

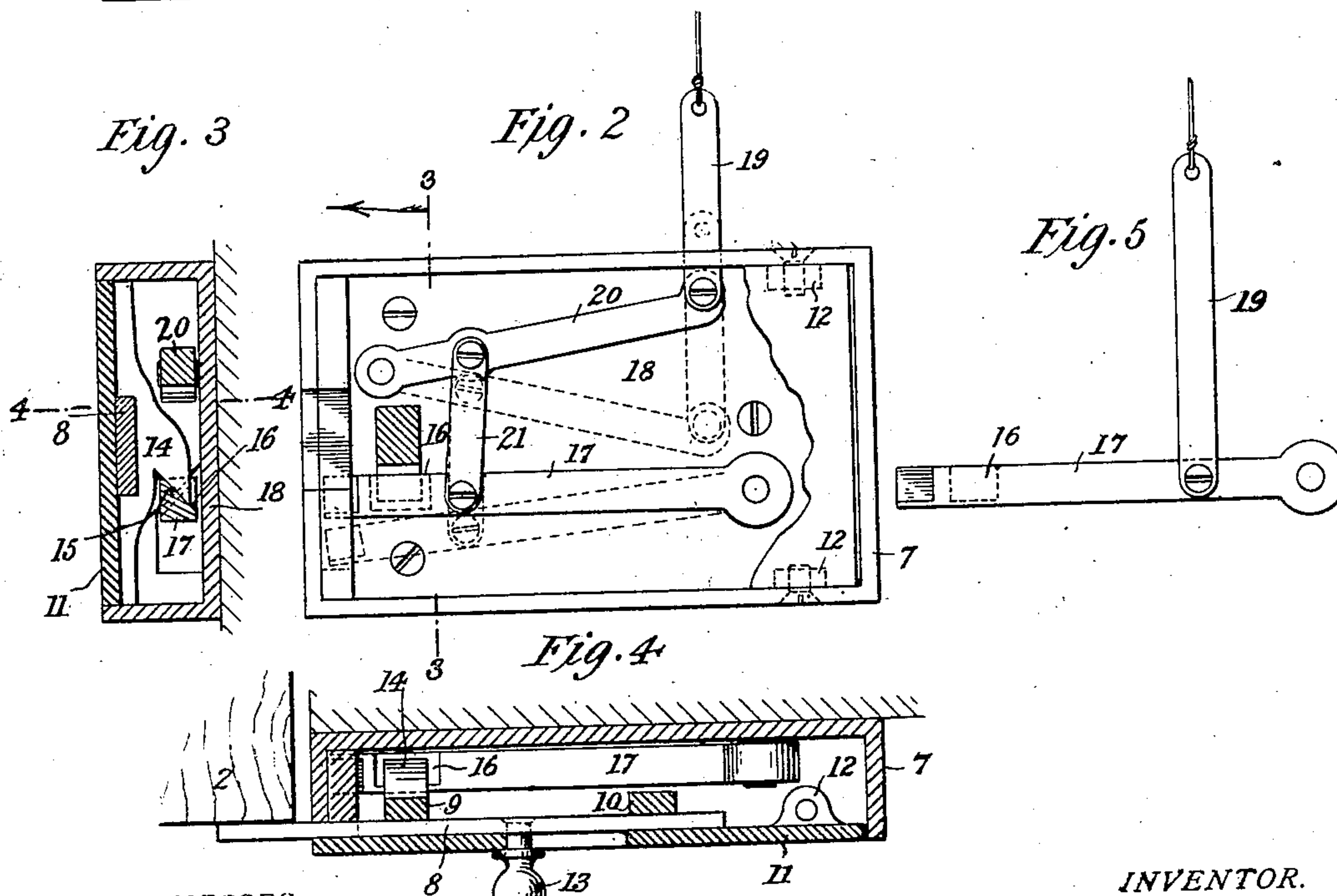
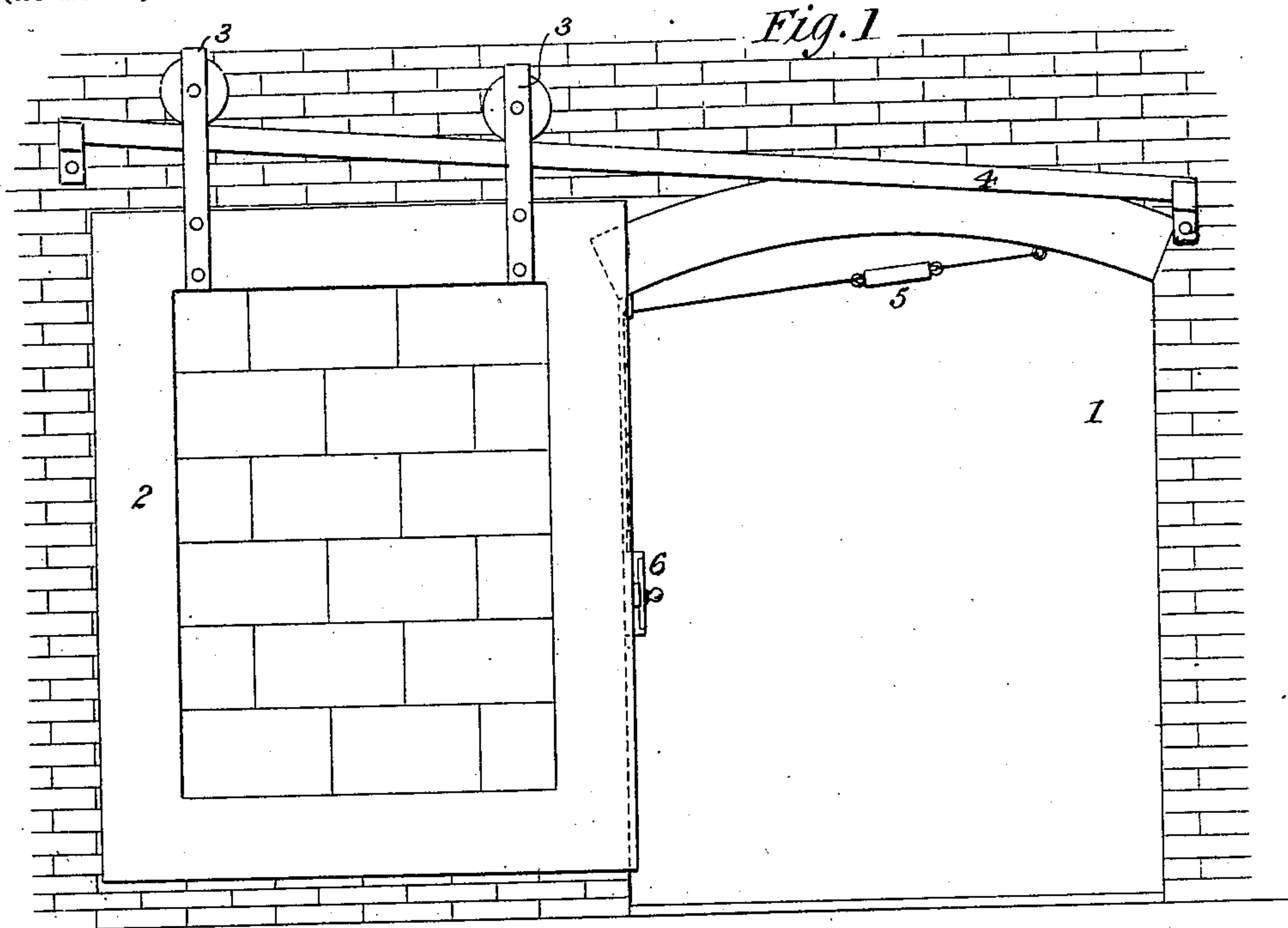
No. 680,415.

Patented Aug. 13, 1901.

O. H. KINGSLAND.
THERMAL DOOR CLOSING APPARATUS.

(Application filed July 7, 1899.)

(No Model.)



WITNESSES

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THERMAL DOOR-CLOSING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 680,415, dated August 13, 1901.

Application filed July 7, 1899. Serial No. 723,063. (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
5 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 In my copending application Serial No. 35,010, filed October 31, 1900, for door-closing apparatus I have claimed such of my inventions as are disclosed, but not claimed, in this application.

15 The present invention relates particularly to thermal door-closing apparatus, and especially is designed to provide a door which may be opened and closed as many times as desired in the ordinary usages of business
20 and locked in its open position, but which in case of an emergency, such as fire, operates to automatically close the passage or compartment to which it is appurtenant.

I am aware that it is old to provide a fire-
25 door with devices which under the action of heat operate to liberate or apply a stored force and otherwise to effect a closing movement of the door. In the present invention, however, not only is the door itself availed
30 of to effect its own release in the case of fire, but also the securing or locking devices, which are of very simple construction, may be operated by hand in the ordinary course of business entirely independently of the automatic
35 features of the invention which come into play upon the occurrence of undue heat, rendering the closing of the door desirable.

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

In said drawings, Figure 1 shows in elevation the general arrangement of the door relatively to the passage which it is designed to
45 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 the arrow. Fig. 4 is a section along line 4 4 of
50 Fig. 3. Fig. 5 shows a modified form of the invention.

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

Referring to the locking devices now in detail, these consist of a casing 7, which is secured to the side wall of the passage-way and 65 contains the devices whereby the door is secured in its open position and the devices whereby upon the occurrence of fire the door operates to effect its own unlocking if the breaking of the thermal fuse under heat 70 should ineffectively or inadequately accomplish this object. The door is secured in its open position by means of a bar movably connected with the hinged plate hereinafter described and preferably consisting of a simple 75 sliding bolt 8, working in guide-pieces 9 and 10, 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 80 with the door by means of the knob or hand-piece 13. Secured to the guide-piece 9 or formed integral therewith is a catch 14, having an inclined and preferably beveled surface 15, which engages with a correspondingly- 85 inclined surface 16 on arm 17. This 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 either by the direct 90 connection shown in Fig. 5 or the link connection shown in Fig. 2 or by any other desired means. As shown in Fig. 2, the connection between the pivoted arm 17 and the thermal fuse 5 consists of a rod 19, passing 95 through the casing 7, one end of which rod is secured by a cord or other flexible connection with the thermal piece or fuse 5. The other end of the rod 19 is secured to one end of an arm 20, the other end of which arm is pivoted 100 to the rear plate 18 of the casing 7, the arm 20 and the arm 17 being connected by a link

21. This mode of connection, as just described and as illustrated in Fig. 2, is availed of for the purpose of transmitting to the arm 17 a comparatively short and strong movement from the relatively longer throw of the rod 19. In the construction shown in Fig. 5 the arm 17 is directly connected to the rod 19, the intermediate link 21 and arm 20 being done away with.

10 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 sustaining the arm 17 in locking engagement. Upon the occurrence of fire, however, the thermal fuse becomes weakened or entirely destroyed, in which event the resistance is destroyed, and the catch 14 under the pressure of the door forces the arm 17 out of engagement and then swings the front plate 11 upon the hinge 12, thus moving the bolt 8 out of 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.

Of course if the rod 19 is made to act as a gravity-piece the arm 17 may be moved out of the path of the catch 14 by the simple dropping of the rod 19, which action will be assisted by the pressure of the door; but the operation of the door to disengage or unlock itself upon the occurrence of fire is entirely independent of any gravity action of the rod 19, as it will be seen that in this construction it will not be necessary to wait until the heat generated by the fire has had sufficient time to entirely consume or destroy 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 were entirely destroyed before a stored force could be applied to close the door. It will also be seen that the ordinary fastening and unfastening of the door in the usual course of business is entirely independent of and does not interfere with the automatic devices which are designed to be brought into play upon the occurrence of fire. This feature presents many advantages in practice and constitutes an important part of my invention.

65 It is apparent that the inclined bearing-surfaces of the plate and of the locking devices may vary in shape and in position so

long as they are relatively arranged, so that the pressure of the door will upon the breaking or weakening of the thermal fuse cause the separation of the bearing-surfaces and the release of that portion of the device which prevents the closing of the door. It is evident that various modifications of my device may be used without departing from the spirit of my invention and that as an equivalent for the thermal fuse and the supporting devices connected therewith supporting devices controlled by an electric current interrupted by the action of heat or the will of an operator may be used or other well-known equivalent devices operating to retain or release the locking devices of my apparatus above described, the construction and action of my device being the same whatever method is used to initiate its action.

I do not wish to be limited to the exact disclosure which I have made in the drawings, since it would be possible to release the locking-piece or retainer 17 by connecting the lever 20 with some other releasing means than the thermal fuse shown. The bolt or catch 8 might also be dispensed with—that is, it is not necessary that this projection be movably mounted in the movable support or front plate 11. The bolt or catch, even when it is movably mounted, need not be mounted to slide in the support; but it may be movably mounted in any other way upon the support 11. Many other modifications of my device might be made by those skilled in this art.

What is claimed as new is—

1. A movable catch adapted to be moved into the path of a self-closing door, a movable support on which said catch is movably mounted, means connected to a thermal fuse to hold said catch in position or to allow said catch to move out of the path of said door and said thermal fuse.

2. 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, a thermal fuse and means connected to said fuse to hold said bolt in position or allow said bolt to move out of the path of said door.

3. 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, a thermal fuse and a retainer connected to said fuse to releasably hold said support in position.

4. The combination with a self-closing door, of a sliding bolt capable of being manually moved in the path in which it slides, and a device comprising a thermal fuse for holding it in that path, releasable by heat for permitting the movement of the bolt out of that path.

5. In a thermal door-closing apparatus, a self-closing door, a thermal fuse, a bar extending across the line of travel of the door and capable of being manually withdrawn out of said line of travel, a locking device connected with said thermal fuse for holding the bar in said path when the fuse is intact, and

permitting the movement of the bar out of said path when the fuse is broken.

6. A manually-operated bolt adapted to move in the path of a self-closing door, a movable support in which said bolt is movable, a thermal fuse, and a retainer engaging said support and connected with said thermal fuse to releasably hold said support in operative position, the engaging faces of said retainer and support being inclined so that the pressure of said door tends to disengage said retainer and said support to allow said bolt to move out of the path of said door.

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

8. A thermal fuse, a lock adapted to be supported adjacent 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, and a retainer pivoted to the back of said lock having a slanting portion to engage said slanting member of the front plate, said retainer being connected to said thermal fuse to releasably hold said retainer in operative position in engagement with said front plate.

9. A thermal fuse, a manually-operated catch adapted to be moved into the path of a self-closing door, a movable plate on which said catch is movably mounted, a retainer to hold said plate in operative position, said retainer being connected to said thermal fuse, the bearing-surfaces between said plate and

said retainer being inclined whereby upon the breaking or weakening of the thermal fuse the said surfaces may be forced apart by the pressure of the door and the plate released from the retainer.

10. A manually-movable bolt, a movable support upon which said bolt is movably mounted, a thermal fuse, retaining devices engaging said support, and means connected to said thermal fuse to releasably hold said support and said retaining devices in engagement whereby if said bolt is engaged by a self-closing door the force of said door tends to disengage said support and said retainer.

11. A manually-operated bolt adapted to be moved into the path of a self-closing door, a support upon which said bolt is movably mounted, a thermal fuse, a pivoted retainer connected to said fuse and engaging said support, the contacting surfaces of said support and said retainer being so shaped that the pressure of said door upon said bolt tends to force said retainer from its operative position to allow said bolt to move out of the path of said door.

12. A manually-operated bolt adapted to be moved into the path of a self-closing door, a pivoted support in which said bolt is guided, a thermal fuse, a pivoted retainer connected with said thermal fuse, said retainer engaging said support to hold the said bolt in the path of said door, the engaging surfaces of said retainer and said support being so shaped that upon the weakening or breaking of said fuse the pressure of the door disengages said retainer from said support and forces said bolt out of the path of said door.

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Witnesses:

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