

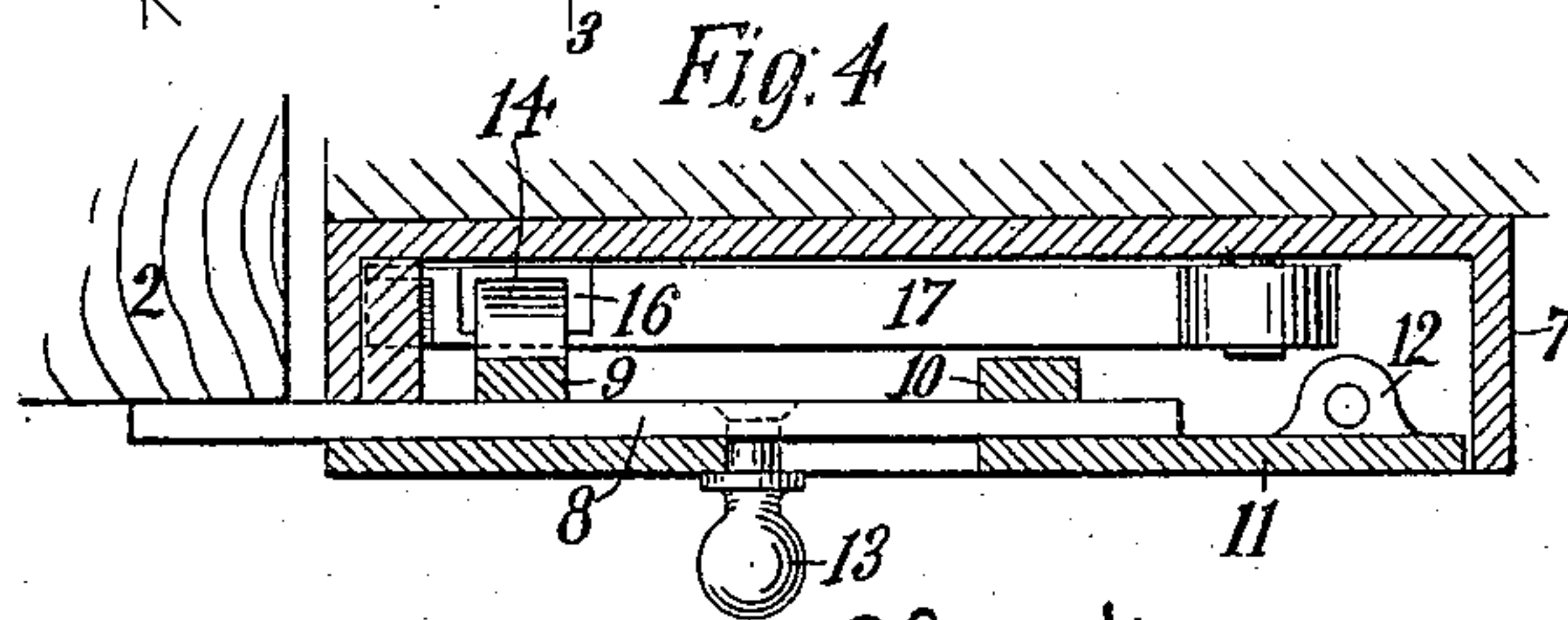
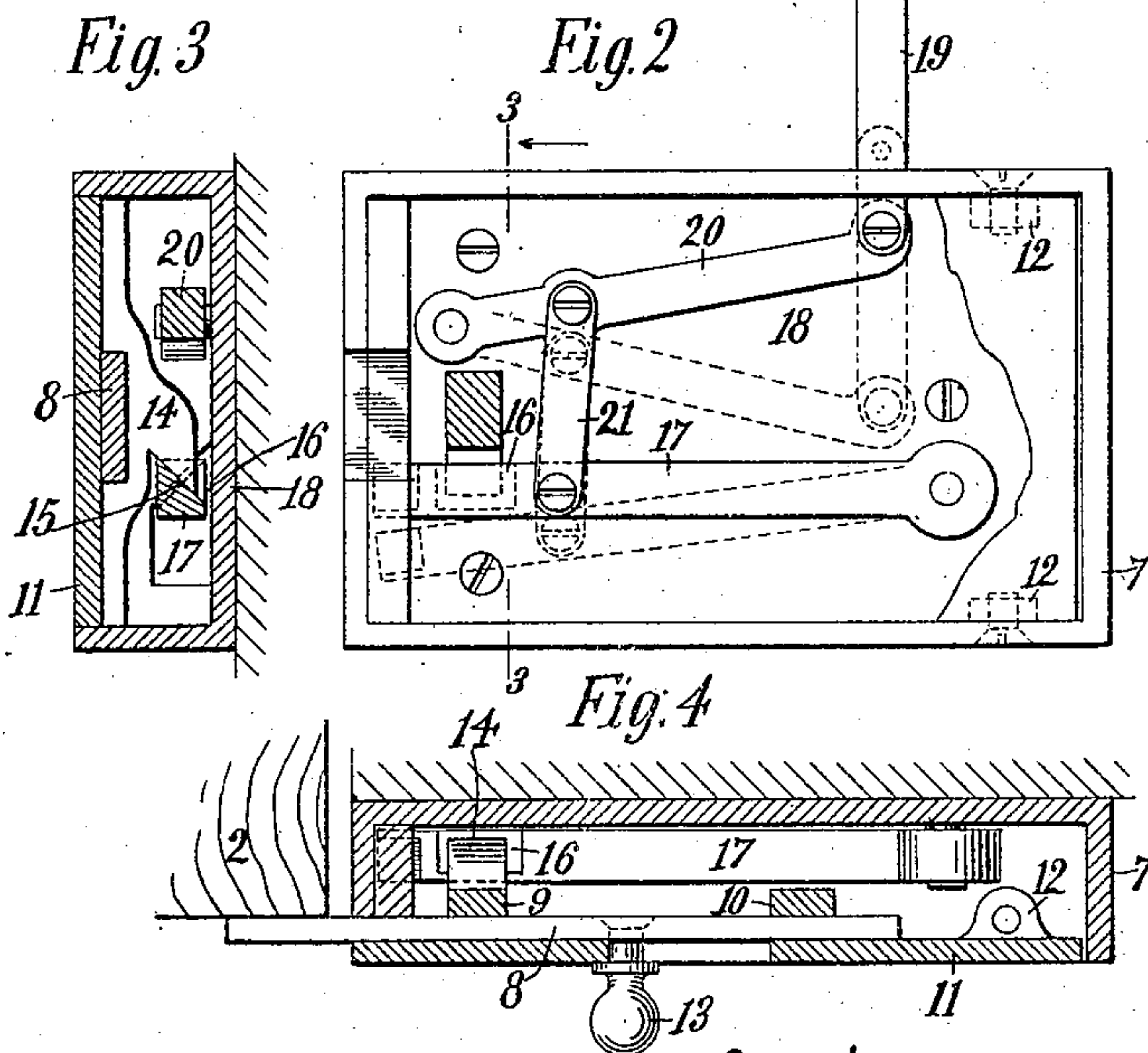
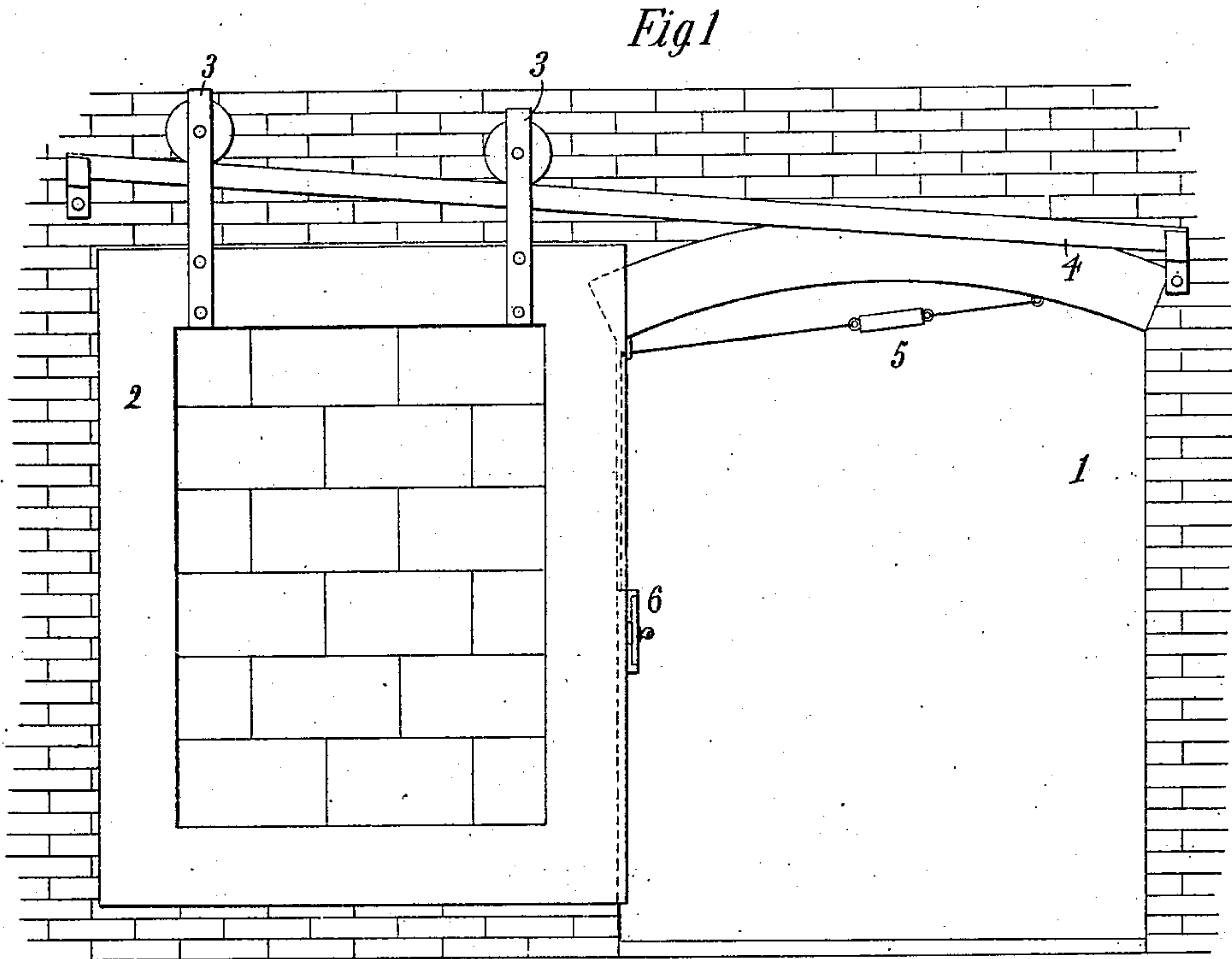
No. 680,458.

Patented Aug. 13, 1901.

O. H. KINGSLAND.
DOOR CLOSING APPARATUS.

(Application filed Oct. 31, 1900.)

(No Model.)



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UNITED STATES PATENT OFFICE.

OLIVER H. KINGSLAND, OF NEW YORK, N. Y., ASSIGNOR TO HENRY B. NEWHALL, OF PLAINFIELD, NEW JERSEY.

DOOR-CLOSING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 680,458, dated August 13, 1901.

Application filed October 31, 1900. Serial No. 35,010. (No model.)

To all whom it may concern:

Be it known that I, OLIVER H. KINGSLAND, a citizen of the United States, residing in the city, county, and State of New York, have invented a new and useful Improvement in Door-Closing Apparatus, of which the following is a specification, reference being had to the drawings accompanying and forming part of the same.

10 The present invention is adapted particularly to automatic thermal door-closing apparatus, and is especially designed to provide means whereby the pressure of the door itself will effectively accomplish the release
15 of the locking devices independent of the action of gravity, springs, or other forces upon said locking devices. My invention may be used, however, in connection with other door-closing apparatus than that operated thermally or automatically.

20 The important feature of my invention consists in the adjustment of the engaging surfaces of those portions of the locking devices which prevent the movement of the door relative to those portions that maintain said parts
25 in position, so that upon the release at the time desired the pressure of the door will by itself insure the separation of these parts and the release of the door.

30 In the drawings I have illustrated a construction embodying the features of my present invention in what I now regard as the most desirable form.

35 The construction here shown and described contains various other features of invention, which I do not intend to claim in the Letters Patent for which this application is filed, said features being made the subject-matter of a separate application for Letters Patent now
40 pending, Serial No. 723,063, filed July 7, 1899, of which said application this was originally part.

45 In said drawings, Figure 1 shows in elevation the general arrangement of the door relative to the passage which it is designed to close. Fig. 2 shows the locking or securing apparatus in elevation with the front plate broken away. Fig. 3 is a section along line 3 3 of Fig. 2 looking in the direction of
50 the arrow. Fig. 4 is a horizontal section of the casing and its inclosed parts, taken at a

point near the top of the bolt 8 and looking downward.

Referring to the drawings in detail, 1 represents a passage or opening, which passage
55 is provided with the fire-door 2. This fire-door is hung or suspended, by means of trolleys 3, upon an inclined track 4. Located in the passage 1 is a thermal fuse or other similar device 5, which is connected with the
60 locking or securing devices 6. The fuse 5 is preferably located in the upper portion of the passage, so that, as is well known, it will be subjected to the maximum heating effect in
65 case of fire.

Referring now in detail to the locking devices, these consist of a casing 7, which is secured to the side wall of the passage-way and contains the devices whereby the door is secured in its open position and the devices
70 whereby upon the breaking or weakening of the supporting devices, due to the occurrence of fire or to the action of a person desiring to close the door, the door may effectively and without the aid of any other force accomplish its own unlocking. The door is secured
75 in its open position by means of a bar movably connected with the front plate of the casing, preferably consisting of a simple sliding bolt 8, working in guide-pieces 9 and 10,
80 secured to the front plate 11 of the casing. This front plate is movably secured to the casing 7 by means of hinges 12, and the bolt 8 is moved into and out of engaging position with the door by means of the knob or hand-
85 piece 13. Secured to the guide-piece 9 or formed integrally therewith is a catch 14, having an inclined and preferably beveled surface 15, which engages with a correspondingly-inclined surface 16 on an arm 17. This
90 arm 17 is pivoted or journaled to the back plate 18 of the casing, which is secured to the side wall of the passage, and may be connected with the thermal fuse by the link connection shown in Fig. 2 or by any other de-
95 sired means. As shown in Fig. 2, the connection between the pivoted arm 17 and the thermal fuse 5 consists of a rod 19, passing through the casing 7, one end of which rod is secured by cord or other flexible connection with the thermal fuse or fuse 5. The
100 other end of the rod 19 is secured to one end

of the arm 20, the other end of which arm is pivoted to the rear plate 18 of the casing 7, the arm 20 and the arm 17 being connected by the link 21.

5 The operation of the device will now be apparent. In the ordinary course of business the door is pushed along the inclined track to its open position and the bolt 8 is thrust by hand into the path of travel of the door, thus holding it in its open position, the several parts of the locking device being in the position shown in full lines in Fig. 2. It will be noted, of course, that the door in its open position is constantly pressing against the bolt 8, which pressure is transmitted through the catch 14 to the arm 17 by means of its inclined portion 16, this pressure having a constant tendency to force the arm 17 down and out of the path of the catch 14. This tendency is resisted under normal conditions by the thermal fuse 5 and its connecting cord or chain sustaining the arm 17 in locking engagement. Upon the weakening or destruction of this support, however, the pressure of the door forces the inclined surfaces of the catch 14 and of the arm 17 out of engagement, and then swings the front plate 11 upon the hinge 12, thus moving the bolt 8 out of the locking position, as shown in dotted lines in Fig. 4, and permitting the door to travel along the inclined track 4 to close the passage-way.

In all other devices which have come to my knowledge in which the closing of a door is prevented by the interposition of a bolt or plate the removal of such bolt or plate from the path or travel of the door at the desired time has been made dependent upon the action of gravity or of springs or of some other force than that of the door upon portions of the locking device. In all such devices the pressure of the door upon the projecting portion of the locking device tends to cramp the said device and prevent the free action of gravity or of the springs or other force above referred to. In some instances the pressure of the door might be great enough to cramp the locking devices, so that they will not operate even when released in the intended manner. My invention precludes the possibility of any such occurrence by providing the inclined bearing-surfaces above referred to, whereby the pressure of the door upon the portion of the locking device which projects into its path of travel constantly tends to force apart the inclined surfaces and to release the locking devices. Of course the action of gravity or of any other force may assist in the operation which occurs in my device, as above pointed out, by the pressure of the door; but the operation of the door to disengage or unlock itself at the desired time is entirely independent of the action of gravity immediately upon the devices that hold the locking-bar in position or of forces acting directly on the locking-bar other than the pressure of the door. Thus in the modifica-

tion of my invention above described the action of the rod 19 being independent of gravity it will not be necessary to wait until the heat generated by the fire has entirely consumed or destroyed the fuse 5; but as the same becomes weakened the door itself may effect the final rupture and operate to close itself long before such action would take place if it were necessary to wait until the fuse was entirely destroyed before a stored force could be applied to unlock the casing.

It is apparent that my invention is applicable to any form of locking devices in which a bar projects into the path of travel of a self-closing door, said bar being maintained in its position by securing devices, which are held fastened by a thermal fuse or other suitable means.

In the modification shown in the drawings and hereinabove specifically described the bolt may, if desired, be rigidly fastened to the hinged plate or may be made integral therewith; nor is it necessary in the other forms of my device that the projecting bar or bolt should be movable relative to the parts which immediately carry it, although in most cases the use of a movable bolt will be found advantageous. In any of these devices, however simple, the introduction of the inclined bearing-surfaces between that part of the locking device which comes in contact with the door and that part which maintains the first portion in position until it is desired to release the same will insure the separation of the said portions of the locking device and the unlocking and release of the door at the desired time. It is also evident that the inclined bearing-surfaces of the said portions of the locking device may vary in shape and in position and may be beveled, as herein shown, rounded, or of other form so long as they are relatively arranged so that the pressure of the door will upon the breaking or weakening of the supporting devices cause the separation of the bearing-surfaces and the release of that portion of the locking device which prevents the closing of the door. It is also evident that in place of the thermal fuse and the cord or chain connected therewith any other suitable device, such as a device controlled by an electric current interrupted by the action of heat, may be used for normally maintaining in the locked position the locking devices necessary to prevent the closing of the door. While I contemplate that my invention will be used more particularly in connection with locking devices supported by a thermal fuse or electric devices controlled by a current arranged to be interrupted by heat, yet it is equally adapted for use with locking devices which are not arranged for automatic action, but are controlled by the will of an operator.

I do not wish to be limited to the exact disclosure of the drawings in this case, since it is possible to use parts of the device therein disclosed without employing the remainder of

my invention. It is not necessary in all cases that the retainer or pivoted locking-lever 17 be connected with the second lever 20 to form a compound-lever system, since this 5 compound-lever arrangement is not necessary in all cases to relieve the strain of the self-closing door acting through the bolt and bolt-support or front plate and through the suitably-inclined surfaces of the support and re- 10 tainer exerting a strain upon the releasing devices, such as the thermal fuse. It is not necessary that the bolt or catch which engages the door shall slide in the support, since it may be otherwise movably mounted.

15 Many other modifications of my device may be made by those skilled in the art without departing from the spirit of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters 20 Patent, is—

1. A movable catch adapted to be moved into the path of a self-closing sliding door, a movable support on which said catch is movably mounted and means to hold said catch in 25 position and releasable to allow said catch to move out of the path of said door under the influence of said door.

2. A manually-operated catch adapted to be moved into the path of a self-closing sliding door, a movable support on which said catch is movably mounted, and means to hold said catch in position and releasable to allow said catch to move out of the path of said 30 door under the influence of said door.

3. A movable bolt adapted to be moved into the path of a self-closing door, a movable support in which said bolt is guided and means to hold said support in position and allow said bolt to move out of the path of said 40 door.

4. A manually-operated bolt adapted to be moved into the path of a self-closing door, a movable support in which said bolt is guided and means to hold said support in position and releasable to allow said support to move 45 said bolt out of the path of said door.

5. A movable bolt adapted to be moved into the path of a self-closing door, a pivoted support in which said bolt is guided and means 50 acting upon said support to hold said bolt in the path of said door and releasable to allow said bolt to move out of the path of said door.

6. A sliding bolt capable of being manually moved into the path of a self-closing door, 55 and a device to be connected with a thermal releasing means to releasably hold said bolt in such path and to allow said door, on the action of said releasing means, to move said bolt from such path.

7. A catch adapted to be extended across the line of travel of a self-closing sliding door, and capable of being manually withdrawn 60 out of such line of travel; a movable support for said catch, and a retainer to be connected with a thermal releasing means for releasably holding such catch in such path, said retainer being mounted to move out of contact with

said support to allow said door to move said catch out of such line of travel.

8. A manually-operated catch adapted to 70 be moved into the line of travel of a self-closing sliding door, a pivoted support upon which said catch is movably mounted and means releasable by excessive heat to hold said support in position.

9. A manually-operated bolt adapted to be moved across the line of travel of a self-closing door, a pivoted support on which said bolt is guided and a retainer to releasably hold said support in position to be connected with a 80 thermal device to release said support in case of an excessive rise of temperature.

10. A pivoted device to hold open a self-closing door by moving across the path of said door, a pivoted retainer to releasably 85 hold such device in operative position, and coacting means on such device and on said retainer, to cause the pressure of said door to tend to disengage said retainer and such device.

11. A catch adapted to move across the path of a self-closing door, a movable support on which said catch is movably mounted, a re- 90 tainer and engaging means on said support and retainer to releasably hold said support in operative position to cause the pressure of said door to tend to disengage said support and said retainer and thereby allow said catch to move out of the path of said door.

12. A manually-operated bolt adapted to 100 move into the path of a self-closing door, a movable support in which said bolt is movable, a retainer engaging said support to releasably hold the same in operative position, the engaging faces of said retainer and sup- 105 port being slanting so that the pressure of said door tends to disengage said retainer and said support and move said bolt out of the path of said door.

13. A manually-operated bolt adapted to 110 move into the path of a self-closing door, a pivoted support having suitable guides for said bolt and being formed with a slanting member, a pivoted retainer having a slanting portion to engage said slanting member on the 115 support, a lever connected to said retainer to be connected with a thermal device to allow said bolt to move out of the path of said door in case of excessive rise of temperature.

14. A lock adapted to be supported adja- 120 cent a self-closing door comprising a pivoted front plate in which is supported a manually-operated bolt adapted to be moved into the path of said door, said front plate having a slanting member, a retainer pivoted to the 125 back of said lock having a slanting portion to engage said slanting member of the front plate, a lever pivoted to the back of said lock connected to said pivoted retainer by a link attached to said lever near its pivot, and a 130 bar pivoted to the free end of said lever to be attached to means for releasably holding said retainer in operative position.

15. A movable stop adapted to be moved

into the path of a self-closing sliding door, a
 5 retainer releasably holding said stop in posi-
 tion and means to hold said retainer in oper-
 ative position and to release said retainer to
 allow said stop to move out of the path of said
 door under the impulse of said door.

16. A self-closing door, a pivoted device one
 portion of which projects when the device is
 in operative position into the line of travel of
 10 the door, a retainer for holding said device
 in said position, means for releasably support-
 ing said retainer, the bearing-surfaces be-
 tween said device and said retainer being in-
 clined to cause upon the breaking or weaken-
 15 ing of the supporting means the said surfaces
 to be forced apart by the pressure of the door
 and the device released from the retainer.

17. A securing device adapted to maintain
 a self-closing door in open position, said se-
 20 curing device consisting of the casing having
 means pivoted thereto to project when the
 plate is maintained in operative position into
 the line of travel of the door, a retainer en-
 gaging said pivoted means, means arranged
 25 to be connected with a thermal device for
 holding said retainer in engagement with said
 pivoted means and means whereby upon the
 action of the thermal device the door itself re-
 leases the pivoted means from the retainer.

30 18. A bolt adapted to be moved into the

path of a self-closing door, and means releas-
 ably holding said bolt in said path, such means
 being adapted to be connected to a thermal
 device whereby said bolt is allowed to move
 from the path of said door in case of an excess- 35
 ive rise of temperature.

19. A movable support adapted to be mount-
 ed adjacent a self-closing door, a manually-
 operated bolt mounted in said support and
 adapted to be moved into the path of said 40
 door, so as to hold said door in open position,
 and means releasably holding said support
 in operative position to be connected with a
 thermal device whereby said support is al-
 lowed to move in case of excessive rise of 45
 temperature so as to allow said bolt to move
 from the path of said door, the pressure of
 said door tending to release said support from
 said means.

20. The combination with a self-closing 50
 door, of a sliding bolt capable of being man-
 ually moved in the path in which it slides
 and a device for holding it in that path, re-
 leasable by heat for permitting the movement
 of the bolt out of that path.

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Witnesses:

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