J. H. WILLICH.

LOCKING MECHANISM FOR DOORS.

APPLICATION FILED SEPT. 3, 1912.

1,124,372.

Patented Jan. 12, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

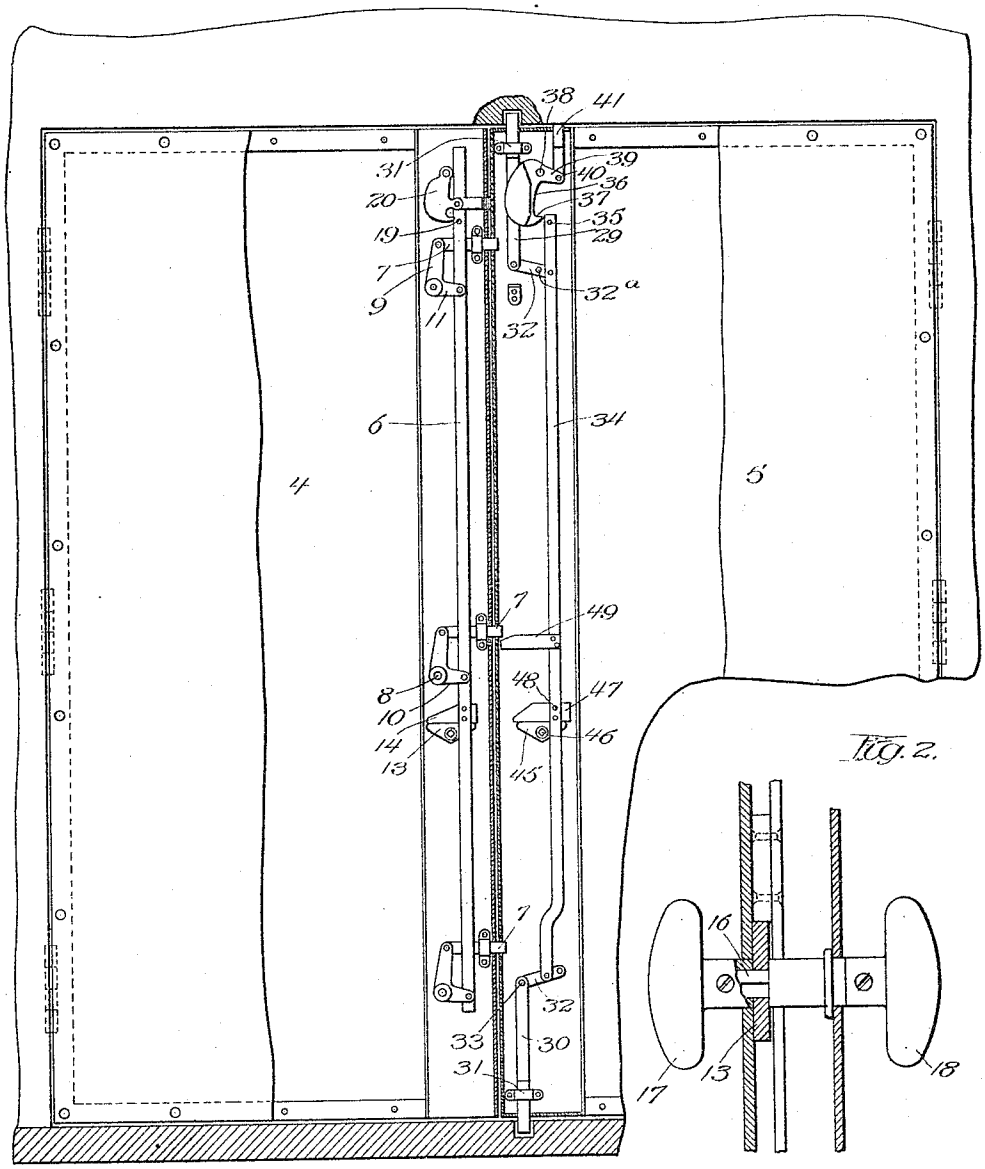


Fig. 2.

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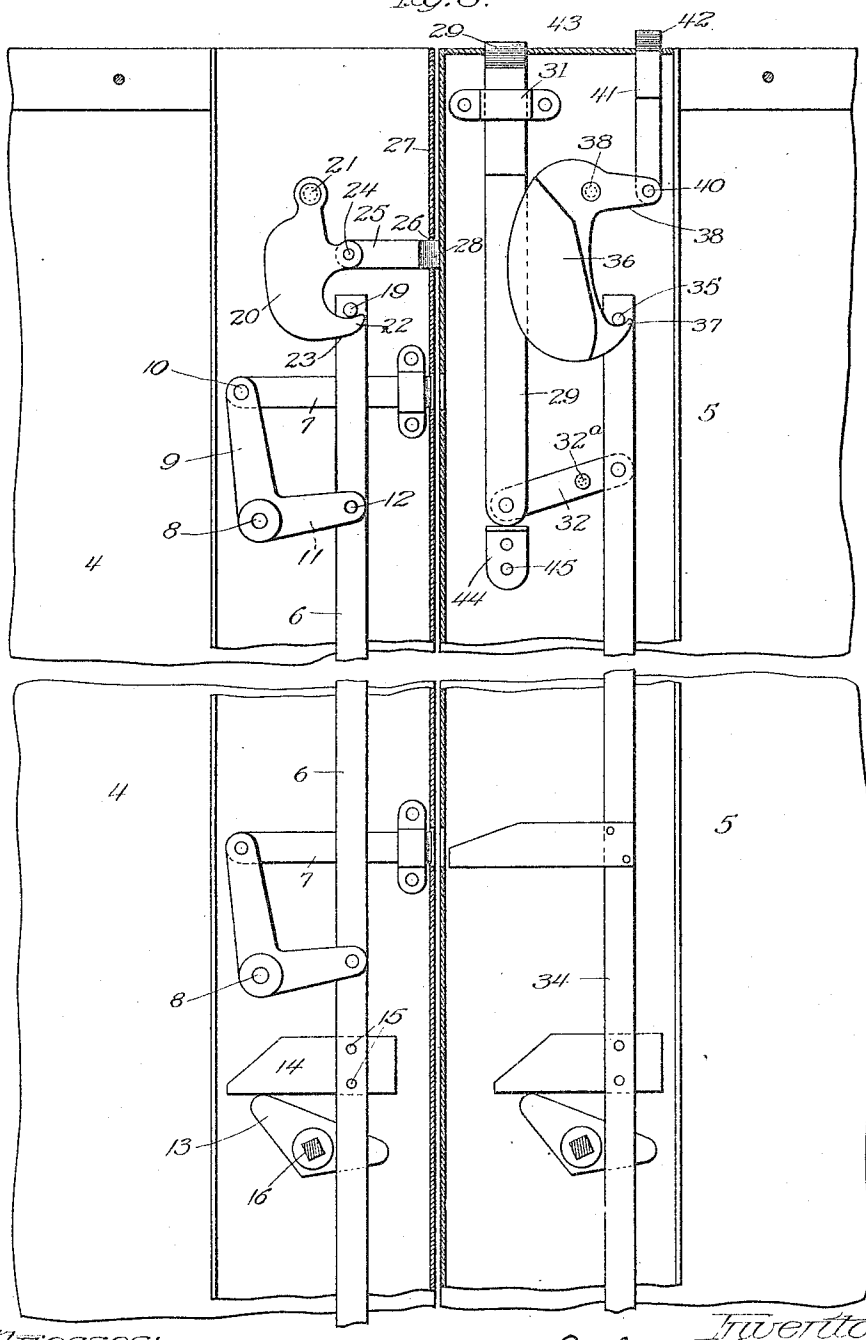
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2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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LOCKING MECHANISM FOR DOORS.

1,124,372. Specification of Letters Patent. Patented Jan. 12, 1915.

Application filed September 3, 1912. Serial No. 718,242.

To all whom it may concern:

Be it known that I, JOHAN H. WILLICH, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Locking Mechanism for Doors, of which the following is a full, clear, and exact specification.

This invention relates to improvements in locking mechanism for doors, and particularly fire proof doors in which heretofore lock bars operating by gravity to lock a door at its top and bottom are maintained out of their operative position by a gravity catch engaging the bar, which is actuated away from its locking position by a bolt on the closing of the door, and the adjacent door, if there be one, is locked to the first mentioned door at its edge by angular lock-bolts pivoted to the door and to a bar connecting all of said lock bolts, which bar operates by gravity to simultaneously move all of the latch bolts to their locking position, and which are held out of their locking position by a gravity stop in turn like the first door released from the bar by a rod engaging the frame of the door on the closing thereof.

The prime object of this invention is to dispense with any necessity for the use of rods for actuating the gravity stops.

A further object of this invention is to have the locking ends of the lock bar move in a direct line to their locked position into both the top and bottom of the door frame, and at the same time have the gravity catch therefor actuated by the top of that frame, whereby a rod passing across the door for the same purpose is unnecessary.

A still further object of this invention is to actuate the lock bolts at the edge of a door, and to move them in a more direct line to and from their locking position when actuated by a gravitating bar connecting several such latch bolts.

With these ends in view, my invention finds embodiment in certain features of novelty in the construction, combination and arrangement of parts by which the said objects and certain other objects are hereinafter attained, all as fully described with reference to the accompanying drawings and more particularly pointed out in the claims.

In said drawings: Figure 1 illustrates in front elevation a pair of doors in which my invention finds embodiment, with parts broken away for disclosing the latch mechanism therefor. Fig. 2 is a detail section indicating the relative arrangement and connection between a knob structure and the cam for actuating the gravity lock bars of both doors, and Fig. 3 is an enlarged detail of the bolt structure illustrated in Fig. 1.

Similar characters of reference indicate the same parts in the several figures of the drawing.

4 and 5 respectively indicate doors of the fire proof type, forming double doors, one of which, 4, is provided with a gravity bar 6 actuating by its weight the several lock bolts 7 simultaneously to their locking position, which for example, as shown in the drawings, may be in the door 5, or in the case of a single door to a locked position with the frame of the door.

The lock bolts 7 are actuated by the weight of the bar 6 through the medium of a bell crank pivoted at 8 to the door, provided with a long arm 9 secured to the inner end of the latch bolts by a pivot 10, and with a short arm 11, secured in a plane below the latch bolts to the gravity bar 6 by a pivot 12, so that when the gravity bar 6 is moved to its lowest position, the several lock bolts are thereby simultaneously thrust inwardly to their locked position, that is to say, into engagement with the door 5, or with sockets in the frame for a single door.

The gravity bar 6 is elevated from its locked position to the limit of its upward stroke by the engagement of a cam 13 with the block 14 secured to the bar 6 by rivets or screws 15, and for which purpose the cam 13 is mounted upon a knob 16 on the inner and outer projecting ends of which are respectively knobs 17 and 18.

From the bar 6 toward its upper end projects a pin 19 adapted to be engaged by a gravity stop 20 suspended from a pivot 21 secured to the door or some fixed part thereof on the lower end of which gravity stop is a hook 22, the underside of which is rounded as indicated at 23, the gravity stop being so pivoted that its hook 22 will constantly project in the path of movement of the bar 6 except when during the upward movement of the bar it engages the rounded underside 23 of the stop, and pushes it aside until the pin has passed upwardly beyond

the point of the hook when the stop will immediately swing by gravity to engagement with the underside of the pin and thereby maintain the bar in its elevated unlocking position.

Pivoted to the gravity stop 20 somewhat above its center of length is a lever 25, the free end of which has a bearing in the walls of a slot 26 through the edge wall 27 of the door, said lever having its outer end beveled as indicated at 28, and projecting outwardly beyond the door during the suspension of the gravity bar 6 by the hook 22, and therefore lying in the path of the closing movement of the opposing door 5 when used on a double door structure.

From the foregoing it will now be seen when a double door structure is employed as shown in the drawings, that the beveled end 28 of the lever 25 projects from the edge of the door 4 on a line in the path of movement of the uninterrupted edge of the door 5, with the result that on closing the door 5 the hook of the gravity stop is thereby disengaged from the pin 19 on the bar 6, and whereby the gravity bar is maintained in its elevated position and the lock bolt 7 in an unlocked position from the door 5 until that door is entirely closed when, and not until then is the hook 22 moved from engagement with the pin 19 and the bar 6 by its weight moves the locking bolt 7 outwardly through the door 4 into the door 5, and thereby locks the two doors together until the bar 6 is again lifted by the cam 13 to reëngagement with the hook 19. In this connection it should be observed that in single door structures the engagement of the beveled end of the lever 25 with the door frame will produce the operation and results above described.

When a double door structure is employed, such for example, as is shown in the drawings, the door 5 is and should be provided with means for bolting it to the top and bottom sills of their door frame, and to this end my invention includes the employment of a top bolt 29 and bottom bolt 30, each of which have their bearing in, and are guided in their movement by clips 31—31 secured to the door, both of which bolts are connected by levers 32—32 fulcrumed on a pivot 32^a, and pivoted to the bolts as indicated at 33—33, with a bar 34 on the upper end of which is a pin 35 adapted to be engaged by a gravity stop 36 provided at its lower end with a hook 37 and suspended from a pivot 38 at its upper end. In this connection it should be observed that the lever of the upper bolt is of the first class, and that of the lower bolt of the second class in order that the bar 34 may simultaneously move the bolts 29 and 30 in opposite directions so that they may be simultaneously locked and unlocked, by the same movement of the bar 34. Gravity stop 36 is also provided with a laterally projecting arm or lug 39 to the outer end of which is secured by a pivot 40 a link 41 beveled at its free end as indicated at 42, and adapted to be projected outwardly beyond the top edge of the door 5 to engagement with the outer face of the upper sill of a door.

The link 41 provides a means like the link 25 preventing the disengagement of the gravity stop 36 from the bar 34 until the door 5 is fully closed and thereby preventing the bolts 29 and 30 from being moved to their locked position before the door 5 is closed, in other words the weighted catch 36 operates to normally project the beveled portion 42 of the link 41 above the top of the door 5 so long as that door is open and until depressed and forced inwardly of the door, but the underside of the opposing surface of the door on the closing of the door thereupon so actuates the weighted latch as to disengage it from the pin 35 of the bar 34, which by reason of the lever connection between it and the bolt 29 then elevates the latter to its locking position in a socket 43 in the door frame. The down stroke of the bolt 29 is limited by a lug 44 in the path of the bolt, which lug is riveted or screwed to the door as indicated at 45.

For lifting the bar 34 to a position unlocking the bolts 29 and 30 a cam 45 on a knob shank indicated at 46 engages a block 47 riveted to the bar 34 as indicated at 48, which cam and block are counterparts of the cam 13 and block 14 for the door 4, both of which cams also serve to limit the downward thrusts of the bolts 29 and 30, and from striking and hammering against the bottom ends of their keepers. In this connection it may be observed that another block 49 similar to the block 47 with its end projecting against the inner edge of the door serves to guide the movement of the rod 49 in a straight line, and may also operate to push the opposing lock bolt 7 outwardly from the door 5 and to that extent be an auxiliary to the bar 6 in starting the lock bolt toward its unlocked position with the door 5.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. A locking mechanism for doors comprising in combination a gravity bar, a gravity catch normally in the path of said bar, a pivoted link bolt normally projected from the door by the gravity catch, whereby said catch is disconnected from the gravity bar when, and only when said bar is released by the closing of the door, substantially as described.

2. A locking mechanism for doors comprising in combination a plurality of lock bolts, a gravity bar, bell cranks connecting

said bolts and bar, a gravity catch normally in the path of movement of the bar, a link bolt pivoted to said catch whereby the gravity catch is moved away from the path of and thereby released from the gravity bar when and only when said bar pushes the gravity catch temporarily out of the path of movement thereof, and means for elevating said bar to engagement with the gravity catch.

3. A locking mechanism for double doors comprising in combination a gravity bar, a gravity catch normally in the path of movement of said bar, a link bolt, normally projected above the top of a door pivoted to the gravity catch whereby the gravity catch is adapted to suspend the gravity bar out of its locking position until said door is closed, substantially as described.

4. A locking mechanism for double doors comprising in combination lock bolts upon one of said doors for engaging the other door, top and bottom bolts for locking the other of said doors to the frame of the doorway, gravity bars and lever connections between said bars and their respective lock bolts, gravity catches on each door normally in the path of said gravity bars, pivoted link bolts for each door, normally projected respectively through the side edge of one door and through the top of the adjacent door by the operation of the gravity catch, substantially as described.

In witness whereof, I have hereunto set my hand and affixed my seal, this 28th day of August, A. D. 1912.

JOHAN H. WILLICH. [L. S.]

Witnesses:

JNO. G. ELLIOTT,

MILDRED ELSNER.

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