

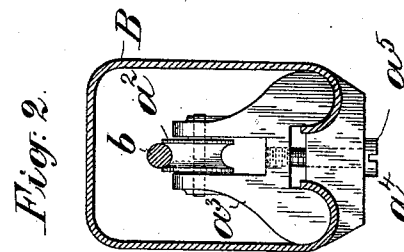
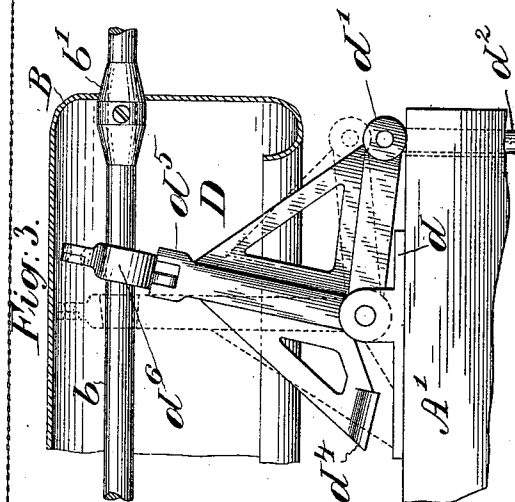
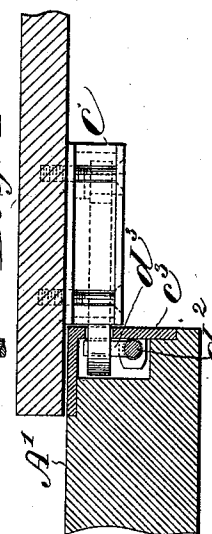
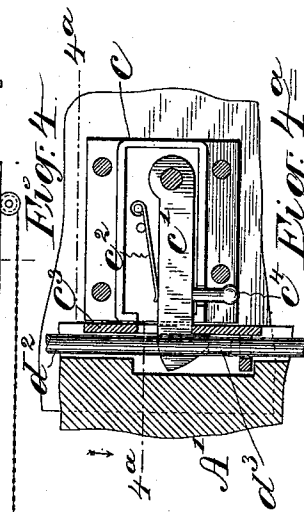
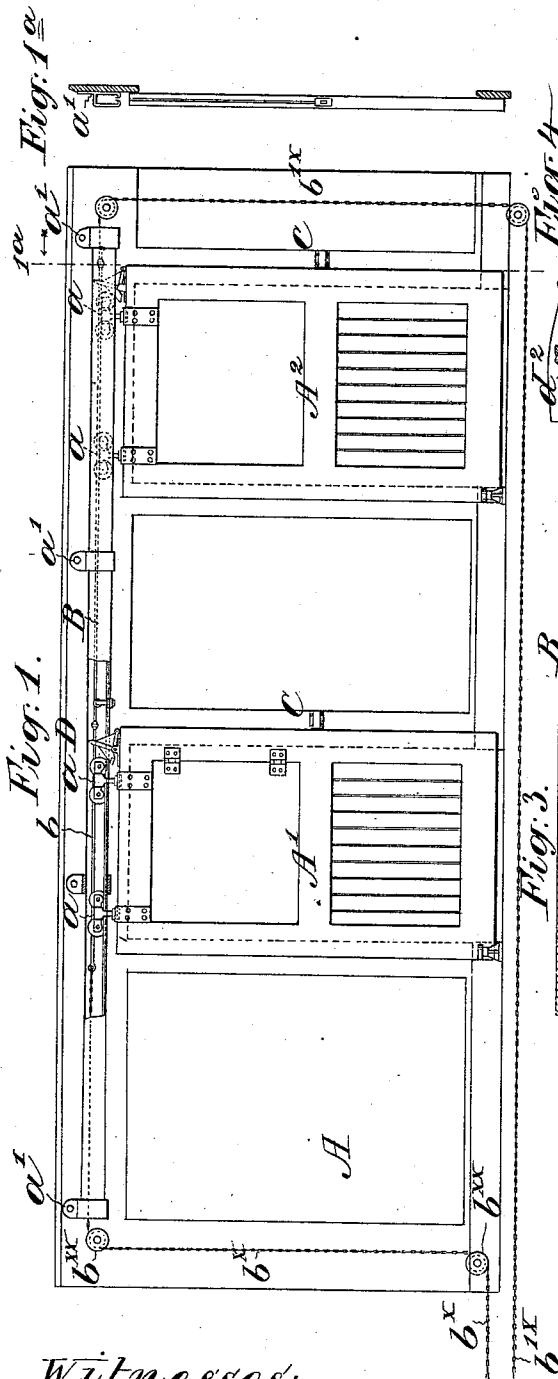
(No Model.)

3 Sheets—Sheet 1.

W. H. BRODIE.
DEVICE FOR OPERATING SLIDING DOORS.

No. 531,150.

Patented Dec. 18, 1894.



Witnesses:
J. W. Wiman
Peter A. Ross.

Inventor:
William H. Brodie
by Henry Conner
his Attorney

(No Model.)

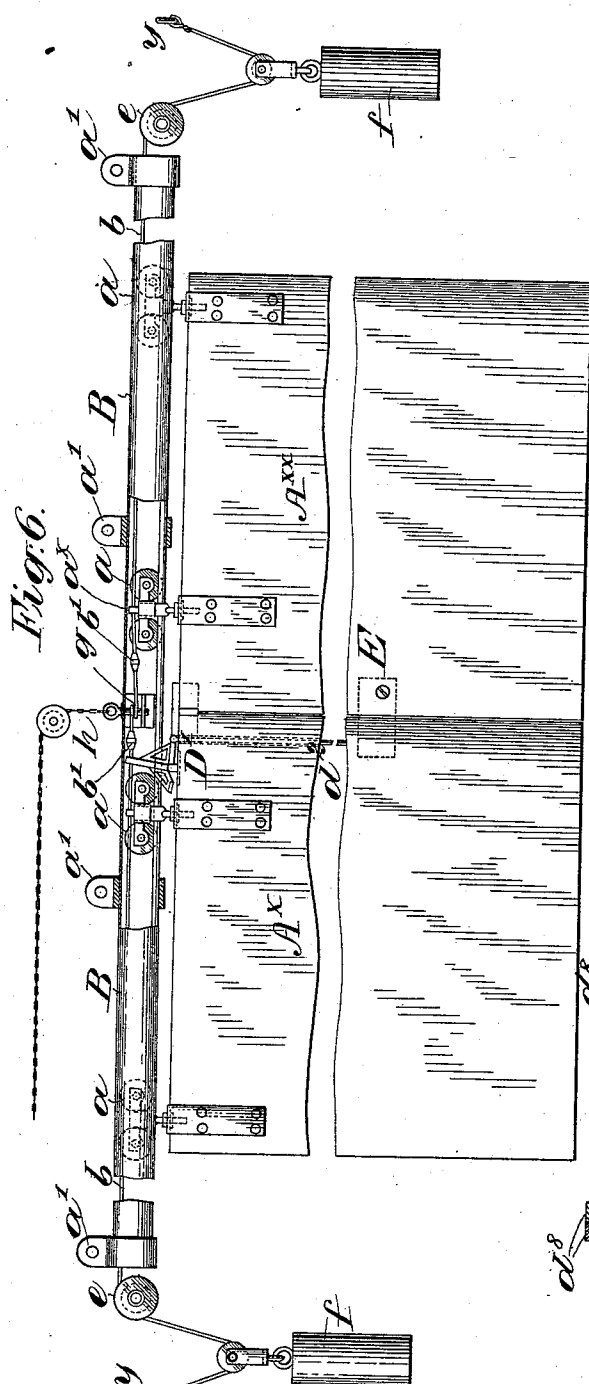
3 Sheets—Sheet 2.

W. H. BRODIE.

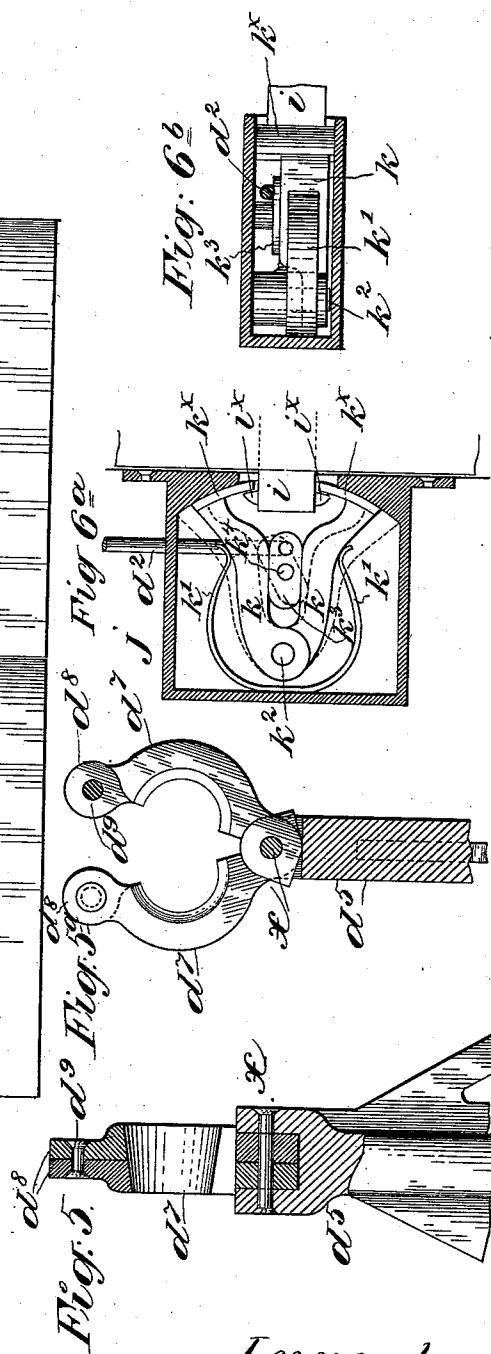
DEVICE FOR OPERATING SLIDING DOORS.

No. 531,150.

Patented Dec. 18, 1894.



Witnesses:
J. H. Hinman
Peter A. Ross.



Inventor:
William N. Brodie
by Henry Connelley
his Attorney

(No Model.)

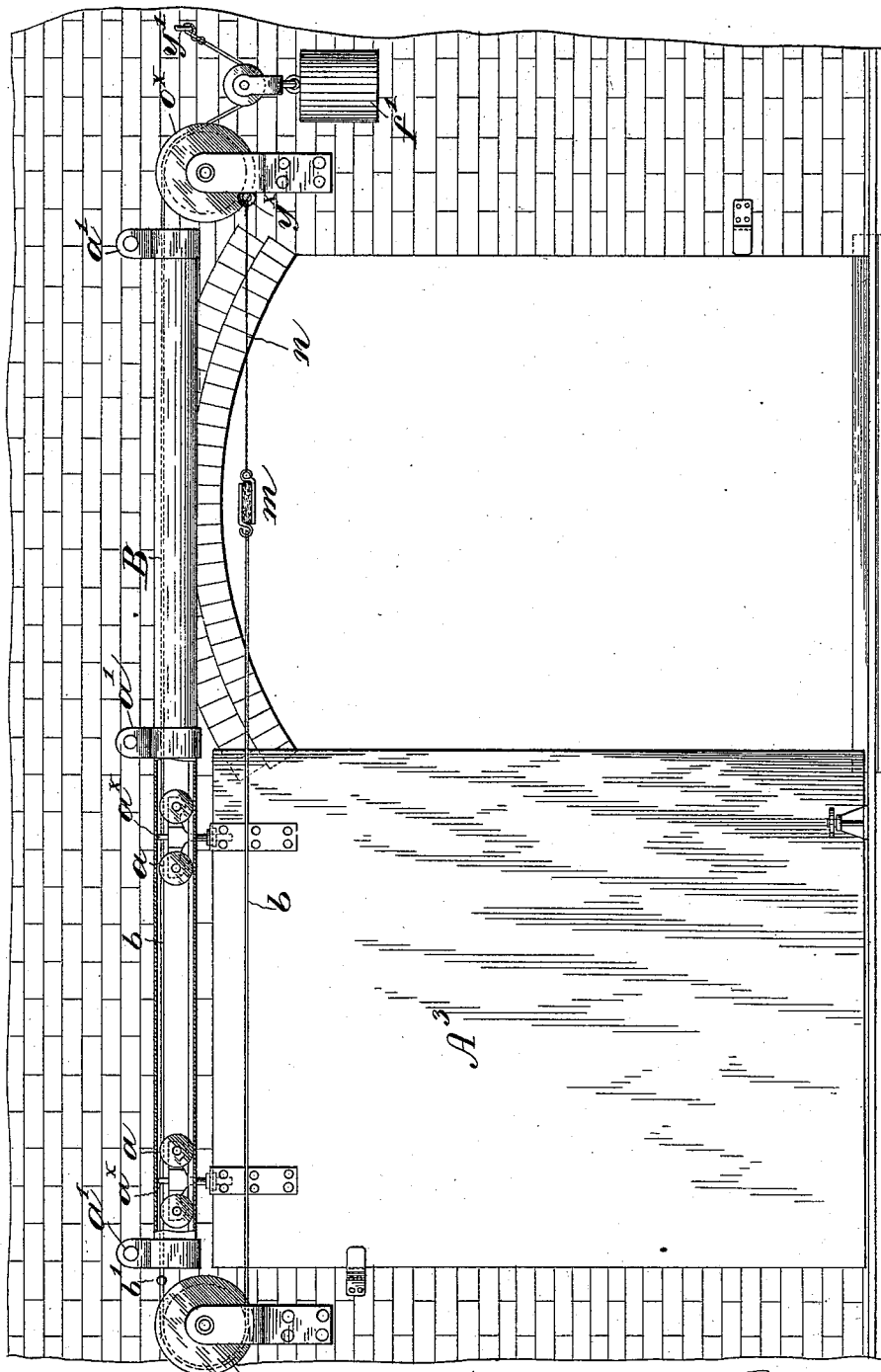
3 Sheets—Sheet 3.

W. H. BRODIE.
DEVICE FOR OPERATING SLIDING DOORS.

No. 531,150.

Patented Dec. 18, 1894.

Fig. 7.



Witnesses:
J. H. Himm
Peter H. Ross

Inventor:
William H. Brodie
by Henry Connelley
His Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM H. BRODIE, OF BROOKLYN, NEW YORK.

DEVICE FOR OPERATING SLIDING DOORS.

SPECIFICATION forming part of Letters Patent No. 531,150, dated December 18, 1894.

Application filed February 26, 1894. Serial No. 501,517. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. BRODIE, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Devices for Operating Sliding Doors and the Like, of which the following is a specification.

My invention relates to devices for closing or opening doors, sliding shutters, &c., of buildings, such as barns, stables, warehouses, &c., to provide against injury in case of fire. For example, in the case of barns or stables where valuable live stock is kept, it is desirable, in case of fire, that all of the doors shall be opened promptly in order to provide for the escape of the animals, and my invention furnishes means for opening all of the doors simultaneously from some point near to or remote from the building, as desired. It also provides means whereby, in case some obstacle should prevent the opening of one door, this obstacle will not prevent the other doors from being opened. In the case of a warehouse or the like, it may be provided with fire-proof shutters adapted to be closed simultaneously in the same manner as the doors of a stable are opened; or the shutters or doors may be adapted to be opened or closed by a weight, automatically, when set free, and they may be set free by hand or by the melting of a fusible coupling, in a well known way.

My invention comprehends means for first unlocking the door and then sliding it open, and it also includes means for opening double sliding doors.

It will be understood that as herein employed the word door is meant to include any sliding covering whether it be an actual door, a sliding metallic shutter, or any device of this character; and it is immaterial to my invention whether the sliding covering is merely a screen to protect another door or window, or is a door for closing the opening. As I have stated, it may be a sliding door, normally closed, or a sliding shutter, normally open.

My device does not prevent a single door or shutter of the system from being operated freely by hand at any time.

The invention will be fully described here-

inafter and its novel features carefully defined in the claims.

In the accompanying drawings which serve to illustrate the invention—Figure 1 is a side elevation showing two stable doors provided with my improved devices for unlocking and opening them simultaneously. These two doors will suffice to illustrate the application of the invention to any number of doors connected in one system or series. Fig. 1^a is a vertical section in the plane indicated by line 1^a, in Fig. 1. Fig. 2 is an enlarged cross-section of the track showing the means for supporting the shifting rod. Fig. 3 is an enlarged side view of the unlatching device. Figs. 4 and 4^a are detached views of the latch for securing the door when closed. Figs. 5 and 5^a are enlarged views of the part of the unlatching lever carrying the shearing pin or rivet. Fig. 6 is an elevation of a double door adapted to be operated automatically when freed by hand. Figs. 6^a and 6^b are enlarged detail views of the lock for the double door. Fig. 7 is an illustration of the application of my invention to the automatic closing of a fire-proof door, screen or shutter when freed by the melting of a fusible coupling or the like.

Referring first to Figs. 1 to 4^a, A represents the side of a building, as a stable for example, and A', A², represent two like sliding doors therein. These doors are hung from trolleys, a, mounted in a trolley-track, B, fixed on the side of the stable by supporting brackets, a', as indicated. The trolley track herein shown (see Fig. 2) is the well known "Coburn" track, and I prefer to use this form of track.

The doors are so hung as to be free to slide open and shut, in a well known way, the trolleys a, rolling in the hollow track B; and each door is, by preference, provided, with a latch, seen at C, in Fig. 1, and in detail in Figs. 4 and 4^a, the first view being a side view, with the latch-plate removed, and the latter a horizontal section, or sectional plan, taken in the plane indicated by the line 4^a, in Fig. 4. This latch comprises a casing, c, set in the door-frame or casing, a hooked latch-bolt, c', pivotally mounted in the casing, a spring, c², to depress the bolt, and a striking-plate, c³, on the door. When the door is closed the head of the latch-bolt wipes into the aperture in

the striking-plate and its hook catches the plate and holds the door closed. The bolt is provided with a button, c^4 , which projects downwardly from the casing. By pressing upward on this button the bolt may be raised to free it from the striking-plate.

I will now describe the means employed for unlocking and opening all of the doors simultaneously.

Extending longitudinally along the track B, above the trolleys a , is a shifting rod, b . I prefer to employ for this purpose a stiff, iron rod for each set or series of doors arranged in the same plane, but a chain, or other flexible device, would serve. It should be, however, of material that will not stretch or elongate materially under strain and therefore a rod is preferred. This shifting rod is supported on sheaves mounted in the track B, between the doors, as seen in the transverse section, Fig. 2, wherein a^2 is the sheave, a^3 a fork within the hollow track and supporting the journals of the sheave, a^4 an outer clamping plate, and a^5 a screw which secures the plate a^4 , to the base of the fork. The said base and the plate a^4 , are shaped to fit and clamp the lower part of the track B, between them.

Mounted on the top of the door, is an unlatching device, D. Seen best in Fig. 3. Pivoted at its base in a plate, d , secured to the top of the door, is a rocking-lever; one arm, d^1 , of which is coupled to a latch-lifting or releasing rod, d^2 , which extends down along a recess, groove, or hole in the door to the point where the latch C is situated where said rod is provided with a lateral lug, d^3 , (see Figs. 4 and 4^a) which takes under the head of the latch-bolt, c' , when the said head is caught in the striking-plate. When the rocker-lever is rocked to the position seen in dotted lines in Fig. 3, the arm d^1 , is raised and the head of the latch-bolt is thus lifted until it is free from the striking-plate. This movement unlatches the door. At the same time, a shoulder, d^4 , on the rocking-lever strikes the plate d , and limits the further movement of the lever on its pivot. The upper arm, d^5 , of the rocking-lever has in it an eye, d^6 , through which plays the shifting-rod, b , and on the said rod is secured a button, b' , which, when the rod b , is moved longitudinally (to the left in Figs. 1 and 3) for opening the doors, will not pass through the eye d^6 , on the lever and consequently it first rocks the lever far enough to unlatch the door and then slides the latter open. The movement of the shifting-rod b , need only be enough to open a door,—say four feet—or a little more, and where a stiff rod is used in lieu of a chain, I prefer to couple to the end of the rod (see at the left in Fig. 1) a chain, rope, or other flexible connector b^x , which passes over suitable guide sheaves, b^{xx} , and out to a winch. Not shown. This winch or winding device may be placed at a considerable distance from the building, if desired.

As all of the doors of a series will be operated simultaneously it will be obvious that an obstruction to the movement of one door would interfere with the operation of all unless some precaution be taken to prevent it, and such a precautionary device is illustrated in Figs. 5 and 5^a, which show the elements of the eye d^6 , on the unlatching device detached and enlarged. The eye is formed of two members, d^7 , which are pivotally mounted at x , on the upper end of the arm d^5 , and have each a lip or lug, d^8 , which overlap when the members are closed and have registering holes in them to receive a rivet, d^9 . This rivet or securing pin will be, by preference, of some soft metal or alloy such as lead, or lead and tin, so that a force applied to spread apart the members d^7 , will, if great enough, shear off the rivet. The button b' , on the shifting-rod is of a cone or wedge-shape and when force is applied to the rod b , to shift the doors the tendency of the button is to wedge apart the members of the eye, but the rivet d^9 , will easily resist a strain or force sufficient to move the doors if they are unobstructed. If, however, one of the doors should be obstructed the button at that door will wedge apart the members of the eye, shear the rivet, and permit the button to pass through the eye and thus allow the other doors of the series to be operated.

After the doors shall have been opened by the winch the shifting-rod may be moved back again to its first or normal position, seen in Fig. 1, and when in this position any one of the doors may be opened and closed at will without interference with the shifting-rod. In order to return the shifting-rod to its normal position and also to close all of the doors again, simultaneously, I may attach to the other end of the shifting-rod b (that at the right in Fig. 1) a chain or flexible connector b'^x , and carry said chain over guide sheaves back to the same winch about which the chain b^x is wound, the two chains being wound about the winch-barrel in opposite directions so that one will unwind as the other is wound up. Thus the shifting-rod may be returned.

It will be obvious that instead of applying the device to doors to be simultaneously opened it may without change be applied to doors or sliding shutters to be simultaneously closed to guard against fire. It will also be obvious that the shifting-rods of several series of such shutters or doors, on the different floors and different sides of a building, may be connected with and operated simultaneously from the same winch. It will only be necessary to employ suitably placed guide-sheaves, and chains or other flexible connectors.

My invention may be applied to automatically operated doors: that is doors or shutters which are operated by a weight when set free, and to double as well as single doors and shutters. In Fig. 6 I have shown its applica-

tion to a double door wherein the two sections of the door are moved in opposite directions when set free by hand. In this application of the invention A^x and A^{xx} represent the two sections of the door. B is the track and a the trolleys, as before. The two shifting-cords or chains are fixed at their outer ends, as at y, y , pass over sheaves e at the respective ends of the track, and have weights, f , suspended in their bights. Where the other ends of the shifting-cords are brought together above the door each is provided with an eye or ring, g , through which is passed a detaching pin, h . On the shifting-cords are buttons or like enlargements, as b' , which, when the cords are released by the withdrawal of the pin h , and the weights f act, engage some parts connected with the sections of the door and slide them open. In the construction shown the two sections of the door are locked together, normally, by a lock E, on the section A^{xx} , its bolt engaging a keeper plate on the section A^x ; and on the said section A^x , is mounted an unlocking device, D' , substantially like that before described, and the button b' , on the shifting-cord which operates this section engages the upright arm of the rocking-lever of this device precisely as in the construction before described. The button b' , on the shifting-cord which operates the section A^{xx} , engages an eye-piece, a^x , formed on one of the trolleys a , which supports that section, the operating cord playing through the eye in this eye-piece.

In Fig. 6 I have broken away the door-sections transversely, to economize space on the drawings and have also broken away the track b , between the sections of the door and the respective weights f , for the same reason. It will be understood that the doors, door-sections and shutters may be of any kind or dimensions, and may be provided with guides at their bottoms in the usual way with such sliding doors but I have not deemed it necessary to illustrate all the common details as these form no part of my invention.

The lock used on the double door of Fig. 6 may be of any kind adapted to be unlocked by the rod d^2 , depending from the unlocking device D' , or it may be a latch. It need differ from that before described (with reference to Fig. 1) only in that it will be carried by one of the sections of the door and consequently the buttons b' , on the shifting-cords must be so arranged that the section A^{xx} , carrying the lock, will not be shifted until the device D' , on the other section shall have had time to free the locking device.

In Figs. 6^a and 6^b I have shown a suitable lock for the door seen in Fig. 6, the former being a side view showing the keeper mounted in the section A^x of the door and the latter a horizontal section through the casing showing the keeper in plan. In these views, i represents the bolt of the lock provided with withdrawing latches i^x , operated by a key in a well known way. The mechanism for oper-

ating the bolt and its latches may be of the usual kind too well known to require illustration or description. The keeper is mounted in a suitable casing, j , and comprises two like jaws, k , the heads, k^x , of which engage the bolt i , above and below, taking behind the latches i^x , and being held in engagement by springs, k' . The jaws k , are pivoted at a common point on a stud k^2 . Between the jaws k , is situated a cam k^3 , mounted to rock on a stud k^4 , and to this cam is coupled the unlocking rod d^2 . The rod d^2 , when drawn up, rocks the cam, k^3 , and causes the latter to open the jaws k , far enough to free the latches i^x , on the bolt and permit them to pass out.

In Fig. 7 is shown the application of the shifting mechanism to a door A^3 , adapted to be closed automatically by a weight f' , when freed by the fusing of a coupling, m . A cord, n , preferably of combustible material, is secured at one end, y^x , to a fixed part and at its other end to one member of the fusible coupling m , the other member of the coupling being attached to the shifting-cord or chain b . This latter passes over a sheave, o , thence through the hollow track B, and through eyes a^x , on the trolleys a , and thence over a sheave, o^x , to a staple, y' , in the wall. The weight f' , is suspended in the bight of the shifting-cord. On the cord b , is fixed a button b' , as before described.

The door A^3 , is free to be opened and closed at will, but if left open and a fire occurs in the building, as soon as the temperature rises high enough to fuse the coupling m , or burn the cord n , the weight f' , will act through the cord b , to close the door.

I wish it understood that by a trolley I mean any carrier which moves along the track, the door being suspended therefrom. Each door may have one or more of such trolleys. And by the name button as applied to the part b' , I mean any suitable enlargement on the operating rod or cord to engage a part connected with the door, as an eye on the trolley or the rocking-lever. The word rod, as applied to the part b , is also intended to include a chain, cord, wire rope, belt, or the like. The expanding eye on the arm d^5 , and the rivet d^9 , of material easily severed, form a yielding resistance to the button on the rod.

I am aware that it is not new to operate a farm gate, suspended from a track, by means of a cord secured to the gate, and that, broadly, it is not new to provide means whereby the latch connecting two such gates is lifted automatically before the gates move. My construction is clearly distinguished from this in that the doors are not in any case attached to the operating or shifting rod and therefore they are free, normally, to be opened and closed by hand in the usual way without disturbing said rod. This is necessary for doors of this character. In my construction the rod plays freely, independently of the door or doors and is furnished with buttons which

engage some part connected with the respective doors, as explained thus leaving the doors free to be opened and closed separately for daily use.

5 Having thus described my invention, I claim—

1. The combination with a sliding door, a track, and a trolley on the track from which the door is hung, of a shifting-rod extending
10 along the track and provided with a button to engage some part connected with the door, whereby endwise movement of the shifting-rod operates the door, said door being normally independent of said rod, whereby it
15 may be opened and closed without disturbing the latter, as set forth.

2. The combination with a series of sliding doors, a track, and a series of trolleys on the track from which the respective doors are
20 hung, of a shifting-rod extending along the track and provided with buttons to engage parts connected with respective doors, whereby the endwise movement of the said rod is adapted to operate all of the doors simultaneously, and a yielding resistance substantially
25 as described for permitting an obstructed door to remain unoperated, as set forth.

3. The combination with a sliding door, a track and a trolley on said track from which
30 the door is hung, of a shifting-rod provided

with a button, a fastening for the door, an unlatching device carried by the door, said device comprising a rocking-lever having an eye in its upwardly extending arm through which the shifting-rod plays, and having its
35 other arm coupled to a latch-releasing rod adapted to release the door-fastening, and the said releasing-rod, the door being normally independent of said rod whereby it may be opened and closed without disturbing the latter, substantially as set forth. 40

4. In a mechanism for operating a sliding-door, the combination with the shifting-rod and a wedge-shaped button secured thereon, of the arm d^5 , attached to the door and provided with an expanding eye at its end
45 through which the said shifting-rod plays, and a rivet d^9 , securing the members of the said eye together, said rivet being of comparatively soft material, whereby the expanding eye and rivet form a yielding resistance
50 in case the door is obstructed, as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM H. BRODIE.

Witnesses:

HENRY CONNETT,
PETER A. ROSS.