

No. 744,404.

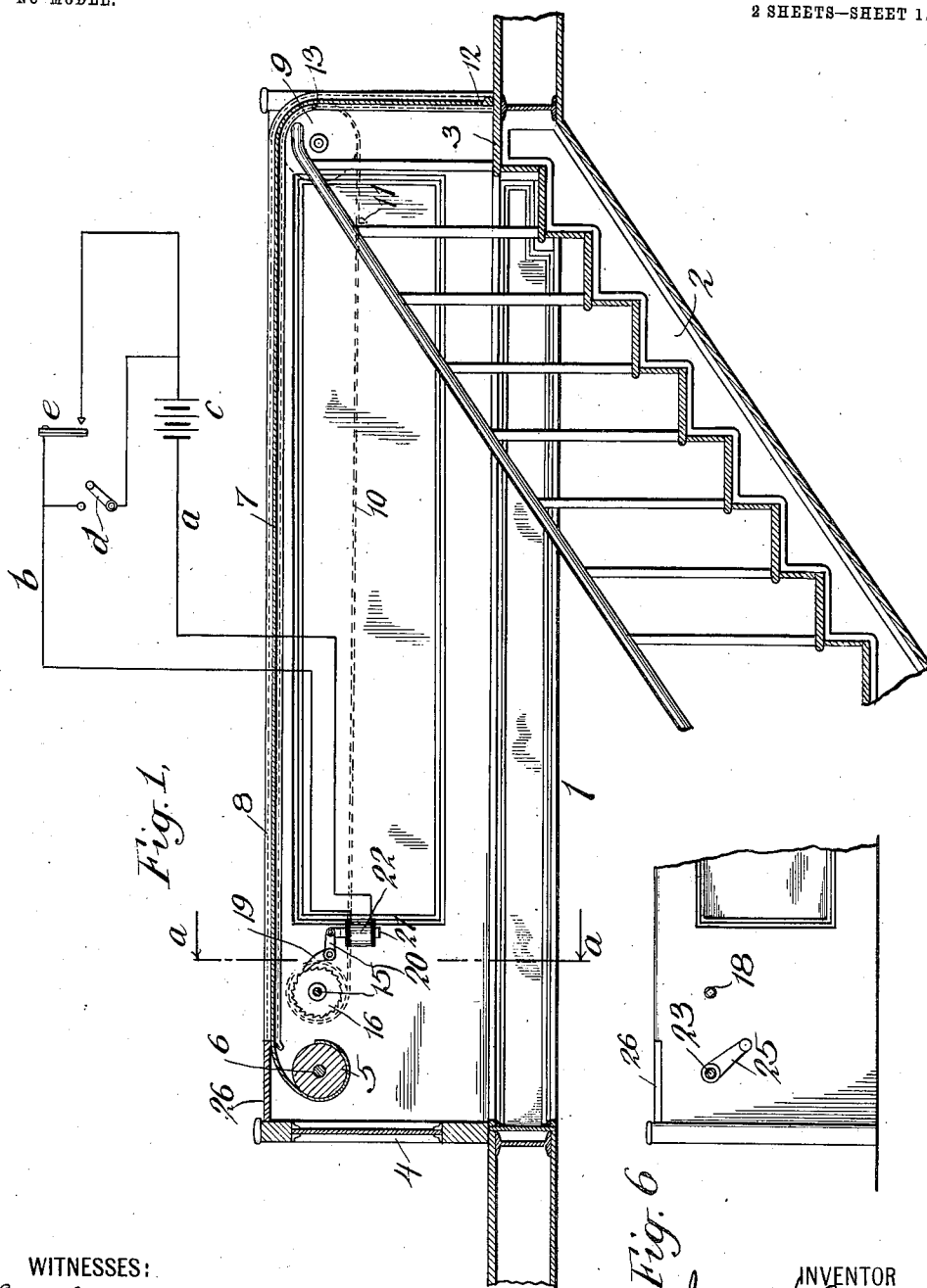
PATENTED NOV. 17, 1903.

J. W. RENO.  
FIRE CURTAIN.

APPLICATION FILED JUNE 16, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

*Charles L. Hart*  
*Maurice Hart*

Fig. 6

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ATTORNEY

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2 SHEETS—SHEET 2.

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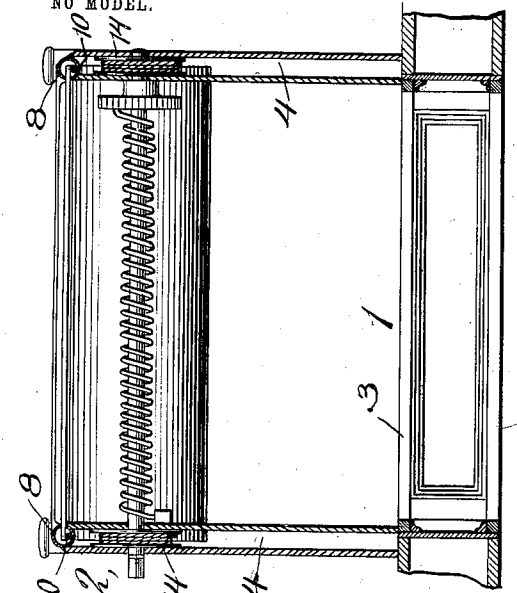


Fig. 2.

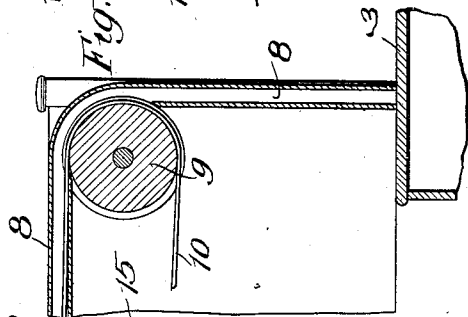


Fig. 3.

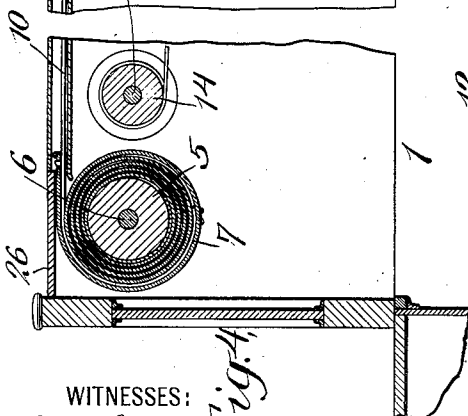
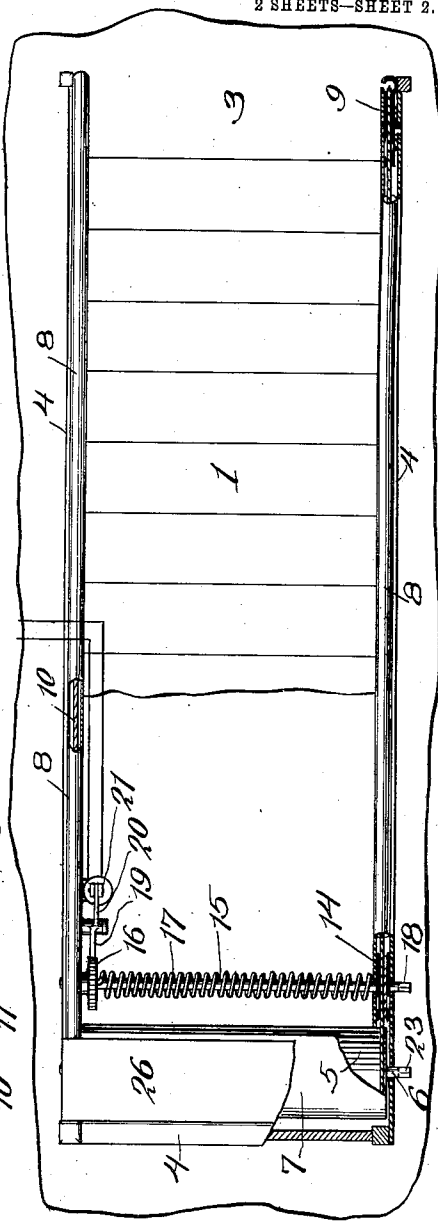


Fig. 4.

WITNESSES:

*Ellis*  
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Fig. 5.



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# UNITED STATES PATENT OFFICE.

JESSE W. RENO, OF NEW YORK, N. Y.

## FIRE-CURTAIN.

**SPECIFICATION** forming part of Letters Patent No. 744,404, dated November 17, 1903.

Application filed June 16, 1903. Serial No. 161,650. (No model.)

### *To all whom it may concern:*

Be it known that I, JESSE W. RENO, a citizen of the United States of America, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Fire-Curtains, of which the following is a specification.

My invention relates to fire-curtains or closures for the well-openings of stairways and other similar openings which it is desirable to close in case of fire in order to shut off the currents of air and smoke between the different floors of a building, and especially in order to prevent smoke from passing from the floor or story where the fire is located to other floors or stories where there is no fire.

The object of my invention is to provide a curtain or closure for well-openings and other similar locations which shall be convenient and effective in its construction and operation, which can be installed in public buildings, such as dry-goods and other stores, without producing an unsightly appearance, and one which may be operated to close either automatically or manually.

My invention consists in providing a novel means for closing the well-openings of stairways which can be operated manually or automatically.

The preferred form of my invention consists in providing a flexible curtain which is imperforate, or substantially so, for the purpose for which it is intended, in providing a drum on which said curtain is adapted to be wound, in providing guides for said curtain which are arranged in such a manner that as the curtain is drawn out or unrolled from said drum it is guided toward the front of the well-opening or the landing of the stairway, in providing means for actuating the unrolling of the curtain either manually or automatically, in providing means for withdrawing or rolling up the curtain on the drum, and in other novel features of construction to be hereinafter more fully explained and described.

One of the most serious consequences of fires in large modern stores, especially where a fire is confined to one floor, results from smoke coming in contact with goods stored on floors other than those on which the fire occurs. It is also well known that a large per cent. of the fatalities resulting from fires

are due to smoke alone at points remote from the location of the fire. It is also well known that fires, especially in tall buildings, are greatly augmented by currents of air passing up from story to story through the well-openings of stairways. By means of my improved fire-curtain the smoke resulting from a fire may be confined to the floor on which the fire occurs, and thus a large amount of damage both to individuals and merchandise spared.

In the drawings accompanying and forming part of this specification, Figure 1 represents a longitudinal section through the well-opening provided with the preferred form of my invention. Fig. 2 represents a transverse section on line *aa* of Fig. 1. Fig. 3 represents a plan view in which certain portions are broken away. Fig. 4 represents a partial section on an enlarged scale. Fig. 5 is a detail section, on an enlarged scale, of the end of the curtain and a flexible band secured thereto. Fig. 6 is a partial side view showing the means for winding up the curtain and withdrawing it from the well-opening.

The reference characters are used in the same sense in all of the figures and the specification.

Numeral 1 represents the well-opening surrounded by the balustrades.

2 represents a stairway leading up to the landing 3 at the front end of the well-opening.

4 represents balustrades which rise from the sides and rear of the well-opening to the usual height and which are made imperforate.

By the word "imperforate" herein used I mean imperforate to the extent that the passage of air or smoke in material quantities is prevented.

5 represents a drum mounted on the shaft 6 above the rear end of the well-opening, the shaft 6 being journaled in the balustrades 4. On the drum 5 is wound the flexible curtain 7, which is preferably made of thin sheet metal or of some such material as asbestos, but which may be made of any other convenient material, whether combustible or non-combustible, as the purpose of the curtain is not so much to resist the action of fire as to prevent the passage of air or smoke.

8 represents guides extending along the tops of the balustrades horizontally to the front ends thereof and thence bending downward

and extending to the landing 3. These guides are preferably made of hollow tubes having a longitudinal slot therein on their inner sides and are adapted to receive the outer edges of the curtain and to guide the same as it is unwound from the drum 5.

9 represents guide-sheaves located tangent to the horizontal and vertical portions of the guides 8, a portion of the inner side of the curve of the guide being cut away to permit the flexible bands 10 to pass from the surface of the guide-sheave into the horizontal portions of the guides 8. The flexible bands or cables 10 have their ends secured to the curtain at points 13 a distance from the end of the curtain substantially equal to the height of the center of the guide-sheaves 9 from the landing 3. At a point on the cables 10 near the end of the curtain I provide a lug 11 and in the curtain opposite 11 holes 12, adapted to receive the lugs when these portions of the cables and curtain are upon the sheaves or in the horizontal parts of the guides 8, the purpose of this construction being to prevent that portion of the curtain between its end and the attachment 13 of the cables from buckling as the curtain is being drawn out. The cables 10 pass from the sheaves 9 rearwardly to the sheaves 14, upon which they are wound. The sheaves 14 are secured to the shaft 15, which is journaled in the balustrades and is provided with a ratchet-wheel 16, secured thereto. Mounted on the shaft 15 is the spiral spring 17, which has one end secured to the ratchet-wheel 16 and the other end to a fixed connection on the balustrade. The shaft 15 projects out beyond the balustrade on one side and is provided with a square end 18, adapted to receive a winch or handle for the purpose of winding up the cables 10 on the shaft 14. A pawl 19 is secured to a pivot fixed to the balustrade and engages the ratchet-wheel 16. The pawl 19 has an armature 20, which carries the pole-piece 21, adapted to operate in the solenoid-magnet 22. The magnet 22 is in a circuit *ab*, which contains the battery *c* or other source of electrical energy. The circuit is provided with a switch *d*, by means of which the circuit may be closed to energize the solenoid-magnet, and it is also provided with a thermostat *e*, by means of which the circuit is closed when the temperature reaches a predetermined point. As will be seen, when the solenoid is energized the pawl 19 is drawn out of engagement with the ratchet 16, thus permitting the spring 17 to wind up the cables 10, and thereby draw out the curtain and close the well-opening. The shaft 6 is provided with the squared end 23 for the purpose of receiving the handle 25 to wind up the curtain or open the well-opening. The space between the end of the guides 8 and the rear end of the well-opening is closed by a cover 26 or extension 26.

In the operation of the curtain when the curtain is fully wound up and it is desired to

close the well-opening the pawl 19 may be thrown out of engagement with the ratchet 16 manually or by means of closing the switch *d*, or it may be done automatically where the temperature surrounding the thermostat *e* has risen to a predetermined point, or in case the spring should fail or in case it is not desired to use the spring to close the well-opening the handle 25 may be placed upon the end of the shaft 15 and the curtain drawn out manually.

Having thus described my invention, what I claim is—

1. The combination with the well-opening of a stairway, of an imperforate balustrade around three sides of said well-opening, and an imperforate closure adapted to close the remaining side and the top thereof.

2. The combination with the well-opening of a stairway, of an imperforate balustrade around said opening adapted to guard three sides thereof, and the removable imperforate closure for closing the remaining side and the opening bounded by the top of said balustrade.

3. The combination with the well-opening of a stairway, of imperforate balustrades to guard three sides of said well-opening, and a flexible imperforate curtain closing the remaining side and the space bounded by the top of said balustrade.

4. The combination with the well-opening of a stairway, of imperforate balustrades on three sides of said well-opening, a curtain and drum located above the rear end of said opening, guides for the curtain extending from the curtain-roll along the top of said balustrades.

5. The combination with the well-opening of a stairway, of imperforate balustrades on three sides of said well-opening, a curtain and drum located above the rear end of said opening, guides for the curtain extending from the curtain-roll along the top of said balustrades to the front ends of the balustrades and thence curving downward and extending to the landing of said stairway.

6. The combination with the well-opening of a stairway, of an imperforate curtain adapted to close communication through said well-opening, guides for said curtain, a flexible connection secured to said curtain and a winding mechanism for said flexible connection whereby said curtain is operated in said guides.

7. The combination with the well-opening of a stairway and imperforate balustrades guarding three sides of said stairway, of an imperforate curtain adapted to close communication through said well-opening, guides for said curtain extending along the top and front edges of said balustrades, a guide-sheave located at the intersection of the top and vertical portion of said guides, a flexible connection passing around said guide-sheave and secured to said curtain, and a winding mechanism for said flexible connection.

8. The combination with the well-opening of a stairway, of an imperforate curtain adapted to close communication through said well-opening, guides for said curtain, a flexible  
5 connection secured to said curtain and a spring-actuated winding mechanism for said flexible connection.

9. The combination with the well-opening of a stairway, of an imperforate curtain mounted on a curtain-roll, guides for said curtain  
10 leading from said curtain-roll to the end of said well-opening, a spring-actuated mechanism connected with said curtain adapted to draw said curtain along said guides to close  
15 the well-opening.

10. The combination with the well-opening of a stairway, of an imperforate curtain mounted on a curtain-roll adapted to close communication through said well-opening, an imperforate balustrade around three sides of said  
20 well-opening, guides extending horizontally along the tops of said balustrades to the front ends thereof, and thence vertically downward to the stair-landing, guide-sheaves located

tangent to said horizontal and said vertical  
25 guides, a flexible connection secured to said curtain at some distance from its end passing around said guide-sheave, and a winding mechanism for said flexible connection.

11. In a fire-curtain for well-openings, the  
30 combination with a curved guide having horizontal and vertical portions, of a guide-sheave tangent to said horizontal and vertical portions, and a flexible connection passing around  
35 said guide-sheave and secured to said curtain at a distance from its end equal to or greater than the height of the center of said guide-sheave from the lower end of the vertical portion of said guide and means upon said flexible connection adapted to engage said curtain  
40 near its end.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JESSE W. RENO.

Witnesses:

ELLA TUCH,  
A. B. BOSSE.