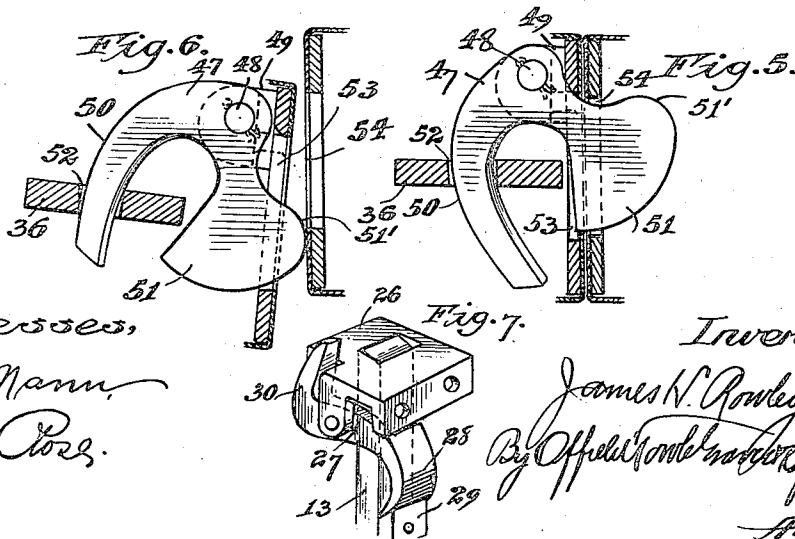
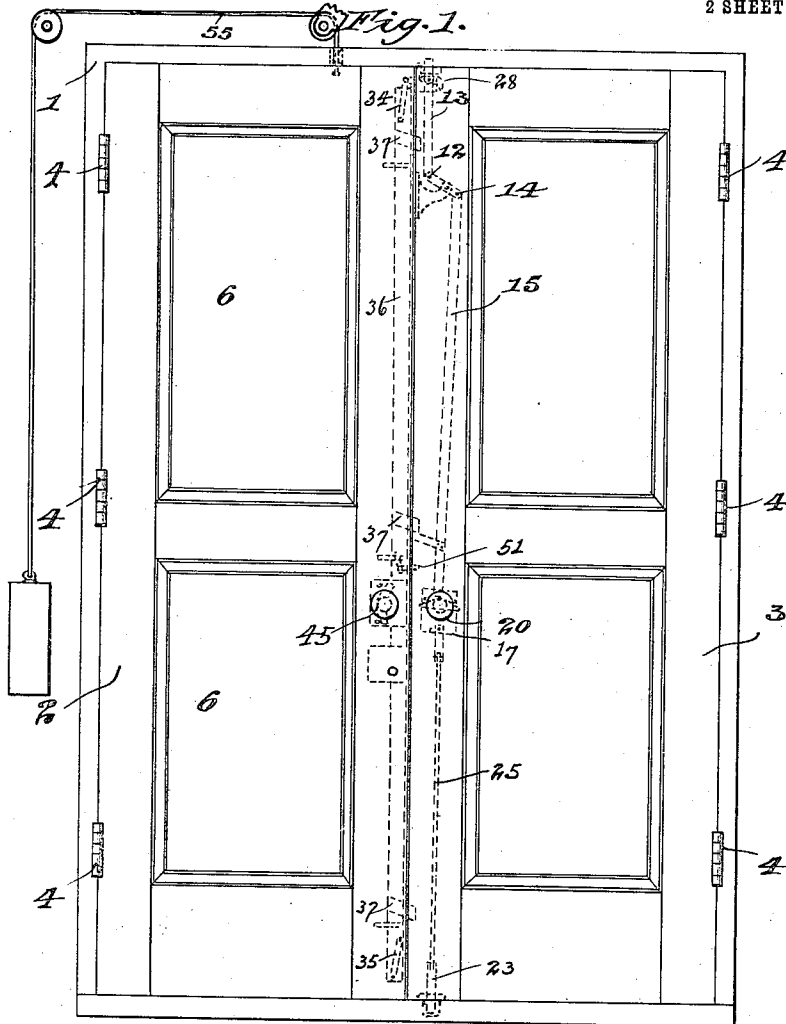


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 LOCKING MECHANISM FOR FIREPROOF CLOSURES.
 APPLICATION FILED APR. 24, 1911.

1,051,918.

Patented Feb. 4, 1913.

2 SHEETS—SHEET 1.



Witnesses,
 J. E. Mann,
 Emily Carr.

Inventor,

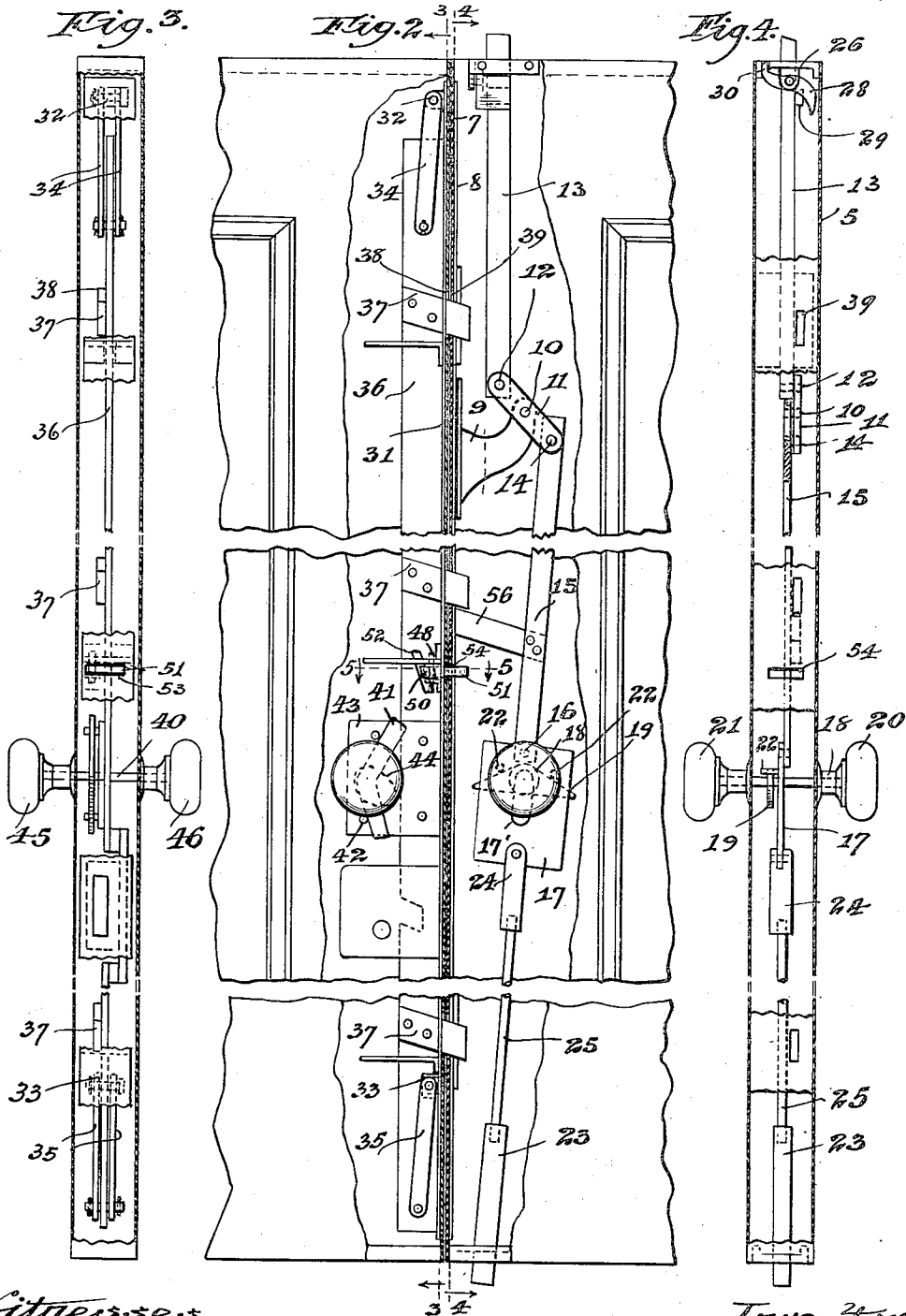
James N. Rowley
 By Official Notary Public
 J. H. S.

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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JAMES H. ROWLEY, OF CHICAGO, ILLINOIS, ASSIGNOR TO SYKES STEEL ROOFING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

LOCKING MECHANISM FOR FIREPROOF CLOSURES.

1,051,918.

Specification of Letters Patent.

Patented Feb. 4, 1913.

Application filed April 24, 1911. Serial No. 822,866.

To all whom it may concern:

Be it known that I, JAMES H. ROWLEY, a citizen of the United States, residing in the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Locking Mechanisms for Fireproof Closures, of which the following is a specification.

This invention relates to improvements in locking mechanisms for closures and refers more particularly to hollow sheet metal fireproof doors, windows and the like.

The salient objects of the invention are to provide improved automatic mechanism for locking two swinging fireproof closures such as steel doors; to provide a construction of the above character in which the locking mechanism is substantially concealed, thus not only preventing accidental displacement of the parts, but also presenting a more workmanlike and attractive appearance; to provide a construction of the above character in which the closures are automatically locked by simply closing them and may be unlocked by turning the door knobs or other manually operated members; to provide a construction in which the closures are locked in closed position at both their upper and lower ends; to provide a construction which is characterized, not only by its simplicity and economy in construction, but by its reliability in operation in forming a fireproof closure structure; and in general to provide an improved construction of the character referred to.

Referring to the drawings, Figure 1 is an outside elevation of two steel doors equipped with my invention, with parts shown in dotted lines. Fig. 2 is an enlarged fragmentary outside elevation with parts broken away and shown in section to more clearly bring out details of construction. Fig. 3 is a vertical sectional view taken substantially on lines 3—3 of Fig. 2 and looking in the direction of the arrows. Fig. 4 is a vertical sectional view taken on lines 4—4 of Fig. 2 and looking in the direction of the arrows. Fig. 5 is an enlarged horizontal sectional view taken substantially on lines 5—5 of Fig. 2 and looking in the direction of the arrows. Fig. 6 is a view similar to Fig. 5 but showing the tumbler or rocker guiding member in another position. Fig. 7 is a detailed perspective view of the latch member for one of the doors.

The invention consists in the matters hereinafter described and more particularly pointed out in the appended claims, and is shown as applied to a fireproof door structure.

Referring to the drawings, 1 designates as a whole the door frame or casing of the building and 2 and 3 respectively hollow sheet metal doors suitably hinged to the door frame, as shown at 4, 4 and adapted to swing outwardly. Each of these doors comprises a hollow sheet metal casing 5 provided with panels 6, 6, in a well known manner.

Describing now the manner of locking the door 3 in closed position, to the inner edge thereof is secured a metal strip 8 provided near its upper end inside the door with a bracket arm 9. Upon the outer end of the bracket 9 is pivoted a toggle link 11, to which in turn is pivotally secured as shown at 12 a locking bolt 13, the upper end of which projects through a suitable aperture in the casing 1 when the door 3 is in locked position. To the lower end of the link 11 is pivotally secured, as shown at 14, a relatively long rod or link 15. This rod 15 is rigidly connected, as shown at 16, to a cam plate 17 which fits over the knob spindle 18 and is adapted to have limited vertical movement thereon by means of an elongated slot 17'. To the spindle 18 is rigidly keyed a triangular shaped cam 19, the upper sides of which engage pins 22 carried by the plate 17. The knobs 20, 21 are secured to either end of the spindle in the usual manner.

The lower end of the door 3 is locked to the casing by means of a throw bolt or rod 23 connected to the plate 17 by means of an arm 24 and rod 25. The arrangement is such that when the spindle 18 is turned in either direction the cam plate 17 will be forced upwardly, the bolts retracted and the door unlocked.

The bolts automatically spring into locking position by gravity inasmuch as the locking bar 13 is much lighter than the cam plate and connected links. To hold the bolts in retracted position while the door is open, a bracket 26 is mounted upon the upper end of the door 3 and apertured to receive the locking bar 13. Upon this bracket is pivoted an automatically tripping member 27, the latch arm 28 of which engages by gravity a block 29 carried by the bar 13

as the latter is withdrawn. This latch also holds the lower locking bar retracted through the connecting links and cam plates. When the door 3 is swung into closed position the lip 30 of the member 27 will engage the casing and rock the latch out of engagement with the block 29. The bars then automatically spring into locking engagement with the casing.

Referring now to the door 2, it is also provided at its inner edge with a plate 31 to which are secured brackets 32 and 33 near the respective upper and lower ends of the door. To these brackets is pivotally secured a toggle mechanism comprising relatively short toggle links 34 and 35 and an intermediate swinging plate or bar 36. This bar 36 is provided with three inclined lugs 37 adapted to have locking engagement with the other door 3. To this end the abutting edges of the door structures are suitably apertured, as shown at 38, 39, to receive these lugs. The supporting plates 7 and 31 are, of course, similarly apertured. When the doors are in closed position these lugs pass through the inner edge of the door 3 and prevent the opening of the door 2.

The locking bar 36 with its lugs 37 is retracted thus: The knob spindle 40 of the door 2 is provided intermediate its length with a V-shaped or double winged cam 41 adapted to engage pins 42 carried by a cam plate 43 rigidly mounted on bar 36; the plate 43 being provided with an oblique slot 44 through which the knob spindle extends and which accommodates the arc movement of the bar 36 moving on its suspension links 34, 35. When knob spindle 40 is turned in either direction by its knobs 45, 46, locking bar 36 is, of course, retracted.

The door 2 is in ordinary practice arranged to automatically swing shut under the action of a weight and pulley mechanism, and is so organized that when the door approaches a closed position bar 36 is positively retracted, so carrying the lugs 37 thereof out of interference with the other door, and as the moving door reaches its closed position the locking bar is released and moves home into locked position. To this end a rocking cam 47 is pivotally secured, as indicated at 48, to a bracket 49 carried by the door 2 (see Figs. 5 and 6). This cam 47 has a cam arm 50 and contacting arm 51, the former being curved throughout its length eccentrically with reference to the pivotal axis 48 and arranged to pass through a slot 52 in locking bar 36. Arm 51 is so shaped as to work through apertures or mortises 53, 54, in the edges of the doors and in register with each other when the doors are closed. When the locking bar is projected arm 51 is likewise projected into the position shown in Fig. 5, and vice versa the retraction of the cam compels

the retraction of the locking bar. As the door 2 is being closed the projecting rounded surface 51' of arm 51 will encounter the edge of the door 3 and the cam be thereby oscillated on its pivot 48, thus retracting the locking bar and its lugs 37. This permits the door to close, and as the cam arm 51 comes into register with the mortise 54 of the opposed door it enters the latter and the locking bar moves home, these parts being impelled into this position by gravity. It will be noted that the slot 52 in the locking bar is obliquely disposed so that the arc movement of the locking bar on its links is not interfered with notwithstanding the engagement of the tail arm 50 of the cam 47 with said slot.

To prevent the door 3 from being unlocked while door 2 is closed, or, in other words, to insure that the door 2 shall always be opened first, I provide on the link 15 a rigid arm or lug 56 which, when the doors are closed, extends immediately beneath and in register with the central locking lug 37 of bar 36; thus preventing the bolt mechanism operated by the knob spindle 18 from being operated.

The operation of the doors has been fully indicated in connection with the description of the mechanism thereof, and need not be repeated.

It will, of course, be understood that any suitable mechanism may be arranged for automatically swinging the door 2 into closed position, as for example a cord-weight and pulley mechanism, indicated at 55.

It will be noted that the mechanism throughout in so far as it is automatic, operates solely by gravity as distinguished from springs; that the parts are all simple, direct-acting and positive in their action and they are all housed within the doors, so that liability to disarrangement, injury, or clogging, and consequent unreliability, are reduced to a minimum.

While the construction herein shown and described is the preferred construction now in practical use, yet it is to be understood that the details of construction and arrangement may be modified within reasonable limits without departing from the spirit of the invention, and the claims are accordingly not to be construed specifically, except in so far as they are made specific in terms.

I claim as my invention:

1. In an automatic fireproof door mechanism, the combination with a surrounding casing in which the door is hung and means for automatically impelling the door to closed position, of a locking bar carried by and extending along the free edge of the door and having locking lugs, a cam provided with a strike-arm normally projecting beyond the free edge of the door and an eccentric tail-arm interengaged with the

locking bar, and means providing locking recesses in the opposed member to which the door locks, adapted to receive the locking lugs of the locking bar and the strike-arm of the cam.

2. In an automatic fireproof door mechanism, the combination with a surrounding casing in which the door is hung and means for automatically impelling the door to closed position, of a locking bar supported by parallel links and extending along the free edge of the door, locking lugs carried by said bar and normally projecting beyond the free edge of the door, a cam provided with a strike-projection pivotally mounted on the door with its strike-projection normally projecting beyond the free edge of the latter, positive interconnections between said cam and the locking bar whereby movement of one compels corresponding movement of the other, and means providing locking recesses in the opposed member to which the door locks, adapted to receive the locking lugs of the locking bar and the strike-projection of the cam.

3. In an automatic fireproof door mechanism, the combination with a surrounding casing in which the door is hung and means for automatically impelling the door to close position, of a locking bar supported by parallel links and extending along the free edge of the door, locking lugs carried by said bar and normally projecting beyond the free edge of the door, a cam provided with a strike-projection pivotally mounted on the door with its strike-projection normally projecting beyond the free edge of the latter, positive interconnections between said cam and the locking bar whereby movement of one compels corresponding movement of the other, and means providing locking recesses in the opposed member to which the door locks, adapted to receive the locking lugs of the locking bar and the strike-projection of the cam, and means for manually actuating said locking mechanism comprising a knob spindle carried by the door and operative connection between said knob spindle and locking bar whereby rotary movement of the spindle retracts the bar.

4. In an automatic fireproof door mechanism, the combination of a surrounding casing in which a pair of doors is hung and means for automatically impelling one of

said doors to closed position, of a locking bar carried by said automatic door and extending along the free edge of the latter, a cam provided with a strike-arm normally projecting beyond the free edge of the automatic door and adapted to contact with the edge of the opposed door, operative connections between said cam and said locking bar whereby oscillation of the cam retracts the bar, means providing locking recesses in the edge of the opposed door, adapted to receive the locking lugs of the locking bar and strike-arm of the cam, bolt mechanism carried by the door opposed to the automatic door, and interconnections between the locking mechanisms of the two doors whereby the automatic door must first be unlocked before the locking mechanism of the opposed door can be unlocked.

5. In an automatic fireproof door mechanism, the combination of a door, an opposed member to which the door is adapted to lock, a locking bar carried by the door and extending along the free edge thereof and adapted for lateral shifting, locking lugs extending outwardly from said locking bar, said opposed member having locking openings and the free edge of said door having openings through which the locking lugs may pass to engage in said locking openings, an actuating lever pivoted to the door adjacent its free edge and adapted to swing in a plane substantially at right angles to the door and having connection with said locking bar, the free edge of said door having an opening through which the outer edge of said actuating lever extends when said locking lugs are extended beyond the door edge, the outer end of said lever being adapted to engage with said opposed member in advance of the projected locking lugs to be thereby swung to effect inward shifting of the locking bar and withdrawal of said locking lugs so that the door may be closed, said opposed member having an opening for receiving the outer end of said lever after closure of the door whereby said locking bar is freed to carry its locking lugs into locking engagement with said locking member.

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