(No Model.)

D. B. AKARD.

DOOR OPENER OR CLOSER.

No. 590,290. Patented Sept. 21, 1897.

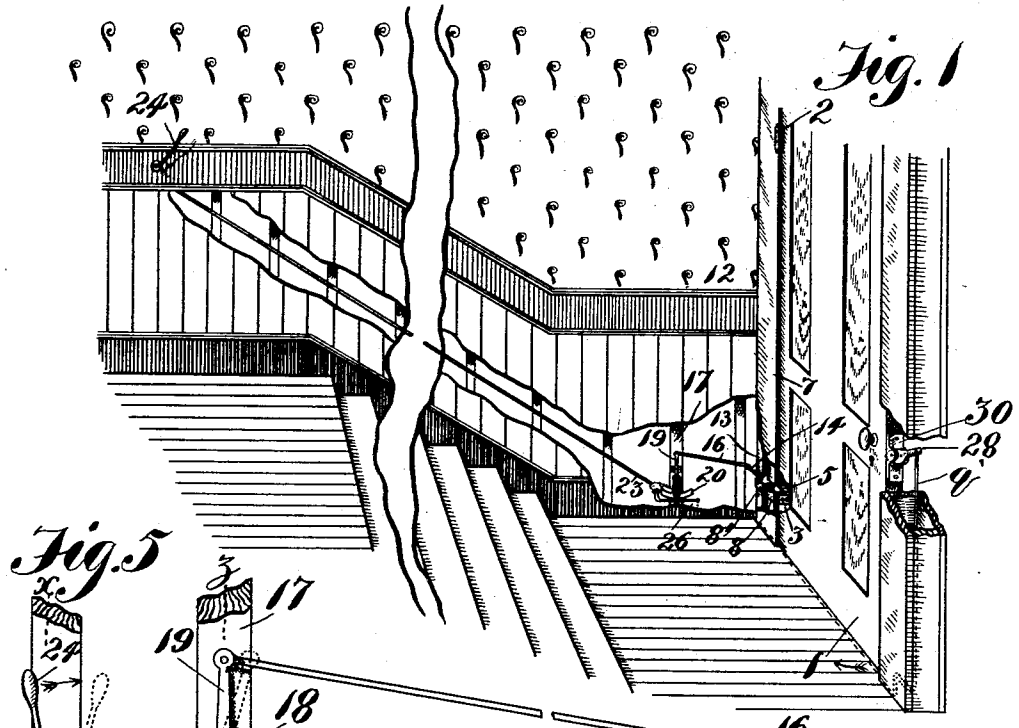

Fig. 1

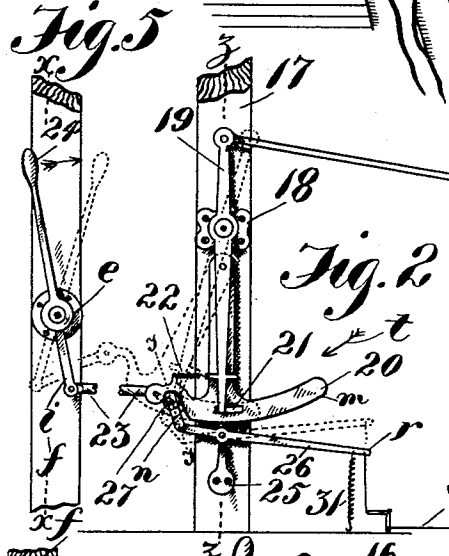

Fig. 5

Fig. 2

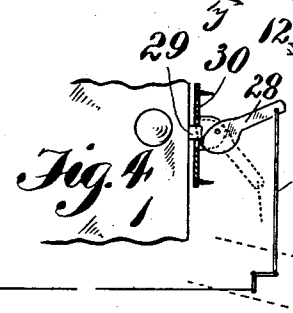

Fig. 4

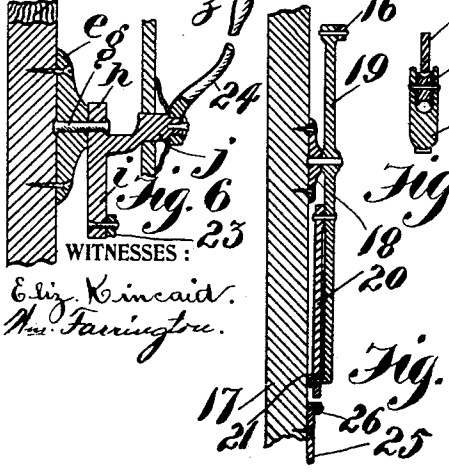

Fig. 6

Fig. 7

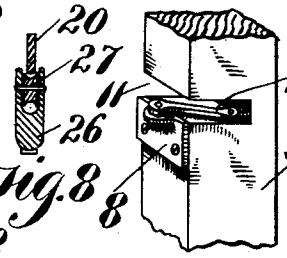

Fig. 8

Fig. 9

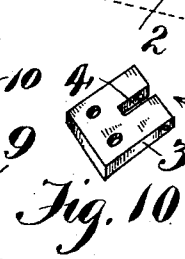

Fig. 10

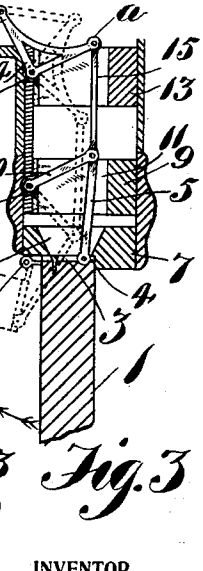

Fig. 3

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UNITED STATES PATENT OFFICE.

DOLVAN B. AKARD, OF SAN FRANCISCO, CALIFORNIA.

DOOR OPENER OR CLOSER.

SPECIFICATION forming part of Letters Patent No. 590,290, dated September 21, 1897.

Application filed October 29, 1896. Serial No. 610,500. (No model.)

To all whom it may concern:

Be it known that I, DOLVAN B. AKARD, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Door Openers or Closers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements on the door opener and closer shown and described in my application for patent filed April 30, 1895, Serial No. 547,654; and the prime objects of the same are, besides those set forth in the above application, to decrease the number and simplify the construction of the several parts, bring to a higher degree of perfection the positive and even action of the device, and, in a word, greatly lessen the first cost of manufacture and labor requisite to set up the complete device, besides adding to the durability and general efficiency of the invention.

In the matter of the unlatching device I have particularly aimed at simplicity and economy in the manufacture, and the parts being fewer in number and more positive in their action the ease with which they can be assembled is increased and the liability of their accidental derangement is lessened.

To the attainment of the foregoing and other useful ends my invention consists in matters hereinafter specified, and the novel features thereof will be particularly specified in the appended claims.

I have clearly illustrated the invention in the accompanying drawings and in the several views shown have employed like numerals and letters of reference to indicate like parts.

Figure 1 is a perspective view of a flight of stairs leading from a door with a portion of the wall and woodwork broken away to show the relative positions of the several parts of my invention. Fig. 2 is a front elevation of the devices for operating the door and latch. Fig. 3 is a horizontal section through the door and casing, showing the mechanism immediately connected to the former. Fig. 4 is a view of the unlatching device, showing its position relative to the door. Fig. 5 is an elevation of the operating-handle. Fig. 6 is a section through the line $x\,x$, Fig. 5. Fig. 7 is a section through the line $z\,z$, Fig. 2. Fig. 8 is a section through the line $y\,y$, Fig. 2. Fig. 9 is a perspective view of a portion of the studding, showing the manner of positioning the swinging arms shown in Fig. 3. Fig. 10 is a perspective view of the plate employed to immediately connect the device with the door.

Referring now to the above figures by numeral, 1 indicates an ordinary "flat" door hung by means of the hinges 2 and adapted to swing inward in the direction of the arrows in Figs. 1 and 3.

Securely screwed to the back edge of the door 1 and at a point near the bottom thereof is the plate 3, which is shown in perspective in Fig. 10. Pivoted to this plate 3 and entering the slot 4 formed therein is the short link 5, which protrudes through a cut-out opening 6 in the door-jamb 7. Directly back of the door-jamb 7 and pivotally hung in the bracket 8, which latter is screwed to the stud 9, is the swinging arm 10, whose inner end is pivoted to the inner extremity of the link 5, which together work in the cut-out opening 11 in the stud 9. (Shown in perspective in Fig. 9.)

Immediately back of the stud 9 and at a point where the wall 12 turns at right angles is usually situated a second stud 13, on which is hung a bracket 8′, similar in construction to that shown in Fig. 9 and to which is pivotally hung a bell-crank 14, having arms a and b. The arm a of the bell-crank 14 is connected to the pivotal point of the link 5 and arm 10 by means of the secondary link 15. The remaining arm b of the angle-bracket 14 is connected, by means of the rod 16, to the mechanism shown in Fig. 2 and which I will now explain.

Pivotally hung to the stud 17, which latter is in close proximity to the mechanism shown in Fig. 3, and by means of the stationary hub 18, is the oscillating arm 19, which reaches above and below its pivotal point. The upper extremity of the arm 19 is connected to the extremity of the rod 16, while its lower portion pivotally bears the inverted-T-shaped member 20. The lower edge of this T-shaped member 20 is formed for a considerable distance with a convex-curved surface m, while

near one extremity an abrupt concave surface *n* is formed.

The lower free extremity of the arm 19 is bent at right angles and enters an oblong slot 21 in the lower portion of the member 20, where it is retained normally at one extremity of the slot by means of the tension-spring 22. The short abruptly-curved extremity of the member 20 is pivotally connected to the rod 23, which latter reaches to the head of the stairs, where it is connected to the operating-handle 24, (shown in Fig. 5,) the construction of which I will explain hereinafter.

Secured to the stud 17 at a point directly beneath the curved branches of the member 20 is the bracket 25, which loosely bears the arm 26, one end of the latter being provided with a friction-wheel 27, while its opposite extremity *r* is connected, by means of the wire rod *q*, to the unlatching-cam 28. (Shown in Fig. 4.) The wheel 27 is adapted to roll over the curved edges *m* and *n* of the member 20 as the latter is oscillated.

To render the operation of the invention readily understood, I have assembled the parts in their relative connected positions in Figs. 2, 3, 4, and 5, and to those figures I now particularly refer.

As the operating-handle 24 is moved gradually in the direction of the arrow in Fig. 5 the rod 23 moves in the opposite direction, carrying with it the T-shaped member 20. Now as the member 20 advances in the direction of the arrow *t* the abrupt curve *u* comes in contact with the wheel 27, forcing the short end of the arm 26 downward and the opposite end *r* upward, which latter turns the cam 28, pushing the latch-bolt 29 of the door 1 inward, thereby releasing its engagement with the striking-plate 30. Now during this short motion of the member 20 the arm 19 remains at rest until the tension on the spring 22 becomes so great or the end of the slot 21 comes in contact with the lower extremity of the arm 19, when it is drawn along with the member 20 and communicates its motion to the rod 16, forcing it in the direction of the arrow *y*, thereby turning the bell-crank 14, arm 10, and link 5, which latter forces the door open. The dotted lines in Figs. 2, 3, 4, and 5 represent the positions of the parts when the door is open.

It is quite manifest that reversing the direction of motion of the operating-handle 24 closes the door 1, but just as the latter reaches a closed position the wheel 27 is forced into the curve *u* by means of the spring 31 and the cam 28 allows the latch 29 to enter its striking-plate 30.

It is further manifest that during the time the wheel 27 rolls over the convex curve *m* the cam 28 completely closes the opening in the striking-plate 30.

In Fig. 6 I have shown the manner of hanging the operating-handle 24. The hub *e*, which is screwed to the stud *f*, bears the loose steele spindle *g*, which in turn bears terminally the casting *h*. This casting *h* is formed with the arm *i* and central shank *j*, the former being immediately connected to the rod 23 while the latter passes through the wall 12 and bears externally the handle 24.

In cases where the wall 12 turns at right angles at a point very close to the door-jamb the arm 10 and link 15 can be dispensed with and the link 5 connected immediately with the bell-crank 14.

I do not desire to confine myself to the exact construction and location of parts herein shown and described, as I am aware the device may take on various forms and still be within the spirit of my invention.

It will be readily seen from the foregoing description that I have provided a very simple and effective door opener and closer whose parts act positively and with ease and are completely concealed by the usual wall finish.

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

1. The combination with a door, of a door-actuating lever, a link pivoted to the rear edge of the door and passing through an opening in the door-jamb, a bell-crank behind the wall or door-casing and connected to said link, and a connection between said actuating-lever and said bell-crank substantially as set forth.

2. The combination with a door, of a link pivoted to the back edge of the door and passing through an opening in the door-jamb, a bell-crank behind the wall or door-casing and connected to said link, an operating-lever connected to said bell-crank and an unlatching device interposed between said operating-lever and said bell-crank.

3. The combination with a door, of a door-actuating lever, an oscillating arm interposed between said lever and said door, a swinging member one end of which is pivoted to said arm while the other end is yieldingly connected thereto, said member being adapted to operate the latch of the door, and suitable connections between said door, arm, swinging member and actuating-lever for the purpose set forth.

4. In an article of the class described the combination with a door of an actuating-lever, an oscillating arm connected to said door, a secondary arm pivoted to said oscillating arm and connected to said lever and by means of which the latch of the door is operated, and means for limiting the movement of said secondary arm independent of said oscillating arm for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

DOLVAN B. AKARD.

Witnesses:
LEE D. CRAIG,
WM. FARRINGTON.