



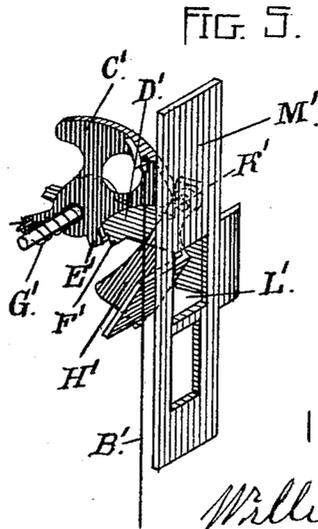
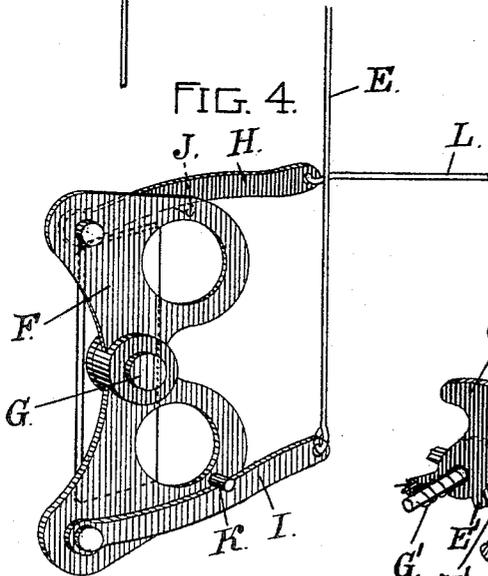
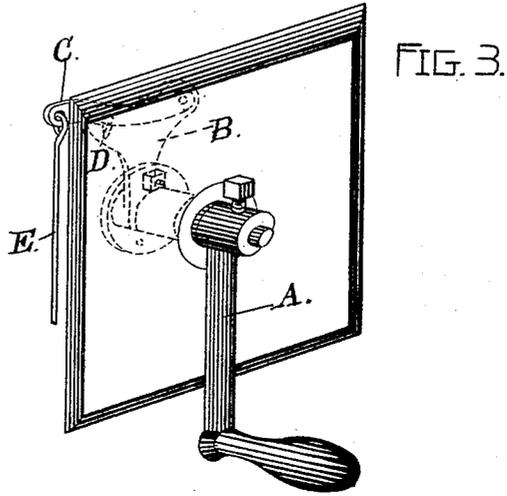
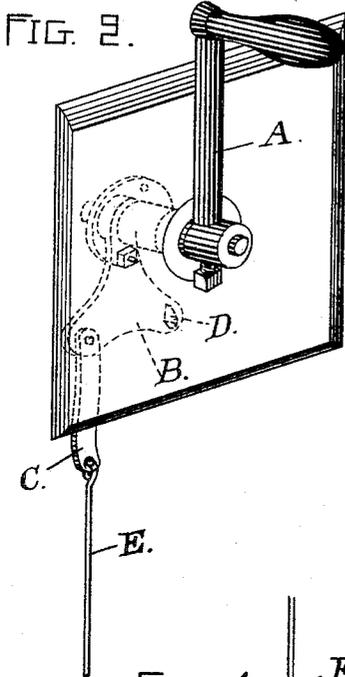
(No Model.)

3 Sheets—Sheet 2.

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DOOR OPENER AND CLOSER.

No. 442,444.

Patented Dec. 9, 1890.



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# UNITED STATES PATENT OFFICE.

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## DOOR OPENER AND CLOSER.

SPECIFICATION forming part of Letters Patent No. 442,444, dated December 9, 1890.

Application filed February 10, 1890. Serial No. 339,915. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM M. LEAVENS, a citizen of the United States, residing in the city and county of San Francisco, and State of California, have invented a certain new and useful Improvement in Door Openers and Closers, of which the following is a specification.

Figure 1 is a perspective view with portions of the wall, the floors, and other parts broken away to show the attachment and construction of the parts. Fig. 2 is a perspective view of the attaching-plate and the operating lever or handle and crank, showing the connection with the connecting-wire and the operating-crank. Fig. 3 is a perspective view of the same as Fig. 2, showing the handle and crank in reversed position from that shown in Fig. 2, and the connecting-wire drawn back. Fig. 4 is a perspective view of the lever for connecting the wires to operate at right angles. Fig. 5 is a perspective view of a detached part, showing the catch-plate. Fig. 6 is perspective view showing the door-closing spring and the immediate operating-connections. Fig. 7 is a vertical plan view showing a broken portion of the door when closed, and showing the connections for opening and closing. Fig. 8 is a vertical plan view of the door when open with the same parts shown as in Fig. 7 in different positions. Figs. 9 and 10 show the same parts as those shown in Figs. 7 and 8 varied in position to show the manner of operating the same.

The object of my invention is to produce a mechanism for both the opening and closing of doors at a distance therefrom, and where desired from stories or floors of a building other than that on which the door is situated.

In Fig. 1 is shown a door provided with opening and closing devices connected with an operating-lever arranged upon the floor above, for the purpose actuating the door from the upper floor.

The following is the construction of the same: I employ such cranks and wires as are generally employed in making the connections and operating door-bells and ordinary latch-openers.

The special features of my invention consist in the device for opening and closing the

door, whereby the crank or operating lever opens and finally closes the door when moving in the same direction. It will be more readily understood by reference to the accompanying drawings and the letters referring thereto, in which—

A represents the handle or lever which is operated by the hand to open and close the door.

B represents a lever-plate for operating the connecting-wire E.

C represents the link-lever connecting the lever-plate B and the connecting-wire.

D represents the stop or rest pin which holds the lever C for the purpose of continuing the operation of the wire.

E represents the prime connecting-wire.

F represents the intermediate connecting-plate lever.

G represents the pivot of the intermediate connecting-plate lever.

H and I represent intermediate connecting-levers.

J and K represent the lever catch-pins for catching and holding the levers H and I.

L represents the extension connecting-wire.

M represents the lever which connects with the door-opening plate.

N represents the door-opening plate.

O represents the stop projection to hold the lever P, which operates to close the door.

P represents the door-closing lever.

Q represents the plate-arm attached to the lever P for the purpose of attaching the lever R, pivoted at N' to allow it to operate from various positions.

R represents the elbow-lever, which connects the plate N with the wire S, which connects with and operates the latch-opener.

T represents the catch-pin of the lever R, which catches the carrier or pivoted stop-lever U and holds the same when required.

U represents the carrier or pivoted lever.

V represents a stop projection for the carrier.

W represents the spring which forces the lever or carrier U in position to be caught by the pin T.

X represents the door opening and closing rod.

Y represents the attaching-socket for the

lever *x*, adapted to the adjustment of the same.

*Z* represents the door.

*A'* represents the crank.

5 *B'* is the wire which connects the crank *A'* with the latch-opener cam.

*C'* represents the latch-opener cam.

*D'* represents the bracket for hanging the cam *C'*.

10 *E'* represents the stop-arm on the cam *C'*.

*F'* represents the stop on the bracket *D'*, which stops the cam *C'*.

*G'* represents the spring which throws the cam *C'* back.

15 *H'* represents the hanging intermediate plate to operate the latch-opener.

*I'* represents the spring which brings the plate *N* back when the handle *A* is released.

20 *J'* represents the spring which forces the door open when the latch is forced out of the catch.

*K'* represents the pivot of the hanging intermediate arm *H'*.

25 *L'* represents the mortise to receive the catch in the catch-plate.

*M'* represents the catch-plate.

*N'* represents the pivot upon which the elbow-lever *R* turns.

30 *O'* represents the pin upon the arm *P* to catch the spring *J'*.

The exact construction and connection of the parts will be better understood by the operation of the same, which is as follows:

35 The door being closed, as shown in Fig. 1, the crank or handle *A* is operated to the right from the position shown and the plate *B*, link-lever *C*, wire *E*, the link-lever *I*, the plate-lever *F*, the link-lever *H*, wire *L*, the link-lever *M*, and the plate-lever *N*, as shown in

40 Fig. 7, are operated. At this period of operation the door is shut, Fig. 7, and the catch-lever or spring-pawl *U* upon the plate or segment-lever *N* is behind the pin *T* on the elbow-lever *R*. A continued pull upon the wire

45 *L* through link *M* causes lever *N* and its pawl *U* to swing, carrying with it the lever *R* and its pin *T*, and actuates the latch-operating mechanism through the wire *S*. The pivotal

50 points of lever *R* and lever *N* are eccentric to each other, and the pin *T* on lever *R* having a shorter swing than the pawl *U* on the longer lever *N* the said pin *T* rides out of engagement with the pawl and the elbow-lever *R* is released, thereby allowing the latch-operating mechanism to be restored to its normal position, Fig. 8.

55 The latch of the door being opened, the spring *J'*, through its free end bearing on pin *O'* of lever *P*, causes the door to swing open, said lever being rigid with shaft *X*, which is connected with the door at *Y*. To shut the door

60 when it is in position shown by Fig. 8, the movement of the crank *A* is continued in the same direction as in opening the door until

the parts are as shown in Fig. 10. In Fig. 8 the spring *J'* has thrown the lever *P* against the stop *O* on lever *N*. Continued pulling 57 upon wire *L* and link *M* causes lever *N* to swing the stop *O*, engaging lever *P*, until the door is closed and latched, thereby locking lever *P* in that position, Fig. 10. The crank *A* having performed its functions, it is released, 70 and the coiled spring *I'*, through its free end bearing against the stop on the under side of lever *N*, causes that lever to swing backwardly to the position shown in Fig. 7.

Fig. 9 shows the lever *N* and connections 75 in an intermediate portion of this movement. As the lever *N* swings backwardly the side of the spring-pawl *U* comes in contact with the pin *T* on lever *R*, Fig. 9, causing the spring-

pawl to be forced aside until the pin *T* rides 80 off the end of the pawl and the spring *W* forces the pawl behind of and again in engagement with the pin, Fig. 7, when the device is again in position to open the door. It

will be noticed that the closing of the door 85 brings the short arm *Q* of the lever *P*, which carries the lever *R* around so that the pin is in position to be operated upon by the pawl *U*. The movement of the wire *S* through lever *R* through its connections causes the cam *C'* to 90 push the intermediate plate *H'* against the door-latch and forces it out of the mortise and clear from the catch-plate *M'*. The spring *J'* now opens the door, to which it is connected

by the rod *X* and socket-plate *Y*. The rod 95 *X* is below the door and directly in line with the hinge or pivot, as shown in Fig. 1. The socket-plate *Y* is designed for the adjustment of the rod *X*, so as to bring it in line with the hinge of the door. The lower journal-plate for the rod *X* is secured fast to the 100 timber directly under the hinge of the door. Thus the rod *X* and the hinges of the door are adjusted to operate in a direct line, the line of the axis of the motion of each forming a

part of the same vertical line. 105

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

The combination of a latch-operating de- 110 vice and a door-opening spring, both located adjacent to the door, a main operating device located at a distance from the door, a lever for unlatching the door, a door-closing lever, and a third or main lever adapted to operate 115 both the unlatching and door-closing lever, wire or cord connections between the main operating device and third or main lever, and similar connections between the unlatching-

lever and the latch-operating device, substan- 120 tially as described.

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Witnesses:  
J. H. REDSTONE,  
G. B. SMART.