is loosely defined as any means of egress from a building that is used in the event of a fire. The term refers to all emergency exits, from ropes tied to window ledges to poles affixed to exterior building walls. Why then does the term “fire escape” conjure images of exterior iron balconies connected by iron ladders or stairs? Arguably, no other form of emergency egress has impacted the architectural, social, and political context of metropolitan America more than the iron balcony fire escape. Rows of fire escapes line building façades along urban streetscapes, and one has difficulty even today strolling through historic city streets without spotting an entire neighborhood hidden behind these iron contraptions.

As a society, we continually take fire escapes for granted. In their presence, we fail to care for them; they deteriorate and become unsafe. When they disappear, we hardly miss them. Too often, building owners, developers, architects, and historic preservationists consider the fire escape a rusty iron eyesore obstructing a beautiful building façade. While the evolving field of historic preservation now fosters a greater appreciation for vernacular, often unaesthetic, building forms than in previous decades, too few preservation professionals and enthusiasts embrace these white elephants of the urban landscape.

Back in 1860, however, when the buildings department first ordered the erection of fire escapes on tenement houses in New York City, these now-forgotten contrivances captivated public attention and fueled a debate that would rage well into the twentieth century. By the end of the fire escape’s seventy-year heyday, rarely could a building over three stories be found in major American cities that did not have at least one small exterior egress. The fire escape altered the urban landscape, both physically and psychologically. Over the course of the twentieth century, during which advanced methods of fire safety evolved, many fashionable buildings lost their fire escapes. In older residential tenement neighborhoods in large metropolitan areas, such as New York City, numerous old fire escapes still adorn façades (Figure 1). The role of fire escapes in the evolution of tenement districts is so significant that their removal would greatly alter the character and diminish the historical value of the buildings and the neighborhood.

Architectural features frequently evolve from a practical or decorative building appendage to a cultural or social icon. The fire escape plays little role in the daily lives of the current tenants of the old balcony-laden buildings, such that one may not realize the impact of the fire escape in the daily lives of nineteenth- and early twentieth-century tenement dwellers. The wrapping Queen Anne porch and the “widow’s walk” cupola, architectural-turned-cultural constructs of the wealthy, rose up in fashionable residential neighborhoods, while the poor and the immigrant culture wove their own piece of architecture into their lives: the fire escape.

The fire escape also serves as a representation of the evolving infrastructure of major cities like New York at the turn-of-the-century. Rebecca Zurier states in her book, *Metropolitan Lives: the Ashcan Artists and Their New York*, “[New York City’s] built environment, the first skyscrapers and the expansion of apartment houses – as dwellings not just for the poor but also for the middle class rich – established patterns that would characterize the city.... The vertical city of the twentieth century replaced the horizontal city of the nineteenth century....”<sup>1</sup> The increasing verticality of the city manifests itself in the exterior fire escape, a device necessitated by the burgeoning erection of multi-storied structures. In the modern day world of steel skyscrapers, the tenement houses and their iron balcony fixtures remind us of a time when the five and six story structures soared above the street to, literally, dangerous new heights.

The evolving landscape of New York City inspired nineteenth- and twentieth-century artists to reassess the aesthetics of their environment. Twentieth-century French artist Marcel Duchamp, after arriving in New York City, commented upon the failure of New York painters and photographers to recognize what is truly authentic to their urban landscape. “The city itself was more of ‘a complete work of art,’ [Duchamp] averred, than any American picture; with its exhilarating scale and automated contraptions....”<sup>2</sup> Fire escapes captured the attention of many New York artists; the contraptions, although in existence for four decades prior to the twentieth century, maintained their appeal as a part of the growing mechanical and geometrical metropolitan vista. American artist Man

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<sup>1</sup> Rebecca Zurier, Robert W. Snyder and Virginia M. Mecklenburg, *Metropolitan Lives: the Ashcan Artists and Their New York* (Washington, D.C.: National Museum of American Art, 1995), 30.

<sup>2</sup> Debra Bricker Balken and Jay Bochner, *Debating American Modernism: Stieglitz, Duchamp, and the New York Avant-Garde* (New York: American Federation of Arts, 2003), 18.



Ray illustrates his perspective of an urban scene in his 1917 work entitled *Fire Escapes and Umbrellas* (Figure 2). The artist focuses the view not at street level but above the heads of pedestrians, toward the new aerial cityscape. Precisionism, a 1920s movement of American modernism, distills urban, industrial, and agricultural landscapes to orderly systems of geometric forms. Devoid of human presence, atmosphere, and movement, Precisionist works epitomize the machine age, using the clarity and precision of line and color to capture the essence of the industrial world. Depictions of behemoth skyscrapers and factories juxtapose with common, utilitarian features of the landscape. The fire escape became an essential feature of the mechanized cityscape, superimposing an entire geometrical, as well as cultural, layer atop the urban fabric. Precisionist artist Charles Demuth, in his 1921 work entitled *Rue du singe qui pêche*, represents the fire escape in his urban vision, using simplified Xs to dot the exterior of a high-rise (Figure 3).

While a large number of fire escapes appear as purely utilitarian, geometric contraptions, many were designed with acute attention to detail and a high degree of ornamentation, enhancing the appearance of the buildings to which they were attached (Figure 4). While the urge to remove the less desirable devices from the more fashionable buildings is compelling, such an alteration will rob the building of an integral architectural appendage and compromise the character of both the individual building block and the comprehensive neighborhood. The temptation of many historic preservationists to restore older structures to their original character frequently leads to the removal exterior balconies and ladders; the rationale that the fire escape is not original to the façade fails to consider the nearly 150-year history the building has undergone behind its iron mask.

This thesis intends to demonstrate the significance of the balcony iron fire escape, as introduced in nineteenth-century New York City, and advocates for the preservation and conservation thereof. Very little research has previously been conducted on this topic. Sara E. Wermiel, technology historian, published in 2000, *The Fireproof Building: Technology and Public Safety in the Nineteenth-Century American City*. The book discusses the evolution of fireproof construction and makes only small references to fire escapes. In 2003, she published an article in *Technology and Culture* entitled, “No Exit: The Rise and Demise of the Outside Fire Escape.” The article looks at the history of the

iron balcony fire escape, touching on a few major landmark building ordinances and discussing the inherent weaknesses of the fire escape and its replacement with fireproof construction. The information provided by Wermiel was used as a stepping stone for my in-depth discussion of the historical significance of the fire escape. The article does not examine the cultural context or discuss the physical, architectural features of the fire escape and is not oriented toward issues of historic preservation. Further primary research was necessary to develop all areas of discussion.

Through my research, I sought to demonstrate three different areas of significance: historical, cultural, and architectural. Historical research focused on the origin of the fire escape, its evolution, and its role in the growth of major American cities. I looked primarily at historical *New York Times* articles, building ordinances, and discussions of fire safety in the *Quarterly of the National Fire Protection Association*. Cultural research focused on the impact of the fire escape on urban culture, particularly the immigrant culture within the tenement house districts. I looked primarily at literature, art, and historical photographs contemporary to the era of the fire escape. Architectural research focused on the visual characteristics of the fire escape, and the impact those characteristics have on the façades of buildings and the urban streetscape. I looked primarily at fire escape patents and trade journals issued by fire escape manufacturers.

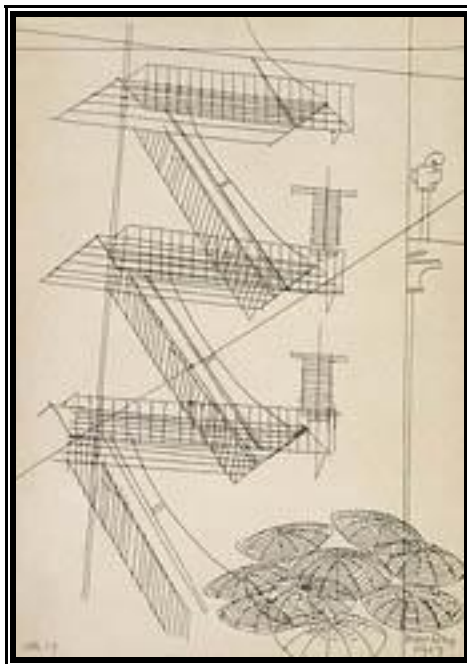
I focused the scope of my research in three areas. I have narrowed the topic of fire escapes to include only the iron balcony fire escape. Although the term “fire escape” refers to any method of egress from a fire, the iron balcony fire escape is the only method of egress that has been a major visual exterior architectural feature on a large number of buildings, and it is the only form of egress that has ever become such an integral part of the urban cultural experience. I have narrowed my discussion to the seventy years between 1860 and 1930. The seventy-year period roughly spans the heyday of the fire escape. It is difficult to prove that iron balcony fire escapes were not being constructed prior to 1860, but evidence supports this theory. The first major egress law in the United States was enacted in 1860, in New York City. The *New York Times* searchable database does not return any hits of the term “fire escape” prior to 1860, and historical photographs or illustrations predating 1860 were not found. Although fire escapes were still being constructed after 1930, they were no longer recognized as a safe, acceptable

means of primary egress. I have narrowed the geographic context primarily to New York City. Not only is it the largest U.S. city with the greatest wealth of fire escapes and richest history thereof, but New York City was at the forefront of all major egress legislation in the United States. Many other cities modeled their legislation upon that of New York City.

This thesis is laid out in five parts. Part one introduces the fire escape and follows its evolution as it relates to five different building types: tenement houses, hotels, theatres, schools, and factories. Part two examines the cultural context of the fire escape within urban immigrant neighborhoods. Part three looks at fire escape patents from the late nineteenth and early twentieth centuries. Part four looks at fire escape designs advertised in trade journals during the late nineteenth and early twentieth centuries. Part five discusses present day conservation issues. A concluding chapter presents actual preservation work being done with fire escapes and discusses how, as preservationists, we can aid the cause.



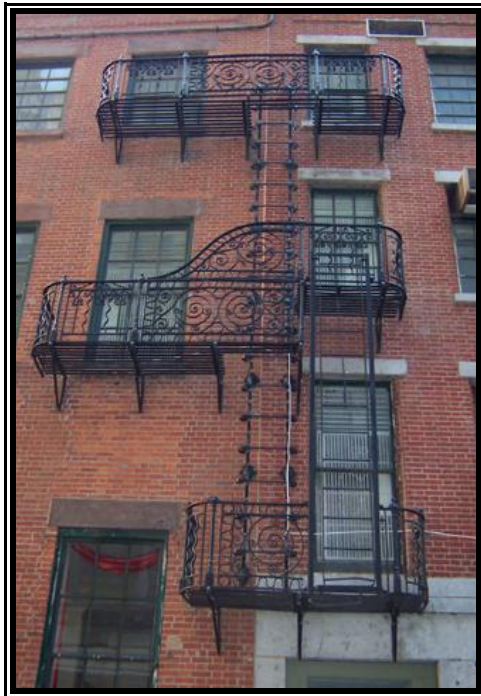
**Figure 1:** Fire escapes line historic buildings in Lower Manhattan in New York City. (author, 2004)



**Figure 2:** Man Ray, *Fire Escape and Umbrellas*, 1917 (Courtesy of the Getty Museum online archive, <http://www.getty.edu/art/collections/objects/o53284.html>)



**Figure 3:** Charles Demuth, *Rue du singe qui pêche*, 1921 (Courtesy of the Terra Foundation for American Art online archive, <http://www.terraamericanart.org/collections/code/emuseum.asp>)



**Figure 4:** Decorative fire escape on a Lower Manhattan apartment house in New York City. (author, 2004)

## **Chapter 1: The Evolution of the Fire Escape**

From its introduction into the urban landscape in 1860, the exterior iron fire escape endured heavy criticism. Already in the early twentieth century, by the time lawmakers effectively enacted detailed legislation regarding the construction of fire escapes on public and private buildings and rigidly enforced compliance thereof, improved methods of fire safety slowly replaced the antiquated iron devices. During the brief period that spans the history of the fire escape, New York City officials struggled to safeguard their citizens and prevent the fatal disasters that plagued the wood-frame neighborhoods of nineteenth-century urban America and, subsequently, paved the way for egress legislation in other major cities across the country. A look into the history of the fire escape within the rapidly expanding metropolis of New York City provides insight into many legal, political, and social issues of the era, thus emphasizing the importance of the fire escape to the evolution of major American cities in the late nineteenth and early twentieth centuries.

The history of fire escape legislation for five different building types was traced from the earliest enacted laws through the eventual outmoding of the exterior exits, focusing on the major historical fires and the unique issues surrounding each building type. Tenement houses, hotels, theatres, schools and factories will be individually discussed in this chapter, concluding with a discussion of the demise of the iron fire escape.

## Part 1: Tenement Houses

The fire originated in a bakery, and the flames shot up the stairs with great rapidity, and extended to the upper floors, which were occupied by twenty-four families. The moment the alarm was given the scene of confusion that ensued was of the most exciting character. The stairway was burned away, and of course all chance of escape in that direction was cut off. Men women and children could be seen, by the spectators on the sidewalk, clustered at the windows, screaming for assistance, and wringing their hands in the agony of their despair. Some of them mustered courage enough to jump from the windows, and escaped with slight injuries. The fire-bells quickly gave the alarm for the Fifth District, and the firemen repaired to the spot. Ladders were immediately elevated to the windows, but the longest of them could not reach above the fourth floor.... The burning building extended four stories above any of the surrounding structures, and it must have been instant death for any of the poor creatures on the upper floors to have jumped from the roof, where a great many of them had clustered.<sup>3</sup>

Such was the horrific scene the night of February 2, 1860, at 142 Elm Street in New York City, when a fire broke out in the basement of a double, six-story tenement house.

Although not a rare occurrence along the narrow streets of shoulder-to-shoulder, overcrowded, wood-frame buildings, this conflagration marked a turning point in city legislation. Ten persons perished that evening, all women and children, thus publicizing the hazardous conditions within the tenement districts. Journalists smeared the pages of the *New York Times* with detailed and heart-wrenching depictions of this tragedy, striking a chord with New York City residents and causing an outcry for safer, more humanitarian living conditions. The tenement's owner, Edward Waring, was subsequently blamed for the fire-trap, and a move was made by the coroner's jury to pass an ordinance requiring "iron stairways, or some other approved means of egress, on the outside of such buildings" and that other precautions be met to ensure safety of residents.<sup>4</sup>

The culmination of the fatal fire was New York City's first egress law. A bill introduced in Albany, New York, on February 10, 1860, granted the mayor, aldermen, and commonality with the power to create laws compelling tenement owners to provide sufficient means of egress; placed an injunction on new tenement construction until the passage of the law; empowered the common council to pass laws managing tenement

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<sup>3</sup> *New York Times*, "Calamitous Fire," February 3, 1860, Proquest Historical Newspapers, <http://proquest.umi.com>

<sup>4</sup> *New York Times*, "News of the Day," February 7, 1860.

houses; and imposed \$500 for violations of the aforementioned prescriptions.<sup>5</sup> The ensuing legislation merged existing building codes with new emergency egress regulations.<sup>6</sup> Passed on April 17, 1860, Chapter 470, Section 25 of the New York City Acts, entitled, “An Act to Provide Against Unsafe Buildings in the City of New York,” states the following:

In all dwelling-houses which are built for the residence of more than eight families, there shall be a fire-proof stairs, in a brick or stone, or fire-proof building, attached to the exterior walls, and all the rooms on every story, must communicate by doors, or if the fire-proof stairs are not built as above, then there must be fire-proof balconies on each story on the outside of the building connected by fire-proof stairs, and all rooms on every story, must communicate by doors. If the buildings are not built with either stairs or balconies as above specified, then they must be built fire-proof throughout. All ladders or stairs from upper stories to scuttles or roofs of any building, shall if movable, be of iron, and if not movable may be of wood; and all scuttles shall be not less than three feet by two feet.<sup>7</sup>

The ordinance came none too soon for the burgeoning tenement house neighborhoods, filled with overpopulated, often substandard, wood-frame buildings. An 1852 Brooklyn ordinance required “a scuttle or place of egress in the roof,” but when scuttles were placed on tenement houses, they did little for safety short of allowing tenants of upper stories to crowd on the roof.<sup>8</sup> The increasing height of tenement buildings hindered the ability of escapees to jump from one roof to another, as these tall structures towered over their neighbors. Additionally, the cheap, flimsy construction allowed little time for tenants to flee through the dark, narrow hallways and navigate to the scuttle. In 1856, the New York State Legislature appointed an inspection committee to survey the conditions of tenement houses.<sup>9</sup> The findings were telltale of the neglect of landlords over the sanitary and safety conditions of their buildings. Reports concluded that tenants had “no chance of escape in the event of a fire,” particularly for the upper sixth- and seventh-story tenants who “in the always-likely event of fire beneath them are hopelessly cut off from

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<sup>5</sup> *New York Times*, “From Albany,” February 11, 1860.

<sup>6</sup> Sara E. Wermiel, “No Exit: the Rise and Demise of the Outside Fire Escape,” *Technology and Culture* 44, no. 2 (2003): 260.

<sup>7</sup> Board of Supervisors, “New York Acts,” May 29, 1860.

<sup>8</sup> Wermiel, 260.

<sup>9</sup> *New York Times*, “New York City,” March 15, 1856.



all chance of salvation.”<sup>10</sup> The committee concluded that existing interior stairwells and floors should be reinforced with iron beams and that stairs be affixed to the masonry walls, in order to prevent rapid ignition and collapse in the event of a fire, and they strongly urged laws to require and enforce the basic safety measures.<sup>11</sup> However, nothing emerged from inspections short of the public’s awareness of the plight of tenement dwellers, and egress laws did not take effect until the fatal Elm Street tenement fire of 1860.

Shortly after the 1860 blaze, a letter to the editor was submitted to the *New York Times*, describing an inexpensive, rather elementary, fire escape that would prove beneficial to saving the lives of tenants. The writer proposed a simple iron ladder fixed along the side of the building from one roof down to the roof of the adjoining building.<sup>12</sup> Thus began the debate over the use of fire escapes as fixed apparatuses on building façades. Two days after the publication of the letter, a reader in Newark, New Jersey, denounced the use of fixed ladders as an invitation for burglars.<sup>13</sup> Again, one week later, a rebuttal to the Newark letter propounded that “iron ladders may be constructed in such a manner that they could be folded up and form a kind of projecting sill to the windows, on which the inmates could place their house plants.”<sup>14</sup> Hinged braces, offered the writer, could be placed for support when the ladder is elevated and to safely distance the ladder from the building when it is lowered, reducing the danger of flames reaching the fire escape and the risk of burglars entering windows from the lowered apparatus.<sup>15</sup> It is no surprise that these early concepts for exterior egress echo the traditional fixed iron balconies and ladders that the term “fire escape” connotes today; the idea was persistently in the collective conscious, but it would be years of contention between lawmakers, city officials, and reform activists before the construction of fire escapes was strictly codified and enforced.

Fire escape provisions grew even more elusive in a revised 1862 tenement law. Chapter 356, Section 27 states that every dwelling over forty feet high occupied by more

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<sup>10</sup> *New York Times*, “Tenant Houses,” April 1, 1856.

<sup>11</sup> *Ibid.*

<sup>12</sup> *New York Times*, “Letters to the Editor,” February 22, 1860.

<sup>13</sup> *New York Times*, “Letters to the Editor,” February 24, 1860.

<sup>14</sup> *New York Times*, “Letters to the Editor,” March 2, 1860.

<sup>15</sup> *Ibid.*

than six families above the first floor and all dwellings occupied by more than eight families above the first floor “shall have placed thereupon a practical fireproof fire escape that shall be approved of by the Department for the Survey and Inspection of Buildings.”<sup>16</sup> Any dwelling of thoroughly fireproof construction or sited alongside a structure of the same height, both with flat roofs, was exempt from the regulations.<sup>17</sup> The new ordinance progressed toward equipping both existing and newly-constructed tenements with fire escapes, but the law no longer dictated specifications for the type of escape; and due to the cumbersome, ungainly nature of the fixed iron balconies and staircases detailed in the 1860 ordinance, landlords often looked towards alternative means of egress. Dozens of new patents were issued annually over the next several years, and exhibitions of new inventions in New York City lured onlookers to marvel at the mechanical wonders. In September 1862, a crowd gathered to witness the demonstration of Shute’s Patent Fire Escape. The contraption consisted of a lightweight, durable, wrought-iron chain ladder wound about an axle. Tenants could mount the ladder and be lowered from any story of the building by a simple turning mechanism with a break. The ladder, when lowered completely to the ground, could be locked in place and made taught for “timid” people. The survey and inspection department, upon viewing the demonstration, remarked that this device came nearer to the requirements of the law than anything thus far.<sup>18</sup> Nonetheless, the egress laws proved difficult to enforce, and buildings were rarely outfitted with the proper devices during the early years of the legislation. Landlords stubbornly refused to comply and, when forced, erected the most rudimentary contraptions possible: iron ladders fixed to walls or small balconies connected with flimsy straight ladders (Figure 5).<sup>19</sup>

The Tenement House Act, which was passed on May 14, 1867, mandated that all tenement houses, new and old be furnished with fire escapes. The law was not specific enough to be truly effective, stating that all tenements must have fire escapes or “some other means of egress approved by the inspector of public buildings,” and final decisions

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<sup>16</sup> Robert W. De Forest and Lawrence Veiller, *The Tenement House Problem* (New York: Arno Press, 1903), 230-1.

<sup>17</sup> *Ibid.*

<sup>18</sup> *New York Times*, “Shute’s Patent Fire Escape,” September 27, 1862.

<sup>19</sup> Wermiel, 263.

were left to the discretion of the board of health.<sup>20</sup> Given the loose verbiage of the regulation, the fire escapes that were erected often proved insufficient. Notoriously deficient fire escapes were unable to physically support all of a building's residents; were not accessible from all apartments; were of substandard construction; and/or exited into narrow or enclosed courtyards. Exemptions on smaller, less crowded buildings freed many landlords from the constraints of the law but allowed the perpetuation of firetraps. An 1884 fire killed a family of five in an unequipped tenement house. The landlord had not been required to erect fire escapes because only one family lived on each floor. However, investigators determined that the family would have survived with proper egress, as they were forced to jump from the front window of their apartment to escape the encroaching flames.<sup>21</sup> Another tenement fire in 1892 claimed lives as a surge of escapees rushed to the front fire escapes, clogging the ladders and impeding the safe descent of tenants. The back of the tenement opened into a small courtyard not large enough to hold the crowd, thus making a rear escape impossible.<sup>22</sup> Given the other inadequacies of tenements – flimsy construction of quick burning materials, overcrowded rooms, wooden stairs, storage of flammable materials, and poor ventilation – fires were frequently disastrous, with or without adequate egress. In compounding all these problems, condemning and demolishing certain structures and rebuilding with fireproof construction and enclosed fireproof stairways seemed the safest option. Talk of improved construction methods continued through the nineteenth century, but older tenement buildings continued to flourish. The enactment of small amendments to the Tenement House Act never spelled out strict guidelines for egress, and the lax enforcement of regulations continued to exacerbate an already dire situation.

An 1871 revision of the 1867 Tenement House Act relaxed provisions for fireproof stairways and corridors but urged the use of exterior fire escapes. In cities around the United States, the exterior escape gained acceptance as the approved secondary means of egress for buildings.<sup>23</sup> The 1871 ordinance also required owners to keep their fire escapes painted and in general good repair and prohibited encumbrances of

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<sup>20</sup> Jared N. Day, *Urban Castles* (New York: Columbia University Press, 1999), 27.

<sup>21</sup> *New York Times*, "Fatal Fire in Stanton-Street," February 29, 1884.

<sup>22</sup> *New York Times*, "Leaped to Escape Flames," February 2, 1892.

<sup>23</sup> Wermiel, *The Fireproof Building: Technology and Public Safety in the Nineteenth-century* (Baltimore: Johns Hopkins University Press, 2000), 92.

any kind to be placed upon fire escapes. An 1885 amendment tightened the language, demanding fire escape manufacturers to affix a cast-iron plate with raised letters in a conspicuous location reading: “Notice! Any person placing any encumbrance on this balcony is liable to a penalty of \$10 and imprisonment of 10 days.”<sup>24</sup> Clutter rendered many fire escapes impassible in the event of an emergency (Figure 6). Although the provision was in the best interest of the tenants, convincing the residents to maintain cleared balconies was an arduous task.<sup>25</sup> Several shifts of authority within New York City public offices hindered the ease of enforcing compliance with regulations. Originally, all tenement house matters rested in the hands of the board of health. The Consolidation Act of 1882 shifted power over the erection of fire escapes to the fire department.<sup>26</sup> Another shift of power in 1892 granted the superintendent of buildings full authority in the matter.<sup>27</sup> Finally, the proposal of a new tenement law in 1895 sought to resolve many of the inadequacies of previous legislation and made strides in safeguarding tenement house dwellers. Provisions required newly-constructed buildings to incorporate interior fire partitions and enclosed fireproof interior stairways. The law also prevented fire hazards within tenements, by banning, among other things, the storage of combustible materials.<sup>28</sup> Specific stipulations regarding fire escapes were conspicuously absent from the law.

Outcry against the Building Codes Revision of 1899 finally prompted a widespread reform in tenement legislation. The municipal assembly granted to the buildings department commissioner the process of revising the building codes. Justifiably, concern arose over the future of tenement conditions. “For decades, landlords and builders had relied upon corrupt and partisan officials from the buildings department to ignore building regulations, and they tended to view the agency as an effective bulwark against reform.”<sup>29</sup> As the citizens of New York City struggled for years with rampant corruption in their attempts to obtain safe and healthy living conditions, it came

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<sup>24</sup> De Forest, 240-1.

<sup>25</sup> Ibid, 288.

<sup>26</sup> Ibid, 229.

<sup>27</sup> Ibid.

<sup>28</sup> *New York Times*, “For Better Tenements,” January 18, 1895.

<sup>29</sup> Day, 64-5.

as no surprise that the commissioner undercut existing fire regulations while still allowing landlords to build additional floors atop extant buildings.<sup>30</sup>

In 1900, the New York City Tenement House Department was formed, and its Tenement House Commission was appointed to thoroughly investigate the conditions of the tenement houses. At the end of 1901, Commissioner Robert W. De Forest and First Deputy Commissioner Lawrence Veiller published a full, detailed report, outlining current conditions of tenement houses from safety to sanitation, comparing the plight of New York's tenement districts to several other major U.S. cities, and urging measures of action to be taken to remedy the situation. The commission devoted an entire section of the report to the issue of fire escapes. With the passage of the Tenement House Act of 1901, landlords had a whole new series of regulations to comply with, and the Tenement House Commission was making strict enforcement a priority.

Although egress laws were already on the books, thousands of buildings were still lacking adequate fire escapes by 1901. During De Forest and Veiller's investigation, 1,701 fire escapes were constructed; 4,024 fire escapes were ordered to be constructed; and 10,600 wooden fire escape floors were replaced with the proper iron floors.<sup>31</sup> Prior to the new legislation, many landlords provided egress only on the rear façades of their buildings, exiting out into small yards not more than ten feet in depth. A typical tenement backyard was penned in with by closely abutting buildings (Figure 7). Even worse, many fire escapes let out only into airshafts no more than three feet wide.<sup>32</sup> Landlords protested the erection of egress on main façades, citing that they "will materially affect their property and reduce its value. They would also materially affect the value of other property in the same neighborhood, destroying the appearance of their buildings and completely changing the character of the house and of the tenants."<sup>33</sup> Improper, unsafe fire escapes frequently passed inspections, creating a false sense of security for tenants. Prior to 1901, straight ladder fire escapes dominated tenement façades (Figure 8); however, after the passage of the Tenement House Act, fixed staircases extending between balconies became the required method of construction

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<sup>30</sup> Ibid, 65.

<sup>31</sup> De Forest and Veiller, 88.

<sup>32</sup> Ibid, 16.

<sup>33</sup> Ibid, 90.

(Figure 9). The act of 1901 sought to rectify the basic inadequacies of existing laws, as well as provide strict, airtight regulations that codified when, how, and where fire escapes would be erected, right down to the size of the nuts, bolts, and washers affixing the balconies to the walls (Figure 10).

Differing stipulations were written for both newly-constructed and extant tenements. The details of the law that follow remained accepted legislation for tenement egress for decades to come.

*New construction:*

- All newly-constructed tenement houses exceeding six stories in height shall be fireproof.
- All newly-constructed, non-fireproof tenement houses shall have fire escapes.
- Fire escapes shall be located at the front and rear of the building at each story above ground level or on any apartment that does not have a rear or front facing window.
- Fire escapes must be constructed with open iron balconies and stairways; stairways will be angled at not more than sixty degrees; treads will be not less than six inches wide and twenty inches long with a rise of nine inches.
- A gooseneck ladder should extend from upper balcony to roof.
- Balconies should be at least three feet wide, taking in at least one window of each apartment at each floor above ground level; they shall be not more than one foot below the windowsill and extend at least nine inches beyond each window; a landing of at least twenty-four inches on each side should be provided at the foot of each stairs; well-holes should be of sufficient size for headroom.
- Balcony floors shall be wrought iron or steel slats of at least one and one half inches by three-eighths inches in size and placed not more than one-quarter inch apart; slats will be secured and riveted to iron battens on one and one half inches by three-eighths inches, not over three feet apart.
- Balconies should carry a load of at least eighty pounds per square foot.
- The outside top rails shall extend around the entire platform and be properly secured into the wall with nuts four-inches square and washers at least three-eighths inches thick; top rails shall be one and three-quarters inches by one-and-one-half inches of wrought iron or one-and-one-half inch angle iron one-quarter inch thick.

- The outside bottom rails shall be one-and-one-half inches by three-eighths inches wrought iron or one-and-one-half inches angle iron one-quarter inch thick, well secured into the wall.
- Standards of filling-in bars shall be at least one-half inch round or square and securely riveted to top and bottom rails and platform frame, placed at not more than six inch centers and secured at intervals by outside brackets.
- Stairways shall hold no less than one hundred pounds per step, and treads must hold at least two hundred pounds.
- Treads shall be flat, not less than six inches wide with a rise of no more than nine inches.
- Stringers shall not be less than three-inch channels of iron or steel and shall rest upon and be secured to a bracket that is secured to the wall and secured to balcony at the top.
- Steps shall be double bolted or riveted to stringers.
- Three-quarter inch handrails for steps, well braced.
- Brackets shall be at least one-and-one-half inches by three-quarter inches wrought iron or one-and-three-quarter inch angle iron one-quarter inch thick, well braced; they shall not be more than four feet apart; brackets should go through walls.
- Drop ladders are required from lowest balcony; not less than fifteen inches wide, with strings not less than one-half inch by two inches and rungs not less than five-eighths inches in diameter, placed not more than one foot apart and properly riveted to the strings.
- When lowest platform is more than fourteen feet above ground, a landing platform shall be provided not more than ten feet above ground and connected via a stairway; the platform should be at least three by four feet wide with proper railings and a drop ladder to the ground.
- At least two coats of paint shall be applied, one in the shop and one after erection.
- Encumbrance plates shall be placed conspicuously on all fire escapes.
- Vertical ladders will no longer be permitted upon new buildings.<sup>34</sup>

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<sup>34</sup> Ibid, 104-7.

*Extant structures:*

- All currently existing, non-fireproof tenements without proper escapes shall have them erected according to provisions previously stated.
- Fire escapes in airshafts and courtyards to not count toward required escapes.
- Party wall fire escapes, connecting adjoining buildings are acceptable only when a fireproof wall separates the two buildings.
- All wooden platforms shall be replaced by proper iron slats or floors.
- No wooden balcony or stairs acceptable.
- Fire escapes placed on wooden tenements shall be secured to wall through a wrought iron or steel plate and span at least two studs.<sup>35</sup>

Inspectors used the detailed guidelines and filled out an “F” card describing the conditions of fire escapes for efficient inspection. For the first time, regulations were strictly enforced and tenement house conditions significantly improved and regulations were strictly enforced; and as iron balconies and stairs began lining exterior walls, the physical and cultural character of tenement house neighborhoods underwent a major transformation (Figure 11). As well, the rigid enforcement of suitable exterior egress prompted landlords to seek out designs that would not seriously tarnish their real-estate investments and purchase more decorative contraptions for primary, street-front façades (Figure 12).

The Tenement House Commission also surveyed the general conditions of tenement neighborhoods and the status of tenement laws in twenty-seven U.S. cities. By the turn-of-the-century, nearly every major city in the United States had enacted exit regulations for tenement houses; only New Orleans and Detroit lacked proper legislation. Although most cities required tenements to be outfitted with fire escapes, the type and placement was left to the discretion of the commissioners or inspectors. Philadelphia possessed the only comprehensive egress law, many aspects after which the New York City laws were modeled.<sup>36</sup> Over the course of the next decade, many cities would begin to draw up similar legislation. Although it is unclear whether any city specifically used

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<sup>35</sup> Ibid, 113-5.

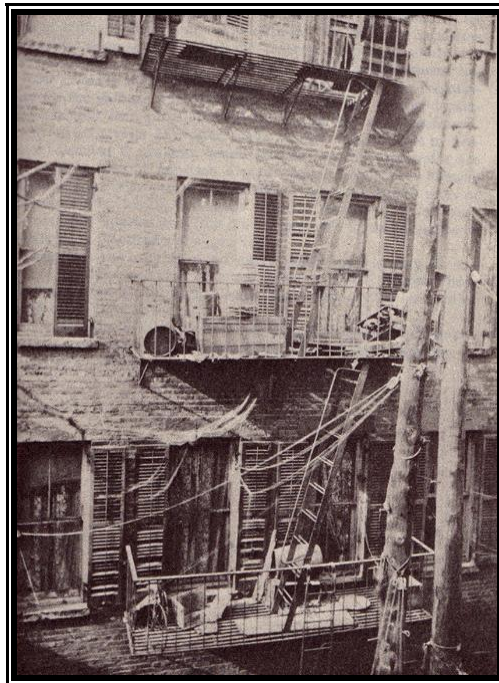
<sup>36</sup> Ibid, table inserts.



New York or Philadelphia as a prototype to their own doctrines, the details of exit type and placement closely resembled one another from city to city. Accepted standards were often discussed on a national level, and major disasters were widely publicized, allowing lawmakers to extract the failures and successes in systems of egress from other cities.



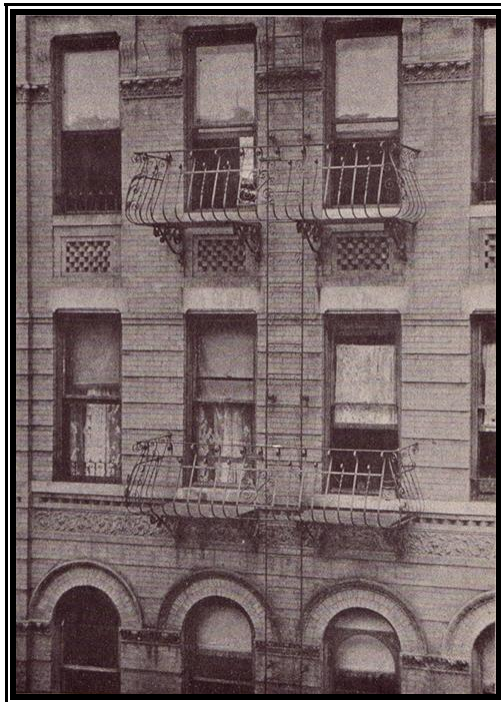
**Figure 5:** Landlords often provided the most rudimentary fire escapes for tenement houses. (*Visiting Nurse*, 1915, New York City Department of Records Municipal Archives Photo Gallery, Photo ID: DOH 2556, <http://www.nyc.gov/html/records/>)



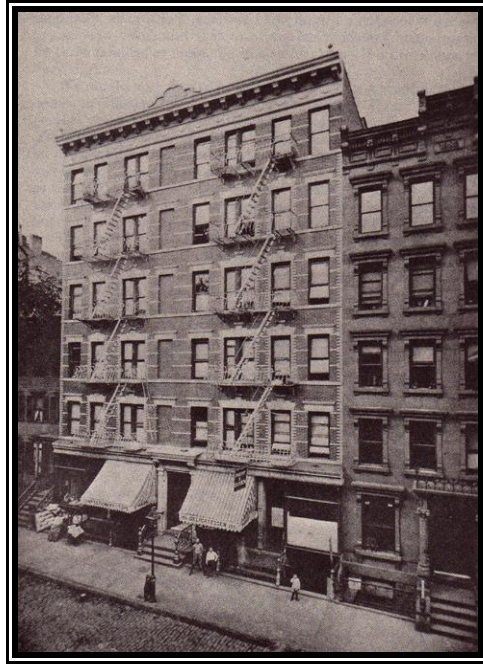
**Figure 6:** Encumbrances upon a tenement house fire escape. (De Forest, Robert, and Lawrence Veiller. *The Tenement House Problem*. New York: Arno Press, 1903: 288)



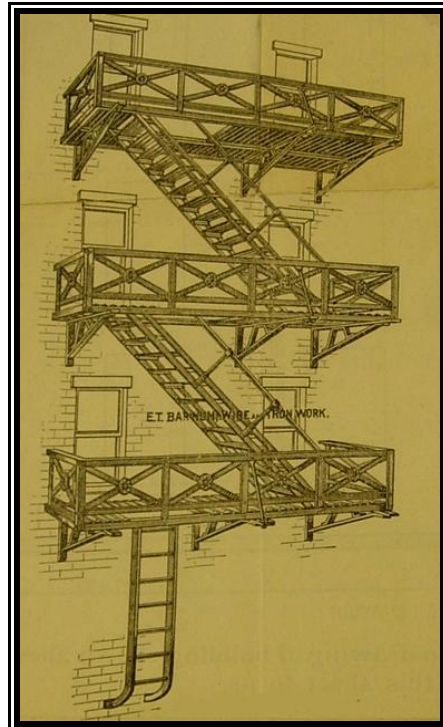
**Figure 7:** Narrow tenement yard. (De Forest, Robert, and Lawrence Veiller. *The Tenement House Problem*. New York: Arno Press, 1903: 88)



**Figure 8:** Example of fire escapes no longer acceptable after the 1901 law. (De Forest, Robert, and Lawrence Veiller. *The Tenement House Problem*. New York: Arno Press, 1903: 287)



**Figure 9:** Example of proper fire escapes following the 1901 law. (De Forest, Robert, and Lawrence Veiller. *The Tenement House Problem*. New York: Arno Press, 1903: 278)



**Figure 10:** Example of a fire escape design meeting the requirements of the 1901 specifications. (E.T. Barnum Wire and Iron Works. *No 178-E Fire Escape Supplement*. Detroit: The Firm, 1912: 3)





**Figure 11:** Tenement house façade lined with fire escapes. (*Pike and Henry Streets, Manhattan, 1936*, Berenice Abbott Changing New York Collection, Digital ID: 482697, New York Public Library Digital Archives, <http://www.nypl.org/digital/index.htm>)



**Figure 12:** Fire escapes on the main facades of tenements occasionally were more decorative. (*Tenement Dwellers Dropping Clothes from Fire Escapes for Italians of the Lower East Side, 1909*; George Grantham Bain Collection at the Library of Congress, Library of Congress Prints and Photographs Online Catalogue, <http://hdl.loc.gov/loc.pnp/ggbain.03081>)

## Part 2: Hotels

Hotel safety underwent great scrutiny in the mid-to-late nineteenth century. Public buildings had been omitted from New York City fire exit ordinances until 1871. Like the slow evolution of tenement house legislation, years passed without rigid enforcement. Major disasters became the catalyst for change, and too many lives succumbed to fire before hotel safety improved. Hotel proprietors had a product to sell, and much of that product's appeal was based upon the appearance of both the interior and exterior of the building. An 1886 *New York Times* article describes a scene that took place in Philadelphia's Girard House. Upon viewing an elegantly furnished room equipped with a box holding a fire escape rope, a woman demanded the contraption's removal. The hotel clerk's refusal prompted the woman to outburst, "I won't take the room. I'll go where they don't have fire escapes – where the law is evaded – rather than have that ugly thing there to remind me that I may have to swing myself out of the window to save my life."<sup>37</sup> More like a metaphor for the debate between hotelkeepers and city officials than a witty anecdote, the article confirmed the proprietor's biggest fear. Despite the dozens of reports stating the desire of guests to occupy rooms with accessible fire escapes, hotelkeepers still refused to comply, and, when they did, the cheapest and least obtrusive escapes were installed.

In December 1870, James M. MacGregor, superintendent of the New York Department of Buildings, ordered the inspection of all hotels preparatory to new fire escape legislation. At this point, the courts had yet to determine whether hotels and other public buildings were legally subject to the same precepts as tenement houses; and a decision was pending in a suit brought against a negligent hotel proprietor by Superintendent MacGregor.<sup>38</sup> Prompting the inspections was a fire at the Spotswood Hotel in Richmond, Virginia, that took the lives of at least seven people.<sup>39</sup> In New York, eyes opened to the very real possibility that a comparable, if not worse, tragedy could befall their city. A *New York Times* editorial, in February 1871, urged city officials to

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<sup>37</sup> *New York Times*, "Would Rather Run the Risk," November 14, 1886.

<sup>38</sup> *New York Times*, "Fire-Escapes to be Placed on Every Hotel in the City," December 30, 1870.

<sup>39</sup> *New York Times*, "Telegrams," December 26, 1870.

take heed of the warning issued by the Richmond incendiary. The writer warns, “New-York may at any time be the scene of a hotel-burning as much more appalling than either of these, as the average population of one of our huge caravansaries exceeds that of a provincial hotel.”<sup>40</sup> Nonetheless, hotel proprietors continued to argue the disfiguring nature of fire escapes and the ease with which burglars could access the rooms. Inspectors issued citations to numerous properties without sufficient egress, but hotelkeepers refused to comply and instead awaited the jurisprudence of the court. Eventually, in 1871, building codes required the installation of fire escapes on hotels and other public buildings. However, like the early tenement laws, fixed exterior fire escapes were not specified, and the lack of specifications left the type and placement of the exterior egress up to the discretion of inspectors.

On December 11, 1872, a calamitous fire brought down the Fifth-Avenue Hotel in New York City, claiming the lives of eleven servant girls. The attic above the top floor of the six-story hotel housed the servant quarters, and no fire escapes had been provided for their safety.<sup>41</sup> The rooms of servant girls often perched perilously atop the multi-story structures, with only narrow interior hallways and stairways for escape. Continual inspections during the ensuing months brought to light many similar conditions in both grand hotels and meager lodging houses around the city. Although not specifically required to do so by law, inspectors frequently recommended iron balcony fire escapes for hotels.

The efforts of the superintendent of buildings did little to quell the fears of New Yorkers. The Fifth-Avenue Hotel fire paled against the catastrophic Saint Louis, Missouri, blaze on April 11, 1877. More than one hundred guests of the Southern Hotel perished, largely due to fatal leaps from upper story windows. *New York Times* accounts described the fire department’s bungling efforts, malfunctioning rescue equipment, and ladders that failed to reach desperate guests clamoring at their windowsills.<sup>42</sup> Across the United States, city officials turned an eye toward their own hotels, fearing a disaster of similar magnitude. Major cities, including New York, drafted important legislation to safeguard the public. A new ordinance in Cincinnati mandated the erection of fire escapes

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<sup>40</sup> *New York Times*, “Fires in Hotels,” February 7, 1871.

<sup>41</sup> *New York Times*, “The Hotel Disaster,” December 12, 1872.

<sup>42</sup> *New York Times*, “A Great Hotel Burned,” April 12, 1877.

on all factories, hotels, places of amusement, and tenement houses. According to the Cincinnati fire marshal, “[A] blamable degree of neglect has been found in nearly all the hotels in the matter of providing means of escape in case of fire.”<sup>43</sup> A January 1883 bill introduced in the District of Columbia required that all hotels and boarding houses be “provided with fire escape ladders in every room, and that every hotel over three stories high shall be provided with iron balconies at each end of every hall, with ladders leading down from one balcony to the other.”<sup>44</sup>

Finally, in January 1883, improved fire escape legislation was passed in New York City. Alderman Waite presented at the meeting of the board of aldermen a resolution stating that the commissioners of the fire department would make a thorough examination of egress conditions in all hotels and lodging houses within the city. Upon inspections, commissioners would present the legislature with any amendments to current laws that would enjoin proprietors to “observe regulations which would make their places absolutely safe.”<sup>45</sup> When the Sturtevant House failed to comply with orders of Inspector Esterbrook of the bureau of buildings to erect fire escapes in January 1883, a suit was filed by the fire department. The court authorized the fire department to proceed with the fire escapes at the expense of a lien placed upon the hotel.<sup>46</sup> For the first time, New York City sought rigorous enforcement of hotel safety regulations. At the end of 1883, suitable fire escapes were installed on thirty-nine hotels, very much against the will of innkeepers.<sup>47</sup>

In 1887, the Erwin Bill landed on the desk of the New York governor. The controversial measure proposed that rope fire escapes be supplied in every hotel room. Hotelkeepers criticized the bill, citing the already strict building safety codes. The effectiveness of the ropes remained questionable, as they would be of little use on buildings of seven or eight stories. Commercial travelers, however, pushed for the passage of the bill, decrying the “perils to which hotel guests are subjected.”<sup>48</sup> The law

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<sup>43</sup> *New York Times*, “Fire-Escapes in Cincinnati,” January 11, 1882.

<sup>44</sup> *New York Times*, “Notes from Washington,” January 22, 1883.

<sup>45</sup> *New York Times*, “The Busy Aldermen,” January 17, 1883.

<sup>46</sup> *New York Times*, “Fire-Escapes on a Hotel,” November 28, 1883.

<sup>47</sup> *New York Times*, “Buildings Bureau Report,” January 24, 1884.

<sup>48</sup> *New York Times*, “Ropes for Hotels,” June 18, 1887.



took effect on July 1, 1887, although compliance remained minimal at best.<sup>49</sup> Several hotel fires during the 1890s confirmed the inadequacies of the rope fire escape: the Leland Hotel in Syracuse, New York, in 1890; the Hotel Royal fire in New York City, in 1892; and, most significantly, the Windsor Hotel fire in New York City, in 1899. The scenes of failed descents and fatal plunges from upper story windows horrified onlookers. At least sixteen people perished in the Windsor Hotel, and dozens suffered severe injuries.<sup>50</sup> The event prompted an outpouring of protest over the requirement of ropes as egress. A *New York Times* editorialist declared, “Ropes, as means of descending from the upper stories of burning buildings, have so often proved to be useless or worse than the tragical happenings at the Windsor emphasized rather than revealed the fact that the laws in compliance with which hotels are equipped with these least effective of fire escapes ought all and instantly to be repealed.” The writer continued on to discuss the difficulty of a rope descent, an act exacted only by a gymnast.<sup>51</sup> A second letter submitted to the newspaper a few days later pled for officials to rid the hotels of the ropes. “The sight of seeing a dozen women attempting to escape from the seething mass of flames behind them by means of this worse than useless contrivance, only to drop to death of partial destruction,” cried the writer, “is one I shall never forget.”<sup>52</sup>

Out of the ruins of the Windsor Hotel arose three new fire escape bills drafted in the New York State Assembly. The first bill proposed that keepers of hotels with accommodations for more than ten persons shall not assign any guest to a room that does not directly communicate with an exterior fire escape, and violators would be charged with a felony. Said fire escape “shall be so constructed that each floor shall be provided therewith, on the outer walls thereof, in front of the windows; each shall form a continuous platform and each floor, platform, or fire escape shall be connected with the other by a stairway of iron or stone, or such other material as the persons having authority shall direct.”<sup>53</sup> The second bill required all hotels over forty feet in height with more than twenty rooms for rent to have additional balconies be placed at every story roughly forty feet apart. The third bill stipulated “that it shall be the duty of the proprietor, owner,

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<sup>49</sup> *New York Times*, “No Ropes in Hotels Here,” July 17, 1887.

<sup>50</sup> *New York Times*, “Windsor Hotel Disaster Grows,” March 19, 1899.

<sup>51</sup> *New York Times*, “Topic of the Times,” March 19, 1899.

<sup>52</sup> *New York Times*, “Flames in Five Places,” March 22, 1899.

<sup>53</sup> *New York Times*, “Bills to Save Lives at Fires,” March 21, 1899.

agent, manager or lessee of every hotel having accommodations for one hundred guests or more, ‘to provide on the outside of such building or buildings fire-escapes or means of escape in case of fire, on each and every floor thereof; such fire-escape or fire-escapes to extend outside along the entire length and sides of said building or buildings; such fire-escape or fire-escapes to afford means of egress to the roof of said building or buildings, and to the street in front of or around said building or buildings as a means of escape in case of fire; and any such person or persons who shall fail or neglect to comply with any of the provisions of this act shall be guilty of a misdemeanor.’<sup>54</sup> The proposed bills were the strongest fire escape legislation to date and provided the most detailed provisions to the use and placement of balcony fire escapes.

After the Hotel Royal Fire of 1892, investigation uncovered false reports filed by Inspector William Seaton. Seaton reported that the Hotel Royal fully complied with the necessary fire escape laws, when in fact the hotel lacked the apparatuses.<sup>55</sup> In response to the lax enforcement of regulations, the superintendent of buildings in New York City announced in September 1895 that he would be using all authority at his disposal to enforce said laws.<sup>56</sup> The aforementioned 1899 legislation, many citizens protested, was redundant. Rather, it would be the enforcement of existing laws that, they felt, would be the key to successfully securing every hotel in the city. The constraints of the proposed bills no doubt enraged hotel proprietors. An editorialist in the *New York Times* denounced the proposals as “silly”, arguing, “To hang a hotel all around with iron ladders would make a disfigurement that might agreeably testify to the activity of legislators and swell the profits of ironmongers. But it would amount to little or nothing as a precaution. A burning tinder box is no safer for being [e]nclosed in a cage of red-hot ladders called fire escapes. If the Windsor had been equipped with this grillage, it is doubtful whether any inmates would have been saved who were not saved; it is certain that not all who were lost would have been saved.”<sup>57</sup> The writer also refueled the ongoing arguments about the importance of fireproof construction. Independent fireproof staircases set apart from the building and slow-burning construction, many urged, provided more safety than

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<sup>54</sup> Ibid.

<sup>55</sup> *New York Times*, “The Hotel Royal Fire,” February 25, 1892.

<sup>56</sup> *New York Times*, “Need of the Fire Escapes,” April 13, 1895.

<sup>57</sup> *New York Times*, “A Silly Proposal,” March 21, 1899.

any exterior mechanism. Slow-burning construction was praised in another editorial days later. According to the writer, “If you allow a man to erect a pile of combustibles 200 feet each way and seven stories high, and conceal its combustibility with plaster and call it a hotel and entice hundreds of people into it, you are going to [e]nsure the safety of these people, provided the heap of combustibles takes fire, by hanging a lot of iron ladders around the edges of the fire and inviting the inmates to descend by means of them. That is ridiculous.... There are buildings, architecturally attractive by their design, which have been shockingly defaced by the external application of iron ladders.”<sup>58</sup> Not to say that defenders of the iron contraptions failed to exist. Eyewitnesses of the Windsor conflagration, having viewed numerous guests safely descend to the ground on iron fire escapes, sang the praises of the life-saving devices. A divide grew between the hotel guests and employees, who greatly benefited from the fire escapes, and the building owners, who considered them a liability. The Fifth Avenue Hotel, constructed in 1859 with ornate Renaissance Revival motifs, was one such fashionable lodging house that was outfitted with iron balcony fire escapes in the late nineteenth century (Figure 13). Looking retrospectively at the hotel with its fire escapes, they appear unobtrusive, yet contemporary critics decried the balconies and stairs as disfiguring. In an attempt to solve the seeming dissonance between the aesthetically-pleasing façades and the crude mechanical contraptions, many hotel proprietors adorned their establishments with unique, decorative fire escapes that harmonized with the architectural style and added visual appeal to the building exterior (Figure 14).

As the debate continued, city officials and lawmakers wrestled with the issue of the most effective fire-safety methods. Regardless of all the legislation passed in previous decades, a 1902 *New York Times* letter condemns the ongoing lack of fire escapes on many hotels, as well as combustible nature the combustible nature of the buildings.<sup>59</sup> Inspectors with the bureau of buildings began visiting every hotel in the city and reported prompt compliance from those without proper fire escapes.<sup>60</sup> On the heels of the Tenement House Law of 1901, the thirty-year long battle for life-safety in hotels appears to have neared an end. Rigid enforcement of existing regulation and the

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<sup>58</sup> *New York Times*, “Protecting Hotels,” March 23, 1899.

<sup>59</sup> *New York Times*, “Demand for Fire Escapes,” February 27, 1902.

<sup>60</sup> *New York Times*, “Fire Escape Facilities,” March 12, 1902.

emergence of fireproof construction technologies resolved serious egress deficiencies within the city's hotels, both grand and small.

*Case Study - Broadway Central Hotel:*

The Broadway Central Hotel, constructed as the Grand Central Hotel and advertised as the largest hotel in America, opened its doors in August 1870. The eight-story Second Empire structure boasted 650 rooms housing 1,500 guests. The elegant building was constructed on the site of the former Lafarge Hotel and Winter Garden Theatre. The fact that the theatre burnt to the ground only three years previous did not compel the owners to provide fire escapes within their hotel. Constructed just prior to the first official legislation for hotel fire-safe measures, the early *New York Times* description of the hotel mentions not a single safety device. The views of the eighth floor hailed superb, the difficult ascent to the top worth the effort. Emergency descent from the top did not seem to be an issue.<sup>61</sup>

The Broadway Central Hotel was first officially surveyed during the 1873 inspection of hotels by the department of buildings. Inspectors recommended iron balconies from the eighth floor to the roof. Again in January 1883, inspectors visited the hotel. Inspector Esterbrook of the bureau of buildings, upon viewing the report, ordered the erection of fire escapes on the rear Mercer Street elevation. "The fire escapes," stated Esterbrook, "are to consist of substantial iron balconies to take in the two southerly windows of each story, and similar balconies on each story to take in the fifth and sixth windows from the southerly end of the building, and also at the northerly end of the structure to take in the two northernmost windows on each story."<sup>62</sup> Balconies would be connected with fixed ladders and the sidewalk would be accessible via iron drop-ladders from the lower balconies. An advertisement in the *New York Times* from 1884 boasts, "[F]ire escapes have been added, and two stairways, making five in all; it is now the safest hotel in the city."<sup>63</sup> The Broadway Central succumbed to a few minor fires and several close calls, but appears to have been spared any major disaster. An early image of the hotel, likely dating from the nineteenth century, depicts the hotel prior to the erection of any fire escapes (Figure 15). A circa 1908 image illustrates the hotel with fire

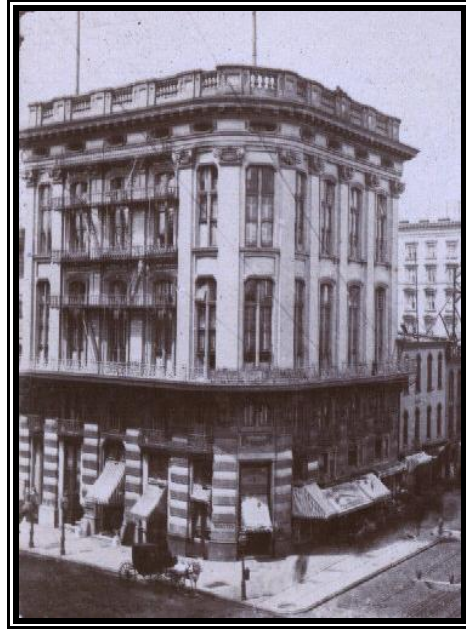
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<sup>61</sup> *New York Times*, "A Monster Hotel," August 26, 1870.

<sup>62</sup> *New York Times*, "Inspecting New-York Hotels," January 13, 1883.

<sup>63</sup> *New York Times*, Display Ad 2 – No Title, January 30, 1884.

escapes affixed to the main façade of the structure (Figure 16). The façade and streetscape have an altered character with the addition of the fire escapes. During the era in which this image was taken, fire escapes most likely adorned the façades of most buildings over three stories, including all the elegant hotels of the city. A photograph capturing the remains of the hotel after its collapse in 1973 shows the small five-story wing, known as the Annex (Figure 17). The Annex was the only portion to withstand the building's demise. The Annex is visible in the historic images on the right side of the building. The fire escapes remained on the façade through to the building's end.



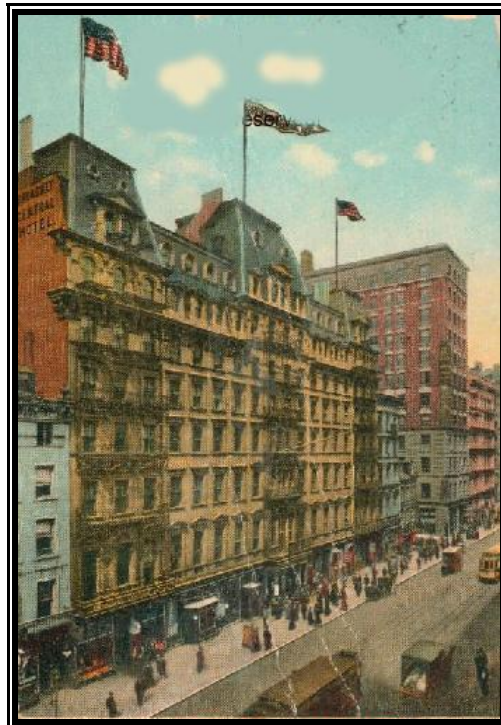
**Figure 13:** Fire escapes on the elegant Fifth Avenue Hotel in New York City. (Fifth Avenue Hotel, N.Y., circa 1880, Robert N. Dennis Collection of Stereoscopic Views, Digital ID: G91F209-033f, New York Public Library Digital Collection, <http://www.nypl.org/digital/index.htm>)



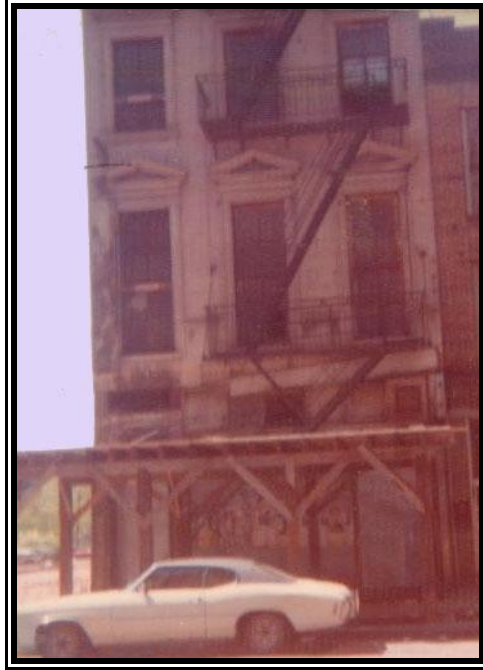
**Figure 14:** Decorative fire escape on the Murray Hotel in Manhattan. (Murray Hill Hotel, Manhattan, 1935, Berenice Abbott Changing New York Collection, Digital ID: 482741, New York Public Library Digital Archives, <http://www.nypl.org/digital/index.htm>)



**Figure 15:** Broadway Central Hotel prior to the erection of fire escapes. (Courtesy of “Randall’s Lost New York City,” <http://www.lostnewyorkcity.com>, accessed October 21, 2005)



**Figure 16:** Broadway Central Hotel circa 1908. (Courtesy of “Randall’s Lost New York City,” <http://www.lostnewyorkcity.com>, accessed October 21, 2005)



**Figure 17:** Hotel Annex, circa 1973. (Courtesy of “Randall’s Lost New York City,” <http://www.lostnewyorkcity.com>, accessed October 21, 2005)



### Part 3: Theatres

Exit regulations for theatres first appeared in the 1871 law requiring fire escapes on all public buildings, but fire escapes on theatres evolved quite differently from those of other public buildings. Fires in theatre and opera houses presented a threat unlike that of hotels and tenements. Large crowds packed into the open, unpartitioned auditoriums. Nothing could prevent the flames from spreading, the smoke from filling the room, and the throngs of people stampeding to the exits. Fatalities in theatre blazes exponentially outweighed the loss of life in the average fire.

A Brooklyn theatre fire in December 1876 killed 294 attendees, trapping them in the aisles as they raced to the few available exits.<sup>64</sup> Theatre patrons raged over habitually locked exits, overcrowded galleries, and the lack of fire extinguishing equipment. Dangerous theatre conditions were not unique to New York. In its quarterly journal, the National Fire Protection Association (NFPA) emphasized the fire safety hazards of American theatres with a photograph of two false exits that were uncovered by an inspector with the Pennsylvania State Department of Labor and Industry (Figure 18). The two doors retained their exit signs yet opened into empty space.<sup>65</sup> The Brooklyn blaze forced officials to reassess safety measures in city theatre and opera houses. A singularly horrific disaster at the Ring Theatre in Vienna, Austria, in December 1881 claimed an astounding 1,300 lives. The old theatre lacked fire appliances and fire exits, forcing victims to trample each other in the aisles and jump from windows.<sup>66</sup> Concern over a similar tragedy taking place in a New York theatre prompted the fire commissioner to order immediate inspections of all theatres and places of amusement.<sup>67</sup>

As the nineteenth century came to a close, the enforcement of safety regulations in theatres calmed fears and gave the impression that the structures no longer held any danger. “The New York playgoer of to-day,” states a January 1903 *New York Times* article,

asks for a good deal more in the way of safety and convenience in the theatre than did the amusement seekers of even a very few years ago, for the reason that the

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<sup>64</sup> *New York Times*, “Official Investigations,” December 8, 1876.

<sup>65</sup> *Quarterly of the National Fire Protection Association*, “False Emergency Exits,” 9, no. 4 (1916): 386-7.

<sup>66</sup> *New York Times*, “A Vienna Theatre Burned,” December 9, 1881.

<sup>67</sup> *New York Times*, “Inspecting the Theatres,” December 17, 1881.

large number of new homes of drama that have been erected recently in this city have each in turn educated the public taste in that direction by some new feature along these lines. It would be comparatively difficult to-day for an audience to do itself any injury in a fire panic in any of the newer play-houses, even were it possible for a fire to get any headway.<sup>68</sup>

A mere one month later, a brand new, completely fireproof theatre in Chicago caught fire backstage, and over 600 women and children perished in one of the worst theatre disasters in the country. The building itself was indeed fireproof and did not burn, but emergency egress was seriously inadequate and often impeded, and fire-extinguishing appliances were not available. Victims suffocated in their seats or succumbed to the trampling crowd trying to escape. The theatre had been furnished with a few exterior iron fire escapes, but the ladders had not yet been attached when the theatre opened for business.<sup>69</sup> Theatre designers and managers in New York City scoffed at the Chicago disaster, claiming their buildings possessed adequate fire-safety facilities and the calamity that befell Chicago could not happen in New York. City officials saw a different situation. Although they agreed many theatres housed the necessary exits, obstructions and locked doors still hampered a safe evacuation. Additionally, although managers improved in their adherence to fire codes over the past few years, the Chicago disaster brought new problems to light.<sup>70</sup>

In Chicago, Mayor Harrison took drastic steps to avert disaster and closed nineteen theatres and museums that he deemed not up to code; most of the theatres lacked asbestos fire curtains.<sup>71</sup> The city passed a new ordinance requiring all Chicago theatres to be equipped with levers for simultaneously opening emergency exits: one lever for exits to fire escapes and another for exits emptying onto streets and alleys.<sup>72</sup> In the ensuing weeks, Mayor Harrison proceeded to close more theatres, churches and public halls, eventually threatening to close every theatre establishment for the remainder of the season until safety codes were met.<sup>73</sup> The new fire commissioner in New York City, Commissioner Hayes, took a cue from Chicago and stepped up inspections in places of

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<sup>68</sup> *New York Times*, "New Theatre to Open," January 11, 1903.

<sup>69</sup> *New York Times*, "Over Five-hundred Die in Chicago Theatre," December 31, 1903.

<sup>70</sup> *New York Times*, "To Investigate all New York Theaters," January 1, 1904.

<sup>71</sup> *New York Times*, "Nineteen Chicago Theatres Closed," January 2, 1904.

<sup>72</sup> *New York Times*, "Multiple Levers for Exits," January 3, 1904.

<sup>73</sup> *New York Times*, "Keep Theatres Shut," January 20, 1904.

amusement and public halls.<sup>74</sup> New York City Mayor McClellan himself participated in investigations, and after conferring with theatre managers in all the boroughs, revealed his confidence in one hundred percent compliance with safety codes.<sup>75</sup> The importance of fireproof construction and asbestos curtains was recognized by all, but the iron fire escape never failed to provide life-saving aid, and citizens recognized the oft neglect of the device. As improved fire-safety precautions were implemented, the simple fire escape was forgotten. A January 1904 *New York Times* letter decries the conditions of the exterior escape on many buildings. The writer had occasion to step out on an iron balcony one night at the theatre and found the rickety contraption to be a death trap itself.<sup>76</sup>

In 1911, Borough President McAneny proposed stricter legislation for safeguarding theatres, including larger and more numerous exits and fire escapes and incentives for the construction of fire towers. The proposal received much criticism over its rigidity, and it was felt to inhibit the construction of new theatres.<sup>77</sup> Nonetheless, stricter regulations, inspections and compliance significantly improved the safety of theatre-goers in the ensuing years of the twentieth century. A circa 1913 image of the Washington Theatre in Detroit demonstrates effective exterior egress on theatres, indicative of what was common practice in the twentieth century (Figure 19).

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<sup>74</sup> *New York Times*, "Theatre Galleries Closed," January 7, 1904.

<sup>75</sup> *New York Times*, "Mayor Confers with Theatre Managers," January 10, 1904.

<sup>76</sup> *New York Times*, "Unsafe Theatre Escapes," January 10, 1904.

<sup>77</sup> *New York Times*, "Would Change Laws on Theatre Safety," April 5, 1911.



**Figure 18:** False exits on a Pennsylvania theatre. (“False Emergency Exits,” Quarterly of the National Fire Protection Association 9 (1916), 386.)



**Figure 19:** Demonstration of sufficient fire escapes on a Detroit, Michigan, theatre. (J.E. Bolles Wire and Iron Work. *Sectional Catalogue*. Detroit: The Firm, 1913: 89)

## Part 4: Schools

Egress laws for schools, asylums, and hospitals originated in the laws of 1871 requiring fire escapes on all public buildings. Particular concern arose over the protection of these institutions because the children, the elderly, and the infirm were not as able bodied in the event of an emergency. The New York City sanitary inspector surveyed the conditions of schools in 1873 and completed a report illustrating their need for immediate attention. In addition to numerous other health and safety violations, several schools lacked any means of emergency egress.

As New York City actively inspected schools and enforced fire escapes during the 1880s, other cities and states passed their own legislation regarding the safety of schools and other public buildings. In 1881, the mayor of Philadelphia ordered the immediate erection of permanent fire escapes on the exteriors of all seminaries, schools, colleges, academies, hospitals, and asylums within the city.<sup>78</sup> In 1882, the New Jersey House of Representatives introduced a bill requiring fire escapes on the exteriors of all factories, schools and workshops.<sup>79</sup>

On February 21, 1883, a fire broke out at the Church of the Holy Redeemer, a parochial school in New York City. Panic ensued, and the children fled to one of two staircases, the other cut off by flames. The mass exodus down the staircase proved fatal. An obstruction at the bottom caused the children to amass, and the entire staircase collapsed. Although Inspector John Riley of the buildings department had filed a report a few months prior stating that nothing was of concern in the safety of the school, no fire escapes existed. Fifteen children perished.<sup>80</sup> The Board of Education met following the disaster and Commissioner Wetmore announced that a comparable calamity was not possible in the city's public schools, as "the stairways are broad and roomy, and constructed of stone or masonry, and the buildings are abundantly supplied with fire-escapes."<sup>81</sup> However, testimony from the examiner of buildings revealed that seventy-five percent of the public schools in the district had narrower stairways than Holy

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<sup>78</sup> *New York Times*, "Fire-Escapes in Philadelphia," October 16, 1881.

<sup>79</sup> *New York Times*, "At the New-Jersey Capital," February 16, 1882.

<sup>80</sup> *New York Times*, "Seeking to Place the Blame," February 21, 1883.

<sup>81</sup> *New York Times*, "Safety of the Public Schools," February 22, 1883.

Redeemer.<sup>82</sup> Mr. Elbridge T. Gerry, president of the Society for the Prevention of Cruelty to Children, addressed a letter to Inspector Esterbrook of the Bureau of Buildings citing the dire need of many schools for proper fire escapes. Additionally, he noted the failure of the fire escapes approved by the bureau to effectively save children. “Adults,” wrote Gerry, “may possibly save themselves by perpendicular descents on long, narrow iron ladders, but these are obviously useless, nay, even dangerous, if intended as a means of escape for children.”<sup>83</sup> Mr. Gerry included with his letter a list of fifty-three schools in need of proper emergency egress. In the following weeks, school buildings benefited from the erection of new fire escapes and improvements to existing devices. The safety of exterior fire escapes always drew concern, often being difficult and frightening to use in times of panic, but the safe evacuation of children from schools or patients from hospitals posed a new set of problems.

Unfortunately, the public’s worst fears were realized. On December 18, 1884, fire almost completely destroyed the St. John’s Home orphan asylum in Brooklyn, home to 785 children, many of them ill. Smoke and flames blocked stairways, trapping children on upper floors and killing twenty-two. The building’s substandard construction and insufficient means of escape passed inspection with only minor recommendations.<sup>84</sup> The inadequacy of the regulations regarding fire-safety for children enraged the public. A *New York Times* editorial two days after the fire criticized Inspector Esterbrook and the flimsy fire escape laws and lax enforcement in both Brooklyn and New York City. The writer states, “We might perhaps expect that in charitable institutions where children are cared for greater pains would be taken for security than in other classes of buildings.... In Brooklyn there were not even outside fire escapes, and an outside fire escape is but a shabby makeshift.”<sup>85</sup> Fireproof staircases accessible from every floor, he argues, should be required on all public buildings and tenement houses, particularly in situations where children are involved.<sup>86</sup>

The beginning of the 1893 school year in New York City brought new schools and improvements to existing facilities. The Board of Education spent \$60,000 of the

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<sup>82</sup> *New York Times*, “Safety in School Buildings,” March 2, 1883.

<sup>83</sup> *New York Times*, “Unsafe School Buildings,” March 3, 1883.

<sup>84</sup> *New York Times*, “Orphans’ Lives in Peril,” December 19, 1884.

<sup>85</sup> *New York Times*, “The Brooklyn Fire,” December 20, 1884.

<sup>86</sup> *Ibid.*

\$130,000 allotted from the Board of Estimates and Appointments erecting fire escapes and fireproofing existing stairways in older buildings.<sup>87</sup> Yet complaints continued to pour in over inadequacies of fire precautions. Snow and ice collected on exterior fire escapes rendering them unsafe for use, and interior stairways constructed of wood posed serious threat.<sup>88</sup> New, stricter legislation for the erection of fire escapes on all public buildings appeared before the New York State Legislature in the 1890s. The protest that arose over the erection of fire escapes on hotels, theatres, and tenements was absent in the push for school safety. The lives of children were at stake. The reason schools remained unprotected was because the Board of Education struggled with budgetary issues, and the inspectors continued to approve unsafe conditions. In October 1900, the Board of Education brought their 1901 budget proposal before New York City Mayor Van Wick. Among other needs, the board asked for \$130,000 for the erection of fire escapes on public schools in Brooklyn. Mayor Van Wick denied the application, arguing that the Board of Education's poor management was the reason for their lack of funds.<sup>89</sup>

A tragic fire in Collinwood, Ohio, a suburb of Cleveland, stunned the nation on March 4, 1908. Nearly 170 children lost their lives at the Lake View School, trapped in the narrow hallways of the second and third floors. Flames quickly cut off escape, and students jammed up against doors that were locked or opened inward. The flammable construction allowed only a few minutes for evacuation. One fire escape was accessible at the rear of the building, but not all the children found their way to the exit.<sup>90</sup> The surreal events of the Ohio blaze compelled every city and town to analyze the safety precautions in their own schools. Secretary Egan of the Illinois State Board of Health ordered every public and private school in the state without adequate fire safety to be closed until properly supplied.<sup>91</sup> The City of Cleveland moved to install in all schools spiral fire escapes enclosed in towers, replace wooden stairs with iron treads, fireproof basements, and remove doors on interior vestibules.<sup>92</sup> The Superintendent of Schools in New York City, along with other officials, maintained that their schools possessed a high

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<sup>87</sup> *New York Times*, "Now the School Days Begin," September 10, 1893.

<sup>88</sup> *New York Times*, "Unsafe Public Schools," January 4, 1895.

<sup>89</sup> *New York Times*, "Board of Education Asks For \$1,929,868," October 9, 1900.

<sup>90</sup> *New York Times*, "165 Children Perish in Fire," March 5, 1908.

<sup>91</sup> *New York Times*, "To Close Illinois Schools," March 5, 1908.

<sup>92</sup> *New York Times*, "50 Burials in Collinwood," March 7, 1908.

standard of safety, outfitted with all the necessary precautions, and that a tragedy of such magnitude could not befall their city.<sup>93</sup> Statements were put to the test when 2,500 students evacuated a burning school in one minute. The stairways and fire escapes on the old building, along with the practice of fire drills, allowed the incredible timely escape. Fire escapes safely constructed with stairs extending off the sides of balconies, rather than down well-holes and openings covered in wire mesh, aided the safe, quick descent of school children (Figure 20). President McGowan of the Board of Education moved to turn down an appropriation of funds for the erection of fire escapes on all New York City schools, citing that there is no school in the city that could not be evacuated in a matter of minutes and that the fire escapes would cause more harm than good.<sup>94</sup> The Board of Education adamantly insisted its schools were “as safe as any in the United States, and safer than most of them.”<sup>95</sup> Upon the closing of unsafe schools in Brooklyn, the Superintendent of Schools claimed public hysteria the culprit rather than a lack of safety.<sup>96</sup> The fire commissioner, in May of that year, recommended to the Board of Education the closure of thirteen unsafe schools and made safety recommendations for 516 other city schools.<sup>97</sup> The recommendations came a month after authority to provide fire safety in schools was placed solely in the hands of the Board of Education. The superintendent of school buildings subsequently recommended to the Board of Education several safety provisions, including fireproof stairways and exterior fire escapes leading to the street.<sup>98</sup>

In Washington, D.C., Richard L. Humphrey, engineer in charge of structural materials for the federal government, denounced the trend toward constructing taller buildings. He noted the difficulty of the fire department to access the upper floors to extinguish fires and save lives and that any building over 150 feet high would need to be equipped with its own fire fighting equipment. “It is a matter of record,” he stated, “providing equipment for fighting fires, while foreign countries spend their money in

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<sup>93</sup> *New York Times*, “Safe Fire Guards in City Schools,” March 6, 1908.

<sup>94</sup> *New York Times*, “Public School Afire,” March 7, 1908.

<sup>95</sup> *New York Times*, “Worry Over Schools Called Hysteria,” March 25, 1908.

<sup>96</sup> *Ibid.*

<sup>97</sup> *New York Times*, “13 Schools Buildings Declared Unsafe,” May 7, 1908.

<sup>98</sup> *New York Times*, “Board Alone Can Safeguard Schools,” April 8, 1908.



building structures which offer the greatest resistance to fire.”<sup>99</sup> Hospitals and public schools, he felt, should never surpass two stories in height. Humphrey hoped to see a law enacted compelling all states to construct the best fire-resistant buildings for public use.<sup>100</sup>

The Special Committee on School Inquiry submitted a report to the Board of Education in July 1912 that illustrated the unsafe conditions of many schools and urged the addition of sprinkler systems, alarms, elevators, and other life saving precautions.<sup>101</sup> The dependency on fire escapes waned, while importance of fire prevention, fireproofing, and fire-fighting appliances became apparent. The iron balconies and ladders alone failed to ensure the safety of children. Ironically, Superintendent of Schools William H. Maxwell still insisted New York City schools were the safest they could possibly be.<sup>102</sup> The fire commissioner nonetheless issued violations to 814 public and private schools in the city in November of that year.<sup>103</sup> Agreement on the fire preparedness of city schools could not be reached, and the interpretation of regulations often caused confusion. In Saint Louis, Missouri, twelve members of the Board of Education were arrested for failing to provide fire escapes on some of their school buildings. The board asserted that their schools did not fall under the jurisdiction of the law.<sup>104</sup>

Three years later when twenty-one children died in a fire at a Peabody, Massachusetts, school, it was found that thirty-five schools in New York City still failed to comply with orders for fire escapes.<sup>105</sup> The school board cited lack of funding, but the mayor’s veto of the Lockwood-Ellenbogen Bill also received blame.<sup>106</sup> The Lockwood-Ellenbogen bill attempted to simplify building inspections by uniting the building superintendents of all the boroughs to make rules and regulations involving all building issues.<sup>107</sup> The bill received stern criticism. Many feared the stricter enforcement of

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<sup>99</sup> *New York Times*, “America’s Fire Losses,” March 8, 1908.

<sup>100</sup> *Ibid.*

<sup>101</sup> *New York Times*, “Condemns Schools for Fire Dangers,” July 12, 1912.

<sup>102</sup> *New York Times*, “Supt. Maxwell Tells What New York’s Schools Need,” July 14, 1912.

<sup>103</sup> *New York Times*, “Fire Orders Issued Against 814 Schools,” November 11, 1912.

<sup>104</sup> *New York Times*, “To Arrest School Board,” December 6, 1912.

<sup>105</sup> *New York Times*, “21 Children Die in School Fire,” October 29, 1915.

<sup>106</sup> *New York Times*, “Serious Fire Peril in 35 City Schools,” November 11, 1915.

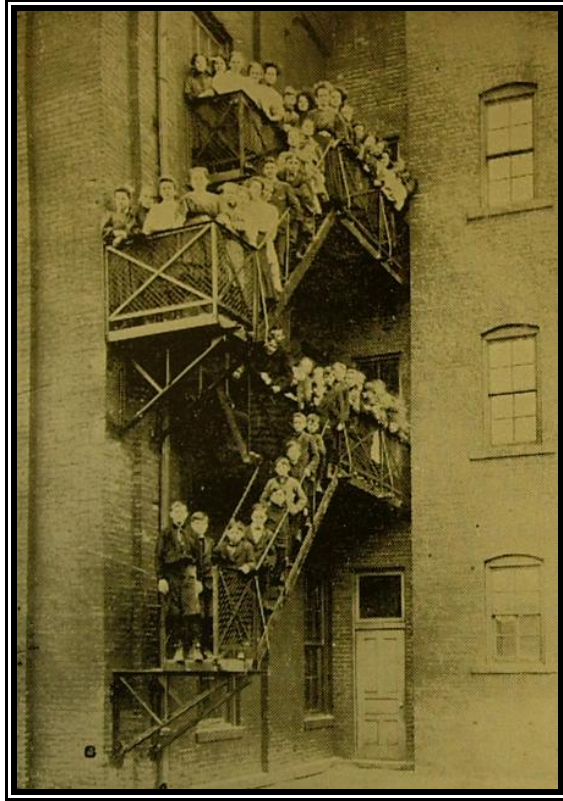
<sup>107</sup> *New York Times*, “Building Bill Hearing,” February 28, 1915.

regulations, while others worried that tenement houses, which already had strict enforcement, might lose attention.

Newly-constructed fireproof schools in New York City met safety requirements and resolved many issues regarding evacuation of children. Forty-four school fires were reported in New York City in 1921, all without great injury.<sup>108</sup> Fireproofing proved the best method of safeguarding students, as well as the practice of fire drills and supplementation of fire-fighting equipment. Exterior fire escapes on schools continued to provide secondary means of egress, but students were no longer dependent of the devices.

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<sup>108</sup> *New York Times*, "Tell of Fire Peril in Many Schools," July 3, 1921.



**Figure 20:** School children gathered on a safely constructed fire escape in Michigan. (J.E. Bolles Wire and Iron Work. *Sectional Catalogue*. Detroit: The Firm, 1913: 87)

## Part 5: Factories

Despite the enactment of the 1871 law, which required fire escapes to be erected on all public buildings in New York City, decades of tragedy and protest passed before factory workers truly experienced safe working conditions. The tumult that ensued over fire safety in factories far exceeded that of arguments over fire escapes for the other public buildings covered within the 1871 law. The outcry for fire escapes on factories became entrenched within the broader issues of worker's rights, equality of the sexes, and child labor laws. In the wake of deadly fires, worker strikes, and public protest, labor reform aided in ensuring the safe conditions of factories.

A December 1872 fire destroyed a factory building on Centre Street in New York City. The small loss of life brought the poor conditions of the factories to light during the inquest. “[O]nly one narrow stairway and a rickety fire escape” provided egress from the upper floors, which were filled with highly combustible materials, and the faulty drop ladder on the lowest balcony could not be lowered. The workers had not been drilled on emergency procedures and the location of exits.<sup>109</sup> Factory inspections followed to enforce compliance with fire escape regulations, factory owners were urged to prepare their employees for emergencies, and challenges to the effectiveness of the current laws prompted their reconsideration. The ill treatment of the working class, though, truly sparked anger. A December 26, 1872, *New York Times* editorial protested, “Conspicuous as was this structure as a trap for the poor people toiling in it, there are many others in this City which are quite as bad. It is a duty the authorities owe to the thousands of artisans who are every day working at perilous heights in flimsy buildings, to see that they are provided with such means of escape, in case of fire, as to render a repetition of this Centre-street disaster impossible.”<sup>110</sup>

On September 20, 1874, Granite Mill 1 of the Fall River Textile Mills in Massachusetts burned, killing forty workers and injuring eighty. Fire spread quickly, cutting off escape routes from the sixth floor. Ladders extended from the top floor to the roof, but many workers failed to negotiate their way up in the terror of the moment. Cotton ropes dangled in front of windows, but the rush of frightened people all grabbing

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<sup>109</sup> *New York Times*, “The Centre-Street Fire,” January 11, 1873.

<sup>110</sup> *New York Times*, “Our Danger From Fire,” December 26, 1872.

the ropes at once created a disaster, causing many to fall to their death. Others safely jumped into beds of straw placed beneath the windows; some were not so fortunate. Newspaper accounts and editorials claimed the mill building had sufficient means of escape. The helplessness of the workers and their failure to use ladders and stairs right before them, it was argued, caused such a huge loss of life.<sup>111</sup> Open interpretation of the term “sufficient means of escape” caused a number of problems. C.O. Stone, agent of the Granite Mill, reported that the single stairway within the building completely fulfilled the requirements and ensured the safety of the workers. The elevator, added Stone, could easily be taken to the top floor allowing workers to access the roof scuttle.<sup>112</sup> Regardless of reports that the elevator was not in service at the time of the fire and that the interior stairway was cut off by flames, panic was still considered the culprit. To many, though, it was evident that escape routes were minimal, and the push for revised legislation and strict enforcement of codes began.

In September 1877, Hale and Company’s Piano Factory caught fire, igniting eighty buildings along the block in “one of the most disastrous fires that has visited New-York in several years.”<sup>113</sup> The chief of the Fire Escape Bureau of the Department of Buildings testified that both the fire escapes and the construction of the building met the requirements of the law.<sup>114</sup> Demand for the revision of the current law continued. “A Building law which permits the erection of a fire-trap like Hale’s factory,” editorialized a *New York Times* reporter, “must either be radically defective or its execution must be in very incompetent hands.”<sup>115</sup>

Women and children often fell victim to the poor factory conditions. They comprised a large portion of the workforce and were confined to the uppermost floors of the factories. Women and children were rarely drilled in emergency preparedness and had more difficulty in descending the exterior fire escapes. The long skirts worn women during this era were a particular hindrance to safe ladder descent (Figure 21).<sup>116</sup> All too often, though, fire escapes failed to reach the upper floors of the buildings. Exit

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<sup>111</sup> *New York Times*, “A Shocking Calamity,” September 20, 1874.

<sup>112</sup> *New York Times*, “The Fall River Disaster,” September 21, 1874.

<sup>113</sup> *New York Times*, “Eighty Buildings Burned,” September 4, 1877.

<sup>114</sup> *New York Times*, “The Burning of Hale’s Factory,” September 14, 1877.

<sup>115</sup> *New York Times*, Editorial Article 7 – No Title, September 15, 1877.

<sup>116</sup> *Quarterly of the National Fire Protection Association*, “Hobble Skirts Dangerous at Fires,” 7, no. 2 (1913): 154.

regulations on factories, henceforth, often became embedded in labor laws for women and children. In October 1886, a woman died in a factory fire on the top floor, to which not a single fire escape had been provided.<sup>117</sup> Consequently, a bill introduced in the New York Senate in February 1887 amended several provisions of the Child and Woman Labor Act. The bill sought to require “elevators in factories to be [e]nclosed, if the Inspector deems it necessary, rails to be provided on staircases, doors to open outward, and suitable fire escapes.”<sup>118</sup> Similarly, the New Jersey Legislative Committee of the State Federation of Trade and Labor Unions met in July 1887 to discuss labor conditions. The committee determined that “adequate fire escapes must hereafter be erected on all factories and workshops two or more stories in height, in addition to portable fire escapes.”<sup>119</sup> Both laws appear nonspecific and discretionary, using the terms “suitable” and “adequate”, and factory workers would suffer the effects.

Twenty workers succumbed to an August 1888 fire at a factory on Chrystie Street in New York City. Fire escapes on both the front and rear of the building failed to save the victims, and panic again appeared to have driven people to jump from windows. The superintendent of buildings confirmed the factory’s compliance with every aspect of the law. However, flames licked the fire escapes, which were not accessible to every window and did not extend to the top floor, and the stairways had been cut off.<sup>120</sup> Grease and oil soaked the building’s highly flammable walls and floorboards, spreading flames quickly. The top floor workers’ only means of escape was the roof scuttle, which was unable to accommodate all who needed it.<sup>121</sup> The coroner concluded that the law needed revision for factories employing a large number of workers.<sup>122</sup> A year later, in August 1889, factory inspectors announced improvements. Deputy Inspector Shaubert remarked that factories fared fifty percent better than the year prior and ordered only 110 fire escapes.<sup>123</sup> The 1890 inspections a year later found only twenty factories in need of fire escapes.<sup>124</sup>

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<sup>117</sup> *New York Times*, “Caught in a Death Trap,” October 8, 1886.

<sup>118</sup> *New York Times*, “Labor’s Work at Albany,” February 11, 1887.

<sup>119</sup> *New York Times*, “Legislation for Labor,” July 28, 1887.

<sup>120</sup> *New York Times*, “Many Lost Their Lives,” August 4, 1888.

<sup>121</sup> *New York Times*, “Chrystie Street Fire,” August 10, 1888.

<sup>122</sup> *New York Times*, “The Law Needs Revision,” August 18, 1888.

<sup>123</sup> *New York Times*, “Good Results of the Law,” August 18, 1889.

<sup>124</sup> *New York Times*, “The Factory Inspection,” July 6, 1890.

The first decision handed down in February 1893 regarding Chapter 402 of the Laws of 1887, mandating fire escapes on factory buildings, favored the defendant. The owner of the Steam Gauge and Lantern Company in Rochester, New York, was being sued over the death of a teenage boy in a fire that killed twenty-nine workers total. According to the plaintiff, the factory owner failed to provide adequate fire escapes. The factory inspector approved the building upon inspection and stated that the two fire escapes met requirements of the law.<sup>125</sup> Clearly, workers were still losing the battle.

The Statutory Revision Commission, under the advisement of State Factory Inspector Daniel O’Leary, drew up an act in January 1899 requiring all buildings used for manufacturing purposes in the State of New York to have a license. Factory inspectors granted licenses based on a factory’s compliance with the laws, including the erection of fire escapes, taking steps to eliminate “sweat shops.”<sup>126</sup> The act was the tip of the iceberg for labor reform, but years passed before safe factory conditions were truly realized.

Disorganization of authority continued to hamper enforcement of factory regulations. A bill introduced in April 1891 in the New York Assembly proposed granting the fire department exclusive control over the erection of fire escapes on factories. Factory inspectors disputed the bill, claiming it would only delay time and slow the progress of enforcing regulations. Inspectors would need to report to the fire department, creating a middleman in the process.<sup>127</sup> A law passed in Albany in 1899 authorized factory inspectors in New York to also enforce the erection of fire escapes on all tenements, apartment houses, hotels, boarding and lodging houses, and clubhouses.<sup>128</sup> Eventually, factory inspectors spread themselves too thin, neglecting factories in favor of the other buildings over which they were given power. A decade later, a fire at a fibroid comb factory in Brooklyn killed ten workers. The building lacked fire escapes and had iron bars on windows that trapped victims. The factory owner admitted the building was not up to code but stated that inspectors had recently visited the factory and pronounced it safe.<sup>129</sup> Disputes raged among the various departments within Brooklyn as to who should

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<sup>125</sup> *New York Times*, “The Fire-Escape Law,” February 3, 1892.

<sup>126</sup> *New York Times*, “To Drive Out Sweat Shops,” January 24, 1899.

<sup>127</sup> *New York Times*, “Local Labor Matters,” April 27, 1891.

<sup>128</sup> *New York Times*, “Bills Passed by the Assembly,” April 13, 1899.

<sup>129</sup> *New York Times*, “Nine Dead in Fire,” November 9, 1909.

have been inspecting the factory. The buildings department claimed not to have known a factory existed at that location, as they were not notified when it was converted.<sup>130</sup>

Conflict between state and municipal administration can be blamed for inadequate fire protection in a Newark factory fire on November 27, 1910. Twenty-four girls perished in the early morning blaze. Soaked with oil and highly flammable, the 150-foot building was protected by only two small fire escapes, one at each end. The commissioner of the New Jersey State Department of Commerce, the bureau regulating fire safety in factories, felt that the building was sufficiently constructed and protected within the law and that the victims merely succumbed to panic. The state law required one fire escape to be provided for every twenty-five persons employed as high as the third floor and additional escapes on each successive floor. Due to the 150-foot length of the building, arguably dozens of fire escapes were needed. Municipalities in New Jersey lacked enough authority to enforce these types of regulations.<sup>131</sup> Investigation later revealed that the buildings department condemned the factory three times, to no avail.<sup>132</sup>

The disaster prompted a look at factories in New York City, particularly older buildings and those that were later unsuitable converted to factories. The Woman's Trade Unions League in New York City took a stand against the dreadful conditions of factories, many of which employed young girls on upper floors with inadequate egress. The women joined forces with the Central Labor Union of Brooklyn, the Federated Union of New York, and the Labor Council of the Bronx, taking immediate steps in rectifying the conditions of factories.<sup>133</sup> Thus commenced the battle to secure safety and equality for women laborers.

Thoughts of all prior factory blazes diminished on March 26, 1911, when a fire at the Triangle Shirtwaist Factory, in New York City, claimed the lives of nearly 150 workers.<sup>134</sup> The Triangle fire marked a significant turning point in factory legislation, as well as general fire prevention and safety. This landmark blaze drove forward labor reform and rights for women and children. Six hundred workers found themselves trapped on the upper three floors of the ten-story factory building. The building, touted

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<sup>130</sup> *New York Times*, "Investigate Brooklyn Fire," November 10, 1909.

<sup>131</sup> *New York Times*, "Building a Trap for the Hundreds," November 27, 1910.

<sup>132</sup> *New York Times*, "The Newark Fire," November 30, 1910.

<sup>133</sup> *New York Times*, "Women to Protect Workers," December 8, 1910.

<sup>134</sup> *New York Times*, "141 Men and Girls Die in Waist Factory Fire," March 26, 1911.



as fireproof, survived relatively unscathed. Due to the fireproof construction, only one interior fire escape satisfied egress needs. The victims, primarily immigrant girls, jumped to their deaths from upper story windows when flames cut off the stairways. Former employees had unionized and held a strike to protest the poor working conditions within the factory a year before. They had been arrested and fired, but the factory continued to be reported as unsafe by the fire department. “Look around everywhere,” [Fire Chief Croker] said, ‘nowhere will you find fire escapes. They say they don’t look sightly. I have tried to force their installation, and only last Friday a manufacturers’ association met in Wall Street to oppose my plan and to oppose the sprinkler system, as well as the additional escapes.’”<sup>135</sup> Chief Croker found the only escape to be “an old-time perpendicular affair” that only one person could descend at a time into the interior courtyard. Additionally, it was loose on the upper floors and very dangerous. He had recommended balcony fire escapes with wire iron staircases, but his orders were ignored. Further investigations revealed that many of the doors had been locked and all opened inward. Sadly, that was the case of many factories in the city. Factory owners locked doors to discourage tardiness and to keep the girls from leaving during work hours.<sup>136</sup> John Williams, the State Commissioner of Labor, visited the Triangle factory a few months prior to the fire and found the building to be flame resistant and properly equipped with a fire escape. “My belief is,’ said Mr. Williams, ‘that no matter how carefully a factory may be constructed there is always danger on account of panic. In nearly all of such disasters it is the panic that kills.’”<sup>137</sup> The state commissioner also urged the need for fire drills. An amendment in the hands of the Assembly Committee on Labor and Industries required fire alarms and weekly fire drills.<sup>138</sup> The lack of an overarching authority for enforcement of factory regulations and the vagueness of the exit law both received blame for the tragedy. Section 103 of the Building Code includes in its wording, “such good and sufficient fire escapes, stairways, or other means of egress,” and leaves the terms “good” and “sufficient” to be interpreted by the individual inspectors. Fire Commissioner Waldo asserted the inadequacy of the Triangle Factory’s fire escape.

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<sup>135</sup> Ibid.

<sup>136</sup> Ibid.

<sup>137</sup> *New York Times*, “New Law Needed, He Says,” March 27, 1911.

<sup>138</sup> Ibid.

Treads of only eighteen inches fitted the ladder, and when the iron shutters of the windows were open the escape was impassible.<sup>139</sup>

Within a couple days of the Triangle fire, lawmakers in Albany and other cities around the country scrutinized their factory legislation and made amendments to prevent any future disasters near this magnitude. Consolidation of the authority over fire escapes within the City and State of New York was discussed, and hot disputes ensued over laying blame for the negligence of the Triangle factory. A *New York Times* editorialist protested the disorganization within city and state agencies. “Controversy between the various officials concerned in this matter, as to the measure of responsibility resting upon them,” he argued, “should be dispensed with, as it will only tax the public patience.” He continued, “If the State Labor Commissioner knows of such useless fire escapes as he describes, he should help the Building Inspectors to find them, so that they may be removed, and useful fire escapes provided in their place.”<sup>140</sup> All blame aside, the deputy fire commissioner stated that all buildings should be properly supplied with exterior fire escapes, even if fireproof, for both escape and fire-fighting purposes.<sup>141</sup>

The Women’s Trade Union League joined forces with twenty other philanthropic organizations to improve working conditions for the already underpaid female laborers.<sup>142</sup> Over one thousand workers confidentially reported to the committee on the firetraps in which they worked.<sup>143</sup> The Collegiate Equal Suffrage League held a mass meeting a week after the fire, protesting the conditions that fueled the disaster of the Triangle factory. A banner hung at the event with the following statement: “Votes for Women, Nov. 26. – Twenty-five women killed in Newark factory fire. March 25 – One hundred and thirty women killed in Triangle fire. Locked doors, overcrowding, inadequate fire escapes. The women could not, the voters did not, alter these conditions. We demand for all women the right to protect themselves.”<sup>144</sup> Three speakers orated on the subject: Meyer London, counsel for the Triangle factory workers who went on strike the year before; Morris Hilquit, who used the fire as a text for the gospel of socialism;

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<sup>139</sup> *New York Times*, “Whitman Men Seek to Fix Responsibility,” March 27, 1911.

<sup>140</sup> *New York City*, “Blame Shifted On All Sides for Fire Horror,” March 28, 1911.

<sup>141</sup> *Ibid.*

<sup>142</sup> *New York City*, “Doors Were Locked, Say Rescued Girls,” March 27, 1911.

<sup>143</sup> *New York City*, “Many Now Tell of Fire Traps,” March 29, 1911.

<sup>144</sup> *New York City*, “Public Indifference Held Responsible,” April 1, 1911.

and Dr. Anna Shaw, a suffragist. Dr. Shaw spoke on the responsibility of the voters, who allowed the conditions within the factory to exist. A woman has, she stated, “been driven into the market, with no voice in the laws, and powerless to defend herself.”<sup>145</sup> The participating organizations moved to establish a permanent bureau of labor laws, which would ensure that health and safety regulations for workers be sufficient and rigidly enforced.<sup>146</sup> Another meeting the next evening spurred talk of new fire laws and a strong reform movement of the working-class. Governor Dix sent a letter pledging his support for progressive fire protection legislation and his immediate action to determine if any departments in the State of New York had been derelict in their duties of enforcing the laws.<sup>147</sup> The report of the Joint Board of Sanitary Control, which was sent into the Women’s Trade Union League stated, “Fire protection is to be based upon a code of efficient labor legislation effectively enforced through an adequate staff of inspectors, and with the responsibility centralized in one department. When this is done, and it is the mandate of the people that it should be done without delay, then the blood of these industrial martyrs will be the seed of social progress, represented in a policy of life – protection which will make such a death trap as 25 Washington Place a nightmare of the past.”<sup>148</sup>

A bill introduced into the New York legislature in 1911 called for proper fire escapes on all office and factory buildings. Specifics for construction of fire escapes finally appeared within the text of the bill, taking much of the guesswork out of inspecting factories. These devices needed to be constructed with stairways at an angle of at least thirty degrees, treads not more than nine inches apart, and hand railings the entire length of the fire escape. Additionally, standpipes, automatic sprinklers, roof tanks, and automatic fire alarms were also required.<sup>149</sup> A meeting of the Employer’s Welfare Section of the National Civic Federation, on April 7, 1911, was called to discuss the Triangle fire and recommendations were made to amend Section 82 of the Labor law with respect to fire egress: drop ladders should be replaced with stairs extending from balconies; doors on fire escape exits should open outward; and fireproof balconies should

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<sup>145</sup> Ibid.

<sup>146</sup> Ibid.

<sup>147</sup> *New York Times*, “Mass Meeting Calls for New Fire Laws,” April 3, 1911.

<sup>148</sup> Ibid.

<sup>149</sup> *New York Times*, “New Bills in Legislature,” April 19, 1911.

run the entire length of the building with stairways at each end.<sup>150</sup> The New York City Fire Commissioner recommended three possible types of safe fire escapes: the iron balcony extending the width of the building with connecting staircases wide enough for two people to descend abreast; an enclosed fire proof stairway accessible from the exterior by iron balconies; and an enclosed fire proof stairway accessible from each floor of the interior of the building.<sup>151</sup>

Ongoing discussion in the ensuing months of the Triangle fire prompted the introduction of dozens of new bills in New York. By December 1912, over thirty bills had been tentatively drafted for factory reform. Several provisions for fire escapes were detailed in the various bills, providing the first truly specific exit legislation for factory buildings. Important details follow:

- Enclosed fireproof stairways from basement to roof were required for buildings with more than fifty employees.
- Every factory building in the state over two stories in height should have at least two means of egress “remote from each other, leading to fire escapes on the outside of the building or to stairways on the inside, and no portion of any floor of such factory shall be further away than 100 feet from at least one such means of egress.”
- The outside fire escapes should be constructed of wrought iron or steel “and shall be designed, constructed, and erected as to safely sustain on all platforms, balconies, and stairways, with a factor of safety of four, a live load of not less than ninety pounds per square foot.”
- Stair treads should also have a safety factor of four and sustain a live load of 400 pounds per step.
- “The balconies and stairways shall be at least twenty-four inches wide in the clear at all points, ends, and sides, the length and width of the balcony to be determined by the kind of stairway used and by the height and slope of such stairway.”
- “The stairways and balconies shall be guarded by iron railings not less than three feet in height, thoroughly and properly braced.”
- “The balconies shall be connected by stairways placed at an incline of not more than 45 degrees, with steps of not less than six-inch tread and not over nine-inch rise.”

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<sup>150</sup> *New York Times*, “Factories Must Be Better Protected,” April 7, 1911.

<sup>151</sup> *New York Times*, “We Safeguard Property; Now Protect Life,” April 9, 1911.

- If the fire escapes cannot be constructed on the front of the building, clear and unobstructed exits at least three feet wide should be provided from the inner court to the street.
- Doors would be constructed opening outward to escapes and to not be locked during working hours.<sup>152</sup>

New Jersey made comparable strides in improving factory conditions, rectifying major faults of current exit regulations. The use of fire escapes in an emergency proved too difficult and dangerous, felt lawmakers. Ordinary detached ladders generally provided access to the ground from the lowest balcony, and they often failed to handle the necessary loads or were too difficult to manipulate onto the balcony. Flames too often blazed through window openings, impeding descent of affected fire escapes. Warped fire escapes often survived to tell of the flames that issued from the windows into the path of egress (Figure 22).<sup>153</sup> New Jersey law would require outwardly opening doors cut close to the level of the floor, and fire escapes would be either the “straight-run” type, providing a continuous descent; the “return” type, providing stairs that extend from one end of a balcony to the opposite end of the next lowest balcony; or enclosed stair towers.<sup>154</sup>

Improvements in factory safety failed to prevent the death of nearly forty girls in the Binghamton, New York, clothing factory fire on July 22, 1913. Although many blamed the lack of inadequate exit, officials cited the failure of the girls to act quickly. According to survivors, the workers thought the alarm signaled another fire drill. By the time the true danger had been realized, fire cut off the interior stairs, and the fire escapes became clogged with the throngs of girls. The exits did not have the capacity to hold the rush, and girls threw themselves from the windows and over the railings.<sup>155</sup> The fire marshal had urged the use of fire escape stairs rather than the straight ladders that connected the balconies on the Binghamton factory, but poor supervision of factory

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<sup>152</sup> *New York Times*, “Loft Regulations for Legislature,” December 29, 1912.

<sup>153</sup> *Quarterly of the National Fire Protection Association*, “Two Factory Fire Holocausts,” 9, no. 3 (1916): 273.

<sup>154</sup> *New York Times*, “Concerning Human Life and Safety in the Factories,” July 7, 1912.

<sup>155</sup> *New York Times*, “50 Girls Die in a 20-Minute Factory Blaze,” July 23, 1913.

regulations left the building inadequate.<sup>156</sup> Further assessment of the fire escapes revealed dangerous construction; too few were supplied, they were too narrow, they were composed of flimsy iron piping, and they were not up to the standards of the State Labor Law.<sup>157</sup> The New York Assembly urged immediate passage of a bill requiring enclosed fireproof stairways on factories.<sup>158</sup> If nothing else, the Binghamton factory blaze reinforced skepticism of exterior fire escapes. Frances Perkins, Executive Secretary for the Committee on Safety warned of the primary dangers in the Binghamton factory, “Reliance for emergency exit was placed upon one outside fire escape, which although allowed by the labor law, is a type of exit condemned by the experience of many fires, because more often than not it warps under heat, collapses under heavy load, is too small to accommodate more than six or seven persons per floor, and becomes little less than a roasting pen for people attempting to use it, since the flames come out of non-fireproofed windows.”<sup>159</sup>

Finally in 1916 amended factory laws strengthened fire escape requirements. Fire escapes erected on structures five stories or less were required to have “at least one opening on every floor leading to the balcony, with an unobstructed height of at least six feet, which shall be protected by a self-closing fire door or a fireproof casement window [Figure 23] at least within six inches of the floor.”<sup>160</sup> On buildings six to nine stories, exterior fire escape balconies and stairs “must be screened on the outside to a height of at least five feet above the landing, and this screening is to consist of No. 10 United States gauge wire [Figure 24]. These balconies are not to be less than three feet wide, and if the building is not more than six stories high the connecting stairs on the fire escapes may be at any angle not to exceed sixty degrees.”<sup>161</sup> On buildings greater than nine stories, exterior fire escapes were unacceptable.<sup>162</sup>

By the 1920s, the use of firewalls, fireproof interior walls that separate different parts of the building, proved to be the safest method. This “horizontal” method of fire safety contained fire and allowed safe egress for workers. “The proof that this method is

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<sup>156</sup> *New York Times*, “The Fire at Binghamton,” July 24, 1913.

<sup>157</sup> *New York Times*, “Fire Escape Poor, Says Ahearn’s Aid,” July 25, 1913.

<sup>158</sup> *New York Times*, “For Fireproof Staircases,” July 23, 1913.

<sup>159</sup> *New York Times*, “Fireproof Exits,” July 31, 1913.

<sup>160</sup> *New York Times*, “Fire Escapes on Factory Buildings,” June 4, 1916.

<sup>161</sup> *Ibid.*

<sup>162</sup> *Ibid.*

effective is complete,” states a 1923 *New York Times* article. “For six years there has been no loss of life by fire in the 200 buildings so treated. And the cost is far less than the cost of the fire escapes and other equipment.”<sup>163</sup>

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<sup>163</sup> *New York Times*, “Firewall in All Buildings Seen as Only Safeguard,” February 25, 1923.

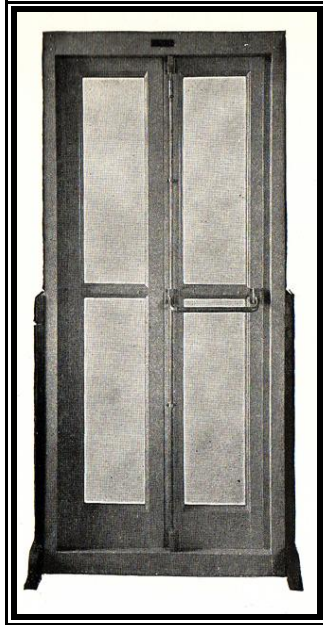


**Figure 21:** Women negotiation steep ladders in their long skirts. (“Hobble Skirts Dangerous at Fires,” Quarterly of the National Fire Protection Association 7 (1913), 154.)

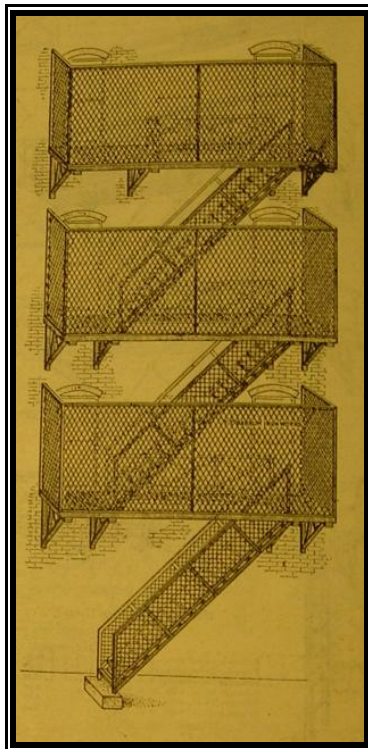


**Figure 22:** Flames shot out the window at this deadly factory fire, rendering the fire escape impassible. (“Two Factory Fire Holocausts,” Quarterly of the National Fire Protection Association 9 (1916), 273.)





**Figure 23:** A fireproof panic-bolt casement window designed for use in openings accessing fire escapes. (“Fire Escape Windows,” *Quarterly of the National Fire Protection Association* 9 (1916), 383.)



**Figure 24:** Fire escapes enclosed in galvanized iron wire for safety. (E.T. Barnum Wire and Iron Works. *No. 590 General Catalogue*. Detroit: The Firm, 1921: 8)

## Part 6: From Fire Escape to Fireproof

The iron balcony fire escape, although a significant life saving device for many buildings, had serious weaknesses and eventually was replaced by newer, improved methods of egress. Although the outside fire escape received criticism from the time of its introduction, it did not undergo serious scrutiny until the early twentieth century, a time of enhanced fire proof construction and improved fire prevention methods. Early exit codes were often so inadequate because they were blanket regulations covering a variety of different building types and situations. According to Robert S. Moulton, Technical Secretary of the National Fire Protection Association (NFPA), “Each major fire where there was a loss of life led to the introduction of requirements designed to prevent loss of life in similar future disasters, but such requirements were commonly very imperfect and there was no basis for any scientific approach to the entire problem.”<sup>164</sup> Moulton cited many of the variable factors that occur in cases of fire, the most significant being the human factor.

The NFPA, in 1911, turned to the topic of fire escapes after the Asch Building (Triangle Shirtwaist Company) succumbed to fire killing 150 men and women earlier that year. The fire caused a nation-wide examination of fire exits. The conclusions of the NFPA, as published in their quarterly, reinforce the public attitude about the diminished safety of the exterior fire escape:

It has long been recognized that the common outside form of iron ladder-like stairway anchored to the side of the building is a pitiful delusion. This device for a quarter of a century has contributed the principal element of tragedy to all fires where panic resulted. Passing successively the window openings of each floor, tongues of flames issuing from the window of any one floor cut off the descent of all on floors above it. Iron is quickly heated and is a good conductor of heat, and expansion of the bolts, stays, and fastenings soon pulls the framework loose, so that the weight of a single body may precipitate it into the street or alley. Many a human being has grasped the hot rail of such a ‘fire escape’ only to release it with a scream and leap from it in agony. Its platforms are usually pitifully small, and a rush to them from several floors at once jams and chokes them hopelessly. It is a makeshift creation of the cupidity of landlords, frequently rendered still more

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<sup>164</sup> Robert S. Moulton, *Building Exits for Fire Safety* (Boston: National Fire Protection Association: 1938), 1.

useless by the ignorance of tenants, who clutter it up with milk bottles, ice boxes and other obstructions.<sup>165</sup>

The Asch fire and several other major fatal fires in the United States prompted improved studies in exit safety. In 1913, The NFPA organized the Committee on Safety to Life. The committee compiled careful studies on four notable fires: the Binghamton Clothing Factory Fire, the Iroquois Theatre Fire, the Collinwood School Fire, and the Triangle Shirtwaist Company Fire. The conclusion of the study expressed the need for advisory regulations for the construction and arrangement of emergency exits for classes of buildings posing the greatest threat to life safety. The committee did not recognize fire escapes as an approved means of egress in new construction and recommended them only to correct deficiencies in existing buildings. Moulton characterized exterior fire escapes as “utterly inadequate flimsy precipitous structures, unshielded against fire in the structure to which they are attached and often terminating in balconies high above ground level.”<sup>166</sup> The contraption creates a false sense of security. Both the NFPA and the American Standards Association adopted that position. Properly enclosed interior stairs and smoke proof towers, the committee felt, are far more superior. Due to the position of the NFPA, cities across the United States abandoned the traditional exterior fire escape and properly installed fire-safe interior stairwells.<sup>167</sup> Exterior fire escapes, however, were still recognized as a beneficial means of access for the fire department in an emergency, and their construction as a secondary means of egress did not completely halt. Rather, exterior fire escapes supplemented the attributes of safely constructed buildings.

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<sup>165</sup> *Quarterly of the National Fire Protection Association*, “The Asch Building Holocaust,” 4, no. 4 (1911): 472-3.

<sup>166</sup> Moulton, 4.

<sup>167</sup> *Ibid*, 5.

## Chapter 2: Fire Escapes as a Cultural Construct

Contention over exit legislation embroiled city officials, lawmakers, landlords and philanthropists for the duration of the fire escape's heyday. Yet, daily life persisted in the overcrowded tenement districts, wrought with a restlessness and poverty that bound the denizens to the narrow avenues of tall buildings. Fire escapes accrued a value to the tenement dwellers that far exceeded safety concerns. Iron balconies, stairs, and ladders also became a social construct, shaping and being shaped by the urban existence. Recognizing the social impact of fire escape requires an understanding of the conditions of the early tenement house. Jacob Riis, a nineteenth-century journalist and photographer presents the following description of the average tenement house in his book *How the Other Half Lives*:

It is generally a brick building from four to six stories high on the street, frequently with a store on the first floor.... [F]our families occupy each floor, and a set of rooms consists of one or two dark closets, used as bedrooms, with a living room twelve feet by ten. The staircase is too often a dark well in the centre of the house, and no direct through ventilation is possible, each family being separated from the other by partitions. Frequently the rear lot is occupied by another building of three stories high with two families on a floor.<sup>168</sup>

The lack of sufficient light and ventilation exacerbated the claustrophobic conditions of the tenement interiors and nurtured an unsanitary environment. "Take a look into this Roosevelt Street alley," Riis continues, "just about one step wide, with a five-story house on one side that gets its light and air – God help us for the pitiful mockery! – from this slit between brick walls. There are no windows in the wall on the side; it is perfectly blank. The fire-escapes of the long tenement fairly touch it; but rays of the sun, rising, setting, or at high noon, never do."<sup>169</sup> Yards between structures often amounted to nothing more than a barren plot of land ten feet wide or a narrow alley barely passable.

The fire escape balcony supplanted the need for additional living and working space for tenants, transforming into an extension of the small apartment. The small iron floors allowed a minimal amount of space for storage, and the clutter of fire escapes became woven into the fabric of the tenement neighborhoods. So common was the

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<sup>168</sup> Jacob Riis, *How the Other Half Lives* (Massachusetts: Charles Scribner's Sons, 1890), 17-8.

<sup>169</sup> Riis, 40.

practice that building inspectors continually urged tenants to free the obstructions from their balconies. Tenants frequently ignored violations, carrying on with their necessary daily routines. In 1936, the New York City Tenement House Department, under Mayor LaGuardia, commissioned a Federal Art Project urging tenants to keep clutter clear from their fire escapes (Figure 25).

No other image fully captures the essence of the tenement neighborhood as the laundry strung between fire escape railings. It would have been nearly impossible to find a tenement backyard free of clotheslines and the women leaning over their balcony railings pinning up the day's wash. While the imagery affords a view into the nineteenth-century tenement lifestyle, it also creates a unique cityscape, adding to the evolving vertical and horizontal infrastructure of urban America. A 1912 painting by John Sloan, entitled *A Woman's Work*, depicts a woman stringing laundry over her balcony railing (Figure 26). The artist captures a snapshot of the everyday experience for women in the tenement houses. A vista of the common tenement landscape with dozens of crisscrossing pulley lines represents the increasingly vertical nature of the city; multiple levels of clotheslines, from ground floor up, connect fire escape to fire escape across the small courtyard (Figure 27) The Hill Dryer Company, in the early twentieth century, developed a clothes dryer for use in tenement and apartment houses. The galvanized iron rack affixed to the side of the building and swung over the fire escape for easy access (Figure 28). The company claimed its dryer would rid the yard of the unsightly clotheslines and increase the value of the property for rentals.<sup>170</sup>

The poor lived, leisured, and often worked within the confines of the tightly packed tenement districts. Green space rarely survived the ongoing development within the neighborhoods, and tenants lacked means for country vacations. "They don't go to the country for the same reason that they don't live in light, airy, spacious homes: they don't afford to. Instead, they do the best they can, stepping out-of-doors into the comparatively fresh air of the streets."<sup>171</sup> Tenement dwellers poured outdoors in the warmer months, escaping the steamy, unventilated interiors of their rooms. Perched over the crowded streets, fire escapes provided an airier respite than the building stoop or

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<sup>170</sup> *New York Times*, "Display Ad 11 – No Title, August 4, 1906.

<sup>171</sup> Zurier, 110.

street curb (Figure 29). A short story entitled, “The Great Sympathetic Strike”, from an 1894 issue of *The Century*, tells of a woman having moved from Maine to New York City with her husband: “She had always been delicate, and the stifling air of the tenement had broken her down, and now she lay all day in her bed, except for a few hours every fair day, when she was carried out on the landing of the iron fire-escape. It was a poor substitute for the fresh air and the green fields of her country home.”<sup>172</sup> The urban jungle, replete with concrete, masonry, and iron, did not dissuade tenants from adorning their small, personal outdoor plots with a little greenery (Figure 30). Paolo, a tenement dweller in “Out of the Book of Humanity”, a short story published in an 1896 issue of *The Atlantic Monthly*, receives a plant and hopes to beautify his small apartment. “The ‘garden’ was contained within an old starch-box, which had its place on the window-sill, since the policeman had ordered the fire escapes to be cleared. It was a kitchen garden with vegetables, and was almost all the green there was in the landscape. From one or two other windows in the yard there peeped tufts of green; but of trees there were none in sight – nothing but the bare clothes-poles with their scores of pulley-lines from every window.”<sup>173</sup> Plants and flowers dotted windowsills and fire escapes and created, according to Jacob Riis, a more habitable environment. “The German,” says Riis, “has an advantage over his Celtic neighbor in his strong love for flowers, which not all the tenements on the East Side have power to smother. His garden goes with him wherever he goes.... But wherever he puts it in a tenement block it does the work of a dozen police clubs. In proportion as it spreads the neighborhood takes on a more orderly character.”<sup>174</sup>

Sweltering summer nights in the tenements forced young and old from the stagnant interior heat. Rooftops, windowsills and fire escapes become peopled with restless, sweating bodies trying to grasp the tiniest bit of relief. Newspaper articles illustrate the spectacle of thousands lying prostrate in the rising temperatures. Jacob Riis epitomized this phenomenon in his observations of New York City life:

With the first hot nights in June police dispatches, that record the killing of men and women by rolling of roofs and window-sills while asleep, announce the time

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<sup>172</sup> *The Century*, “The Great Sympathetic Strike,” 47, no. 5 (1894): 652. Making of America, <http://cdl.library.cornell.edu/moa/>

<sup>173</sup> *The Atlantic Monthly*, “Out of the Book of Humanity,” 78, no. 469 (1896): 704. Making of America, <http://cdl.library.cornell.edu/moa/>

<sup>174</sup> Riis, 164-5.

of greatest suffering among the poor is at hand. It is in hot weather, when life indoors is well-nigh unbearable with cooking, sleeping, and working, all crowded into the small rooms together, that the tenement expands, reckless of all restraint.... In the stifling July nights, when the big barracks are like fiery furnaces, their very walls giving out absorbed heat, men and women lie in restless, sweltering rows, panting for air and sleep. Then every truck in the street, every crowded fire-escape, becomes a bedroom, infinitely preferable to any the house affords. A cooling shower on such a night is hailed as a heaven-sent blessing in a hundred thousand homes.<sup>175</sup>

The fire escape again became an extension of the living-quarters, and a necessity for the tenants beyond a means of egress. *Tenements at Hester Street*, a 1900 painting by Everett Shinn, provides a close-up, personal view of the restless summer nights of the tenement districts (Figure 31). Bodies sprawl on fire escapes and rooftops. Small interior rooms of the tenement apartments lacked room for children to play. The streets, alleyways, and meager yards often overflowed with restless youth. Every available inch of outdoor space became a playground for children, and hundreds of reports in the *New York Times* note children falling to their death while playing upon fire escapes. An article in an 1894 issue of *Harper's Monthly* entitled "In Search of Local Color" describes a typical New York City street scene: "There were countless children, and they were forever swarming out of the houses and up from the houses and over the sidewalks and up and down the street.... They ran wild in the street; they played about the knees of their mothers, who sat gossiping in the doorways; they hung over the railing of the fire-escapes, which gridironed the front of every tall house."<sup>176</sup> An early twentieth-century photograph by Lewis Wickes Hine, entitled *Congestion, Orchard Street, NY*, illustrates children crowding the narrow tenement streets and people and clutter filling the fire escapes that line the buildings (Figure 32).

A group of eight artists in New York City at the turn-of-the-century captured the urban iconography on film and canvas that became the watermark of the American city.<sup>177</sup> These Realists challenged the doctrine of "art for art's sake," turning their attention toward the gritty reality of the urban experience in a city that was growing both

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<sup>175</sup> Riis, 165-6.

<sup>176</sup> *Harper's New Monthly Magazine*, "In Search of Local Color," 89, no. 529 (1900): 261. Making of America, <http://cdl.library.cornell.edu/moa/>

<sup>177</sup> Zurier, 15.

outwardly and upwardly faster than any in the world. “[New York],” writes Virginia M. Mecklenberg, “was a city of social shifts, cultural transformations, even changing geography.”<sup>178</sup> The metropolis evolved into a city of immigrants, sprawling into neighborhoods with unique ethnic flare but entrenched in poverty. Clearly defined dichotomies of Old World versus New World and upper class versus lower class suffused the landscape from which the Ashcan artists drew their inspiration.

Fascinated by the quotidian immigrant experience, the artists limned with a vibrancy and movement that truly encapsulated the humanity within the small ethnic enclaves. Human interactions and daily activities caught the attention of the Ashcan school, but the interaction of the Old World immigrants with the strictly American urban constructs of the built environment came alive in their detailed work. Lives in the tenement districts sharply contrasted the middle and upper class experience, comfortable behind the closed doors of their fashionable apartment houses. Observers marveled at the disregard for personal space and privacy in the poor, immigrant neighborhoods, where tenants took their lives out-of-doors into the streets and onto the fire escapes. The hustle and bustle in street and on fire escape is depicted William Glackens’ *Far From the Fresh Air* (Figure 33). No detail in this 1911 work has been excluded, and signs of life emerge on nearly every fire escape. The fire escapes do not meld into the background imagery, but rather they become integral to the activities of the streetscape. Comparisons between tenement neighborhoods of New York City and European cities, from which the immigrants came, were often drawn. Juxtaposed next to a 1902 stereoview of an old tenement in Naples, Italy, one cannot help but notice the similarities in the liveliness that has poured onto balcony and street (Figure 34). Iron balconies are populated with movement, clutter and décor. Jacob Riis, too, discusses the ethnicity of neighborhoods as characterized by the resident’s use of the outdoor space. “Chinatown,” observed Riis, “as a spectacle is disappointing. Next-door neighbor to the Bend, it has little of its outdoor stir and life, none of its gaily-colored rags or picturesque filth and poverty.”<sup>179</sup>

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<sup>178</sup> Virginia M. Mecklenberg, “New York and the Ashcan School” *The Magazine Antiques* 148 (1995): 685-6.

<sup>179</sup> Riis, 93.



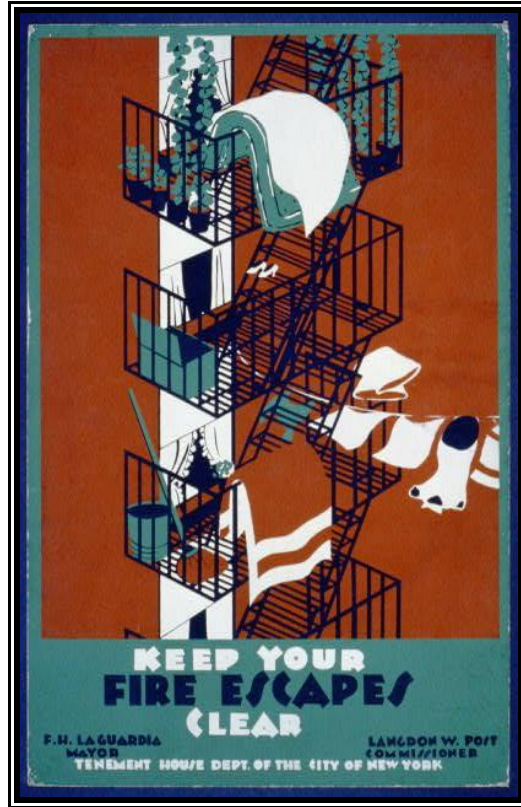
Holidays and festivals spruced the iron balconies; Christmas, describes an 1897 article in *The Century*, “[i]n the homes of the poor blossoms on stoop and fire-escape.”<sup>180</sup> William Glackens, in his 1907 work entitled *Patriots in the Making*, pokes fun at the celebration of Independence Day in an immigrant neighborhood (Figure 35). As American flags sway from fire escape balconies, tenants look down over their iron railings at a firework mishap in the street. The artist seems to muse about the efforts of the immigrant to assimilate into the American culture while still maintaining their individuality. Different ethnic neighborhoods often held their own festivals and parades, each with its own unique décor. A festival on Mott Street in New York City decorated the small street of Little Italy (Figure 36). Garlands and banners were strung between fire escape balconies, upon which people would soon gather for the parade. An article in an 1899 issue of *The Century* entitled “Feast Days in Little Italy” recreates the scene of Italian festival: “The fire-escapes of the tenement had, with the aid of some cheap muslin draperies, a little tinsel, and the strange artistic genius of this people, been transformed into beautiful balconies, upon which the tenants of the front house had reserved seats.”<sup>181</sup>

Although a life saving device ordered into the tenement house districts by the superintendent of buildings, tenants placed their own set of values upon the iron stairs and balconies. Landlords irately complained of the disfiguring façades, but tenement dwellers took the contraptions for granted, depending upon them for the everyday activities of their lives. The poor and the immigrants populated the tenement districts, and the fire escape grew to become a defining characteristic of their lives in the nineteenth and twentieth centuries in New York City and other major cities across the United States. From the need for extra rooms and storage space to a cultural artifact representing a dichotomous urban environment, the significance of the fire escape is entrenched in the history of these people.

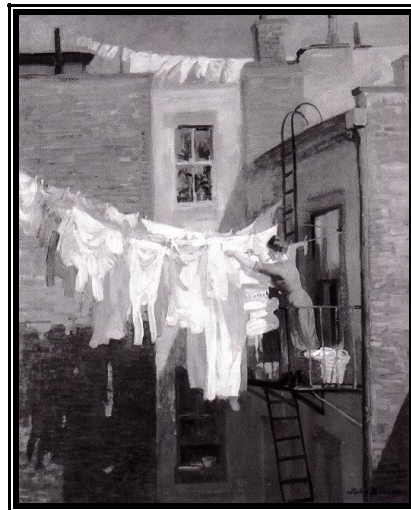
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<sup>180</sup> *Century*, “Speaking of Holidays,” 55, no. 2 (1897): 176. Making of America, <http://cdl.library.cornell.edu/moa/>

<sup>181</sup> *Century*, “Feast Days in Little Italy,” 58, no. 4 (1899): 493. Making of America, <http://cdl.library.cornell.edu/moa/>



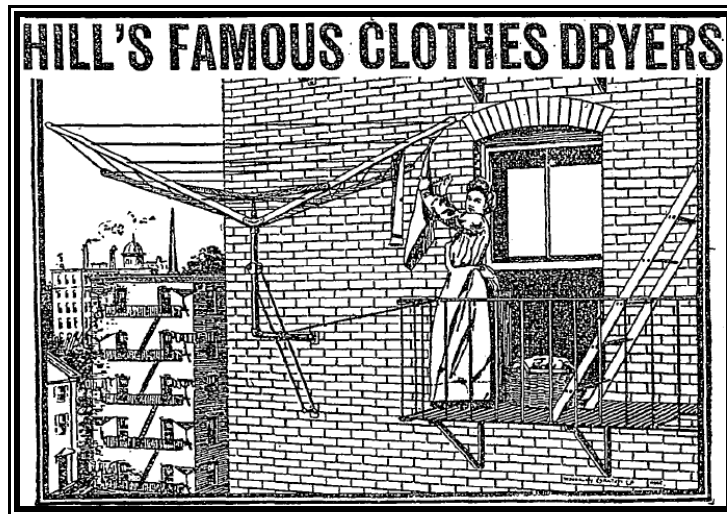
**Figure 25:** Muller, *Keep Your Fire Escapes Clear*, Federal Art Project Poster issued by the Tenement House Department urging tenants to keep fire escapes free of obstructions (Library of Congress Prints and Photographs Division, <http://hdl.loc.gov/loc.pnp/cph.3b48840>)



**Figure 26:** John Sloan, *A Woman's Work*, 1912. (Rebecca Zurier, Robert W. Snyder and Virginia M. Mecklenburg, *Metropolitan Lives: the Ashcan Artists and Their New York*. Washington, D.C.: National Museum of American Art, 1995: 179.)



**Figure 27:** Laundry strung between tenement windows and fire escapes, *Yard of a Tenement at Park Ave. and 107<sup>th</sup> Street, New York* (Detroit: Detroit Publishing Company, 1900, Library of Congress Prints and Photographs Division, <http://hdl.loc.gov/loc.pnp/det.4a28182>)



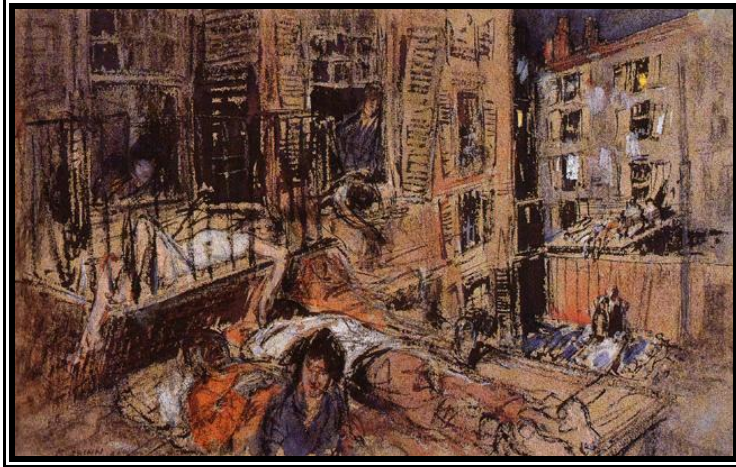
**Figure 28:** Hill's Famous Clothes Dryer for hanging laundry on the fire escape (*New York Times*, Display Ad 11 – No Title, August 4, 1906. Proquest Historical Newspapers, <http://proquest.umi.com>)



**Figure 29:** Tenement dwellers pour onto the streets and fire escapes for fresh air, Anthony, *A Not Night on the East Side*, 1899 (New York Public Library Digital Collection, Mid-Manhattan Picture Collection, Digital ID: 801547, <http://www.nypl.org/digital/index.htm>)



**Figure 30:** Plants adorn a fire escape balcony, *Apartment Houses and Business on the East Side, New York City*, c. 1901 (New York Public Library Digital Collection, Mid-Manhattan Picture Collection, Digital ID: 801445, <http://www.nypl.org/digital/index.htm>)

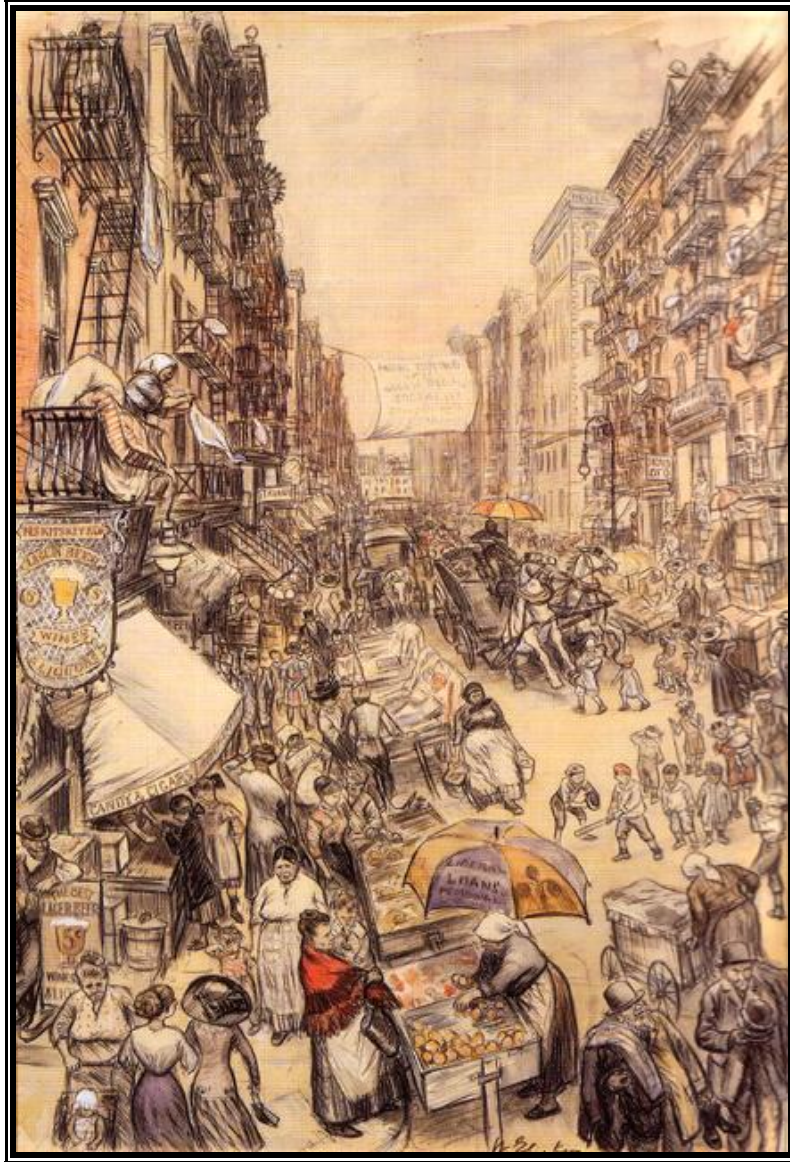


**Figure 31:** Everett Shinn, *Tenements at Hester Street*, 1900 (Rebecca Zurier, Robert W. Snyder and Virginia M. Mecklenburg, *Metropolitan Lives: the Ashcan Artists and Their New York*. Washington, D.C.: National Museum of American Art, 1995: 105.)

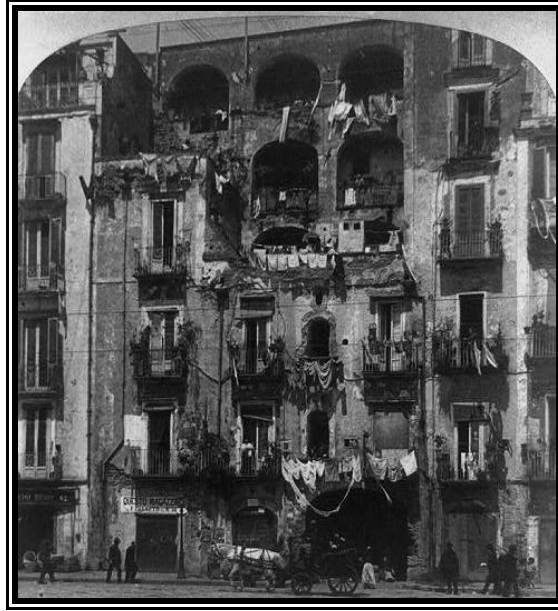


**Figure 32:** Children play in the street in a tenement district, Lewis Wickes Hine, *Congestion, Orchard Street, NY*, c. 1905-1938 (New York Public Library Digital Collection, Photographs Concerning Labor, Housing and Social Conditions in the United States, L.W. Hine Collection, Digital ID: 416563, <http://www.nypl.org/digital/index.htm>)





**Figure 33:** William Glackens, *Far From the Fresh Air Farm*, 1911. (Rebecca Zurier, Robert W. Snyder and Virginia M. Mecklenburg, *Metropolitan Lives: the Ashcan Artists and Their New York*. Washington, D.C.: National Museum of American Art, 1995.)



**Figure 34:** Tenement house in Naples, Italy Griffith and Griffith, *A Residence in the Old Part of Naples, Italy*, c.1902 (Library of Congress Prints and Photographs Division, <http://hdl.loc.gov/loc.pnp/cph.3b39516>)



**Figure 35:** William Glackens, *Patriots in the Making*, 1907. (Rebecca Zurier, Robert W. Snyder and Virginia M. Mecklenburg, *Metropolitan Lives: the Ashcan Artists and Their New York*. Washington, D.C.: National Museum of American Art, 1995: 122.)



**Figure 36:** Festivities on Mott Street in Little Italy, *Mott Street Decorated for Fiesta*, 1908 (Library of Congress Prints and Photographs Division, <http://www.loc.gov/rr/print/catalog.html>)



### Chapter 3: Fire Escape Patents

Prior to 1860, the iron balcony and ladder fire escape did not appear to have been prevalent. The 1860 law in New York City that required fire escapes on tenement houses specified the use of exterior balconies connected by fire proof stairs or ladders. As there had not been any standard fire escapes in use prior to this time, other than the roof scuttle, specifications for the design and construction of said fire escapes were not detailed in the ordinance. Numerous devices were soon patented, attempting to answer the needs of the city. Although the majority of the patents issued never came into use, several designs incorporated various ideas for balconies and stairs or ladders.

May 22, 1860, Henry O. Baker and James McGill, both of New York City patented a fire escape design that closely resembles the requirements of the 1860 law, which was enacted only one month prior (Figure 37). According to their patent description: “The nature of [the fire escape] consists in providing a series of adjustable or stationary stairs, steps, or ladders, with or without single or double folding guards or balusters, in connection with balconies upon the outside of the buildings, to be used as a means of egress or escape from buildings when on fire or upon an alarm of fire.”<sup>182</sup> The design incorporated nearly all the major components of the traditional exterior iron balcony fire escape. In the patent, the balconies are not discussed with any specification, although the image illustrates a typical long balcony taking in several windows. The method of drop stairs between balconies is discussed, although the specifics of their construction is left open-ended. Angled stairs in their lowered position, as shown in the sketch, extend at roughly a forty-five degree angle. Stairs are hinged to the underside of each balcony, and a rope, chord or chain extends off the foot of the stairs, securing them to the balcony above. A reel controls the raising and lowering of the stairs. Rope or chain netting may be employed to safely guard the staircase when lowered, as seen in the upper portion of the illustration.<sup>183</sup> The rope, chain or chord used to raise the stairs closely resembles the pulley system that would later be utilized for raising and lowering the stairs from the lowest balcony to the ground.

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<sup>182</sup> Henry O. Baker and James McGill, Patent No. 28,340 for Fire-Escape (May 22, 1860)

<sup>183</sup> Ibid.

After the introduction of the balcony fire escape, several patents were issued attempting to improve on the design. March 31, 1868, John Parr, of New York City, patented a balcony fire escape design without drop stairs (Figure 38). Parr utilized balconies with an enclosed ladder affixed to the wall of the building connected to the side of the balconies. Doors in the side of the balconies open into the enclosed ladder unit, allowing a safe descent away from the flames. The idea was a precursor to the enclosed fireproof stairways and stair towers employed in later years.<sup>184</sup>

After the 1862 amendment to the fire escape law in New York City, which removed any specific reference to balcony fire escapes and allowed the term “fire escape” to be open to interpretation, dozens of patents were issued annually for bizarre contraptions. Ropes, slides, baskets, chutes, chains and automatic ladders were patented and demonstrated in the streets of New York City. Not until the 1880s did balcony and ladder fire escapes receive significant attention by inventors.

Several different patents for drop ladders and stairs connecting balconies appeared in the 1880s. Although fixed stairs and ladders were the accepted method for descending between balconies, many did not like the obtrusiveness of the stairs, the disfigurement to the building façade, or the ease in which intruders could ascend to their windows. Felice Tocci, of New York City, patented his fire escape on October 19, 1880, hoping to answer the concerns of New York citizens (Figure 39). Tocci’s design incorporates iron balconies, but the floor of the balcony doubles as a ladder. Two brackets support the ladder from beneath, and a rope or chain runs from the bottom step up to the corner of the balcony above. One could step out on the fixed portion of the balcony floor, release the support brackets and lower the stairs via a pulley. The stairs lower onto the railing of the balcony below. Tocci description states: “As the balconies can be made vary ornamental and the stairs are not seen, the within described fire-escape will not mar the appearance of the building, as the fire-escapes as constructed at present do.”<sup>185</sup>

In a similar design, Alphonse T. Cwerdinski, of Saint Louis, Missouri, patented a drop ladder fire escape on September 13, 1881 (Figure 40). In Cwerdinski’s design, the floor is not composed of the fire escape ladder, but the ladder is elevated and affixed

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<sup>184</sup> John Parr, Patent No. 76,097 Fire Escape (March 31, 1868)

<sup>185</sup> Frank Tocci, Patent No. 233,578 Fire Escape, October 19, 1880.

beneath the floor of the balcony. The ladder is accessible via a trapped door, fastened shut, in the balcony floor. When opened the ladder releases and drops, allowing descent. The door and ladder are counterbalanced to provide easy lowering and raising when the door opens and closes. This design improves the safety of the traditional design, as children cannot fall through the opening in the balcony floor. Cwerdinski also cited in his description the more aesthetically pleasing design and the safety of prohibiting intruders to ascend the fire escape.<sup>186</sup> James Taylor, of New York City, patented a similar design June 3, 1884. He also employed a trap door in the balcony floor. However, rather than the ladder dropping automatically as the trap door opens, the ladder is attached to a pulley and is released with a lever set into the balcony floor.<sup>187</sup>

John Batten of Detroit, Michigan, patented his Automatic Fire Escape on September 2, 1884 (Figure 41). Batten's idea consists of balconies at each floor with ladders raised when not in use. The uniqueness of his design is found within the method of lowering the ladders. When a lever is pulled on one balcony, all the ladders on every balcony, connected by cables, will lower at once. However, all the ladders on the balconies above will stay in the horizontal position. A person on the ground floor may also pull a lever within the building itself that will release all the ladders at once. Therefore, burglars cannot pull the lever and ascend the ladders.<sup>188</sup>

Patents involving unfixed stairs or ladders never became an accepted fire escape design. Safety was a concern with stairs that were not fixed. The time it would take to lower stairs was precious time wasted in an emergency, and one may not have their senses together in a panic to properly release the devices. As well, it would be dangerous for people on lower balconies when ladders may come down upon their heads. As for intruders ascending fire escapes, having a raised ladder or stairs from the ground to lowest balcony would be suitable to prevent such crime. The disfigurement of the building façade was still a concern for many, but lawmakers had little concern for matters of aesthetics.

Several patents were issued involving fixed ladders between balconies. John B. Wickersham of Philadelphia, Pennsylvania, patented on October 3, 1882, a system of

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<sup>186</sup> Alphonse T. Cwerdinski, Patent No. 246,871 Fire-Escape, September 13, 1881.

<sup>187</sup> James Taylor, Patent No. 299,595 Fire-Escape, June 3, 1884.

<sup>188</sup> John Batten, Patent No. 304,596 Fire Escape, September 2, 1884.

balconies with an adjacent ladder fixed to the masonry wall (Figure 42). Wickersham placed his ladder off to the side and devises a balcony floor. The design allows for a lighter balcony and a safer, light permitting floor. Wickersham devised a floor of iron wire or netting with a cross-hatch pattern that allows light to enter, snow and ice to fall through, and traction for safety. The design solves problems of large, cumbersome escapes while still being practical. The light balcony is not as disfiguring and the secure ladder is easier and quicker to descend than lowering the stairs from balcony to balcony.<sup>189</sup> Many fire escapes actually did employ ladders fixed to the side of the building, although many building codes eventually deemed them unsafe.

Hugo Kafka of New York City patented on January 1, 1884, a very ornamental fire escape design (Figure 43). He too utilized fixed straight ladders from balcony to balcony. The ladders are masked behind an intricate and decorous iron latticework. Decorative, detailed balconies span the width of the windows on each floor. Ladders are fixed at each end of the balcony running down to the next balcony, perpendicular to the wall of the building. A decorative latticework is placed on the outside of the ladder, shielding it from view and perpendicular to the ladder on the front of the balcony. The construct would provide a decorative addition to a building façade while protecting its tenants. The latticework panels would also provide additional security for the ladders, as they are attached at intervals. Kafka stated: “A fire-escape constructed according to my improved method...presents an ornamental appearance, especially when its design is in keeping with the architecture of the building.”<sup>190</sup> The design seems too large and costly to have caught on but was a precursor to the many ornamental balconies that were erected as fire escapes.

As a precursor to fireproof stairs, two designs were patented in the 1880s involving balconies connected with interior egress. John L. MacDonald of Shakopee, Minnesota, patented his design on July 1, 1884, for balconies attached to the outsides of buildings to communicate directly with an interior fireproof stair shaft. The shaft is accessible only with the balconies or interior hallways.<sup>191</sup> Similarly, William F. Cullen of Logansport, Indiana, patented a design on September 2, 1884, for balconies connecting

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<sup>189</sup> John B. Wickersham, Patent No. 265,551 Fire-Escape Balcony, October 3, 1882.

<sup>190</sup> Hugo Kafka, Patent No. 291,198 Fire-Escape, January 1, 1884.

<sup>191</sup> John L. MacDonald, Patent No. 301,138 Fire-Escape, July 1, 1884.

with an enclosed fireproof “compartment” accessible through the interior and connected with fireproof doors. Fireproof stairs descend on the interior to the ground floor.<sup>192</sup>

Several unique balcony patents also were issued in the nineteenth century, none of which became accepted as fire escape designs. Robert Stevenson of Ferrysburg, Michigan, patented on January 29, 1884, a balcony and ladder fire escape that folds up against the wall of the building (Figure 44). A rod running beneath the windows allows release of the balcony floor, and when the floor is lowered, the balcony railing automatically swings up. The ladders are folded up underneath the balcony and can lower when the balcony is lowered. The underside of the contraption can be used as a signboard for businesses when in the raised position.<sup>193</sup> Once again, the design fails in safety, as it would require too much time to unfold in an emergency.

Alfred Williams of Philadelphia, Pennsylvania, patented on June 13, 1882, a movable fire escape (Figure 45). He utilized the balcony and fixed ladder fire escape but incorporated horizontal guide rails across the building to move the fire escape unit from one end of the facade to the other, accessing any window that would need the unit. A chain connects to a pulley that can be manipulated from the ground and moved to whatever window necessary.<sup>194</sup> The fire escape succeeds in allowing all tenants access. Fire escapes often failed to be provided on every window or be accessible to all persons within the building. However, this design fails to allow all tenants to access the unit at once at a time when people from numerous windows would require emergency egress. Cleophas Monjeau of Middletown, Ohio, patented on March 10, 1885, a similar design to Williams’ (Figure 46). He provided one balcony on an elaborate pulley system. The balcony rests at one window and can be raised and lowered to access any window in an emergency.<sup>195</sup> Like Williams’ idea, it does not provide ample escape.

By the 1900s, the number of fire escape patents each year dwindled. Safety measures dictated that fixed stairs from balcony to balcony be utilized and use of drop stairs only be provided from the lowest balcony. Simple pulley and counterweight systems for lowering the stairs were implemented. The large manufacturing companies

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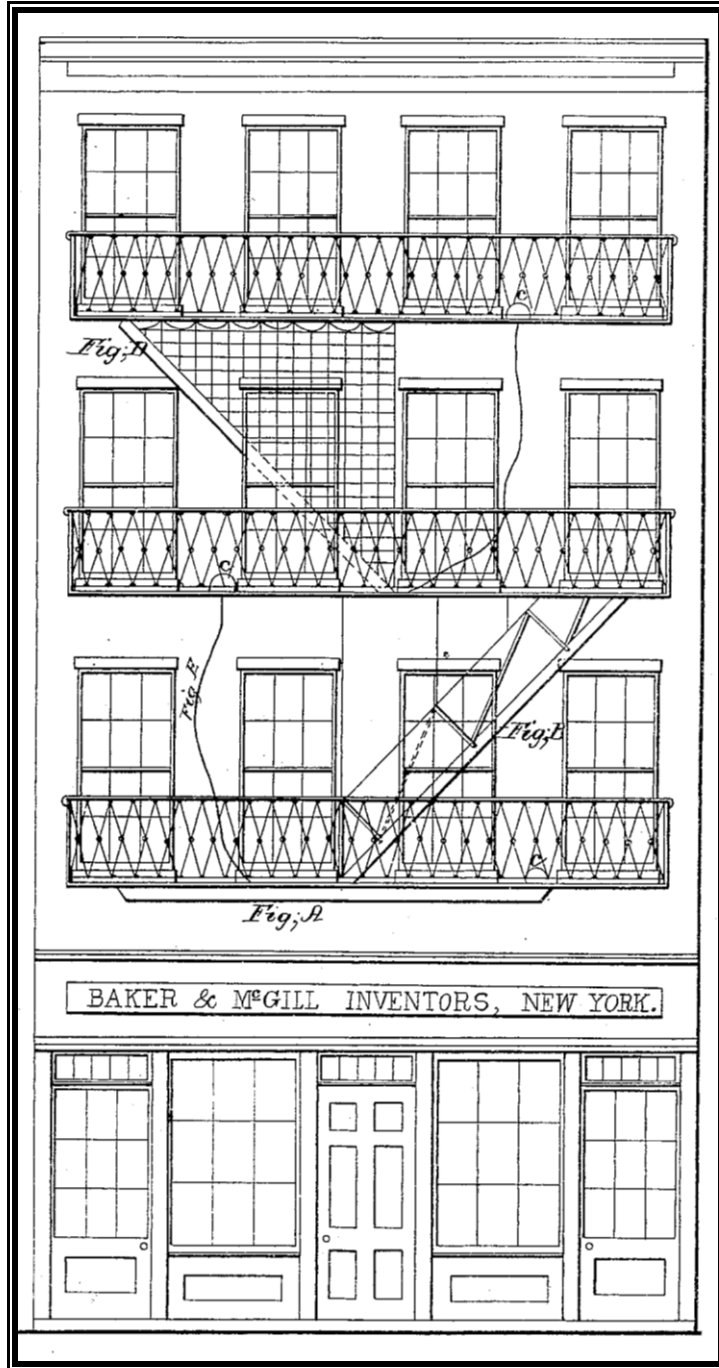
<sup>192</sup> William F. Cullen, Patent No. 304,619 Fire-Escape, September 2, 1884.

<sup>193</sup> Robert Stevenson, Patent No. 292,767 Fire-Escape, January 29, 1884.

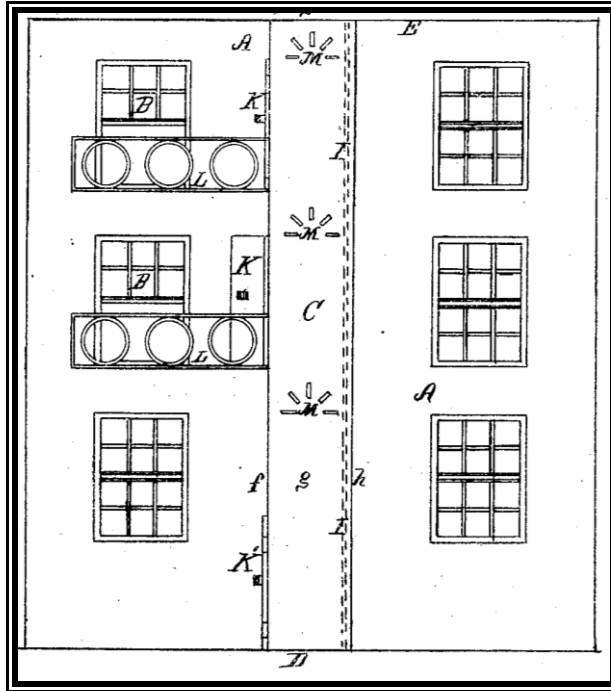
<sup>194</sup> Alfred Williams, Patent No. 259,622 Fire-Escape, June 13, 1882.

<sup>195</sup> Cleophas Monjeau, Patent No. 313,511, March 10, 1885.

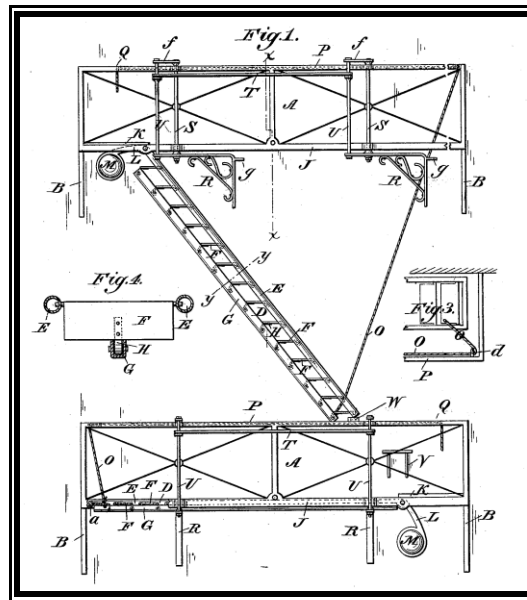
for fire escapes, as discussed in the next chapter, developed their own designs based upon the building code requirements.



**Figure 37:** 1860 Baker and McGill Patent Fire-Escape (United States Patent and Trademark Office Full Text and Image Database, <http://patft.uspto.gov/netahtml/srchnum.htm>)



**Figure 38:** 1868 Parr Patent Fire Escape (United States Patent and Trademark Office Full Text and Image Database, <http://patft.uspto.gov/netahtml/srchnum.htm>)



**Figure 39:** 1880 Tocci Patent Fire Escape (United States Patent and Trademark Office Full Text and Image Database, <http://patft.uspto.gov/netahtml/srchnum.htm>)



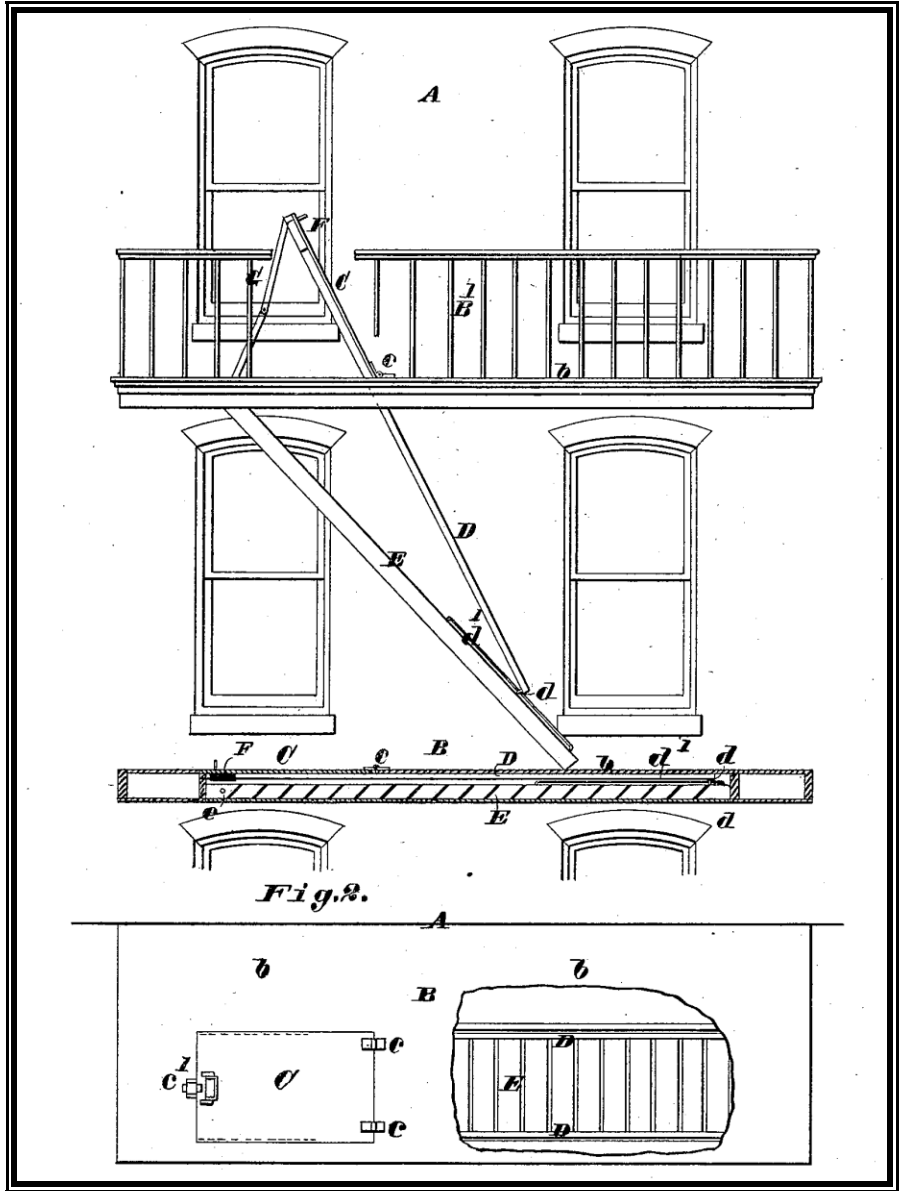
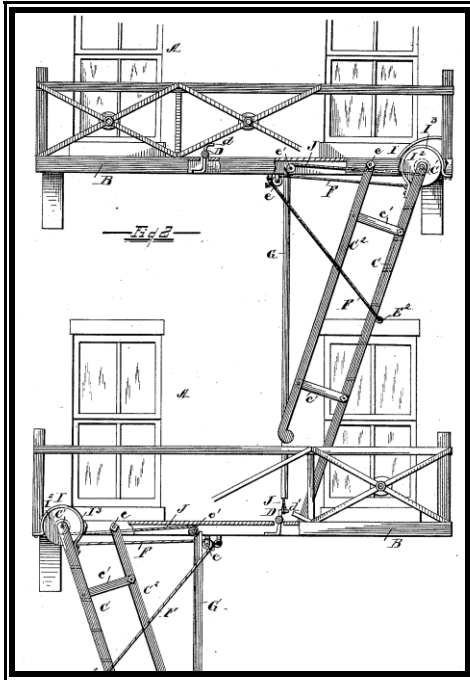
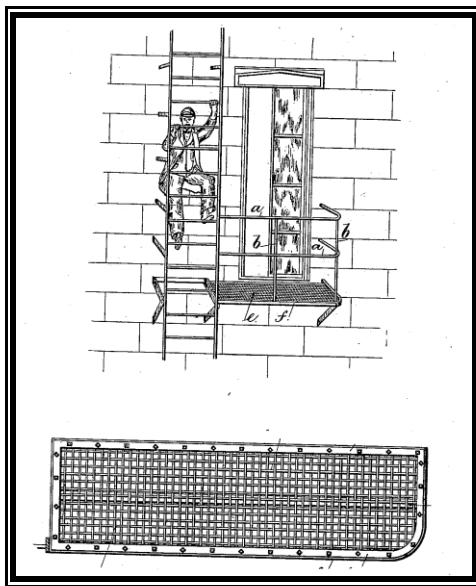


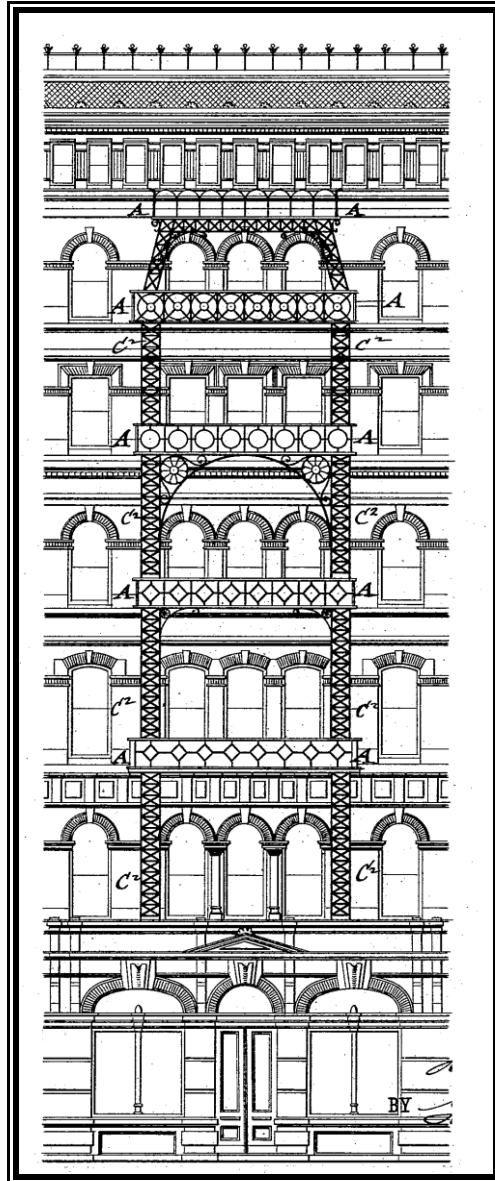
Figure 40: 1881 Cwerdinski Patent Fire Escape (United States Patent and Trademark Office Full Text and Image Database, <http://patft.uspto.gov/netahtml/srchnum.htm>)



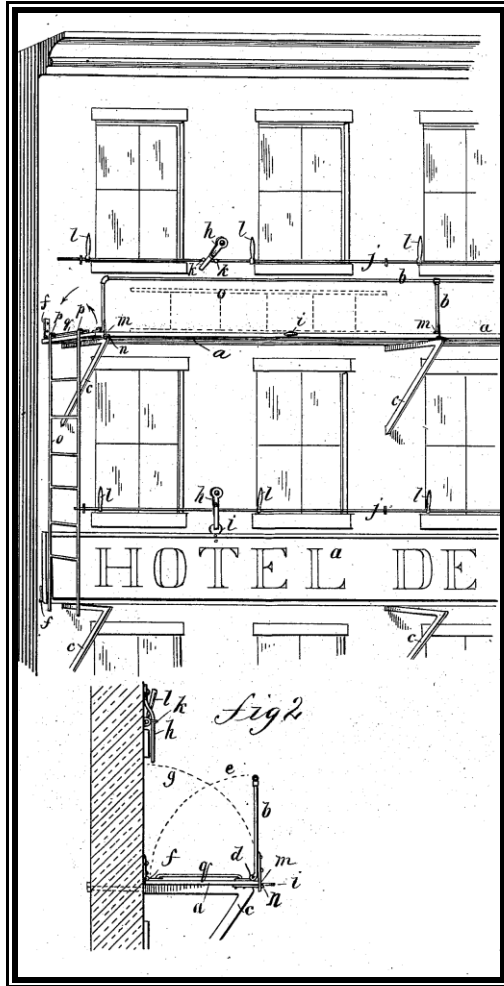
**Figure 41:** 1884 Batten Patent Fire Escape (United States Patent and Trademark Office Full Text and Image Database, <http://patft.uspto.gov/netahtml/srchnum.htm>)



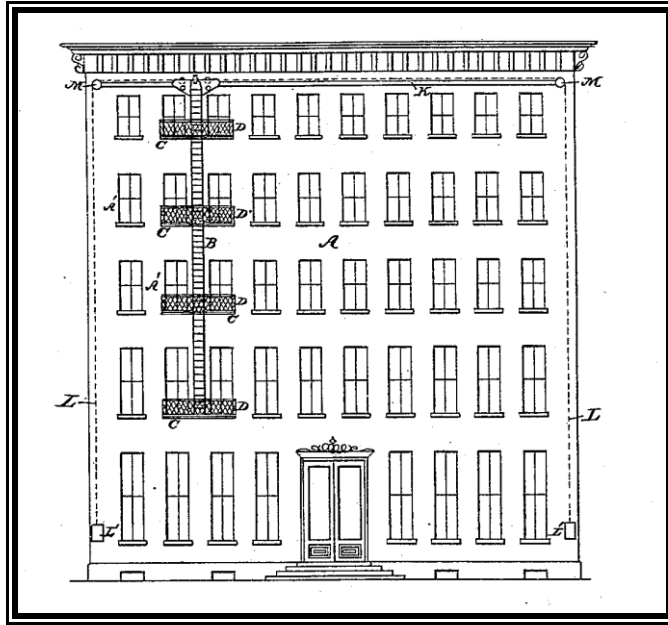
**Figure 42:** 1882 Wickersham Patent Fire Escape (United States Patent and Trademark Office Full Text and Image Database, <http://patft.uspto.gov/netahtml/srchnum.htm>)



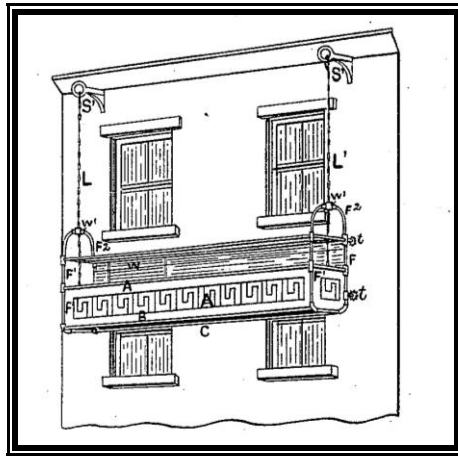
**Figure 43:** 1884 Kafka Patent Fire Escape (United States Patent and Trademark Office Full Text and Image Database, <http://patft.uspto.gov/netahtml/srchnum.htm>)



**Figure 44:** 1884 Stevenson Patent Fire Escape (United States Patent and Trademark Office Full Text and Image Database, <http://patft.uspto.gov/netahtml/srchnum.htm>)



**Figure 45:** 1882 Williams Patent Fire Escape (United States Patent and Trademark Office Full Text and Image Database, <http://patft.uspto.gov/netahtml/srchnum.htm>)



**Figure 46:** 1882 Monjeau Patent Fire Escape (United States Patent and Trademark Office Full Text and Image Database, <http://patft.uspto.gov/netahtml/srchnum.htm>)

## Chapter 4: Fire Escape Manufacture and Design

### Part 1: The Companies

Not many cities developed fire escape ordinances as early or as succinctly as New York City. The need for national companies did not exist, and builders acquired iron fire escapes from local manufacturers. It is unlikely that trade catalogs for the small, local companies were distributed. Early tenement house fire escapes had generally the most basic design, minimally constructed to meet the needs of the building codes. Often the balconies and ladders required immediate construction, and the local construction companies or companies specializing solely in fire escapes would hammer out the order in little time. Manufacturers of ornamental ironwork joined in the production of fire escapes, working with building owners who desired a more decorative structure for their hotel, theatre or fashionable apartment house. Advertisements for companies dealing in fire escapes appear in local newspapers and city or state building code publications. However, these advertisements do not generally appear until the early part of the twentieth century. Most likely, little competition existed prior to this time. Research uncovered the following companies from New York City and vicinity:

- *Hartford Construction Company*: architectural and ornamental ironworks; fire escapes, stairs and beam work a specialty (Figure 47).<sup>196</sup>
- *New Haven Fence and Fire Escape Company*: structural and ornamental iron work for buildings, beams, channels, anchors, plates, and stirrups (Figure 48).<sup>197</sup>
- *Robert Wilson and Son of New Haven*: dealers and manufacturers structural and ornamental ironwork, including fire escapes (Figure 49).<sup>198</sup>

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<sup>196</sup> *Official Building and Plumbing Ordinance for Hartford, New Haven, Waterbury and New Britain* (New Haven: A.W. Harris, 1914, 9.

<sup>197</sup> *Ibid.*

<sup>198</sup> *Ibid.*, 187.

- *Thomas Dimond of New York City*: iron work for buildings; manufacture and repair of iron guards, doors, shutters, railings and fire escapes (Figure 50).<sup>199</sup>
- *Berlin Construction Company of Berlin, CT, New York City and Springfield, Massachusetts*: all kinds of steel work for buildings, including fire escapes, balconies and ladders (Figure 51).<sup>200</sup>
- *Central Iron Works of New York City*: fire escapes and exterior stairs (Figure 52).<sup>201</sup>

By the 1890s, nearly every major U.S. city enacted fire escape legislation modeled after New York's. Fire escapes in the late nineteenth and early twentieth centuries were in great demand around the country in cities and smaller towns. Dozens of large iron works companies, specializing in ornamental and architectural iron work, began manufacturing fire escapes on a large scale. Although it is difficult to confirm every company that was producing fire escapes at that time, the available evidence supports the theory that companies were generally located in the Midwestern United States. Sprawling iron and steel factories dotted the Midwestern landscape, particularly around the Great Lakes where the open flat lands and access to waterways were conducive to the large scale industry.

Detroit, Michigan, had a large industrial base, and several iron works companies existed during the late nineteenth and early twentieth centuries. E.T. Barnum Wire and Iron Works is the most notable. Eugene T. Barnum opened his business out of a small storefront on Woodward Avenue in Detroit, in 1866 (Figure 53).<sup>202</sup> He originally sold a limited amount of ornamental wire works items. By 1886, his company was one of the largest in the world, operating out of a huge riverfront factory in Detroit. Employing over 700 clerks and salesmen, E.T. Barnum manufactured all types of wrought iron goods, including fire escapes, jail cells, theatre marquees, fences, lawn furniture, gates,

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<sup>199</sup> *New York Times*, Display Ad 19 – No Title, July 26, 1907.

<sup>200</sup> Courtesy of Smithsonian Institution, National Museum of American History Archives

<sup>201</sup> *New York Times*, Display Ad 33 – No Title, May 23, 1915.

<sup>202</sup> David Lee Poremba, *Detroit: City of Industry* (Chicago: Arcadia Publishing, 2002), 49.

flowerpot stands and vases.<sup>203</sup> The company was eventually awarded membership in the National Association of Ornamental Iron and Bronze Manufacturers. E.T. Barnum shipped their goods, including fire escapes, to all parts of the country. Trade catalogs advertised dozens of different designs for all types of buildings, made to the specifications of any city's requirements. Testimonials from satisfied customers line the pages of their catalogs, illustrating the wide range of the company. E.T. Barnum solicited correspondence from architects, builders, and contractors who may want to purchase products.

John Edward Bolles was employed by E.T. Barnum until 1881, at which time he started up his own business. Originally J.E. Bolles and Company, the name was changed to J.E. Bolles Iron and Wire Works in 1897, manufacturing both plain and ornamental ironwork. The company moved to new factory facilities in 1909, with an addition for the Architectural Iron Department in 1912, accommodating their rapidly growing national and international trade (Figure 54).<sup>204</sup> J.E. Bolles designs closely mimic those advertised for the E.T. Barnum company. Having worked with E.T. Barnum for several years and competing closely in the same market, it is no surprise that similar designs would be produced.

Union Steel Screen Company originally formed in Battle Creek, Michigan, in 1902, working out of a small building. In 1904, they moved to Jackson and then on to Albion in 1905. The company originally manufactured two products: sand screens and oven racks. By 1915, it widely expanded its inventory and changed its name to Union Steel, becoming the largest factory of its kind in the world (Figure 55).<sup>205</sup> The company continued its operation until 1995, being a significant employer for and integral part of the small town of Albion, Michigan.<sup>206</sup> Also working out of Michigan, Union manufactured designs close in appearance and construction to E.T. Barnum and J.E. Bolles.

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<sup>203</sup> Ibid.

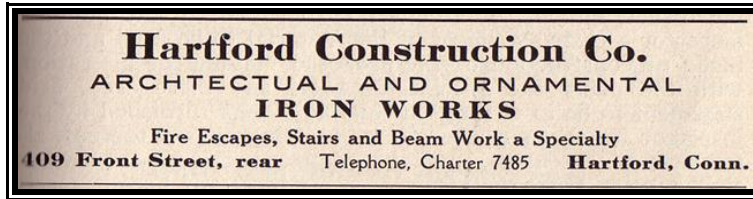
<sup>204</sup> J.E. Bolles Wire and Iron Work, Trade Catalog (Detroit: The Firm, 1913), 1.

<sup>205</sup> Union Steel, Trade Catalog, (Albion, Michigan: The Firm, c. 1920), 1.

<sup>206</sup> *Albion Recorder*, "Union Steel Originally Located Just West of Downtown Albion," November 17, 1887, Historical Albion, [http://www.albionmich.com/history/histor\\_notebook/R971117.shtml](http://www.albionmich.com/history/histor_notebook/R971117.shtml) (accessed October 24, 2005).



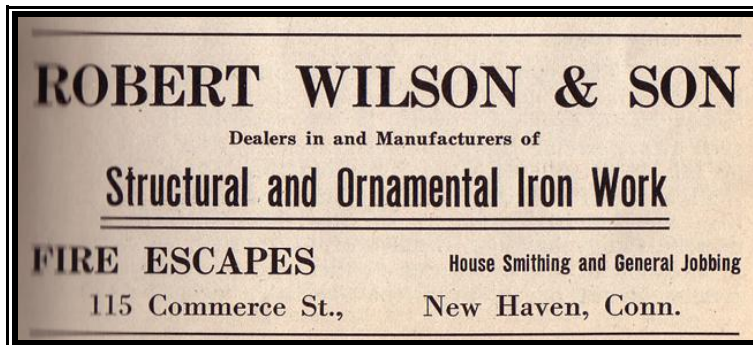
Trade catalogs from William Heffner Iron and Steel Works of Minneapolis, Minnesota; Austin Brothers Steel of Dallas, Texas; and Arrowhead Grating, of Kansas City, Missouri, were obtained. Columbia Wire and Iron Works of Canton, Ohio; Van Dorn Iron Works of Cleveland, Ohio; Capital City Ornamental Iron, Wire and Brass Works of St. Paul, Minnesota; F.W. Krenz and Company, of Stockton, California; W.A. Snow Iron Works, Inc. of Boston; and Giant Manufacturing Company of Council Bluffs, Iowa, all manufactured fire escapes in the early twentieth century, although trade catalogs for the products could not be located. It would be safe to assume, however, that designs are similar to those being manufactured by E.T. Barnum. The list also serves as evidence that the Midwest was a heavy manufacturer of fire escapes.



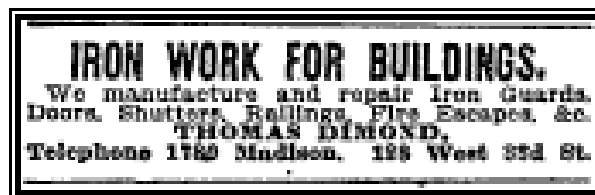
**Figure 47:** Hartford Construction Company (*Official Building and Plumbing Ordinance for Hartford, New Haven, Waterbury and New Britain.* New Haven: A.W. Harris, 1914: 187)



**Figure 48:** New Haven Fence and Fire-Escape Company (*Official Building and Plumbing Ordinance for Hartford, New Haven, Waterbury and New Britain.* New Haven: A.W. Harris, 1914: 9)



**Figure 49:** Robert Wilson and Son (*Official Building and Plumbing Ordinance for Hartford, New Haven, Waterbury and New Britain.* New Haven: A.W. Harris, 1914: 9)



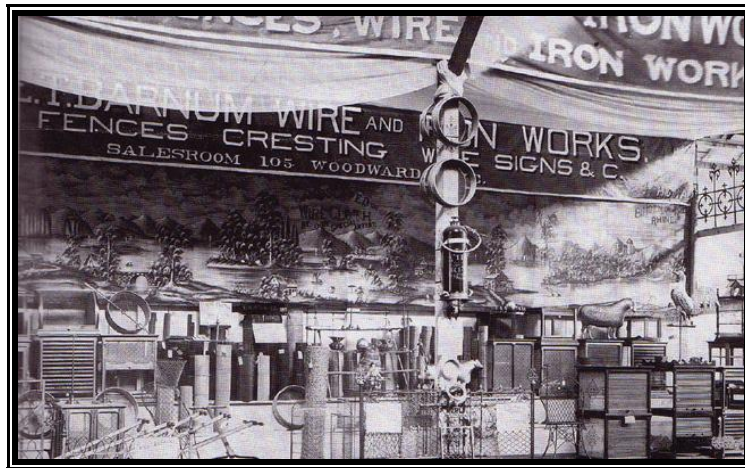
**Figure 50:** Thomas Dimond (*New York Times, Display Ad 19 – No Title, July 26, 1907.*)



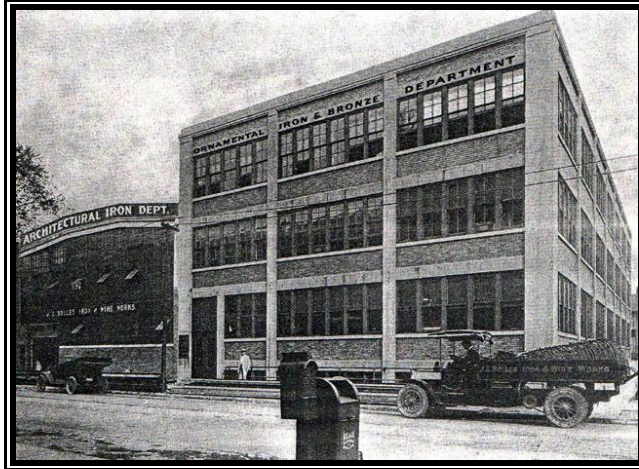
**Figure 51:** Berlin Construction Company (Smithsonian Institution, National Museum of American History Archives)



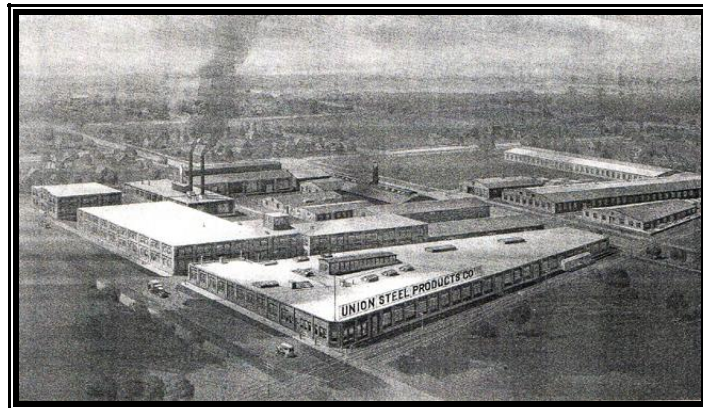
**Figure 52:** Central Iron Works (*New York Times*, Display Ad 33 – No Title, May 23, 1915.)



**Figure 53:** E.T. Barnum storefront on Woodward Avenue in Detroit (David Lee Poremba, *Detroit: City of Industry*. Chicago: Arcadia Publishing, 2002: 49)



**Figure 54:** J.E. Bolles new factory in Detroit (J.E. Bolles Wire and Iron Work, *Sectional Catalogue*. Detroit: The Firm, 1913: 1)



**Figure 55:** Union Steel factory in Albion, Michigan (Union Steel, *Trade Catalogue*. Albion, Michigan: The Firm, c. 1920: 1)

## Part 2: Fire Escape Construction

Early fire escapes were often constructed of cast iron. By the twentieth-century building codes required wrought-iron fire escapes, which remained the dominant material. Cast iron is more resistant to corrosion than wrought iron and has a higher heat resistance. On the downside, its weakness under tension causes failure without little warning. Although possessing a high heat and corrosion resistance, the members can fracture easily and become brittle with age. Wrought iron is strong in tension and is tough with a high fatigue resistance, tending not to wear rapidly with age. On the downside, wrought iron is not as heat resistant, tending to warp and become misshapen. Wrought iron is less corrosion resistant and weak in compression.<sup>207</sup>

The changeover from cast iron to wrought iron may pertain to the types of stresses placed upon the fire escape. Balconies and staircases are bolted into the masonry wall of the structure, supported by wrought iron brackets. An iron bar extends off the tip of the bracket, anchoring it to the top railing of the balcony (Figure 56). Many modern fire escapes have legs that extend all the way to the ground, supporting the weight and working in compression. Historically fire escapes had been hung on the side of the building, the brackets and building wall supporting the weight of the structure. Weight upon the balcony platforms and stair treads would pull the structural members into tension. Such stresses would fare better on wrought iron than cast iron. Additionally, years of wear and heat would cause the cast iron to become brittle.

The exterior iron fire escapes usually consist of balconies at each floor connected by stairs or ladders, but occasionally stairs connected by landings appeared on smaller structures. A fixed staircase or drop ladder accesses the ground from the lowest balcony. Several basic components make up nearly all fire escapes designs. The balcony is comprised of: the floor, stringers, railings, brackets and well-hole. The fixed stairs are comprised of: treads, handrails, and risers. Drop ladders are comprised of: a straight ladder with a pulley and counterweight system or an angled ladder with a hinge and counterweight system. Parts were often bolted together, but wrought iron could be riveted

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<sup>207</sup> John and Nicola Ashurst, "Metals" *English Heritage Technical Handbook 4* (New York: Halsted Press, 1988), 20-1.

or heat welded to provide a well-sealed joint. A detailed description and illustration of each part follows:

*Balcony:* The balcony is generally rectangular, but decorative units with rounded edges appeared on more fashionable buildings. Balconies range from very rudimentary and practical to highly ornate. Height, width and length vary depending on needs, and balconies were designed to extend across any number of windows (Figure 57).

*Floor:* The floor of the balcony is usually constructed of iron or steel bars bolted to stringers, defined below. Early floors were often constructed with wood slats running the width of the balcony.

*Stringers:* Stringers make up the balcony floor on most fire escapes. They are straight, narrow members that are laid flat across the width of the balcony. The space between the stringers prohibits precipitation collecting on the fire escape. Additional beams run lengthwise across the floor, intersecting the stringers and providing support (Figure 58).

*Railings:* The railings run around the perimeter of the balcony and, although they vary based on individual regulations, generally rose to a height of three feet. The upper railing connects to a lower railing that rises a few inches above the balcony floor. Vertical rungs connect the upper and lower railings with each other and with the balcony floor. Basic fire escape designs employ only a series of rungs to enclose the balcony. Advanced designs utilize diagonally intersecting cross-braces for advanced support, and more ornate designs incorporated a wide range of decorative patterns along the balcony enclosure (Figure 59).

*Brackets:* Brackets are through-bolted into the masonry wall of the building to support the balcony. Occasionally a bracket will be placed half way down a fixed staircase for additional support. Brackets also range from functional to decorative (Figure 60).



*Well-hole:* The well-hole is a rectangular void cut into the balcony floor from which ladders or stairs extend. Persons descending the fire escape pass through the well-holes from one level to the next. Well-holes either alternate from one end to another on successive balconies or all situate on one end of the fire escape, allowing a straight descent (Figure 61).

*Fixed Stairs:* Fixed stairs are a set of slanting iron stairs that connect each balcony. The angle of the stairs varies from a shallow forty-five degree angle, usually extending from the end of one balcony to the opposite end of the next, to a steep angle that extends almost vertically.

*Risers:* The risers are the vertical members connecting the stair treads. Generally they are of a wide, heavy design to effectively support loads.

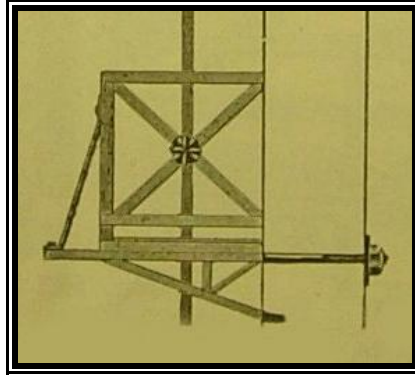
*Handrails:* The handrail runs up the outer edge of the stairs, providing support for persons descending. Often only one handrail runs the length of the stairs, but for safer fire escapes, one or two other lower handrails were provided to prohibit persons from falling through. Vertical members connect the handrails to the risers, defined below (Figure 62).

*Treads:* The steps on the stairs are referred to as treads. The treads have a textured surface to provide traction and to discourage snow and ice accumulation. The width and rise, the height of each tread, varies based on individual specifications (Figure 63).

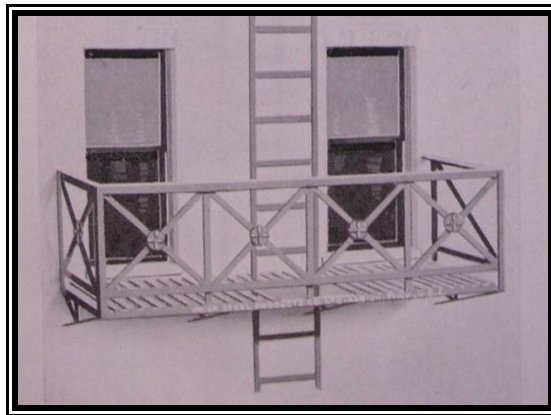
*Swinging Drop Ladders:* Drop ladders provide access from the lowest balcony to the ground. An angled ladder of staircase is hinged to the lowest balcony. A counterbalance system allows the ladder to remain in an elevated, horizontal position when not in use and quickly drop to the ground in an emergency. The weights either extend off the back of the hinged portion of the ladder, balancing the weight; or they are connected to a cable that runs over a pulley and connects to the bottom of the ladder, allowing the ladder to be pulled up and down (Figure 64).

*Sliding Drop Ladders:* Sliding drop ladders also provide access from the lowest balcony to the ground. A straight ladder is attached to a counterweighted pulley system, allowing it to be pulled vertically up from the ground when not in use (Figure 65).

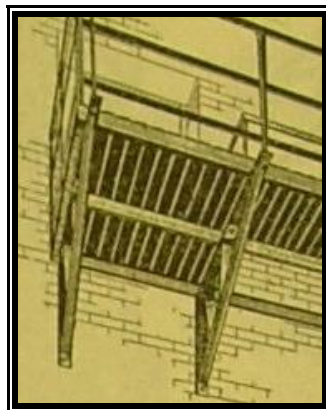




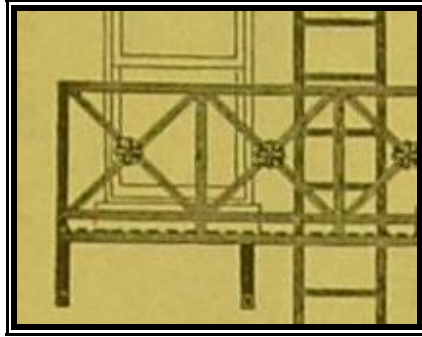
**Figure 56:** Brackets are bolted into the wall and anchored to the balcony railing (E.T. Barnum Wire and Iron Works, *No. 178-E Fire Escape Supplement*. Detroit: The Firm, 1912: 6)



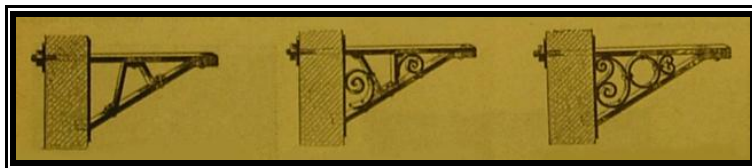
**Figure 57:** Typical fire escape balcony taking in two windows (Union Steel, *Trade Catalogue*. Albion, Michigan: The Firm, c. 1920: 10)



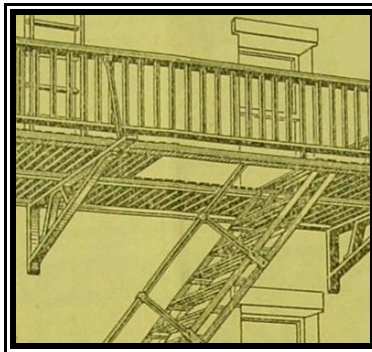
**Figure 58:** Balcony floor made up of steel stringers (E.T. Barnum Wire and Iron Works, *No. 734 Builder's Catalogue*. Detroit: The Firm, 1928: 14)



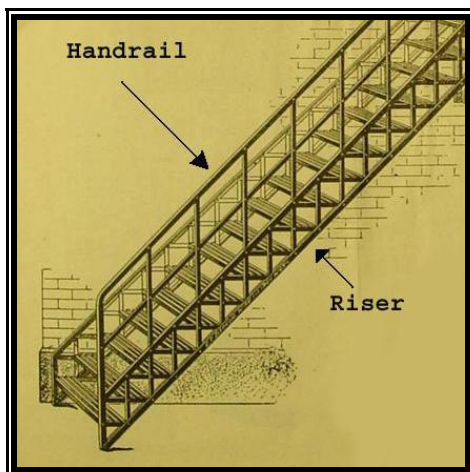
**Figure 59:** Cross-braced balcony railing (E.T. Barnum Wire and Iron Works, *No. 590 Builder's Catalogue*. Detroit: The Firm, 1921: 9)



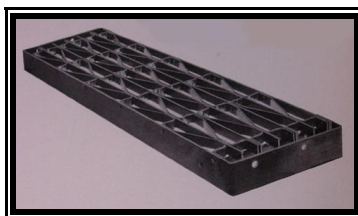
**Figure 60:** Varying styles of support brackets (E.T. Barnum Wire and Iron Works, *No. 774 Builder's Catalogue*. Detroit: The Firm, 1930: 12)



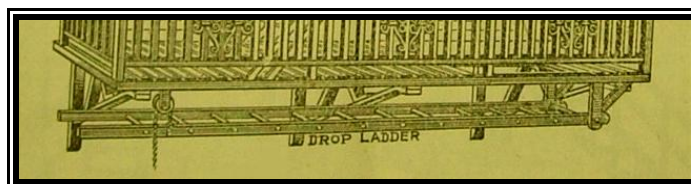
**Figure 61:** Well-hole in the balcony floor, allowing access to stairs (E.T. Barnum Wire and Iron Works, *No. 178-E Fire Escape Supplement*. Detroit: The Firm, 1912: 8)



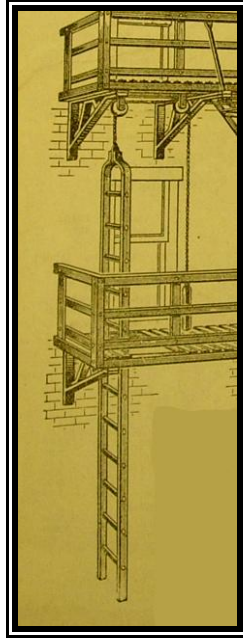
**Figure 62:** Handrails and risers on a set of slanting fire escape stairs (E.T. Barnum Wire and Iron Works, *No. 178-E Fire Escape Supplement*. Detroit: The Firm, 1912: 13)



**Figure 63:** Grated stair tread (Arrowhead Iron Works Incorporated. *Trade Catalogue*. Kansas City, MO: The Firm, 1935: 12)



**Figure 64:** Swinging drop ladder in the upright position while not in use (E.T. Barnum Wire and Iron Works, *No. 178-E Fire Escape Supplement*. Detroit: The Firm: 8)



**Figure 65:** Drop ladder attached to pulley system, raised while not in use (E.T. Barnum Wire and Iron Work. *No. 178-E Fire Escape Supplement*. Detroit: The Firm, 1912: 5)

### **Part 3: The Designs**

#### *E.T. Barnum Wire and Iron Works*

Many early, pre-1900 trade catalogs from E.T. Barnum do not advertise full fire escapes. Components for use in the construction of fire escapes are sold, including balconies, ladders, and brackets. By the turn-of-the-century, the company manufactured complete fire escapes in a large variety of size and design. Eventually, as the demand increased throughout the United States, E.T. Barnum published supplements exclusively devoted to fire escapes. The supplemental catalogs, complete with testimonials from satisfied customers, demonstrate the magnitude and popularity of that arm of their product line. Testimonials hail as far away as New Mexico, Idaho and Louisiana, primarily from elementary schools, colleges and universities. D.G. James in Richland Center, Wisconsin, praised, “The Fire Escapes bought of you were exactly as ordered, went together as they should. My customers are satisfied and so am I.”<sup>208</sup> The letter implies the possibility that other companies were ordering fire escapes directly from E.T. Barnum and reselling them locally or using them in construction projects. Trade catalogs from 1881 through 1930 were obtained, representing a wide spectrum of E.T. Barnum’s work. There is no record of E.T. Barnum trade catalogs after 1930, indicating the company may have gone out of business. The designs discussed in this section, however, span the heyday of the fire escape.

The 1895 Builder’s Catalog introduces the 400 series, one of the earliest complete fire escape designs manufactured by E.T. Barnum. No. 400 remained popular, with only slight modifications, through the 1920s. The design is simple but still maintains a decorative touch, and the construction provides a safe and easy device for descent. Widely spaced vertical rungs on the balcony railing intersperse with diagonal braces, the intersection of which has a small, floral medallion. Rudimentary brackets span the width of the balcony, securing it to the masonry wall. Wood slats compose the balcony floor. Fixed stairways extend from one end of a balcony to the opposite end of the next lowest balcony, passing through well-holes opposite window openings. Drop ladders can be

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<sup>208</sup> E.T. Barnum Wire and Iron Works, No. 178-E Fire Escape Supplement, 9.

furnished that extend from the lowest balcony to the ground. The specific details for measurements of the design in the early catalog are relatively unspecific. Later catalogs, in the early 1900s, provide more detailed specifications. The 464 Builder's Supplement, issued in 1902, introduces the 400-E model (Figure 66). The measurements in the 1902 catalog are based upon the code requirements of Michigan building laws and are relatively standard for building codes of other cities and states. Catalogs note, however, that designs can be manufactured to meet the specifications of any code. The following measurements were the standard for most E.T. Barnum designs and the designs of other fire escape manufacturers:

- Five foot wide balconies for one window; ten foot balconies for two windows
- Three brackets spaced five feet apart for ten foot balconies; the center bracket anchors to the outside of the balcony railing
- Twenty-four to thirty-six inch wide balconies
- Steel stringers widely spaced to allow snow and ice to fall through
- Steel treads six inches wide on fixed stairs
- Fixed stairs eighteen inches wide
- Ladders eighteen inches wide

Fixed vertical ladders, bolted to the masonry wall; swinging drop ladders, hinged to the lowest balcony; or sliding drop ladders could be utilized to descend to the ground.

Enhanced safety features set the 400-E model apart from the original No. 400 model.

Additional bracing secures the handrail to the stair rise. The end brackets are wider and no longer flush with the edge of the balcony floor, and they extend slightly past the front end of the balcony. The new positioning and size provide additional support for the loads placed upon the balcony. The bars constructing the railings and cross-braces are thicker, and the balcony floor is constructed of steel stringers.<sup>209</sup>

The 1899 No. 1244 Builder's Catalog features two new fire escape designs. The No. 475 Fire Escape (Figure 67) advertisement displays three different balcony designs from plain to ornamental, available at a range of prices for different needs. E.T. Barnum

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<sup>209</sup> E.T. Barnum Wire and Iron Works, Various Catalogs, 1895-1924.

frequently offered a wide range of balcony options for incorporating into the fire escape design. Based on the type of building and location of the fire escape (main façade or rear), one may have preferred an ornate design or supplied the most basic, inexpensive design.<sup>210</sup> The fixed stairs on No. 475 are steeper than the standard 400 design and extend down between the two windows. The steeper stairs, although less safe, would not obstruct window views. Many building codes already required a grade of no more than forty-five degrees for stairs, but when allowed people often opted for getting rid of the hindrance in front of windows. The No. 425 Fire Escape is quite unique and only appears in the 1899 catalog (Figure 68). Trapezoidal balconies span two windows, and a straight ladder extends down from the roof and between the windows. Advertised as light and strong, No. 425 is specially adapted for factories and wood-frame buildings.<sup>211</sup>

Advertised in the 464 Builder's Supplement of 1902 and the 590 General Catalog of 1921, the No. 550 Fire Escape was intended for public buildings where additional safety was required, such as schools and asylums. The appearance is similar to the 400 series but safety was enhanced. The width of the staircase was increased from eighteen to twenty-four inches, and the height of the balcony railing was increased from thirty to thirty-six inches. A heavy galvanized wire netting covers the insides of the balcony and stair railings and the underside of the stairs could also be covered. At this time, Michigan law required protective enclosures for school fire escapes, and many other states employed the same standards. A new, safer drop staircase accesses the ground from the lowest balcony. The top section of the staircase is fixed, while the bottom section is counterbalanced. The lower portion automatically raises up when not in use and can be lowered instantly in case of fire. This model for a school fire escape was still popular in the 1920s. A slight variation on the No. 550 model appears in later catalogs. The No. 500-B model (Figure 69) employs additional brackets. The early model uses one bracket at each end of the platform, while the later model has a third bracket placed between the two with a support bar extending up to the balcony railing for additional support.<sup>212</sup>

The No. 675 (Figure 70) and No. 725 (Figure 71) Fire Escapes were two popular models, appearing first in the 464 Builder's Supplement of 1902 and lasting into the

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<sup>210</sup> E.T. Barnum Wire and Iron Works, No. 1244 Builder's Catalog (Detroit: The Firm, 1899), 7.

<sup>211</sup> Ibid.

<sup>212</sup> E.T. Barnum Wire and Iron Works, Various Catalogs, 1902-1924.

1930s. Both designs stray from the standard design of the 400 series, giving customers a more varied selection. The No. 675 Fire Escape's popularity was due, most likely, to its simplicity and small size, and the model did not undergo any changes through the decades. E.T. Barnum advertises the design as being an improvement over the old system of vertical ladders that extend through well-holes. Rather, small balconies at single windows are open on one end, and a straight ladder is affixed directly to the building accessible out the open side of the balcony. The gooseneck ladder extends over the roof and down close to the ground for safe descent, and it is securely bolted into the masonry at evenly spaced intervals. Balconies are four foot, six inches long and two feet wide, but they may be constructed take in more than one window if desired. The ladder is eighteen inches wide and placed as near the balcony as possible, for easy access. Although this design would not have met standards for many large buildings in which a large number of people live or work, it was suitable for smaller, less densely occupied structures or those in which a primary interior fire stairway had been incorporated.<sup>213</sup> The No. 725 Fire Escape, on the other hand, increased safety by eliminating the well-hole. Balconies span two windows, and the section of balcony directly in front of a window opening extends out farther from the building. Stairs descend out from the inner side of the protruding balcony section, leading from one side of one balcony to the opposite side on the next lower balcony. A counterbalanced drop stairway extends off the lowest platform. The early model employs a pulley system with weights attached via a bracket to the wall of the building and connected to the base of the stairs, allowing them to be pulled to the at rest position. The fixed, upper portion of the drop stairway is braced to the underside of the above stairway for support. The later model employs a more efficient counterbalance system for the drop stairway. The lower, movable section of the stairway is balanced in the rest position with a weight extending off the back. A bracket affixed to the wall supports the underside of the weight while in the horizontal position.<sup>214</sup>

The 1912 Fire Escape Supplement advertises several models that are very simple and utilitarian. No. 415-B (Figure 72) was constructed with steel tubular railings, and the

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<sup>213</sup> E.T. Barnum Wire and Iron Works, Various Catalogs, 1902-1930.

<sup>214</sup> Ibid.



balcony has a very rudimentary design of widely spaced horizontal and vertical members. The only known design constructed with tubular railings, the model may not have been as strong and safe as its wrought iron counterparts.<sup>215</sup> No. 450-B (Figure 73), appearing in several catalogs into the 1920s, is also very utilitarian in design. The balconies have the design of the early 400 series, with cross-bracing and floral medallions, but well-holes are cut in the center of the platforms, between two windows, and a straight, fixed, eighteen inch wide ladder passes through from the roof down through the lowest balcony. The design mimics many of the early straight ladder fire escapes of New York City tenement houses, but the ladder is secured to the masonry for additional safety. Nos. 450-D and 450-E appear in several 1920s catalogs, without any changes over No. 450-B. Specifications of these models indicate balconies could be thirty to thirty-six inches wide.<sup>216</sup>

Fire Escape No. 575 (Figure 74), a popular model into the 1930s, is of very strong, substantial construction designed for factories and schools. The example pictured in the catalogs details specifications for Ohio: forty-five inch wide balconies and twenty inch wide stairs with eight inch treads and eight inch risers for factories; and forty-two inch balconies, twenty inch wide stairs with ten inch treads and seven inch risers and fixed stairs that extend all the way to the ground for schools. The solidly designed structure consists of a substantial truss system. Heavy railings compose the balcony and stairs with additional horizontal and vertical braces. Beneath the balcony platform and stairway is a heavy crosshatch truss system for additional support. Three substantial brackets support each balcony, and one bracket supports the lowest staircase midway down.<sup>217</sup> Fire Escape No. 625 (Figure 75), available through the 1920s, is also very solidly constructed with a simple, utilitarian design. Heavy vertical and horizontal bars compose the balcony, which is supported by wide, heavy brackets. Well-holes open in the center of the balcony floor between the two windows, necessitating a steeper staircase that extends from the well-hole to the right end of the next platform down. A straight ladder, sliding drop ladder attaches to a pulley on the underside of the second lowest

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<sup>215</sup> E.T. Barnum, No. 178-E Fire Escape Supplement, 10.

<sup>216</sup> E.T. Barnum Wire and Iron Works, Various Catalogs, 1912-1929.

<sup>217</sup> Ibid.

balcony, balanced by cylindrical weights. The catalog advertises any type of stair or ladder for access to the ground, allowing this model to fulfill a wider variety of needs.<sup>218</sup>

Fire Escapes No. 500-D, E, F (Figure 76) and No. 600-G, H, I (Figure 77) appear in the 1912 Fire Escape Supplement. Both the 500 and 600 series advertise three different balcony styles, from very basic to ornamental, available with each model. The 500 series employs the fixed stairs at the shallow angle running from one end of a balcony to the opposite end of the lower balcony. Four brackets support each balcony and a sliding drop, swinging drop or fixed vertical ladder can be utilized for reaching the ground. A swinging drop ladder is demonstrated in the picture. In the horizontal rest position, the bottom of the ladder is affixed via a cable to the pulley system on the underside of the lowest balcony. The top of the ladder is hinged at the well-hole. Balconies and brackets are priced accordingly, based upon the amount of intricate detail incorporated into the designs.<sup>219</sup> The 600 series employs a steeper stairway, extending through well-holes between the windows rather than at each end of the platform. The vertical rungs of the balcony are heavier and safer, with less space between the bars. The presence of children would require the closely spaced bars. The three different balcony designs for the 600 series all feature the vertical, closely spaced rungs but range from simple to ornate.<sup>220</sup>

A popular model appearing in several catalogs throughout the 1920s is the No. 700 Fire Escape (Figure 78). The model enhances the stair design of No. 725, which is constructed without well-holes. This No. 700 model of short stair flights and intermediate platforms was recommended for theatres and institutions, such as schools or asylums, as the short flights were easier to navigate in a panic and easier for large crowds to safely descend to the ground. Platforms are secured at doors and windows and at intermediate points between. The stair design has basic handrails and closely spaced vertical bars for safety and strength. The image advertises highly decorative brackets, two supporting each platform, adding a decorative character for use on a theatre building where the obtrusiveness of a traditional fire escape was unwanted. As the lower stairs are fixed, the bottom is protected by a locked gate and covered halfway up the lowest flight

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<sup>218</sup> Ibid, 1912-1924.

<sup>219</sup> E.T. Barnum Wire and Iron Works, No. 178-E Fire Escape Supplement, 9.

<sup>220</sup> Ibid, 8.

with heavy, galvanized iron wire. The protected stairs solved the problem of unwanted intruders accessing the fire escape and the danger of having a drop stair or ladder malfunction in an emergency. Decorative iron work adorns the top of the gate frame to again create a appealing design for more fashionable establishments.<sup>221</sup>

Three designs appear in the 1920s catalogs designed specifically for use in schools and asylums. As the catalog states, the No. 735 Fire Escape (Figure 79) was “[d]esigned especially for School and College buildings where an absolute safe and secure escape must be used.” A safer version of the No. 500 model, this design replaces the well-holes with openings in the side of the balcony railings that extend out from the windows. Galvanized iron wire covers the railings and stairs and the “[p]latforms are of improved construction and reinforced to carry maximum loads.” Two brackets support each wider balcony section, and one bracket supports the intermediate balcony run between windows. The lowest staircase is fixed and secured into the ground on a concrete slab.<sup>222</sup> The No. 805 Fire Escape (Figure 80), constructed with the highest security in mind, was intended for asylums or homes for the aged. Galvanized iron wire netting that extends up to the height of the window enclosing the platform replaces traditional balcony railings. The stairways are also enclosed in the netting, and the lower staircase is fixed to the ground with a concrete slab.<sup>223</sup> A progressive model, No. 750 Fire Escape solved some of the problems of exterior fire escapes, and was also suitable for asylums, hospitals or homes for the aged. Balconies are anchored in front of windows, but a system of safely enclosed stairs situated off to the side is accessible through the side railing of each balcony. Short flights run from the top to the lowest balcony, turning at platforms that are guarded with cross-braced railings. The whole system is supported by vertical members running from the lowest platform to the top. A fixed staircase extends from the balcony of the lowest window to the ground. The removal of the stairs from the front of the window allowed more light to enter and shielded those escaping from flames and smoke shooting from windows. A later model, 750-B (Figure 81) encloses the stairs and balconies in heavy, galvanized iron wire.<sup>224</sup>

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<sup>221</sup> E.T. Barnum Wire and Iron Works, Various Catalogs, 1921-1929.

<sup>222</sup> Ibid, 1921-1924.

<sup>223</sup> Ibid, 1921-1926.

<sup>224</sup> Ibid, 1921-1927.

No. 775 Fire Escape (Figure 82), appearing in the 590 General Catalog was “designed to show a more ornamental railing for balconies where the [f]ire [e]scape is in a conspicuous position and ornamentation is desired.” Heavily decorous railings and brackets characterize this model.<sup>225</sup>

Several very rudimentary designs become available in the 1920s catalogs, offering easy and inexpensive construction. No. 812 (Figure 83) employs the simplest balcony design, taking in one or two windows, with a fixed ladder attached to the brick wall off to the side of the balcony. Openings along the side of the balcony provide access to the ladder. According to E.T. Barnum, this fire escape was “intended for use on dormitories, rooming houses, hotels and those buildings having central hallway exits.” The simple structure seems necessary only as an addition to multiple interior exits, as it does not have substantial construction and an easy descent, and only a minimal number of people could safely descend at one time.<sup>226</sup> The balcony design for No. 818 (Figure 84) was modeled after No. 812 and also takes in two closely situated windows. Fixed stairs provide access from balcony to balcony, rather than the straight ladder, and a very basic drop ladder extends to the ground. A large bracket extends from the lowest balcony, hinging the counterweighted ladder. The design is most effective when two or more window exits are used, as seen in the image.<sup>227</sup> No. 823 (Figure 85), designed for factories or mercantile buildings, is a larger version of No. 818, taking in any number of windows on each floor. Railings on the interior of the balcony run along the length of the well-hole to provide protection.<sup>228</sup> No. 826 (Figure 86) employs straight run stairs from window to window. Small landings are situated at each window opening, connecting the stairs. The straight run configuration allowed a swifter, safer descent and was ideal for schools, theatres, dance halls, lodge rooms, and association buildings. Stairs and platforms were typically thirty inches wide. The platform and handrails were designed with the same simplicity as Nos. 812, 818, and 826, but a truss system reinforces the underside of the stair rise. Brackets support the fixed stairs at midway points, and the

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<sup>225</sup> E.T. Barnum Wire and Iron Works, No. 590 General Catalog, 7.

<sup>226</sup> E.T. Barnum Wire and Iron Works, Various Catalogs, 1926-1927.

<sup>227</sup> Ibid, 1926-1930.

<sup>228</sup> Ibid, 1926-1929.

lowest staircase fully extends to the ground.<sup>229</sup> No. 846 (Figure 87) employs a fixed ladder attached to the wall, extending through well-holes of simple balconies. For added safety, ladder enclosures protect the area of descent.<sup>230</sup>

No. 835 and No. 840 (Figure 88) Fire Escapes were designed for buildings on which exits are arranged one atop the other. Small platforms are placed in front of exits, with intermediate platforms where stairs turn. The construction is very rudimentary. No. 835 employs a fixed staircase from the lowest exit to the ground.<sup>231</sup> No. 840 employs a ladder adjacent to the lowest platform, where the upper portion is fixed to the wall and the lower portion can fold up for safety. This design is best for the front of a building or over a sidewalk or alley, when having a fixed stairway is objectionable.<sup>232</sup>

E.T. Barnum also specialized in fire escapes stairs, without the use of balconies, for escaping from first story doors raised up from the street level. Stairs descend either away from the building or out the side of the platform running alongside the building wall. Many stairs are available with a high level of ornamentation, suitable for visible façades, and others are constructed very basically. Single stair fire escapes are often seen on theatres that have doors leading out from auditoriums into alleys or alongside buildings. The doors are low and full fire escape designs are not necessary. Stairs enclosed in heavy galvanized sheet iron with small windows cut in, suitable for schools, theatres, and factories, and spiral stairs are featured in the catalogs (Figure 89). Spiral stairs, although not as safe, were often employed for a more decorative and less obtrusive appearance (Figure 90). Individual brackets, ladders, balconies and railings allowed custom fire escape design. E.T. Barnum catered to a large, national audience, and the company assured customers their products could be adapted to any building type within the requirements of any building code.<sup>233</sup>

### *J.E. Bolles Wire and Iron Work*

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<sup>229</sup> E.T. Barnum Wire and Iron Works, No. 690 General Catalog (Detroit: The Firm, 1926), 13.

<sup>230</sup> E.T. Barnum Wire and Iron Works, Various Catalogs, 1928-1930.

<sup>231</sup> Ibid, 1927-1930.

<sup>232</sup> Ibid.

<sup>233</sup> Ibid, 1921-1930.

The No. C 3730 Michigan Standard Fire Escape (Figure 91), suitable for factory and office buildings, closely resembles the E.T. Barnum 400 series, without the floral medallions. The balcony can span a large number of windows, and the fixed stairs extend down through the center of the escape, at a steeper pitch than the E.T. Barnum model. A sliding drop ladder extends to the ground. The image in the catalog clearly illustrates the appearance of the model on the main façade of the building. The simple design is not too obtrusive to the façade, yet is safely accessible by a number of windows on each floor. The steeper angle of the stairs allows the majority of the windows to be unobstructed. The drop ladder rests in the up position, demonstrating its clearance from the storefront below. Balconies are listed as being available thirty-six inches wide, with twenty-two inch wide stairs.<sup>234</sup>

The No. C 3731 Heavy Fire Escape (Figure 92), suitable for schools, hotels and theatres, employs stairways extending out the sides of the balconies, rather than well-holes, and intermediate landings placed between floors to allow for a smaller angle of descent. The railings are covered with galvanized iron wire for safety, as are the school fire escapes in the E.T. Barnum catalogs. The balcony platforms are constructed of four inch channel iron stringers and heavy two inch lattice floors.<sup>235</sup>

No. C 3732 School Fire Escape (Figure 93) is similar to the form of the previous design with enhanced construction for the safety of school children. Oversized brackets support balconies, and the platforms are reinforced with thicker stringers. The galvanized iron wire covers the railings, and intermediate platforms are also employed. The lowest balcony closely reaches the ground, providing a safe exit off the fire escape without the need for drop stairs or ladders. The advertisement image displayed in the catalog demonstrates a large number of children safely supported on the fire escape and comments on their quick and efficient escape from the building.<sup>236</sup>

No. C 3742 Balcony Fire Escape (Figure 94) is quite ornamental. “These handsome balconies,” advertises the catalog, “connected by stairs the same as standard fire escapes, may be seen on the Madison Hotel in Detroit.” Steep stairways connect rounded balconies; corners are rounded and the vertical bars are rounded out, rather than

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<sup>234</sup> J.E. Bolles Iron and Wire Works, 2.

<sup>235</sup> Ibid.

<sup>236</sup> Ibid, 3.

straight, adding to the decorative quality. Many hotels and upscale apartment houses adorned their façades with rounded fire escape balconies, providing the necessary safety while enhancing the appearance of the structure. The image displayed in the catalog shows the placement of additional balconies at individual windows that match the fire escape balconies.<sup>237</sup>

No. C 3734 Heavy Fire Escape employs the standard design with cross-braces and stairs connecting through well-holes. Platforms are again reinforced with additional stringers and large, paired brackets. A drop staircase with a counterweight pulley system hinges to the lowest balcony. Unlike traditional pulley systems for drop stairs, a wire arch connects to the foot of the staircase with a cable connecting to a pulley system on a bracket four stories up. A counterweight balances the weight of the staircase.<sup>238</sup> The drop staircase is a similar design to No. C 3760 Overhanging Fire Escape (Figure 95). This design not only has a suspended drop staircase, but the entire structure is secured with vertical braces, suspending the unit from above, rather than supported beneath with brackets.<sup>239</sup>

No. C 3755 Spiral Fire Escape (Figure 96), patented by J.E. Bolles in 1912, unobtrusively tucks into a corner of a building. Four foot balconies extend out from windows at each floor and connect with a tightly spiraled staircase, five feet in diameter, that reaches from roof to ground. The addition of balconies to the stairs enhanced safety over traditional spiral stair fire escapes, allowing a larger number of people to exit the building at once.<sup>240</sup>

No. C 3760 Theatre Fire Escape (Figure 97), as designed for the Washington Theatre in Detroit, is also an unusual design. A long balcony gallery extends across the upper portion of the façade. A well-hole opens to a platform below at one end, and a set of stairs leads down to another platform and then down to the lower balcony. Stairs extend from a door, beneath the aforementioned platform, and meet up with the lowest balcony. A fixed set of stairs extends from the lowest balcony to the ground. The width of the balconies provided ample room for the crowds of people attending the theatre. The

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<sup>237</sup> Ibid.

<sup>238</sup> Ibid, 7.

<sup>239</sup> Ibid, 4.

<sup>240</sup> Ibid.

long balcony, according to the advertisement, also connects to an enclosed, fireproof interior staircase.<sup>241</sup>

No. C. 3765 Enclosed Fire Escape (Figure 98) closely resembles the design of the No. 40 enclosed fire stair system from E.T. Barnum. The design is advertised as suitable for schools. The four foot wide straight run stairs and balconies are anchored to the wall of the building, supported by large brackets. The unit is enclosed in a fireproof steel structure with small windows at intervals and a door with windows at the foot of the stairs. The balcony seen in the advertised image extends across several window openings.<sup>242</sup>

No. C 3762 Stair Fire Escape (Figure 99) extends between two close walls of a courtyard. Heavy balcony platforms, protected by simple railings, span between the walls, accessible by doors or windows on each side. Stairs extend out perpendicularly from the balcony platforms, turning 180 degrees at each platform. The bottom stairs let out on the outside of the courtyard, allowing a safe exit away from the building. An iron gate secures the courtyard.<sup>243</sup>

### *Union Steel*

A circa 1920 catalog advertises Union's most popular fire escape style, the No. 60-F Iron Fire Escape (Figure 100). The escape is solidly constructed of both wrought iron and steel. Steel bars securely fasten to steel stringers, comprising the balcony floor. The stringers are widely spaced, cutting down on the accumulation of snow and ice. The balcony railings are designed with standard cross-braces and floral medallions. A fixed, gooseneck ladder constructed of wrought iron with steel treads extends from roof down between the two windows to the ground, although the text states that a fixed staircase can replace a ladder upon request. Simple brackets support the balconies and affix to the masonry walls. The measurements follow the typical specifications of five to ten foot by twenty-four to thirty-six inch balconies, with brackets placed five feet apart.<sup>244</sup>

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<sup>241</sup> Ibid, 5.

<sup>242</sup> Ibid, 6.

<sup>243</sup> Ibid, 7.

<sup>244</sup> Union Steel, 10.



### *Heffner Iron and Steel Works*

William Heffner Iron and Steel Works was based out of Minneapolis, Minnesota. A trade journal circa 1901 lists a few fire escape designs of the Heffner Firm. Heffner's designs do not appear as ornamental as those of E.T. Barnum. Barnum specialized in a wide variety of ornamental iron and wire work, manufacturing products with a high level of intricate detail. Heffner is listed as a manufacturer and contractor of iron and steel products and is not noted for ornamental products. The type of company producing fire escapes influenced the designs they manufactured.

Heffner's catalog features three different designs for use on different types of buildings for different situations. "The Heffner Common Sense Wrought Iron Stairs Fire Escape" (Figure 101) is composed of very simple balconies with pipe railings and fixed stairs that extend from balcony to balcony and to the ground. Stairs have a gradual slope extending from the far side of one balcony to the opposite side of the next balcony down. A small scuttle leads to the roof. The fire escape was touted as being the "best fire escape on the market for Women and Children" because of its fixed, gradually sloping staircases. The company also claimed this design to be practically snow proof, most likely due to the wide spaces between slats on the stair treads. Due to the high number of calamitous fires during which many women and children perished, unable to safely descend the flimsy, steep ladders, the need for a better product was being answered by companies. Additionally, many schools at the time period complained of heavy snow and ice collecting on the steps, being particularly hazardous to children.<sup>245</sup>

Heffner also manufactured a spiral fire escape with a standpipe and valves. The spiral escape, states the catalog, is ideal for the main façade of buildings in which aesthetics and space are an issue. An example of a wrought iron stair tread of rectangular construction with widely spaced stringers, a wedge-shaped cast iron stair tread for use in spiral staircase, and a simple bracket bolted through a masonry wall are all advertised.<sup>246</sup>

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<sup>245</sup> Heffner Iron and Steel Works, Trade Catalog (Minneapolis: The Firm, 1901), 2.

<sup>246</sup> Ibid.

The third design in the catalog is advertised as suitable for men only, to be used in warehouses and elevator buildings in which solely men are employed (Figure 102). A fixed, straight wrought iron ladder extends from roof to ground, affixed to the outer edges of simple balconies. One edge of the ladder is constructed as a standpipe with hose valve attachments at every floor for easy fire-extinguishing. Even when fire escapes were criticized as life saving egress, it was recognized that they were important for firefighters to extinguish fires on upper floors and rescue those trapped.<sup>247</sup>

A sample bracket, cast iron tread, and wrought iron tread are displayed on the cover of the Heffner catalog (Figure 103). The bracket appears to be of a much simpler, lighter construction. The cast iron tread demonstrates the form used in spiral staircases, with a ring at the narrow end for attaching to the center pole of the staircase. The tread appears to consist of one unit, having been cast from a mold, with diamond shaped voids to allow traction and ventilation. The wrought iron step employs simple iron slats, spaced for traction and ventilation, secured to an iron frame.<sup>248</sup>

### *Austin Brothers Steel and Arrowhead Grating*

Austin Brothers Steel out of Dallas, Texas, issued an undated, early twentieth-century catalog, No. 201, advertising a basic steel fire escape of balconies and fixed stairs. A list of items in their product line printed on the front page of the catalog notes the manufacture of fire escape ladders, spiral fire escapes, stair fire escapes, and balconies.<sup>249</sup>

Arrowhead Grating, based out of Kansas City, Missouri, manufactured various types of grating for flooring and treads widely used in fire escapes. The grating replaced the traditional slats of the balcony floors. The 1935 catalog advertises the floor grating and stair treads for use on fire escapes. The “H” Grating (Figure 104) was designed for long spans, heavy loads, and severe weather. “The strength, light, weight, visibility and ventilation of type H,” the catalog states, “have made it by far the most satisfactory and desirable floor for power plant and similar work.” The grating is advertised as self-

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<sup>247</sup> Ibid.

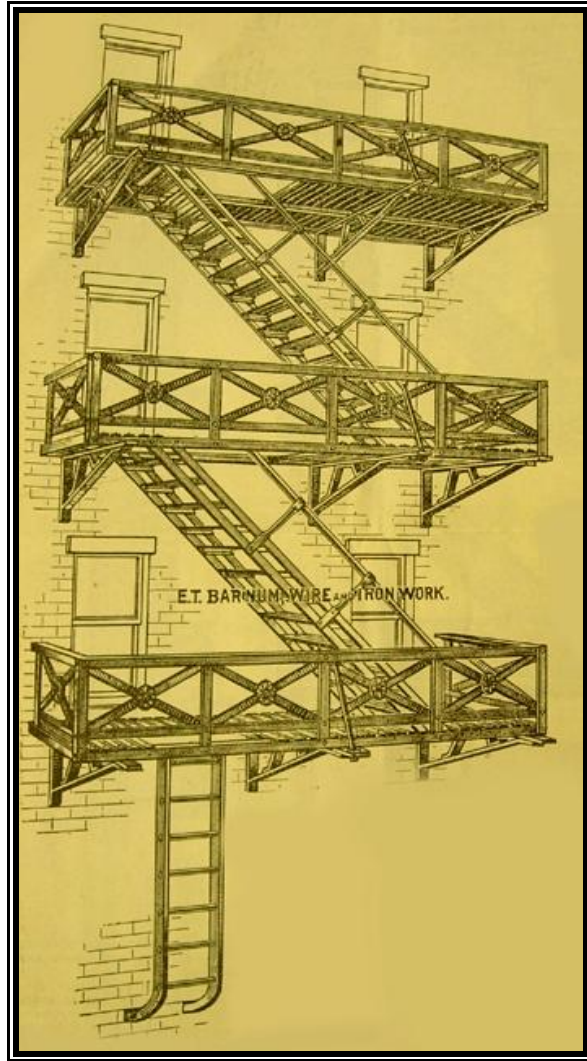
<sup>248</sup> Ibid, 1.

<sup>249</sup> Austin Brothers Steel, Undated Pamphlet (Dallas: The Firm).

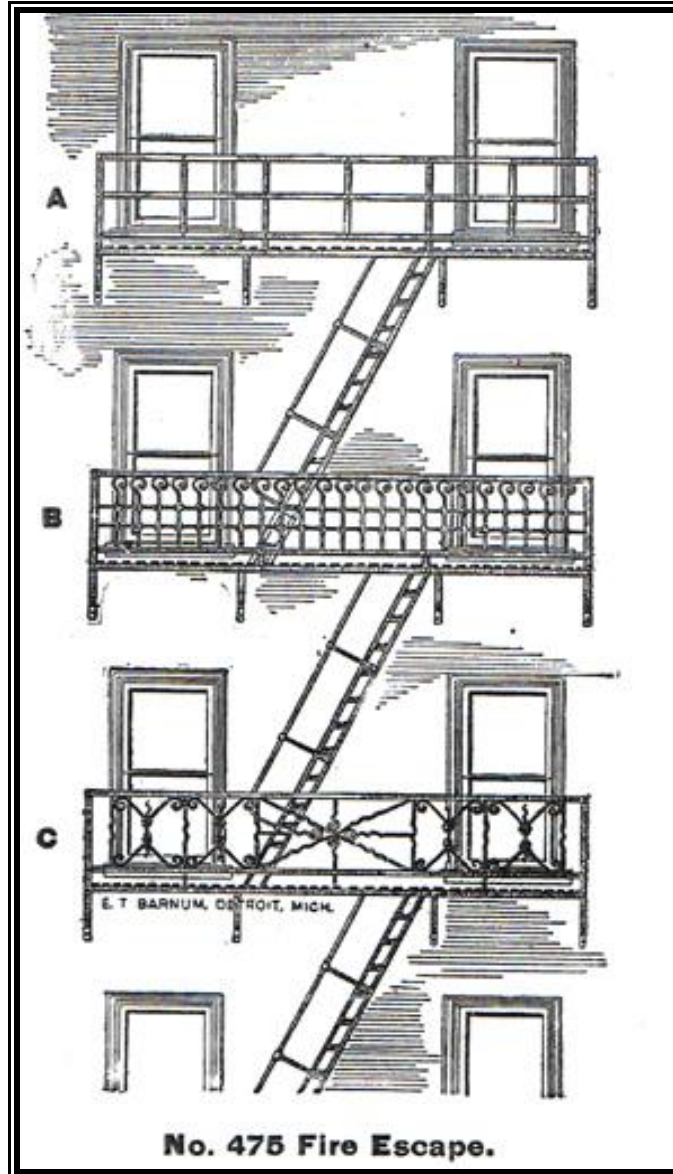
cleaning and safer than traditional treads, providing greater traction and cutting down on snow and ice accumulation.<sup>250</sup>

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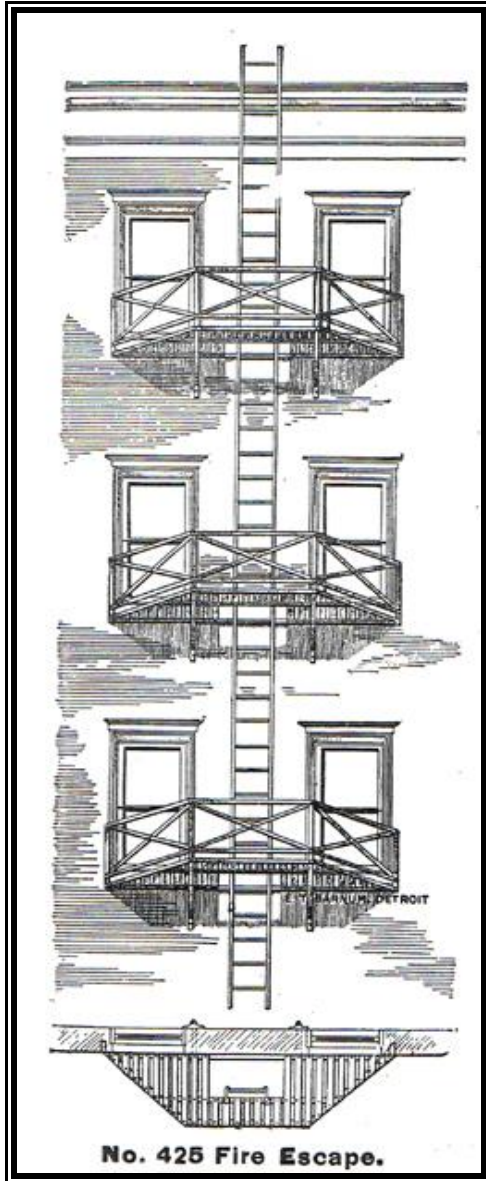
<sup>250</sup> Arrowhead Grating, 5.



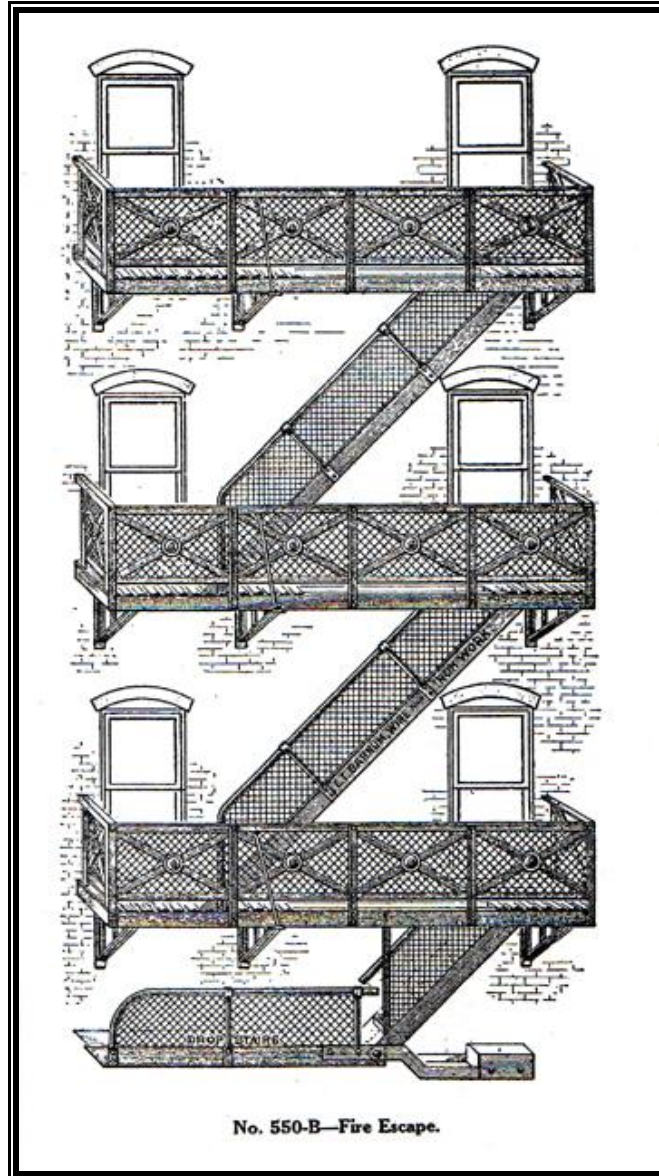
**Figure 66:** E.T. Barnum, 400-E Fire Escape (E.T. Barnum Wire and Iron Work. *No. 178-E Fire Escape Supplement*. Detroit: The Firm, 1912: 3)



**Figure 67:** E.T. Barnum, No. 475 Fire Escape (E.T. Barnum Wire and Iron Work. *No. 1244 Builder's Catalogue*. Detroit: The Firm, 1899: 7)

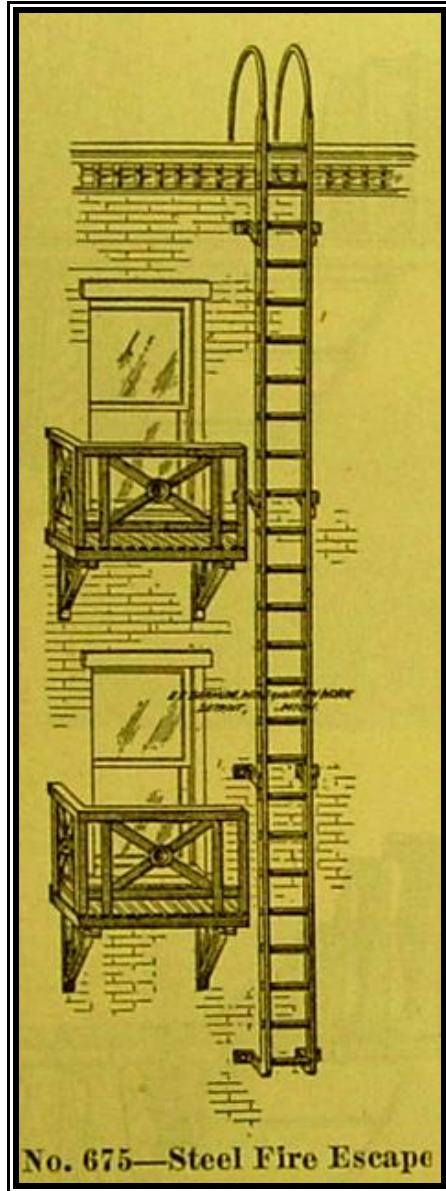


**Figure 68:** E.T. Barnum, No. 425 Fire Escape (E.T. Barnum Wire and Iron Work. *No. 1244 Builder's Catalogue*. Detroit: The Firm, 1899: 7)



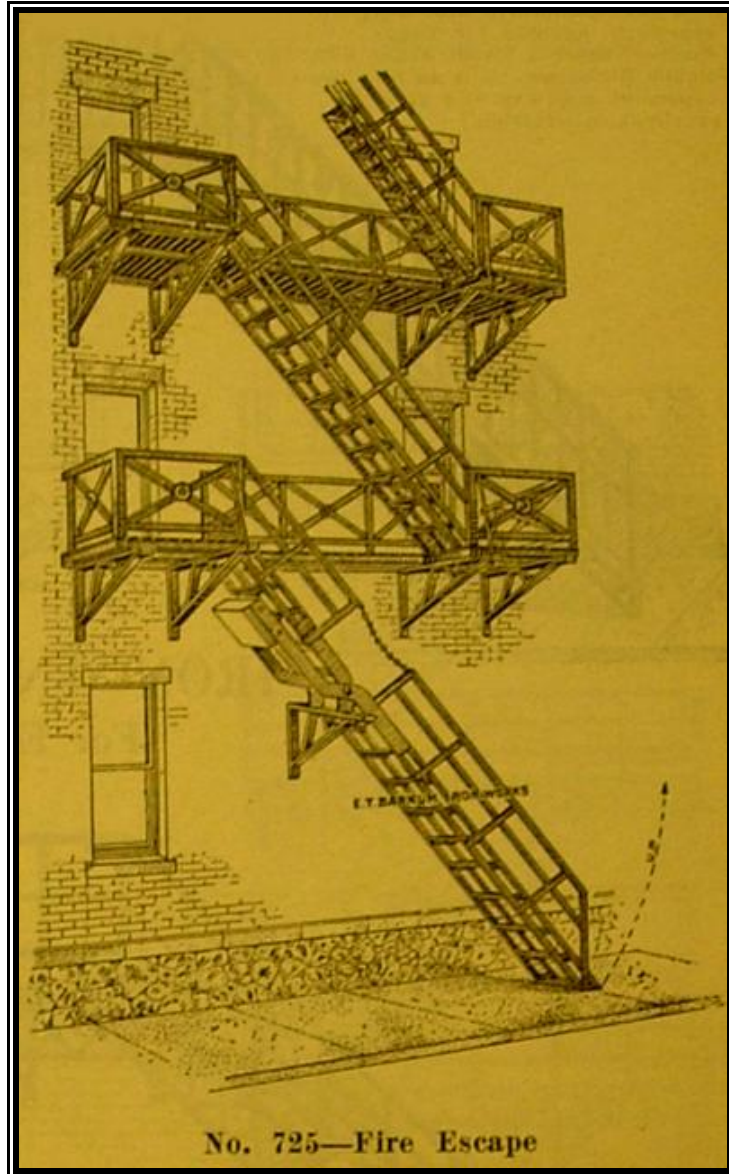
**Figure 69:** E.T. Barnum, No. 550-B Fire Escape (E.T. Barnum Wire and Iron Work. *No. 610 General Catalogue*. Detroit: The Firm, 1922: 11)



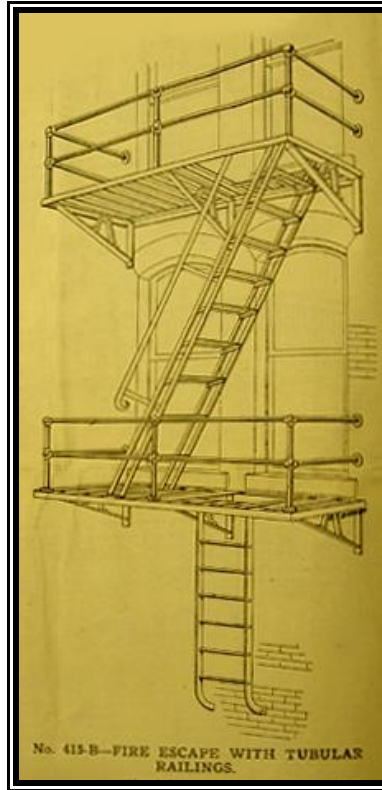


**Figure 70:** E.T. Barnum, No. 675 Steel Fire Escape (E.T. Barnum Wire and Iron Work. *No. 734 Builder's Catalogue*. Detroit: The Firm, 1928: 15)

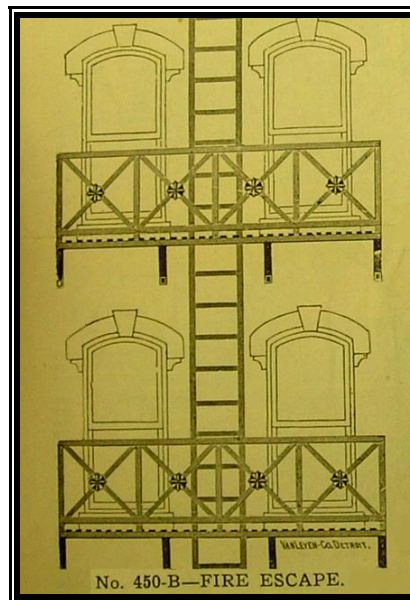




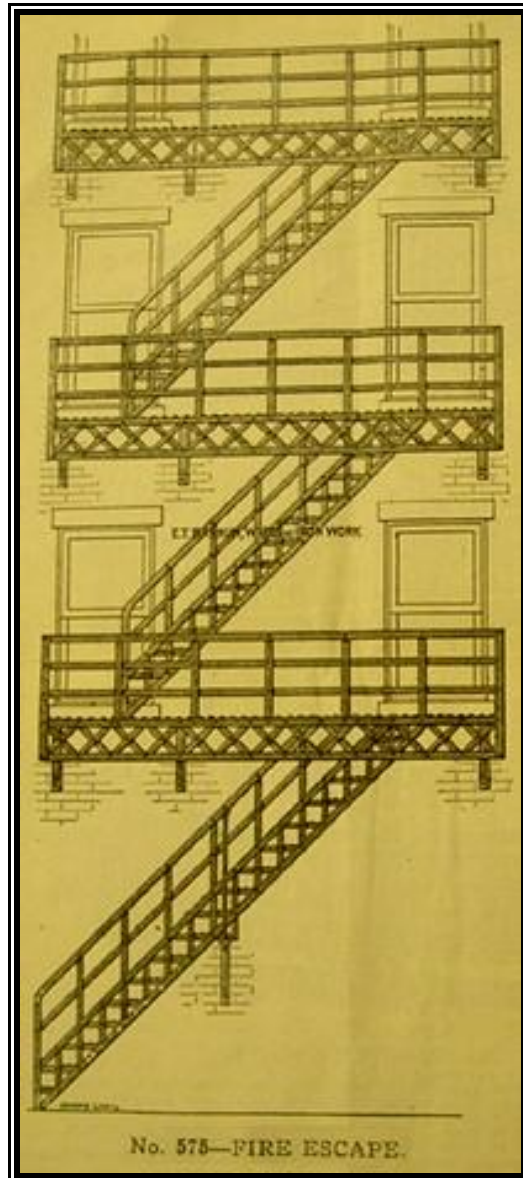
**Figure 71:** E.T. Barnum, No. 725 Fire Escape (E.T. Barnum Wire and Iron Work. *No. 590 General Catalogue*. Detroit: The Firm, 1921: 10)



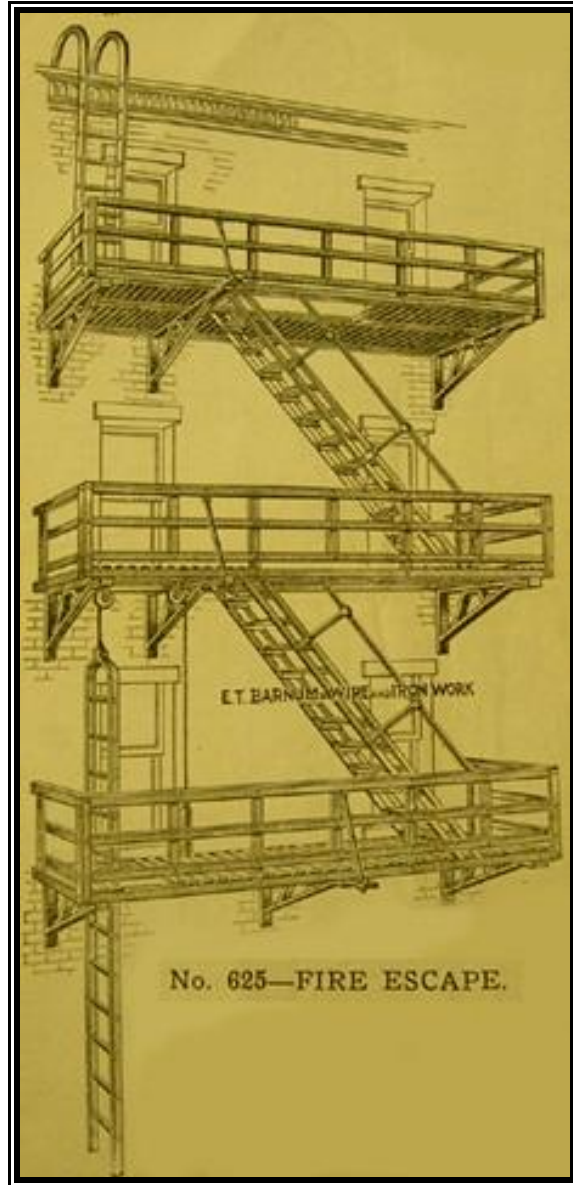
**Figure 72:** E.T. Barnum, No. 415-B Fire Escape with Tubular Railings (E.T. Barnum Wire and Iron Work. *No. 178-E Fire Escape Supplement*. Detroit: The Firm, 1912: 10)



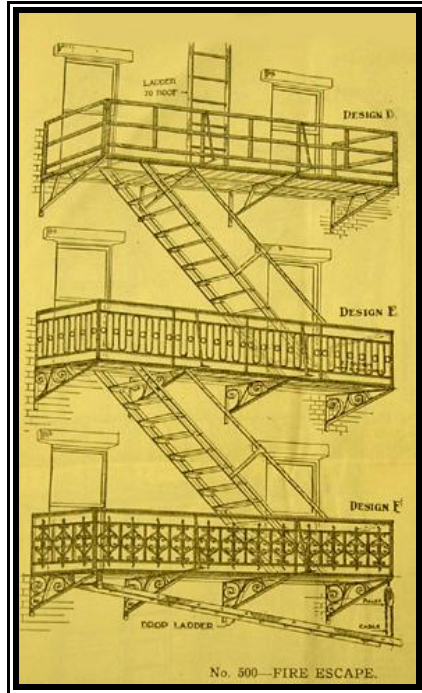
**Figure 73:** E.T. Barnum, No. 450-B Fire Escape (E.T. Barnum Wire and Iron Work. *No. 178-E Fire Escape Supplement*. Detroit: The Firm, 1912: 6)



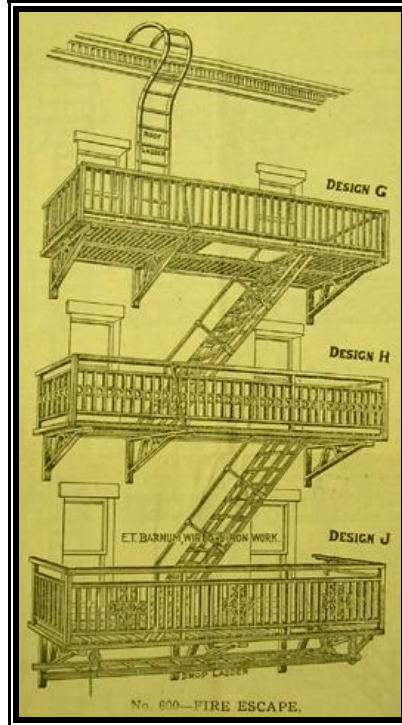
**Figure 74:** E.T. Barnum, No. 575 Fire Escape (E.T. Barnum Wire and Iron Work. *No. 178-E Fire Escape Supplement*. Detroit: The Firm, 1912: 7)



**Figure 75:** E.T. Barnum, No. 625 Fire Escape (E.T. Barnum Wire and Iron Work. *No. 178-E Fire Escape Supplement*. Detroit: The Firm, 1912: 5)

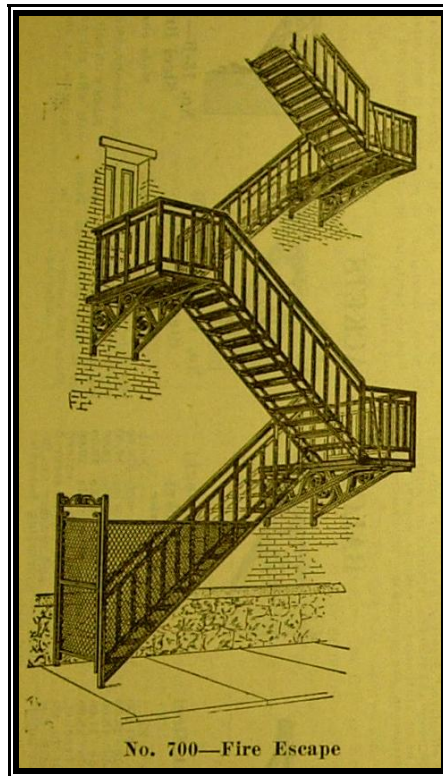


**Figure 76:** E.T. Barnum, No. 500-D, E, F, Fire Escape (E.T. Barnum Wire and Iron Work. *No. 178-E Fire Escape Supplement*. Detroit: The Firm, 1912: 9)

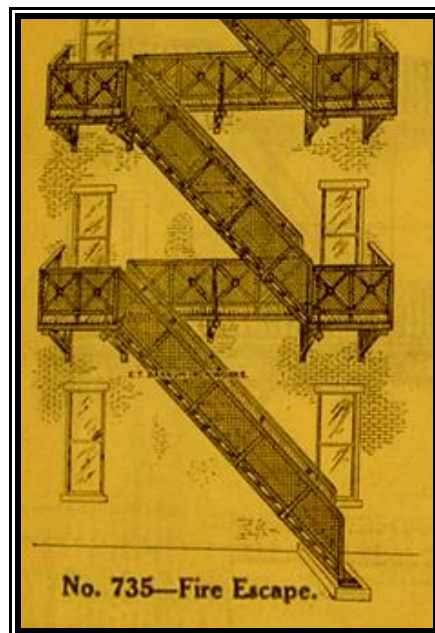


**Figure 77:** E.T. Barnum, No. 600-G, H, I Fire Escape (E.T. Barnum Wire and Iron Work. *No. 178-E Fire Escape Supplement*. Detroit: The Firm, 1912: 8)

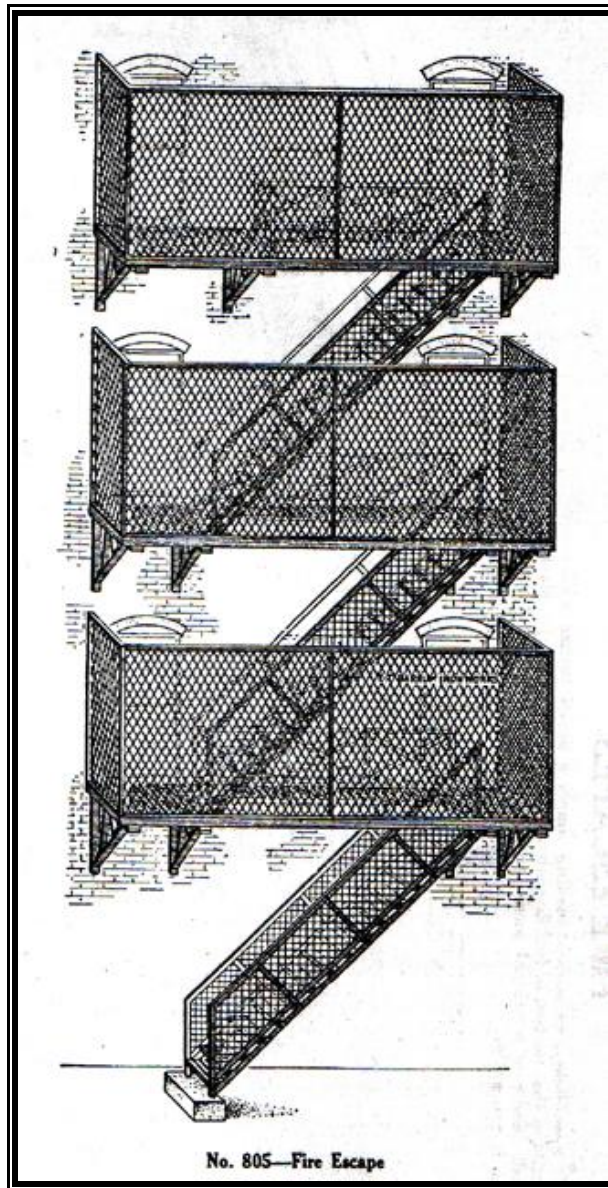




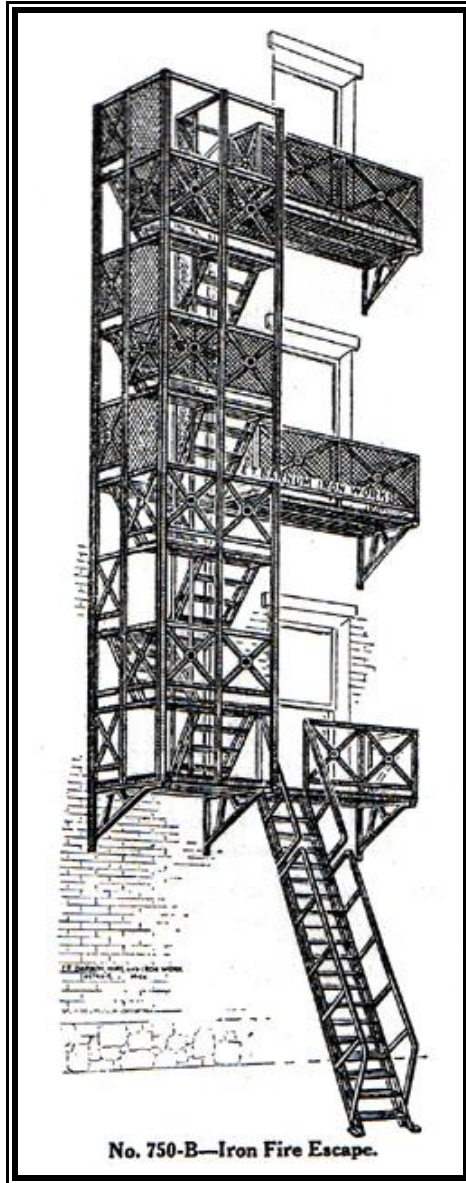
**Figure 78:** E.T. Barnum, No. 700 Fire Escape (E.T. Barnum Wire and Iron Work. *No. 734 Builder's Catalogue*. Detroit: The Firm, 1928: 14)



**Figure 79:** E.T. Barnum, No. 735 Fire Escape (E.T. Barnum Wire and Iron Work. *No. 590 General Catalogue*. Detroit: The Firm, 1921: 8)

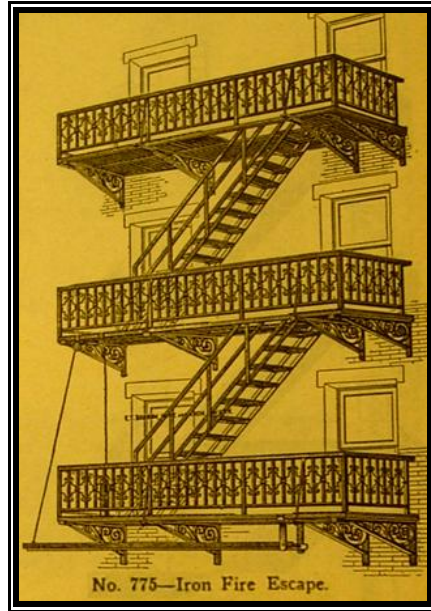


**Figure 80:** E.T. Barnum, No. 805 Fire Escape (E.T. Barnum Wire and Iron Work. *No. 690 General Catalogue*. Detroit: The Firm, 1926: 15)

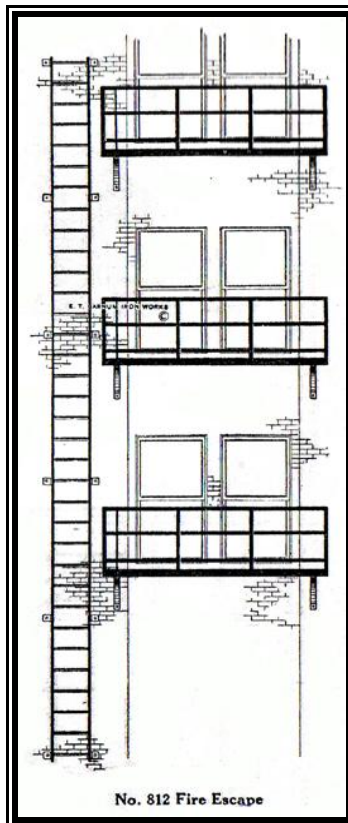


**Figure 81:** E.T. Barnum, No. 750-B Fire Escape (E.T. Barnum Wire and Iron Work. *No. 690 General Catalogue*. Detroit: The Firm, 1926: 15)

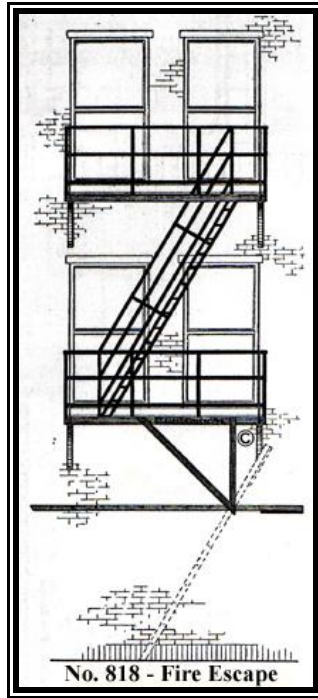




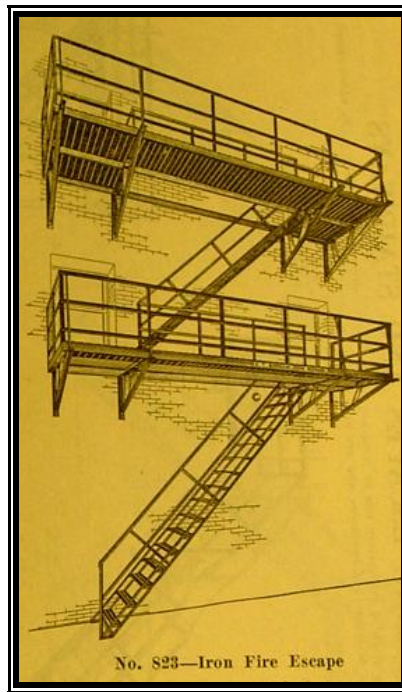
**Figure 82:** E.T. Barnum, No. 775 Fire Escape (E.T. Barnum Wire and Iron Work. *No. 590 General Catalogue*. Detroit: The Firm, 1921: 7)



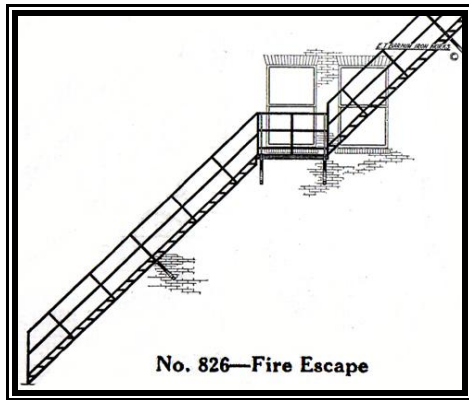
**Figure 83:** E.T. Barnum, No. 812 Fire Escape (E.T. Barnum Wire and Iron Work. *No. 690 General Catalogue*. Detroit: The Firm, 1926: 13)



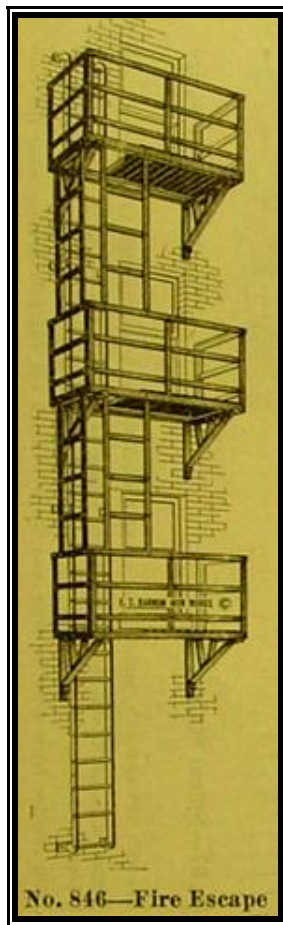
**Figure 84:** E.T. Barnum, No. 818 Fire Escape (E.T. Barnum Wire and Iron Work. *No. 690 General Catalogue*. Detroit: The Firm, 1926: 14)



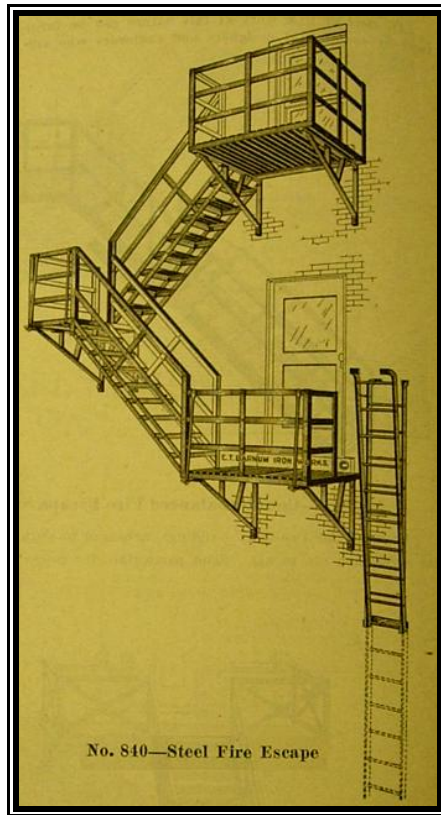
**Figure 85:** E.T. Barnum, No. 823 Fire Escape (E.T. Barnum Wire and Iron Work. *No. 750 Hardware Catalogue*. Detroit: The Firm, 1929: 14)



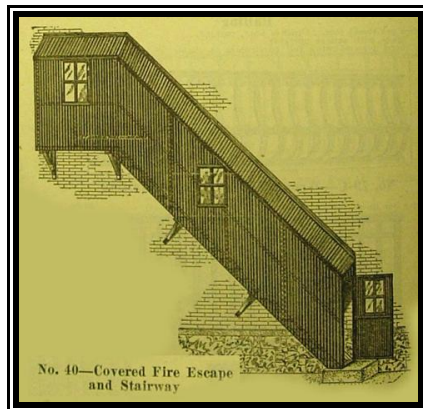
**Figure 86:** E.T. Barnum, No. 826 Fire Escape (E.T. Barnum Wire and Iron Work. *No. 690 General Catalogue*. Detroit: The Firm, 1926: 13)



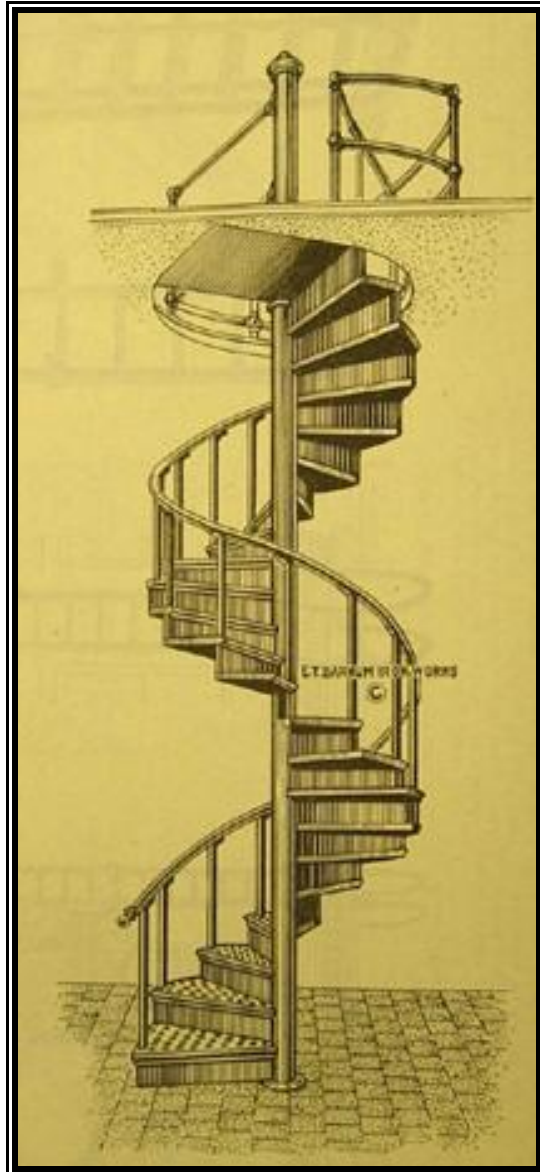
**Figure 87:** E.T. Barnum, No. 846 Fire Escape (E.T. Barnum Wire and Iron Work. *No. 734 Builder's Catalogue*. Detroit: The Firm, 1928: 15)



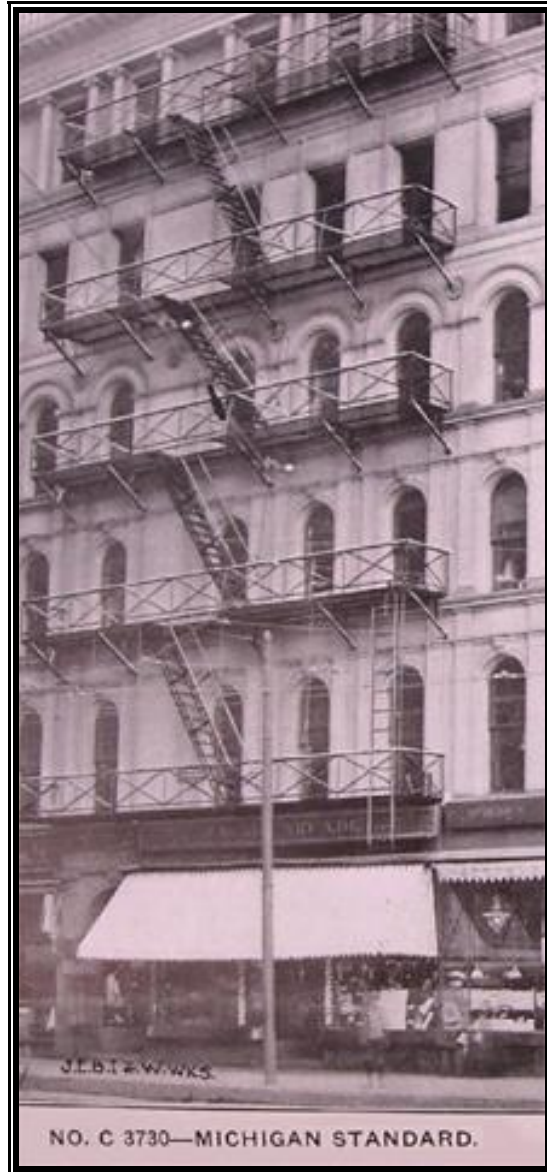
**Figure 88:** E.T. Barnum, No. 840 Fire Escape (E.T. Barnum Wire and Iron Work. *No. 734 Builder's Catalogue*. Detroit: The Firm, 1928: 12)



**Figure 89:** E.T. Barnum, No. 40 Covered Fire Escape and Stairway (E.T. Barnum Wire and Iron Work. *No. 734 Builder's Catalogue*. Detroit: The Firm, 1928: 10)



**Figure 90:** E.T. Barnum, No. 46 Spiral Stairs (E.T. Barnum Wire and Iron Work. *No. 734 Builder's Catalogue*. Detroit: The Firm, 1928: 16)



**Figure 91:** J.E. Bolles, No. C 3730 Michigan Standard (J.E. Bolles Iron and Wire Works. *Sectional Catalogue*. Detroit: The Firm, 1913: 2)

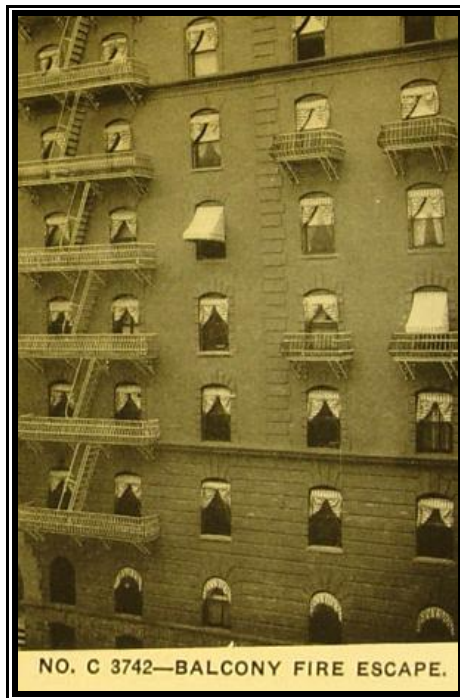




**Figure 92:** J.E. Bolles, No. C 3731 Heavy Fire Escape (J.E. Bolles Iron and Wire Works. *Sectional Catalogue*. Detroit: The Firm, 1913: 2)

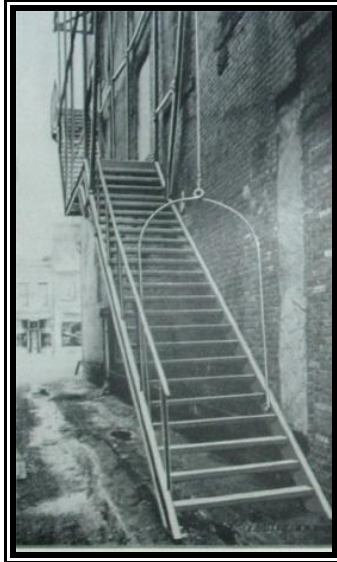


**Figure 93:** J.E. Bolles, No. C 3732 School Fire Escape (J.E. Bolles Iron and Wire Works. *Sectional Catalogue*. Detroit: The Firm, 1913: 3)



**Figure 94:** J.E. Bolles, No. C 3742 Balcony Fire Escape (J.E. Bolles Iron and Wire Works. *Sectional Catalogue*. Detroit: The Firm, 1913: 3)





**Figure 95:** J.E. Bolles, No. C 3760 Overhanging Fire Escape (J.E. Bolles Iron and Wire Works. *Sectional Catalogue*. Detroit: The Firm, 1913: 7)



**Figure 96:** J.E. Bolles, No. C Spiral Fire Escape (J.E. Bolles Iron and Wire Works. *Sectional Catalogue*. Detroit: The Firm, 1913: 4)



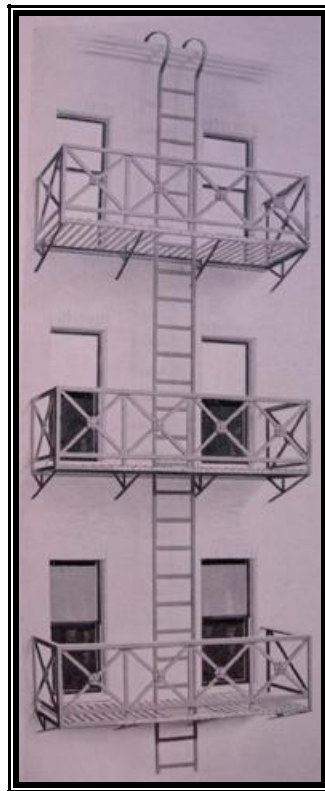
**Figure 97:** J.E. Bolles, No. C 3760 Theatre Fire Escape (J.E. Bolles Iron and Wire Works. *Sectional Catalogue*. Detroit: The Firm, 1913: 5)



**Figure 98:** J.E. Bolles, No. C 3765 Enclosed Fire Escape (J.E. Bolles Iron and Wire Works. *Sectional Catalogue*. Detroit: The Firm, 1913: 6)



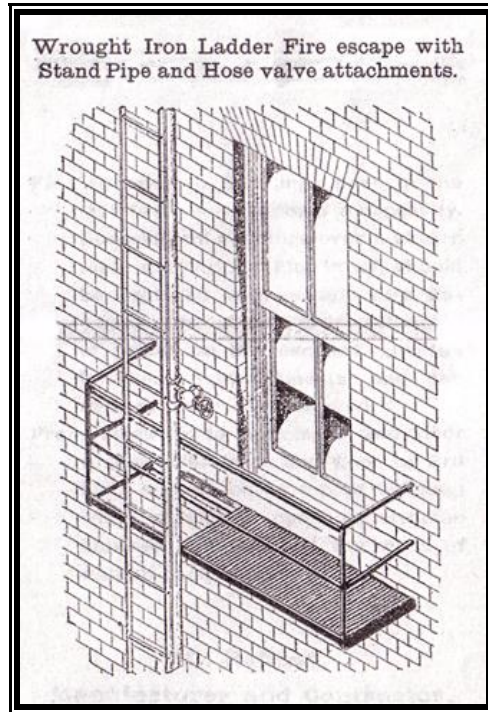
**Figure 99:** J.E. Bolles, No. C 3762 Stair Fire Escape (J.E. Bolles Iron and Wire Works. *Sectional Catalogue*. Detroit: The Firm, 1913: 7)



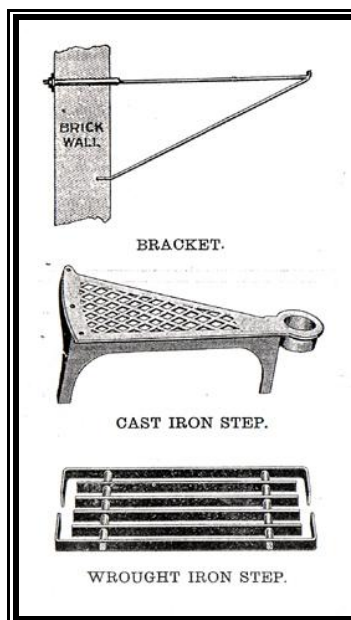
**Figure 100:** Union Steel, No. 60-F Fire Escape (Union Steel. *Trade Catalogue*. Albion, MI: The Firm, 1920: 10)



**Figure 101:** Heffner Common Sense Wrought Iron Stairs Fire Escape (Heffner Iron and Steel Works. *The Heffner Fire Escapes*. Minneapolis: The Firm, 1901: 2)

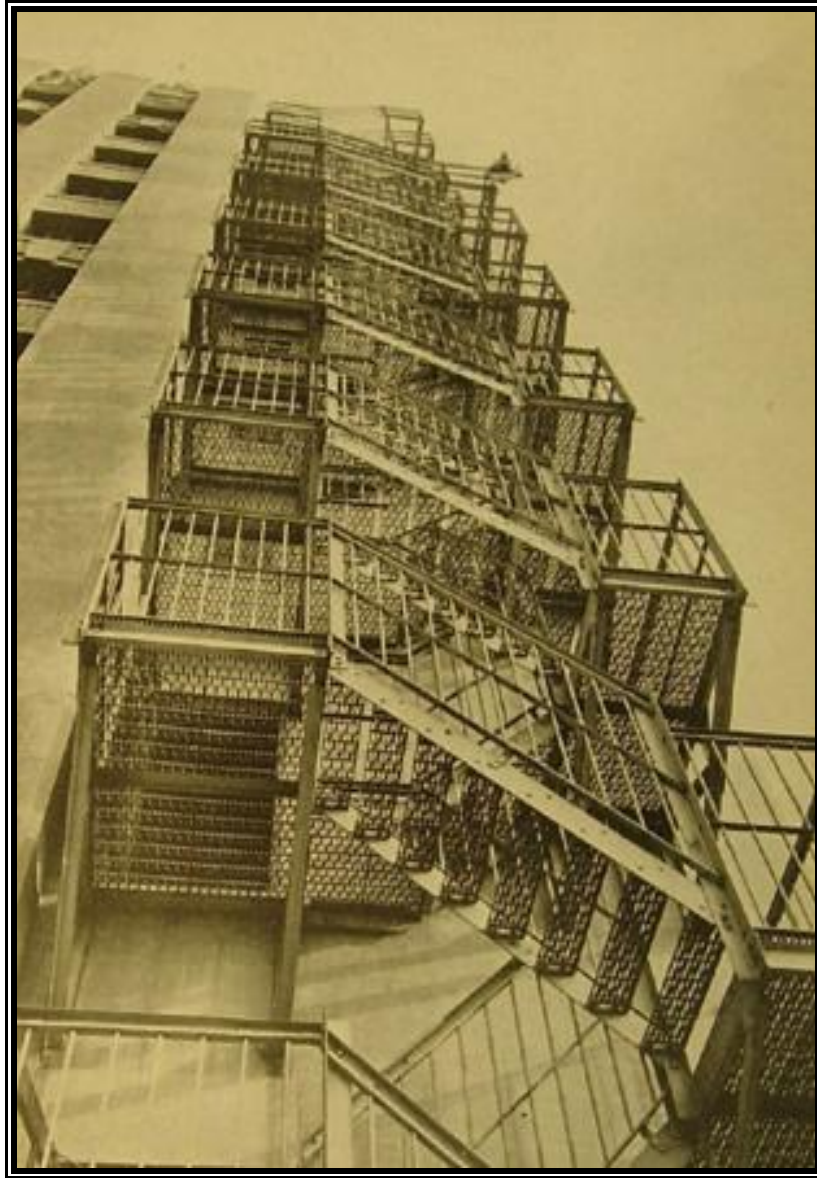


**Figure 102:** Heffner Wrought Iron Ladder Fire Escape (Heffner Iron and Steel Works. *The Heffner Fire Escapes*. Minneapolis: The Firm, 1901: 2)



**Figure 103:** Heffner Bracket and Treads (Heffner Iron and Steel Works. *The Heffner Fire Escapes*. Minneapolis: The Firm, 1901: 1)





**Figure 104:** Arrowhead Grating Fire Escape (Arrowhead Iron Works Incorporated. *Trade Catalogue*. Kansas City, MO: The Firm, 1935: 5)

## **Part 4: Summary of Typologies**

The following is a breakdown of different types of fire escapes and a general summary of their usage. The summaries are based on evidence uncovered through primary research and are not definite. Although many U.S. cities followed in the footsteps of New York, all having similar fire escape codes, regional variances in fire escape design and placement do exist. The dates assigned to the different fire escape types are broad, based on building ordinances and historic photographs, and it is possible for many of these designs to have been constructed past the height of their popularity. A chart of the fire escape designs, building types, and approximate dates follows.

### *Slanting stairs connecting balconies:*

The most common fire escape design involved slanting stairs connecting balconies and accessible through well-holes in the balcony floors. This became the standard for many fire escape codes in U.S. cities after 1900, and, as discussed earlier, this design was required on tenement houses in NYC after 1901. It was much safer than straight ladders connecting balconies. The angle of the stairs varied, although an angle of at least forty-five degrees was generally required after 1900. The balcony design also varied greatly, taking in any number of windows, although two was standard. This design was frequent on all building types but was most common on tenement houses and hotels.

(See Figure 66, Figure 72, Figure 74, Figure 75, and Figure 85)

### *Drop ladders:*

Fixed stairs extending from the lowest balcony to the ground were often not possible on many building types, specifically hotels and tenements, as they created access for burglars and often impeded ground-floor storefronts or sidewalks. However, they were required on schools and often on large factories and theatres. When fixed stairs were not an option, drop ladders could be used. Two types were standard: the swinging drop ladder and the sliding drop ladder. The swinging drop ladder was hinged to a bracket and counterweighted at the back. Stepping onto the stairs lowered them safely, and they could easily be raised again when not in use. The sliding drop ladder hung from a

counterweighted pulley-system and could be raised or lowered accordingly. The swinging stairs were safer and more frequently used after 1900.

(See Figure 75 and Figure 84)

*Straight ladders – well-holes:*

Most building codes no longer allowed straight ladder descents after 1900, but these types could still be employed on buildings of low height and low occupancy - a small apartment or factory - or where additional egress methods were available, such as fire-proof interior stairs. However, they became generally prohibited in locations with women or children. This specific type generally had a ladder extending between two windows through the well-hole of the balcony.

(See Figure 68, Figure 73, and Figure 87)

*Straight ladders – wall:*

This design was less common and not as safe as the straight ladders through well-holes. One had to step out of the balcony onto a ladder affixed to the wall, causing a much slower descent. This type would have been used on very low occupancy buildings, probably not more than two or three stories in height, and would be used in a situation where little room was left for a full balcony and stair design.

(See Figure 70 and Figure 83)

*Galvanized Iron Wire:*

For additional safety in schools, orphanages, and hospitals, galvanized iron wire was placed over balcony and stair openings. The balcony and stair railings were often covered and occasionally, for extra safety, the mesh extended the entire height of the window opening. These designs almost always had a fixed stairway accessing the ground.

(See Figure 69, Figure 79, and Figure 80)

*Continuous Run Stairs:*



Continuous run stairs had small landings at openings and intermediate landings where stairs turned. These were best on low buildings and were often used on theatres, as it was easier and quicker for large crowds to descend. Likewise they were often used on schools, as an easier descent for children. Platforms were not always small, often they took in numerous window or door openings.

(See Figure 71, Figure 78, Figure 86, and Figure 88)

*Covered and Spiral Stairs:*

Other fire escape stairs were available. Covered stairs were mainly used for factories or schools. The exterior stairway was covered in galvanized sheet metal for extra protection. Spiral stairs were rare, as they were not as safe, and used mainly on smaller buildings where appearance was a concern.

(See Figure 89 and Figure 90)

*Ornamental and Basic Balcony Designs:*

Various balcony designs, from utilitarian to highly ornamental, were available and priced accordingly. The main facades of hotels, fashionable apartment houses, offices and theatres were often the recipients of the ornamental designs.

(See Figure 67, Figure 76, Figure 77, and Figure 82)

*Chart of Fire Escape Typologies*

	<b>Tenements</b>	<b>Hotels</b>	<b>Theatres</b>	<b>Schools</b>	<b>Factories</b>	<b>Approx. Date</b>
<b>Balconies with slanting stairs</b>	Required after 1901	Usually required	Usually required	Required	Usually required in the 1900s on larger factories	Frequ. after 1900
<b>Balconies with straight ladders, through well-holes</b>	Common before 1901, not allowed after	Usually not allowed	Usually not allowed	Not allowed, unsafe for children	Frequ. in the 1800s; used in later years for smaller factories with low occupancy	Not common after 1900
<b>Balconies with straight ladders affixed to wall</b>	Not common, not allowed after 1901	Gen. not allowed	Usually not allowed	Now allowed, unsafe for children	Occas. used on small factories with low occupancy	Not common after 1900
<b>Platforms with straight-run stairs</b>	Rare	Rare	Common	Common	Common	Frequ. after 1900
<b>Covered Stairs</b>	Rare	Rare	Occas. used	Occas. used	Occas. used	Frequ. after 1900
<b>Spiral Stairs</b>	Rare	Rare	Occas. used	Occas. used	Rare	Frequ. after 1900
<b>Galvanized wire mesh</b>	Rare	Rare	Rare	Often required	Rare	Frequ. after 1900
<b>Fixed stairs extending to ground</b>	Rare	Rare	Common	Required	Common	Frequ. after 1900
<b>Swinging drop ladder</b>	Common after 1900	Common	Common	Not allowed	Common	Frequ. after 1900

	<b>Tenements</b>	<b>Hotels</b>	<b>Theatres</b>	<b>Schools</b>	<b>Factories</b>	<b>Approx. Date</b>
<b>Sliding drop ladder</b>	Common before 1900	Common	Rare	Not allowed	Common	Frequ. before 1900
<b>Ornamental design</b>	Occas. used on main façades of nicer bldgs.	Common	Common	Rare	Rare	More frequ. after 1870s
<b>Basic design</b>	Common, especially before 1900	Rare except in rear	Common in rear	Common	Common	Common in all years

## Chapter 5: Fire Escape Conservation

Although fire escapes are no longer permissible as a primary means of egress, many present day building codes allow existing fire escapes to act as a secondary means of egress.<sup>251</sup> The National Fire Protection Agency urges the use of interior fireproof stairways, but they promote the use of exterior fire escapes as an aid in firefighting and an effective secondary egress.<sup>252</sup> Allowing the use of fire escapes encourages the rehabilitation of historic buildings and cuts down on the amount of invasive interior reconstruction for bringing buildings up to code. Many small, older buildings do not have the space for enclosed interior stairways. However, additional safety precautions need to be taken when incorporating the exterior fire escape into the life safety plan. Sprinkler systems and fire rated doors and windows are often required in the vicinity of the fire escape. Additionally, most building codes have specific requirements for dimensions, access, materials, strength and termination above grade.<sup>253</sup> Most importantly, many older fire escapes have been neglected and have fallen into serious disrepair. Structurally, fire escapes can be dangerous. Before their use, balconies and stairs need to be inspected and brought up to code, and once in use, routine maintenance is required to maintain their safety.

The 2004 Life Safety Code Handbook, published by the National Fire Protection Association, outlines their guidelines for use of existing fire escapes. According to Section 7.2.8.1.2: “Fire escape stairs shall not constitute any of the required means of egress.”<sup>254</sup> Existing fire escapes are an exception. They may be utilized but not make up more than fifty percent of the required means of egress. According to Section 7.2.8.1.3: “Fire escape stairs of the return-platform type with superimposed runs or the straight-run type with a platform that continues in the same direction shall be permitted. Either type shall be permitted to be parallel to or at right angles to buildings. Either type shall be permitted to be attached to buildings or erected independently of buildings and connected

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<sup>251</sup> John M. Watts Jr. and Marilyn Kaplan, *Fire Safe Building Rehabilitation* (Quincy, Massachusetts: National Fire Protection Association, 2003), 349.

<sup>252</sup> Ben Klaene and Russ Sanders, “Alternative Egress” *NFPA Journal* September/October (Quincy, Massachusetts: National Fire Protection Association: 2004), NFPA Online, <http://www.nfpa.org/index.asp>.

<sup>253</sup> Watts, 349

<sup>254</sup> *Life Safety Code Handbook* (Boston: National Fire Protection Association, 2000), 168.

by walkways.”<sup>255</sup> Balcony and stair fire escapes are permitted only when a series of additional requirements are met. The fire escape must be exposed to the fewest number of window or door openings possible, and those that do access the fire escape shall be of fire rated construction. The code also details specific measurements for the individual fire escape parts and the size and placement of fire escapes. Existing fire escapes are exempt from these standards, but only when additional egress is supplied and when safety precautions are taken such as fire rated windows and doors or sprinkler systems. All fire escapes, nonetheless, need to pass inspection and meet safety requirements.

Rust corrosion, or oxidation, is the main catalyst for deterioration of cast and wrought iron. Oxidation occurs when iron is exposed to a combination of moisture and air, and rust spreads rapidly with frequent rain, proximity to salt-water, and the accumulation of snow and ice. Rusting also rapidly increases when moisture collects in joints, cracks, and crevices. Once oxidation occurs, the porous surface of the rust acts as a reservoir for water, increasing corrosion. If the process is allowed to continue, the iron will completely deteriorate, leaving only rust behind.<sup>256</sup>

Rust removal and prevention is the first step to fire escape conservation. Back in the nineteenth century, laws required landlords to keep two coats of protective paint on the fire escape surfaces. Today, applying at least two coats of paint is still the recommended method for rust prevention. In most cases, severe oxidation will have already occurred on any fire escapes that still exist today. Maintenance has long been neglected, and in the severe weather of northern climates rust spreads rapidly. Before repainting, all surfaces must be cleaned of rust and existing paint. The simplest, least expensive method is to clean surfaces by hand, using a hand-scraper or a wire brush. However, the process does not effectively remove all residue and may cause additional damage to the surface. The most effective, least damaging method is sandblasting with a low-grit aggregate. The process generally leaves a uniformly clean surface, but all building surfaces should be adequately protected before the sandblasting process begins. After the surface is cleaned, at least two layers of a protective paint need to be applied. The coating should be applied as soon as possible to prevent additional rust from

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<sup>255</sup> Ibid, 169.

<sup>256</sup> John and Nicola Ashurst, “Metals” *English Heritage Technical Handbook 4* (New York: Halsted Press, 1988), 25.

forming, but the surface should be absolutely dry to ensure maximum adherence and to prevent moisture from becoming trapped beneath the paint. Likewise, the new coating should not be applied while the air is humid or warm.<sup>257</sup> Preventative measures can be taken to inhibit further corrosion. Snow and ice should be cleared from treads and platforms and from areas where it can collect around joints. Check for roof and gutter leaks that may be dripping onto the fire escape.

Where more serious deterioration has occurred, patching may be necessary. Epoxy resins or metal fillers can be used in voids and cracks, a necessary step for keeping water from collecting. Joints should also be well sealed and regularly monitored for deterioration. Water can collect in the crevices and corrode the joint.<sup>258</sup> Where bolts or rivets are found, the integrity of the entire piece of hardware should be examined. The head may look fine, but corrosion may be occurring inside the joint. Structural damage can occur if corrosion becomes severe in those crucial areas.<sup>259</sup> Where the fire escape is bolted into the masonry wall, corrosion can cause the iron and the masonry to deteriorate, and rust can stain the surface of the wall. Drop ladders, when present, need to be maintained to ensure safe use in the event of an emergency, and hinges should be routinely well oiled.

Following is a discussion of common problems that can occur with the deterioration of fire escapes. The discussion refer to specific problems seen in the associated images taken by the author.

Rust runs down the surface of the masonry from the anchorage joints. More serious than the unattractive stains on the building façade is the possible weakening of the anchorage of the structure. Bolts should be extracted and inspected. Replacement of hardware may be necessary if serious deterioration has occurred. Check if a leak is causing the rust to run down the façade. The roof, gutter or upper windowsill may be constantly dripping down and corroding the anchorage (Figure 105)

The voids in this stair tread are possibly a result of snow and ice collecting on the surface of the tread, or they may be flaws in the manufacturing process. They must be

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<sup>257</sup> John G. Waite, "Preservation Brief 27: The Maintenance and Repair of Architectural Cast Iron", National Park Service Technical Preservation Services, <http://www.cr.nps.gov/hps/tps/briefs/brief27.htm> (accessed October 29, 2005)

<sup>258</sup> Ibid.

<sup>259</sup> Ashurst, 26.

filled and resealed with paint and primer. Left unattended, the cracks will continue to collect moisture and quicken the corrosion process (Figure 106)

The pipe protecting the long bolt on this stair rail suffered severe corrosion and became detached. The rail should be reconnected after corrosion is cleaned from the joint, and the joint should subsequently be sealed with an epoxy filler and routinely examined (Figure 107)

Due to the accumulation of snow and ice on stair treads, severe corrosion plagues the units. Precipitation running through the balcony platform has also rusted the supporting bracket that anchors to the masonry wall. Both parts suffer corrosion most severely at the joints. Bolts should be removed and examined, and will most likely require replacement. Stair treads should be cleaned and repainted. If a cast iron fire escape is being inspected, one should check for any brittleness in the treads. Cast iron can fracture without warning, and the stair treads receive a lot of weight. A replacement may be required. Routine maintenance should involve keeping surfaces clean of snow and ice (Figure 108)

The vertical bars on the balcony have detached from the platform and are misshapen. The integrity of the entire balcony is compromised and a dangerous situation exists. Replacement of the broken bars is necessary, and the structural stability of the entire balcony railing should subsequently be determined to ensure that other rails are not near the fracture point (Figure 109)

The drop ladder on this fire escape is severely rusted. The hinge with which the staircase attaches to the lowest platform suffers significant oxidation, inhibiting a smooth, easy drop for the stairs. Before oiling or greasing the hinge, the mechanism should be inspected and cleaned. Routine maintenance should involve keeping the hinge well-oiled and working smoothly (Figure 110)

Typical surface oxidation. The corrosion can easily be scraped and cleaned prior to priming and painting. The paint chipping around the affected area also should be removed (Figure 111)

The sliding drop ladder has been bent out of shape at the bottom. The ladder will need to be replaced. Its construction is flimsy and it cannot be reformed for a safe and smooth descent (Figure 112)

Long-term neglect can lead to serious structural failure, including loss of anchorage to the masonry wall. In such instances, a professional should be consulted for stabilization of the structure and the possible fabrication of replacement parts. Although the average contractor could handle the work, several companies do specialize in fire escape repair and replacement or the general repair of architectural ironwork. Based on the information obtained regarding fire escape specialists, Britain appears to be the forerunner. A company called Fire Escape Limited based out of London advertises the repair, renovation and replacement of fire escapes and parts. They promote renovation as the primary solution, citing lower cost, quicker repair and less disruption to the building and the fire escape. Prior to any work, the company recommends consulting a specialist in building and fire codes to survey conditions and provide feedback on what needs to be done to meet the requirements of the law. The work that Fire Escape Limited advertises for their customers includes: replacing stair treads, replacing bars, wire-brushing rusted parts and sealing with primer and protective paints, removing fatigued or rusted parts and replacing with new, strengthening railings, recovering non-slip platforms and upgrading structural supports.<sup>260</sup> At least three other companies operating out of Britain specialize in repair of fire escapes and similar architectural features.

Although the work of Fire Escape Limited appears comprehensive, specific regulations for the preservation of fire escapes have yet to be compiled. Architectural cast and wrought iron repair guidelines are put out by the National Park Service in the United States and English Heritage in Britain, in addition to numerous articles and books written on the subject, but fire escapes require individual attention. Being used as a safety device and having undergone years of neglect, fire escape conservation for these exterior egress systems needs focus.

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<sup>260</sup> Fire Escape Limited, <http://www.fireescape.co.uk/information.htm> (accessed October 29, 2005)





**Figure 105:** Rust runs down the masonry facade; anchorage many have weakened (author, 2005)



**Figure 106:** Voids in stair tread need to be filled (author, 2005)



**Figure 107:** Railing has become detached due to severe oxidation (author, 2005)



**Figure 108:** Deteriorating stair treads and bracket (author, 2005)



**Figure 109:** Broken balcony railings (author, 2005)



**Figure 110:** Severely rusted drop ladder; hinge probably stiff (author, 2005)



**Figure 111:** Rust that can be scraped and primed and painted (author, 2005)



**Figure 112:** Drop ladder is bent out of shape and unusable (author, 2004)

## Conclusion

Morning sun sharpened its angled shadow  
on the carpet--ascending and descending  
steps we hoped we'd never need to take.  
As if we could forget what it meant,  
its mission, could say "balcony" and  
balcony it became, we converted it  
to civilian use. Herbs flourished there.  
An urban gardener crouched in her milieu,  
trowel and watering can passed through the window,  
the compact terrain of the planting box  
arrayed in prison stripes cast by its railing.  
Out there an alternate view was garnered:  
sky breathed between rooftops, cats balanced  
on fences that marked small yards,  
trees collected birds as though magnetic.  
Black zigzagged the brick back walls  
of buildings, half ladder, half stairs.  
It was no stairway to heaven, no Jacob's ladder—  
there were limits to how far it could take us—  
though there was something angelic about it,  
the loyal waiting by the window to save.  
Daily that hypertensive summer, you leaned out  
with water to prevent the fragrant leaves  
from parching in the desirable southern exposure.  
Dill, parsley, basil--all that grew there  
we consumed, and more kept coming, a camouflage  
we counted on the iron wings to hold.

-Jeanne Beaumont, "*The Greening of the Fire Escape*", 1992<sup>261</sup>

Fire escapes still have a place in our present day lives; they allow us to appreciate our cultural, political and architectural heritage and create unique outdoor spaces for us to enjoy as our ancestors once did. As stated in the introduction, the list of concerned fire escape preservationists is indeed growing, if not rapidly. Several urban historic preservation commissions across the United States have incorporated fire escape preservation clauses into their master plans, and numerous preservation projects have already been completed.

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<sup>261</sup> Jeanne Beaumont, "The Greening of the Fire Escape" *The Nation* 255, n. 5 (1992): 182. Infotrac OneFile, <http://infotrac.galegroup.com>



The Providence Historic District Commission's design guidelines for the Jewelry Manufacturing Historic District, in Rhode Island, states in Section 76, as amended in June 1995: "Existing decorative fire escapes which contribute to the historic character of a building should be preserved. The removal of existing fire escapes which do not contribute to the historic character of a building and which are no longer required for egress is encouraged."<sup>262</sup> Unfortunately, the verbiage of the clause implies that only decorative fire escapes be retained. The district is comprised of fourteen multi-storied factory buildings, dating from the late nineteenth and early twentieth centuries. Historically, factories of that era over two stories were often required to have exterior fire escapes. Although it is unclear how many fire escapes originally existed and how many survived until the sites rehabilitation, many fire escapes were probably lost. The Doran Building is the only contributing structure that appears to have retained its fire escape (Figure 113).<sup>263</sup>

The Housing Authority of Portland, Oregon's, historic headquarters, New Market West, lies within the Skidmore Fountain (Old Town) National Register Historic District (Figure 114). The 1889 warehouse building "has many unique architectural features, including the brick and stone exterior walls, large arched windows in brickwork, the massive rusticated stone base of the forge, wrought-iron balconies and fire escapes, cast-iron wall ties, engraved street names on the southwest corner, and an ornamental corner flagpole support."<sup>264</sup> The fire escapes remain intact on the Romanesque structure and on the attached theatre annex.<sup>265</sup>

A September 23, 2003, hearing of the Historic Districts Council of New York City before the Landmarks Commission provided insightful information of the status of historic fire escapes within the preservation community of New York City. In reference to 46-48 and 50 Lispenard Street in the TriBeCa East Historic District, the Council questions the proposed removal of fire escapes from the restoration of a Second Empire

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<sup>262</sup> Providence Historic District Commission, [http://www.providenceri.com/government/planning/historic/DownCity\\_regs.html](http://www.providenceri.com/government/planning/historic/DownCity_regs.html) (accessed October 29, 2005)

<sup>263</sup> The Jewelry District, "History of the Jewelry District", <http://www.jewelrydistrict.org> (accessed October 29, 2005)

<sup>264</sup> Housing Authority of Portland, "New Market West: HAP's Historic Headquarters Building", <http://hapdx.org/about/nmw.html> (accessed October 2005)

<sup>265</sup> Ibid.

structure. “Although the fire escapes were not part of the original design of the building, by today’s standards they are historic and serve as an important reminder of the commercial character of the building and the neighborhood. Fire escapes are a singular feature of the New York streetscape and should not be discarded just because they are not original to the building.”<sup>266</sup> The tall, narrow TriBeCa loft buildings retain their fire escapes and their historic character (Figure 115).<sup>267</sup> Fire escapes in some older New York City neighborhoods are now being recognized as worthy of preservation.

The Greenwich Village Society for Historic Preservation in New York City emphasizes the significance of historic fire escapes in their old tenement house districts. A large number of late nineteenth-century structures in South Village display “meticulous architectural detail, from the cornices to brickwork to elaborately crafted fire escape and entryway railing ironwork, to cast-iron storefronts.”<sup>268</sup> A tour of South Village reveals what is likely one of the most comprehensive district of well-preserved fire escapes in the New York City, if not the country. The society has an interest in preserving these character defining features, both the decorative and utilitarian designs. The wave of immigrants who fled into this neighborhood in the late nineteenth century, experienced the streetscapes we see today, lined with an array of iron balconies and stairs and ladders that crisscrossed the façades of their small dwellings. The well-kept, neatly painted fire escapes should be a model for historic preservation commissions involved in urban preservation. According to the Greenwich Village Society, the blocks along Sullivan Street (Figure 116) “probably have the largest array of virtually completely intact late nineteenth- and early twentieth-century tenements, including the especially vulnerable architectural detailing at the buildings’ tops and bottoms, anywhere in New York or the world.”<sup>269</sup> Simple, non-decorous fire escapes receive equal treatment in the neighborhood preservation (Figure 117).<sup>270</sup> Beautifully painted, these fire escapes are

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<sup>266</sup> New York City Historic District Council, “Statement of the Historic Districts Council before the Landmarks Preservation Commission Certificate of Appropriateness Hearing” (September 23, 2003), <http://www.hdc.org/testimonysept23.htm> (accessed October 29, 2005)

<sup>267</sup> Oliver E. Allen, Tribeca Organization, Architecture, <http://www.tribeca.org/history/architecture.aspx> (accessed October 29, 2005)

<sup>268</sup> Greenwich Village Society for Historic Preservation, “South Village-A Distinguished History Largely Unrecognized, <http://www.gvshp.org/southvillagehistory.htm> (accessed October 2005)

<sup>269</sup> Ibid, [http://www.gvshp.org/south\\_village949.htm](http://www.gvshp.org/south_village949.htm)

<sup>270</sup> Ibid, [http://www.gvshp.org/south\\_village969.htm](http://www.gvshp.org/south_village969.htm)

appreciated for their architectural and historical value. Finely crafted ornamental fire escapes adorn many of the tenement façades in the South Village district (Figure 118).<sup>271</sup> Figures 119 and 120 provide stunning views of the historic streetscape. The light playing off the ironwork and casting shadows on the building façades in Figure 119 demonstrates the beauty of the fire escape as an architectural element.<sup>272</sup> The suspended drop stairs in Figure 120 create an interesting sidewalk corridor and hark back to a historical era when residents strolled beneath the iron contraptions.<sup>273</sup>

The Pioneer Square Preservation District in Seattle, Washington, also provides very strict guidelines for the preservation of fire escapes in the historic district of turn-of-the-century buildings. According to the Board: “Fire escapes are important character-defining features of numerous buildings in the District. They are particularly important in contributing to the special character of the District’s alleyscapes. Proposals to remove or alter fire escapes shall be reviewed on a case by case basis with special consideration given to safety issues. However, as a general rule, fire escapes shall be retained.”<sup>274</sup>

Historic preservation continues to evolve. Recent decades have seen the appreciation of vernacular structures, whereas high-style mansions and structures related to famous historical events or figures had at one time been the historic preservation ethos. The future of the field lies in the preservation of the “white elephants” of our built environment. The structures and architectural features that are often seen as disfiguring, unattractive or insignificant are slowly being recognized for their own contributions to American history.

The history of the iron balcony fire escape, as discussed in this thesis, spans a relatively short but vital period in urban evolution. The political and legal disputes that continued to hinder the acceptance of the contraptions, and the race, class and gender-rights advocacy that aided the construction of the safety devices embroiled New York City and other large metropolitan areas. The tenement dwellers, for whom the fire escape became an extension of their lives, within their small, poverty stricken enclaves imprinted

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<sup>271</sup> Ibid, [http://www.gvshp.org/south\\_village948.htm](http://www.gvshp.org/south_village948.htm)

<sup>272</sup> Ibid, [http://www.gvshp.org/south\\_village985.htm](http://www.gvshp.org/south_village985.htm)

<sup>273</sup> Ibid, [http://www.gvshp.org/south\\_village962.htm](http://www.gvshp.org/south_village962.htm)

<sup>274</sup> City of Seattle, Pioneer Square Preservation District Guidelines, [http://www.cityofseattle.net/neighborhoods/preservation/pioneersquare\\_guidelines.htm](http://www.cityofseattle.net/neighborhoods/preservation/pioneersquare_guidelines.htm) (accessed October 29, 2005)



a cultural value on the contraptions. The representation of the fire escape as a symbol of a changing urban infrastructure reminds us of the nature of the growing American metropolis at the turn-of-the-century. Companies nationwide manufactured fire escapes in a variety of different shapes, sizes and designs during the heyday, contributing to the built environment and providing us with a wealth of magnificent works that remain today.

We should take a clue from organizations like the Greenwich Village Society for Historic Preservation, whose members transform the rusted, unstable mechanisms to beautifully restored architectural elements that enhance the façades of buildings. True, we can incorporate many safely conserved fire escapes into emergency egress plans for historic buildings, an important incentive for their preservation. But many urban apartment dwellers in cities across the United States still appreciate the outdoor rooms provided by fire escapes, and many more should be able to safely experience that piece of history.

Strings of white Christmas lights are twisted around the fire escape as if a piece of the black-and-white sky has tangled there.

I'm going to stay out here in the cold air, where my breaths cause icicles to prick the wet red bags of my lungs.

The ladder that reaches to the sidewalk is rusting to terra cotta. A foot would split it. I want to climb the one that goes up.

If it could go on, ladder to ladder, my foot bending around the rungs, up past my neighbors' rooms, warm red walls, striped curtains, a cat, plants with hothouse fronds, up, again, and up to the roof, the tarpaper plain where the wind is imitating pigeon songs.

The ladder turns, goes up again. In my coat with silver buttons I could climb till I was tired, and then sit, rocking gently in the metal wind boat of atmosphere.

*-Elizabeth Sullivan, "Fire Escape", 2003<sup>275</sup>*

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<sup>275</sup> Elizabeth Sullivan, "Fire Escape" *Phi Beta Kappa Forum* 83, no. 3 (2003): 52. Infotrac OneFile, <http://infotrac.galegroup.com>



**Figure 113:** 150 Doran Building, Jewelry Manufacturing Historic District, Providence, RI. Fire escapes can be seen on the facade on the right (Providence Historic District Commission, “Design Guides for the Jewelry Historic District,” Providence, Rhode Island, [http://www.providenceri.com/government/planning/historic/DownCity\\_regs.html](http://www.providenceri.com/government/planning/historic/DownCity_regs.html))



**Figure 114:** New Market West, Portland, Oregon (Housing Authority of Portland, “New Market West: HAP’s Historic Headquarters Building,” Portland, Oregon, <http://hapdx.org/about/nmw.html>)



**Figure 115:** Historic TriBeCa block in New York City that maintains its fire escapes (Allen, Oliver E., “Architecture,” Tribeca Organization, <http://www.tribeca.org/history/architecture.aspx>)



**Figure 116:** View looking south down Sullivan Street in the South Village, New York City (Greenwich Village Society for Historic Preservation, “South Village - A Distinguished History Largely Unrecognized,” New York City, [http://www.gvshp.org/south\\_village969.htm](http://www.gvshp.org/south_village969.htm))



**Figure 117:** 103 and 105 Sullivan Street, South Village, New York City (Greenwich Village Society for Historic Preservation, “South Village - A Distinguished History Largely Unrecognized,” New York City, [http://www.gvshp.org/south\\_village949.htm](http://www.gvshp.org/south_village949.htm))



**Figure 118:** Ornamental fire escape at 169 Sullivan Street, South Village, New York City (Greenwich Village Society for Historic Preservation, “South Village - A Distinguished History Largely Unrecognized,” New York City, [http://www.gvshp.org/south\\_village948.htm](http://www.gvshp.org/south_village948.htm))



**Figure 119:** Looking north on Carmine Street, South Village, New York City (Greenwich Village Society for Historic Preservation, “South Village - A Distinguished History Largely Unrecognized,” New York City, [http://www.gvshp.org/south\\_village985.htm](http://www.gvshp.org/south_village985.htm))



**Figure 120:** View down Thompson Street, South Village, New York City (Greenwich Village Society for Historic Preservation, “South Village - A Distinguished History Largely Unrecognized,” New York City, [http://www.gvshp.org/south\\_village962.htm](http://www.gvshp.org/south_village962.htm))

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