

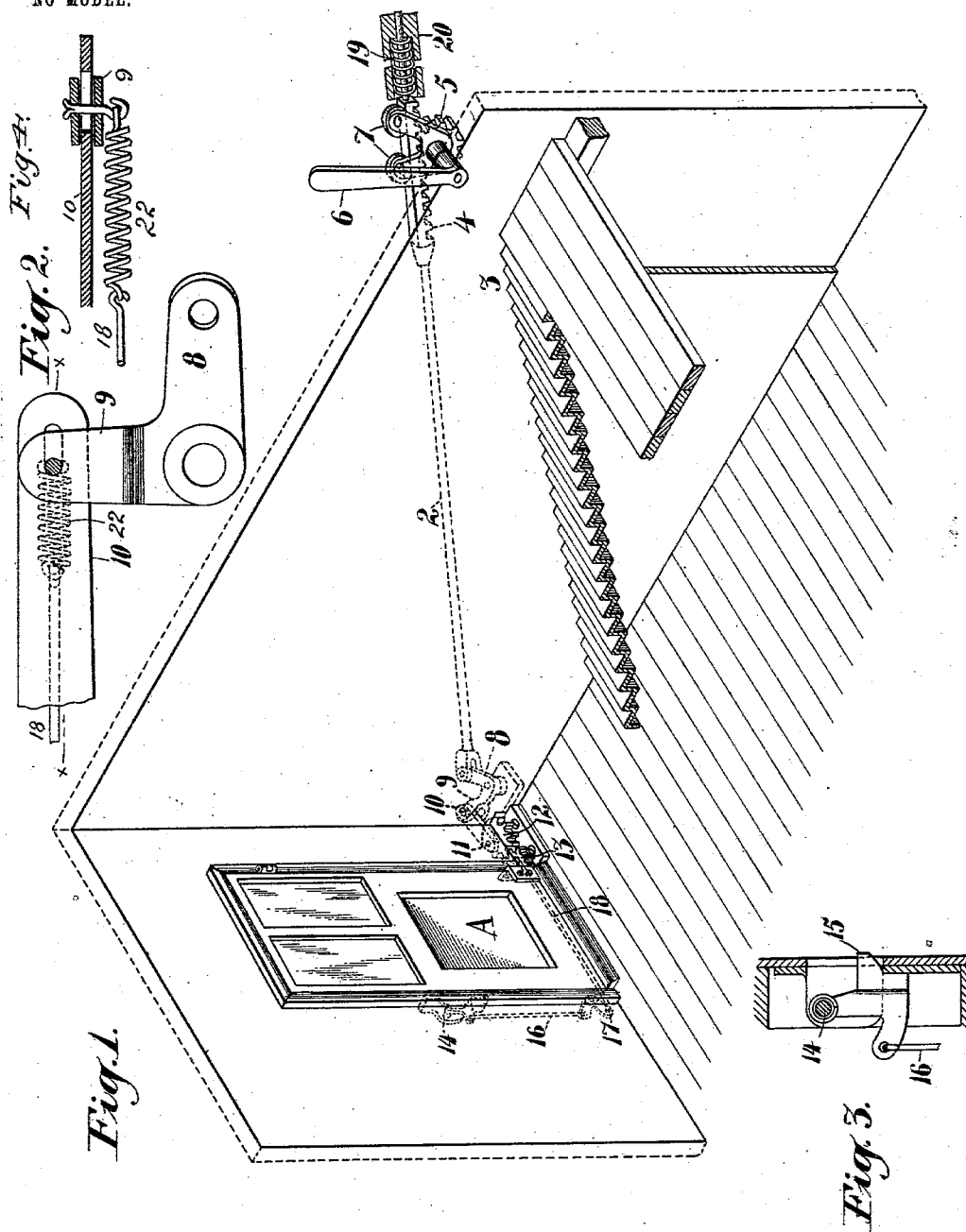
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MECHANICAL DOOR OPENING OR CLOSING DEVICE.

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NO MODEL.



Witnesses:-

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UNITED STATES PATENT OFFICE.

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MECHANICAL DOOR OPENING OR CLOSING DEVICE.

SPECIFICATION forming part of Letters Patent No. 748,848, dated January 5, 1904.

Application filed April 20, 1903. Serial No. 153,454. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM F. DRIESCHMAN and JOHN DRIESCHMAN, citizens of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Mechanical Door Opening or Closing Devices; and we hereby declare the following to be a full, clear, and exact description of the same.

Our invention relates to a device for mechanically opening and closing doors which are located at a distance from the point where the operation is conducted, such as street-doors leading up flights of stairs to rooms or flats located at the head of the stairs.

It consists in a mechanism which may be operated from the head of the stairs or other distant point and by which the latch of the door is first retracted, leaving the door free, and the door is afterward opened by a further movement of the mechanism.

Referring to the accompanying drawings, Figure 1 is a perspective view showing the door opening and closing device. Fig. 2 is a plan view of the bell-crank lever which operates the pinions. Fig. 3 is a side elevation showing the catch that releases the door-latch. Fig. 4 is a sectional view on the line $x-x$ of Fig. 2.

In the present construction we have illustrated our device as applicable for the opening of a door situated at the foot of a flight of stairs, the operating mechanism being located at the head.

A is a door of any ordinary construction, having a spring-pressed latch by which it is normally retained in a closed position.

2 is a rod of such length as to extend to the point where the operator will stand. In the present case we have shown this rod as extending along the wall, either concealed or otherwise, from the inner hinged side of the door to a point at the head of a flight of stairs, as shown at 3. The upper end of this rod is formed into a rack-bar 4. 5 is a pinion suitably journaled to engage the teeth of this rack-bar and having a handle 6 by which it may be turned a partial revolution, so as to move the rack-bar and the rod longitudinally. The rack-bar is kept in mesh with the pinion by any suitable guide. As at present shown,

guide-rollers 7 are so held as to press against the back of the rack-bar, holding it in mesh and at the same time allowing it to slide freely.

The lower end of the rod 2 is connected with one arm, 8, of a bell-crank lever. The other arm, 9, of this lever has a pin which enters a slot in a link 10, and this link is connected by a pin 11 with one side of a centrally-pivoted toothed pinion 12 and in such a manner that a pull upon the link 10 will act through the eccentric pin 11 to turn the pinion a partial revolution. This pinion engages with a second pinion 13, which is journaled in line with the hinges of the door, so that when the pinion 12 is turned in the direction which it will be by a pull upon the rod 2 it will act to turn the pinion 13 in the reverse direction, and as this is connected with the door or its hinge it will by its reverse movement open the door when the latter is released.

The releasing device consists of a swinging arm pivoted at 14 and having a projection 15 in line with the spring-latch of the door. This swinging arm 14 is connected by a rod 16 with one arm on the bell-crank lever 17, and the other arm of this bell-crank lever is connected by a rod 18 with the arm 9 of the bell-crank lever which actuates the door-opening pinions, so that when these connecting-rods are pulled they will force the projection 15 against the point of the spring-latch of the door and push it back, so that it will be disengaged from the catch. The swinging of the arm which carries the catch 15 is limited by a suitable stop, so that this arm will only move far enough to disengage the door-latch and be substantially in plane with the jamb-plate, so that the door-latch may slide freely when pressure is brought upon the door. In order to allow this operation to take place before the movement of the pinions 12 and 13, the link 10 has the slot previously described in which the pin from the arm 9 is slidable, and when the first pull upon the rod 2 takes place this pin will first traverse the slot in the link 10, and as the bell-crank lever 8 9 is turned a short distance during this movement it will act through the connecting-rods 16 18 and bell-crank 17 to

operate the disengaging device 15, as previously described. A further pressure brought upon the parts by the continued movement of the lever-arm 6 will then cause the bell-crank lever 8 9 to continue its turning, and it then acts through the pinions 12 13 to swing the door back upon its hinges, as previously described. When the parts are released, the rod 2 is pushed in the opposite direction by the action of a spring 19, contained in a chamber 20, which stands in line with the upper end of the rod 2, so that the spring may press against the rod. It will be seen that the reverse movement of the rod, acting through the bell-crank lever and connections previously described, will first swing back the arm which carries the presser 15, so as to leave the door free to act, and will subsequently act through the pinions 12 13 to reverse the movement of the door and cause it to close without any attention by persons passing in or out. We are thus enabled to perfectly control distant doors and open or close them at pleasure.

As the first movement of the bell-crank 9 moves the arm 14 and its stop 15 a limited distance to an arresting-stop, it will be necessary to provide a means to allow the further movement of the arm 9 to actuate the pinions 12 13. This means consists of a sufficiently stiff and elastic spiral spring 22, interposed between the crank-arm and the rod 18 and which will yield to allow the further movement.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. A door opening and closing device consisting of intermeshed pinions, one of which is in line with the door-hinges, a bell-crank lever, connections by which it actuates the second pinion, a rod connecting said bell-crank lever with a distant point, and means including a rack fixed to the rod, a pinion engaging the rack and a lever for operating the pinion for reciprocating said rod.

2. A door opening and closing device consisting of intermeshed pinions, one of which is fixed upon the turning hinge-pin of the door, a slotted link connecting with a pin eccentrically fixed upon the other pinion, a bell-crank lever one arm of which has a pin entering the slot in the link, a latch-releasing device with connections between it and the bell-crank lever whereby the first movement of said lever acts to release the latch while the link-pin is moving from one end to the

other of the slot, and the further movement of the bell-crank lever acts upon the pinions to swing the door.

3. In a door opening and closing device having the actuating-rod, a bell-crank lever and intermeshing pinions as shown, a slotted link eccentrically connected with one of the pinions and having the slot in the opposite end, a pin projecting from one arm of the bell-crank lever into said slot and capable of free movement therein, a rod pivotally connected to move in unison with the bell-crank lever, and extending across below the door, a bell-crank lever fulcrumed in the door-casing with which said rod connects, a second rod connecting with the other arm of said bell-crank lever, a swinging arm connected with the rod and having a projection in line with the door-latch, whereby the latter is released before power is applied to turn the pinions to open the door.

4. The combination in a door-opening mechanism of a latch-releasing device, intermeshing pinions one of which is fixed to a hinge-pin of the door, a bell-crank lever and a slotted link connecting with the second pinion and connections between the latch-releaser and the bell-crank lever, a rod extending from the bell-crank lever to the point of operation, the upper end of said rod having rack-teeth formed upon it, a pinion engaging said rack, a handle connected with the pinion-shaft whereby the latter is turned to actuate the rack-bar and rod.

5. A device for opening and closing doors including a latch-releaser, intermeshed pinions and a bell-crank lever by which the latch-releaser is first actuated and the pinions are afterward turned to swing the door, a rod having one end connected with the bell-crank lever and the other extending to the point of operation, said rod having its upper end provided with rack-teeth and guiding-rollers against which the back of the rod travels, a pinion engaging the rack-teeth and having a lever by which it is turnable to retract the rod and open the door, and a spring pressing against the end of the rod adapted to return it to its normal position and close the door when released.

In witness whereof we have hereunto set our hands.

WILLIAM F. DRIESCHMAN.
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Witnesses:

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