J. T. BOYD,

CURTAIN MANIPULATING MEANS.

APPLICATION FILED JULY 7, 1916.

1,249,013.

Patented Dec. 4, 1917.

3 SHEETS—SHEET 1.

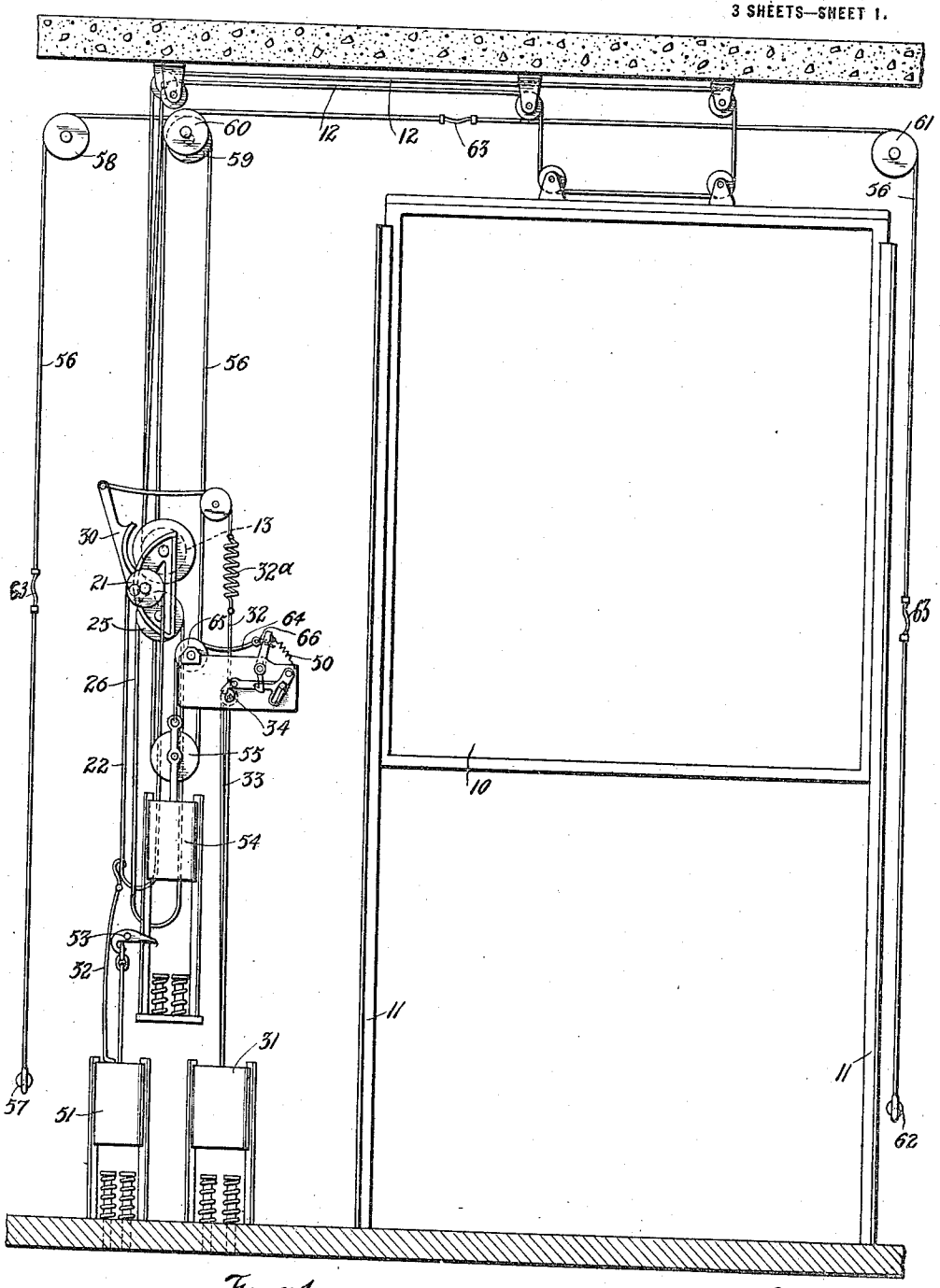


Fig: 1.

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3 SHEETS—SHEET 2.

Fig. 1.

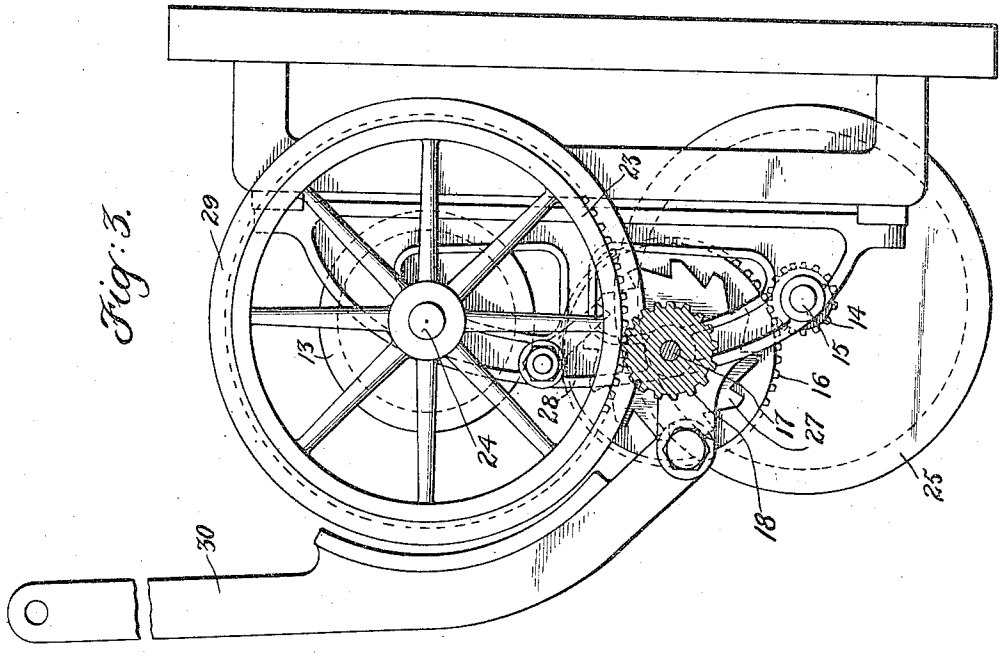
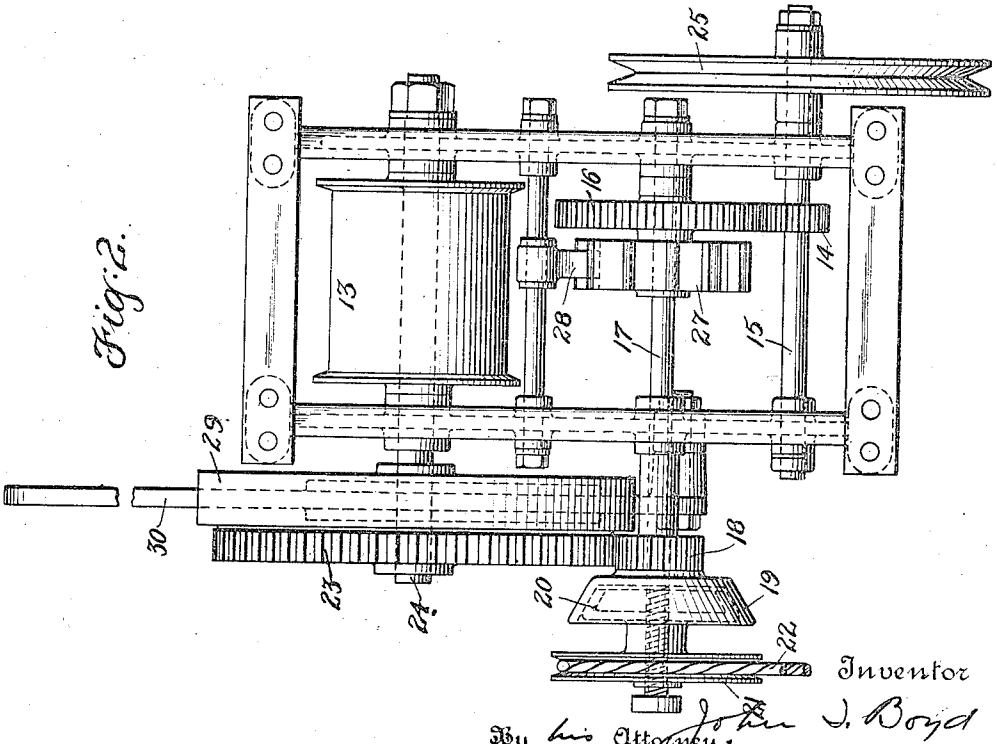


Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 4

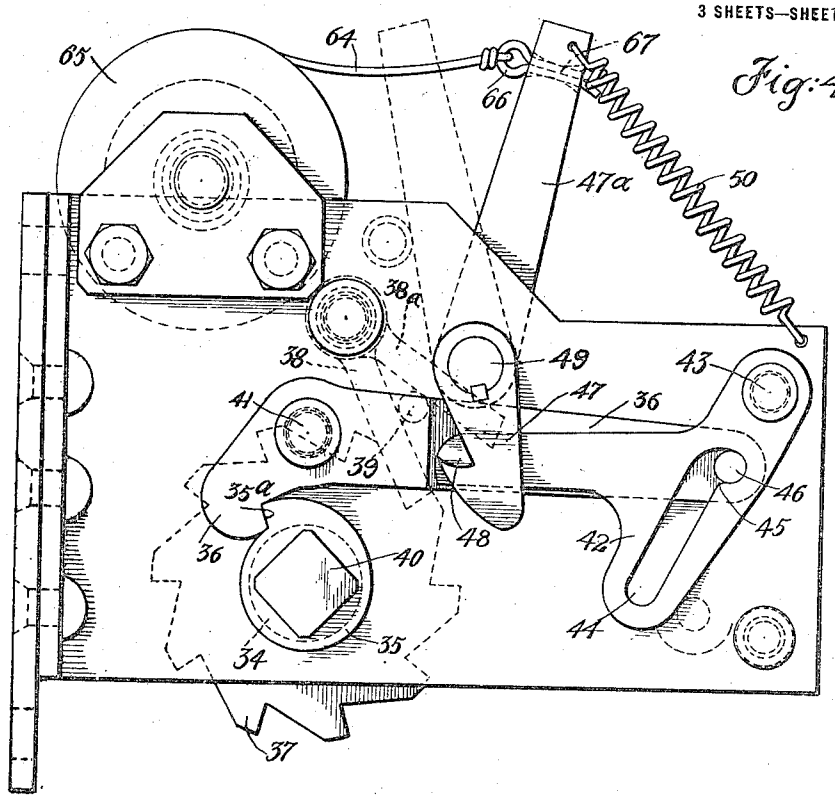
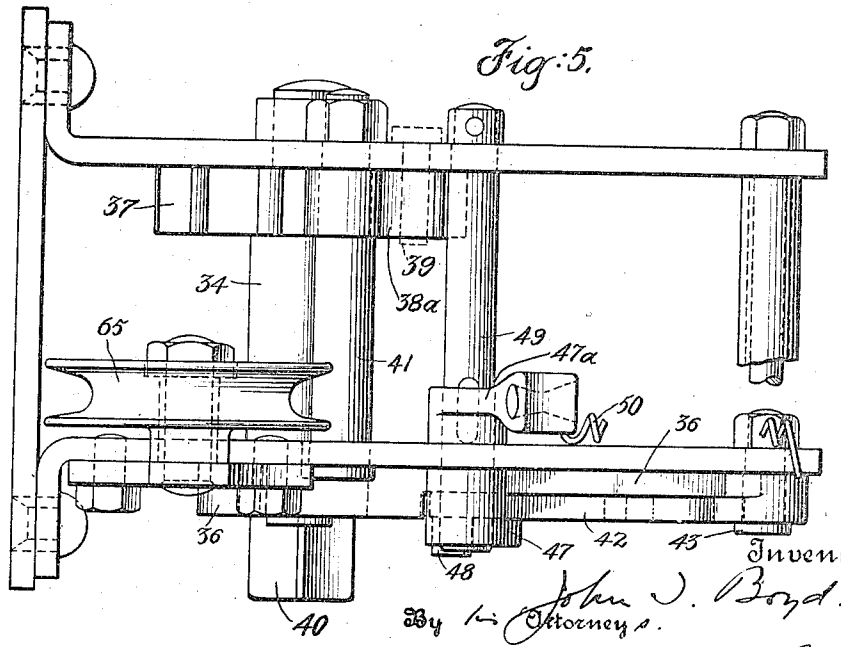


Fig. 5.



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UNITED STATES PATENT OFFICE.

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CURTAIN-MANIPULATING MEANS.

1,249,013. Specification of Letters Patent. Patented Dec. 4, 1917.

Application filed July 7, 1916. Serial No. 108,079.

To all whom it may concern:

Be it known that I, JOHN T. BOYD, a citizen of the United States, and a resident of the town of Hackensack, county of Bergen, and State of New Jersey, have invented certain new and useful Improvements in Curtain-Manipulating Means, of which the following is a description.

My invention relates to means for manipulating curtains such as are used in theaters and other public places, and particularly to means whereby a curtain of fireproof construction may be lowered immediately in case of emergency. The movement of the curtain may be automatically effected by the melting of a fusible link, or otherwise, producing a break in the connections, as will be hereafter described.

One object of my invention is the provision of means which may be set into operation at any time automatically or by an operator, to effect the descent of the curtain. My improved apparatus when operated by an operator may be put into operation very rapidly and with very slight effort.

In providing means of the kind above referred to, it is particularly important to prevent any sudden descent of the curtain, since such a sudden movement is apt to unduly excite the audience, and cause a panic.

It is, therefore, another object of my invention to so construct my curtain manipulating means that the descent of the curtain, while comparatively rapid, will be practically uniform and free from any suggestion of suddenness.

With the above and other objects in view, as will more fully hereinafter appear, my invention includes the provision of means for normally holding the curtain in elevated position; means, such as a brake, for controlling or retarding the descent of the curtain; and means adapted to be set in motion in an emergency to first apply the controlling or retarding means, and then release the curtain from its holding means. By employing mechanisms operating in this way, I preclude the possibility of any uncontrolled or sudden descent of the curtain. The preferred embodiment of my invention is illustrated in the drawing accompanying and forming a part of this specification.

Referring to the drawing:

Figure 1 is an elevation showing the manner in which my improved manipulating means are applied to a curtain;

Fig. 2 is a front elevation showing a winch for elevating the curtain;

Fig. 3 is a side elevation of the winch shown in Fig. 2, and shows the brake for controlling the descent of the curtain;

Fig. 4 is a side elevation of a portion of the curtain releasing mechanism; and

Fig. 5 is a plan view thereof.

Referring in detail to the drawing, 10 indicates a curtain or sliding door of any desired construction, but preferably fireproof, adapted to slide up and down in any suitable guides, such as shown at 11. The elevating means for this curtain include the connectors 12 which are adapted to be wound upon the drum 13, of any desired form of winch, such as that shown in Fig. 2, or operated by a steam or hydraulic mechanism. The means for actuating the drum 13, as herein shown, include the pinion 14, mounted on the shaft 15, and meshing with the gear 16, and the pinion 18 which meshes with the gear 23 mounted on the shaft 24 upon which the drum 13 is also mounted. The pinion 18 is secured to one of the members 19 of a clutch of any desired or applicable type, the pinion and clutch member (18 and 19) being rotatably mounted upon the shaft 17. The other clutch member 20 is so secured as to rotate with the shaft 17, but is movable longitudinally thereon, so that it may be engaged or disengaged with the clutch member 19 when desired. Any suitable means may be employed for effecting this longitudinal movement of the clutch member 20, the means herein shown comprising a rotatable pulley 21, screw-threaded to the shaft 17, and provided with a connector 22. When the pulley 21 is rotated by the connector 22 in one direction, it will cause engagement of the clutch members 19, 20, and thus clutch the pinion 18 to the shaft 17, so that rotation of the pulley 25, mounted on shaft 15, will effect the rotation of the drum 13, and will elevate the curtain. Any suitable means such as the connector or belt 26 shown in Fig. 1, or engine or motor of any type, may be employed for rotating the pulley 25.

The curtain is normally prevented from descending by the coöperating ratchet and pawl 27, 28, as shown in Fig. 2, which normally hold the shaft 17 from reverse rotation. When, however, the pulley 21 is rotated to disengage the clutch members 19, 20, the pinion 18 will be disconnected from the shaft 17, and the drum 13 will thus be disconnected from the ratchet and pawl 27, 28, with the result that the curtain is permitted to descend.

In order to control or retard the descent of the curtain when freed from its restraining means, I provide upon the shaft 24 a brake-drum 29, with which the brake 30 is adapted to coöperate. This brake-drum may be located in any suitable position on shaft 24. I provide also normally restrained means for rendering this brake 30 effective, which means may include the weight 31, which is connected to the brake-arm by the connector 32. Another connector 33, extending from the weight 31, is wound upon the drum 34, which drum is provided at one end with a notched disk 35, with which the latch 36 coöperates, as shown in Fig. 4. The latch 36 thus operates to normally hold the weight 31 in its elevating position. The ratchet 37, mounted on the drum 34, and the pawl 38 which coöperates therewith, are merely for preventing reverse rotation of the drum when the weight is being manually elevated to restore the parts to normal position, and perform no function in the normal operation of the device, since at all times, except when the weight is being thus manually elevated, the pawl 38 is held out of engagement with the ratchet 37, by the removable pin 39, as shown at 38ª in Fig. 4. One end of the drum 34 is preferably squared as indicated at 40, so that a wrench or handle may be conveniently employed for manually elevating the weight.

The latch 36, is pivoted at 41, and is so proportioned that it normally tends to move in a clockwise direction about its pivot, and to thus release itself from the notch 35ª. This tendency of the latch 36 is, however, normally overcome by another latch 42 pivoted at 43 and provided with a slot 44 having an off-set 45 in which the pin 46 mounted on latch 36 is normally retained. This latch 42 is normally held in the position indicated in Fig. 4 by a third latch 47 which engages a projection 48 on said latch 42. This latch 47 is pivoted at 49 and is normally held in the position indicated in full lines in Fig. 4 by a relatively light spring 50. In addition to the above described normally restrained means for rendering the brake 30 effective, I provide other normally restrained means which when released operate to render ineffective the means, herein shown as the ratchet and pawl 27, 28, for preventing the descent of the curtain. These latter normally restrained means include a weight 51 which is connected as shown at 52, with the chain or belt 22 for rotating the pulley 21. The weight 51 is normally held elevated by a latch 53. It is evident that the clockwise movement of this latch will release the weight 51 and thus cause the chain or belt 22 to rotate the pulley 21 so as to disengage the clutch members 18, 19 and free the curtain from the restraint of the ratchet and pawl 27, 28.

The ratchet 27 may be a disk-box containing alternately connetced disks or plates after the well known principle of the Weston multiple disk clutch, and enables the drum 13 to be rotated to lower the curtain or door 10, by operating the pulley 21 in the reverse direction to that used in hoisting.

In order that there can be no sudden or uncontrolled descent of the curtain upon its release from its restraining means, I provide a mechanism, which I will now describe, which may be readily set into operation at any time automatically, as before mentioned, and with but slight exertion, for first effecting the application of the brake or retarding means 30 and then effecting the release of the curtain from its restraining means.

The master weight 54 is provided at its top with a pulley 55 around which passes the connector 56. This connector is anchored at one end to a cleat 57, located at a convenient and accessible point, passes thence around the pulleys 58, 59, 55, 60 and 61, and its other end is anchored to another cleat 62, also located in a convenient and accessible position, but preferably on the other side of the curtain from the cleat 57. The connector 56 thus normally maintains the weight 54 in elevated position. When, however, an emergency arises, such as the breaking out of a fire behind the stage, which makes it necessary to lower the curtain 10, the weight 54 may readily be released from the restraining action of the connector 56. This may be done either by disengaging either one of the ends of the connector from the corresponding cleat 57 or 62, or by cutting the connector at any point with a knife or by the automatic failure of one of the fusible links 63, a plurality of which are shown inserted in the connectors 56. In order that there may be no delay in effecting the release of the master weight 54, I preferably locate knives or other suitable severing devices at convenient points.

The master weight 54 is provided with a suitable connector 64 which passes over the pulley 65 and is provided at its end with a cotter pin or similar device 66, Fig. 4, which is received within a recess 67 in the arm 47ª of latch 47, this cotter pin forming an impositive or releasable connection between the weight 54 and the latch 47. The latch 53

and master weight 54 are so arranged that the free end of the latch lies in the path of descent of the master weight 54.

The result of the release of the master weight 54 is as follows:

The connector 64 becomes tightened and exerts a pull upon the arm 47[a] of latch 47 (Fig. 4) sufficient to rotate this latch in a counter-clockwise direction and thus release in turn the latches 42 and 36. The release of this latter latch will, of course, immediately release the weight 31, the descent of which will apply the brake or other retarding device 30. The spring 32[a], inserted in the connector 32, relieves the brake from the strain due to the sudden descent of the weight 31. After the latch 47 (Fig. 4) has been released, further descent of the weight 54 will result in the withdrawal of the cotter pin 66 from the aperture 67, and further descent of the master weight 54 will therefore be independent of the latch 47. In the course of such further descent of the master weight 54, the latch 53 will be met and will be moved in a clockwise direction to release the weight 51, as will be evident from an inspection of Fig. 1. The release of weight 51 will, as above indicated, result in the rotation of the pulley 21 and the consequent disengagement of the clutch 19, 20, and the release and descent of the curtain.

It will be seen from the above that when the master weight 54 is released, either automatically by the failure of one of the fusible-links, or manually by the severing of the connector 56, or the removal thereof from a cleat, the curtain will be released from its restraining means, but that such release cannot take place until after the application of the brake or retarding means 30. As a result of this construction, I prevent the possibility of any part of the curtain's descent being sudden or uncontrolled, and thus preclude all danger of the descent of the curtain unduly exciting the audience. It is also obvious that there need be no delay in releasing the master weight 54, since this may be done from either side of the curtain or stage merely by severing the connector 56 with a knife or severing device located at a convenient point adjacent the connector.

While I have shown herein and described the several normally restrained means as consisting of weights normally held against the action of gravity, it is obvious that an equivalent construction would be the substitution therefor of springs normally held under tension or compression, and that many other equivalent constructions may be employed.

The brake mechanism shown in the drawings and described herein may be greatly varied to suit the needs of the particular apparatus to which my invention is applied. Thus instead of the block and lever type illustrated in the drawings, I may use a band brake similar to that used on hoisting engines or motor cars, a coil brake which is in the nature of an internal band brake, a clamp brake such as is used in elevator installations, a friction-disk brake of the Weston type, or any other suitable kind may be employed.

While I have shown my invention as applied to the controlling of the movement of a curtain, to which use it has been successfully applied in practice, it is obvious that it may be applied to any door, window, hatchway cover, or similar closure, and in the claims hereto appended I have used the word "curtain" as a generic name for this class of devices.

I wish it understood also that I do not limit myself to the construction herein shown and described, since obviously many changes may be made without departing from the spirit of my invention.

What I claim is:

1. In combination with a fire-curtain adapted for both manual and automatic operation, of means for releasing it for descent, means normally restrained, controlling the releasing means, normally inactive controlling and braking means, means normally restrained controlling said braking means, and means successively liberating first the normally inactive braking means and second the normally restrained releasing means.

2. In combination with a fire-curtain adapted for both manual and automatic operation, of normally restrained means for releasing the curtain for descent, normally inactive braking means, means normally restrained controlling said braking means, and means successively liberating first the normally inactive braking means and second the normally restrained releasing means.

3. In combination with a fire-curtain adapted for both manual and automatic operation, of normally restrained means for releasing the curtain for descent, normally inactive braking means, and means successively liberating first the normally inactive braking means and second the normally restrained releasing means.

4. In combination with a fire-curtain adapted for both manual and automatic operation, of means for releasing it for descent, means normally restrained, controlling the releasing means, normally inactive braking means, and means successively liberating first the normally inactive braking means and second the normally restrained releasing means.

5. In combination with a fire-curtain adapted for both manual and automatic operation, of a normally engaged clutch adapted when disengaged to release the curtain for descent, a weight normally held in

elevated position and adapted, when liberated, to disengage the clutch, normally inactive braking means, and means successively causing the weight to drop and then liberating the weight.

6. In combination with a fire-curtain adapted for both manual and automatic operation, of a normally engaged clutch adapted when disengaged to release the curtain for descent, a weight normally held in elevated position and adapted, when liberated, to disengage the clutch, a brake normally disengaged and adapted when engaged to prevent the rapid descent of the curtain, a weight normally held in elevated position and adapted, when liberated, to set the brake, and a third weight normally held in elevated position and adapted, when liberated, first to release the second weight and then to release the first weight; and a fuse adapted upon melting to release the third weight.

7. In combination with a fire-curtain adapted for both manual and automatic operation, of means for releasing it for descent, means normally restrained, controlling the releasing means, a brake normally disengaged and adapted when engaged to prevent the rapid descent of the curtain, a weight normally held in elevated position and adapted, when liberated, to set the brake, and a second weight normally held in elevated position and adapted, when liberated, first to release the first weight and then to liberate the normally restrained releasing means.

8. In combination with a fire-curtain adapted for both manual and automatic operation, means for releasing the curtain for descent, a weight normally held in elevated position and adapted, when liberated, to liberate the releasing means, a brake for the curtain, a weight normally held in elevated position and adapted, when liberated, to set the brake, latches normally retaining the respective weights in elevated position, a fuse, a third weight held in elevated position while the fuse is intact and adapted to be liberated by the melting of the fuse and adapted when liberated first to operate the latch for the second weight and then to operate the latch for the first weight.

JOHN T. BOYD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."