

(No Model.)

3 Sheets—Sheet 1.

J. H. COONEY & J. H. LAING.
AUTOMATIC DOOR OPERATING DEVICE.

No. 581,338.

Patented Apr. 27, 1897.

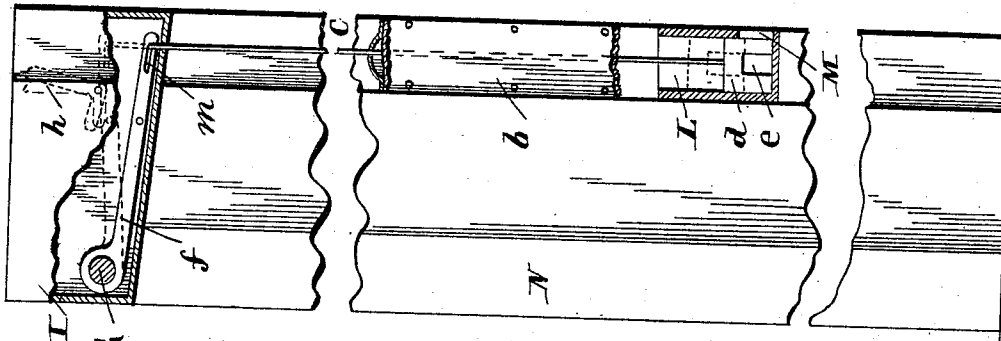
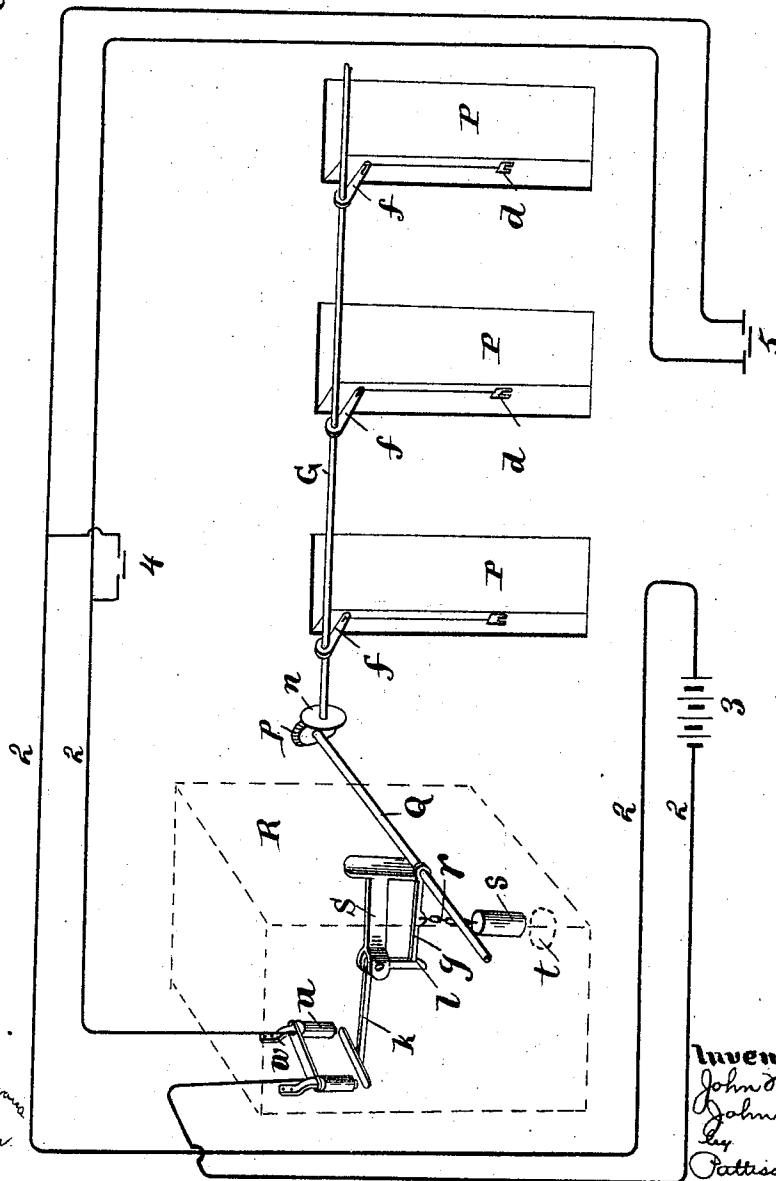


Fig. 3.



Witnesses.

James H. Sumner
J. M. Coppenhaver.

Inventors.

John H. Cooney
John H. Loring
By
Pattison & Nesbit
attys

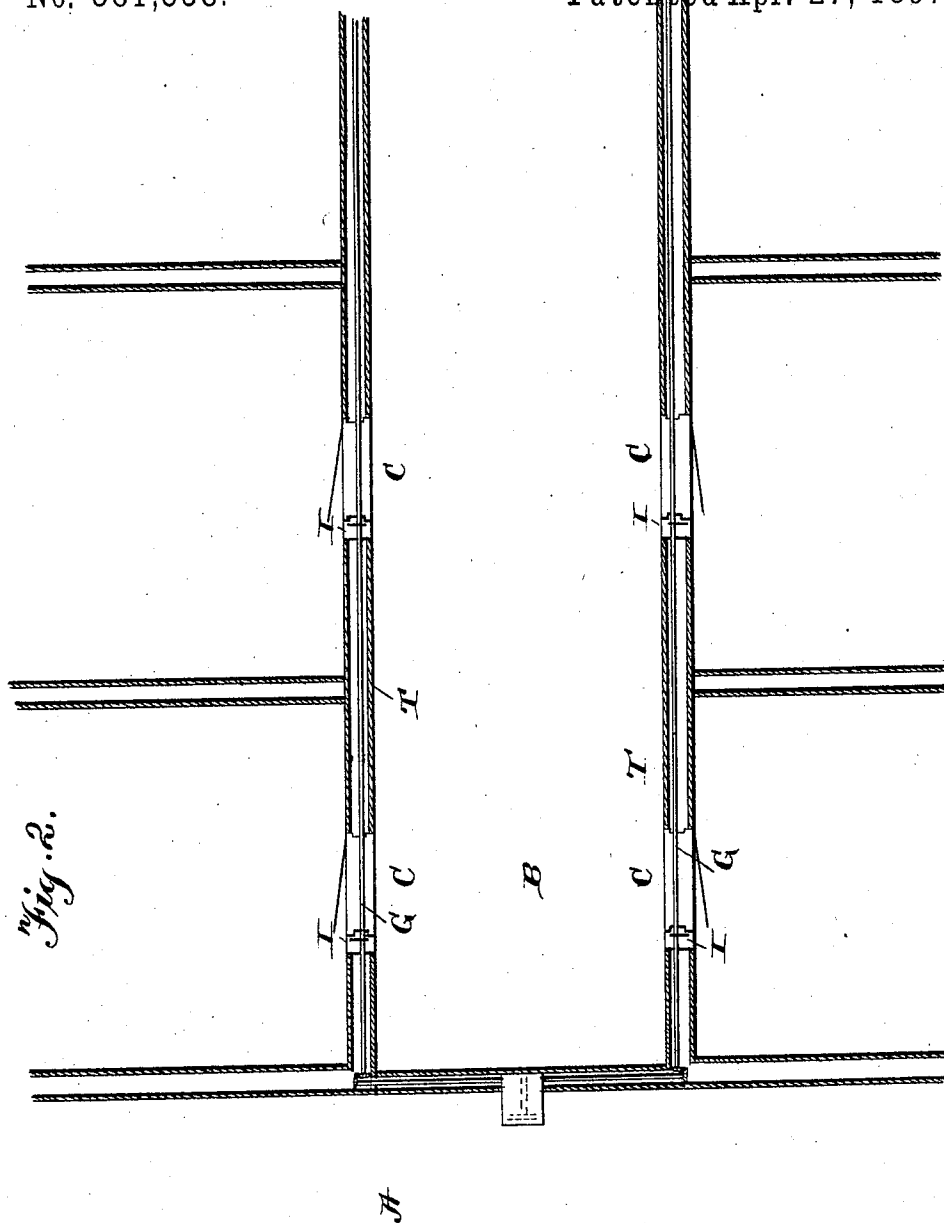
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Witnesses.

Geo. E. Frech

James W. Pears

Inventors.

John H. Cooney,
John H. Laing
by *Pattison* Res. Atty

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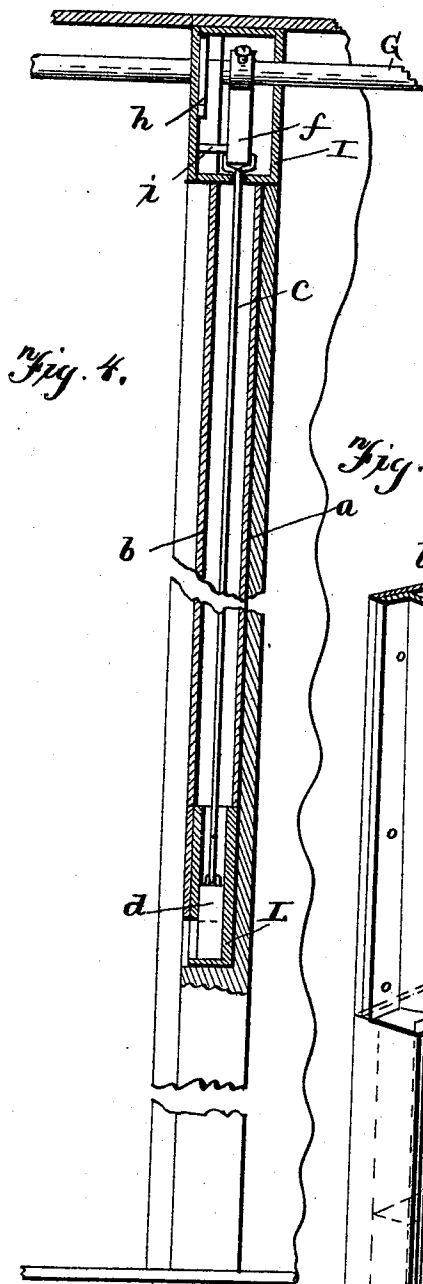


Fig. 5.

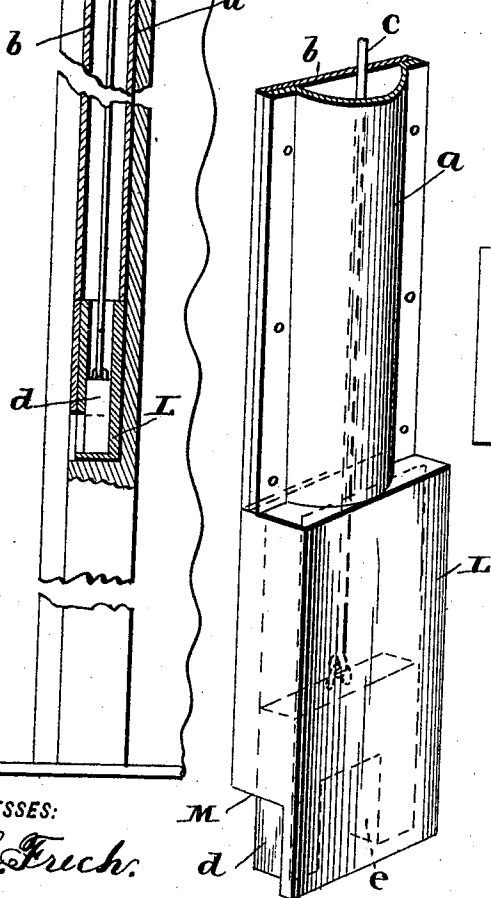


Fig. 6.

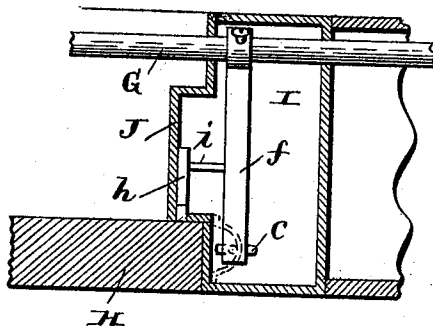


Fig. 7.

1	2	Wards	5	6
○	○	○	○	○
7	8	9	10	11
○	○	○	○	○
General.				
○				

WITNESSES:

Geo. E. Frick.
James M. Berard

INVENTORS.

John H. Cooney,
John H. Laing,
BY
Pattison & Nesbitt
ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN H. COONEY AND JOHN H. LAING, OF PITTSBURG, PENNSYLVANIA,
ASSIGNORS OF ONE-THIRD TO THOMAS G. LAMB, OF HOMESTEAD, PENN-
SYLVANIA.

AUTOMATIC DOOR-OPERATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 581,338, dated April 27, 1897.

Application filed April 18, 1896. Serial No. 588,128. (No model.)

To all whom it may concern:

Be it known that we, JOHN H. COONEY and JOHN H. LAING, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have
5 invented certain new and useful Improvements in Automatic Door-Operating Devices; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in
10 the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

Our invention relates to automatic door-
15 operating devices; and it pertains to a mechanism adapted to automatically release the doors in asylums, hospitals, prisons, hotels, or other buildings containing inmates who are locked therein.

20 The object of our invention is to provide a mechanism, to be used in asylums, hospitals, prisons, hotels, and other like buildings, so constructed that in case of fire the doors of the particular ward in which the fire occurs
25 will be released, permitting the inmates to escape, or the doors in all of the wards or halls may be opened by the pressure of a single button in the superintendent's, clerk's, or warden's office, or the doors in a particular
30 floor or hall opened by the pressure of a button which represents that particular ward.

Referring to the drawings, Figure 1 is a diagrammatical view of our invention, showing it applied to a series of doors and showing
35 the electric and other devices by means of which the invention is operated. Fig. 2 is a plan view of a hospital, asylum, or other building divided into wards. Fig. 3 is a view of the edge of a door-frame against which the
40 door swings, the same being shown partly in section. Fig. 4 is a sectional view taken at right angles to Fig. 3. Fig. 5 is a detached enlarged perspective view of a metallic casing or tubing which extends along the bead
45 of the door-frame against which the edge of the door rests, the lower end of the tube being shown in this view. Fig. 6 is a sectional view taken through the box L, Fig. 4, and on a line through the shaft. Fig. 7 is a view of

a keyboard indicating the manner in which 50 electrical buttons may be arranged to operate the different parts or to operate all of the wires by a single button.

Referring now particularly to Fig. 1, the diagrammatical view G indicates a shaft which 55 is placed within the wall, as indicated in Fig. 2, and extends along the wall across the openings formed by the doors, and this shaft G is provided with an arm *f* for each door. This arm is situated at the side of the door-frame 60 against which the free edge of the door swings and is connected through the medium of a rod *c* to a movable keeper *d*.

The bead or rabbet against which the edge of the door abuts when closed is preferably 65 provided with a facing-tube consisting of a facing-plate *b* and a curved plate *a*, (clearly shown in Fig. 5,) the bead or rabbet being gouged out or so shaped to receive the said plate. The lower end of this tube is provided 70 with a separate box L, or the lower end of the tube itself may be fashioned into a box L, which box is of such a size as to receive, hold, and guide the movable keeper *d*. This keeper *d* has its lower end provided with an 75 open-ended slot *e*, which receives the bolt of the lock carried by the door.

One corner of the lower end of the box is cut out, as shown at M, which permits the bolt to move outward from within the box 80 without being drawn into the lock when the keeper *d* is moved vertically out of engagement with the bolt, as will be readily understood by reference to Figs. 3, 4, and 5.

As shown in Fig. 2 and also in Figs. 3 and 85 4, the levers or arms *f* and the shaft G are inclosed within the walls of the building, and there they are out of sight and out of reach of the inmates of the building. This is an essential arrangement not only in point of ap- 90 pearance, but to be entirely out of the way and out of sight of the inmates, especially in asylums, where the inmates are very curious and possessed of supernatural strength, and unless so inclosed the apparatus would be 95 liable to damage from said inmates. As also shown in Fig. 2, each side wall of the ward B is provided with a shaft G, and a shaft Q

extends across the end wall of this ward, through which communication is had by means of a door, as will be readily understood, to the main hall A of that floor of the building. The ends of the shaft G are provided with beveled gears *n*, engaging beveled gears situated upon the ends of the shaft Q, and this shaft Q passes through a box R, (shown in dotted lines, Fig. 1, and full lines, Fig. 2,) and into this box an arm *q* extends, which is rigidly connected in any desired manner with the shaft Q. Also placed within this box is an electromagnet *u*, supported by suitable brackets *w*, and a bracket S is also supported within the box. A bell-crank lever *k* is pivoted to and supported by the bracket S, one end of the bell-crank lever carrying an armature adapted to cooperate with the electromagnet *u*. The opposite end of the bell-crank lever *k* is provided with a notch *l*, thereby forming a latch upon which the free end of the arm *q* is adapted to rest and by which it is supported. A weight *s* is connected to the arm or lever *q* by means of a rope, cord, or chain *r*, and the bottom of the box may be provided with an opening *t*, through which the weight may pass when permitted to drop.

The electromagnets are connected in a circuit 2 2, which includes a battery 3, a push-button 5, and a thermostatic circuit-closer 4. The thermostat in the electric circuit will be so situated in the ward B and also in the other wards as to be affected by any rise in temperature sufficient to indicate a fire. In this event the circuit will be closed through the magnet's attracting the armature and releasing the arm *q*, permitting the weight to drop and in dropping rotate the shaft Q. The rotation of the shaft Q in turn rotates the shaft G, and through the medium of the arms *f* the movable keepers are moved out of engagement with the bolts of the locks, as will be clearly understood.

For the purpose of throwing open the doors at the same time the bolts are released a bell-crank lever *h* is provided in the boxes I, which are situated at the upper end of the frame of the door and flush with the face of the frame, as shown in Fig. 3. The bell-crank lever at its upper end rests against door H, as shown in Fig. 6, and the arms *f* are provided with projections *i*, adapted to engage the opposite and lower ends of the bell-crank levers when the arms or levers *f* are moved upward through the rotation of shaft G.

It will be noticed that there is sufficient space between the arms *f*, when in their normal position, and the bell-crank levers *h* to permit the keepers to be first thrown out of engagement with the bolts before the bell-crank levers are engaged. The engagement of the bell-crank levers through the medium of the projections *i* before referred to throws the upper ends of the bell-crank levers outward against the doors, as indicated in dotted lines in Fig. 2, which throws the doors open. The amount of movement given to the doors

by these bell-crank levers is readily arranged by the particular construction of the bell-crank levers as may be desired.

In Fig. 7, which represents an electric keyboard, the button 5 is the button illustrated in Fig. 1, and the keyboard is situated in the warden's, clerk's, or superintendent's office. In this way, should a fire occur, or if for any other reason it is desired to release the inmates of the rooms of the ward B, the superintendent, clerk, or warden, by the push of the button, will cause the doors to be automatically released and opened, and the electric connection will be such that by the push of the button designated as "General" in Fig. 7 the doors in all of the wards of the building will be automatically released. It is not necessary to show the electric connection by means of which this is accomplished, it being old to have such connection and only such a construction as is well known and understood in the art.

While in Fig. 2 we have shown the invention applied only to one ward, it will be understood that it is to be applied to all the wards, if desired, in the same manner as described and shown in respect to the ward B, Fig. 2.

The outer face of the box I at the upper end of the door-frame is formed in contour to correspond to the contour of that face of the door-frame shown in Fig. 6, so that the bell-crank lever *h* is supported at a point adapted to engage the door when operated, and, as will be noticed, the arms or levers *f*, carried by the operating-shaft G, extends at a point beyond the edge of the door when closed, whereby it more readily operates the keeper, and it is therefore necessary to provide a projection *i*, whereby the bell-crank levers *h* are operated by the levers *f*. However, instead of providing the levers *f* with a projection, this may be reversed and the levers *h* provided with a projection, as will be readily understood, whereby the same function would be performed.

The ends of the levers or arms *f* are preferably provided with slots *m*, into which the ends of the rod *c* extend, whereby the movement of the ends of the arms in the arc of a circle must affect or act upon the rod *c*. The slot is not absolutely necessary, however, providing the tube formed by plates *b* and *a* is sufficiently large to permit the rod *c* play equal to the arc of the circle in which the ends of the levers *f* travel.

While we here show the operating-shaft G situated at the upper ends of the doors, we do not limit ourselves to this location, for it will readily be conceived that the shaft may be placed at the lower ends of the doors and below the floor, with the operating-rod *c* extending upward and operating the movable keeper. Hence we consider our invention sufficiently novel and broad to include the location of the shaft at the lower ends of the doors as well as at their top or upper ends. We also

consider the mechanism through and by which the keepers are moved sufficiently novel to include a mechanical means for moving the trip or latch in the place of the electromagnet, though we much prefer the electrical device for many obvious reasons.

We have not shown any particular form of thermostat for closing the circuit, for any one skilled in the art would be enabled to adapt any of the well-known forms to our system.

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

1. A door releasing and operating mechanism comprising the door carrying a bolt, a movable keeper therefor, a bell-crank lever adapted to engage the door for throwing it open, and an operating member connected with the movable keeper, the operating member adapted to operate the opposite end of the bell-crank lever, substantially as described.

2. In a door-releasing device, the combination with the door having a bolt, a keeper-casing supported in the door-frame adjacent the said door-bolt when the door is closed, said casing having an opening for the door-bolt to pass freely therefrom when the bolt is projected, a keeper movable vertically across the line traveled by the door-bolt, and means for moving the keeper out of line with the said door-bolt, substantially as described.

3. In a door-releasing device the combination with a plurality of doors and casings therefor, bolts carried by the doors and projecting beyond the free edge thereof, the door-frames carrying keeper-casings, the latter having openings through which the door-bolts may freely pass when projected, movable keepers within the keeper-casings adapted to move across the said openings and intercept the movement of the door-bolts, the vertical casings within the door-frame extending from the keeper-casings to one end of the door-frame, a shaft common to all of said doors,

and connections within the casings connecting the said shaft and the doors, and an actuating means for the said shaft, substantially as described.

4. In a door-releasing device, in combination the door having a bolt, a movable keeper adapted to lock the bolt, a door-opening lever situated at the upper end thereof and within the door-frame, one end of the lever adapted to engage the door, an operating means engaging the opposite end of the lever, and a connection between the operating means and the keeper, the parts adapted to operate as described.

5. A door releasing and actuating mechanism comprising a movable shaft or rod, a movable keeper, an arm operatively connected with the shaft, a connection between the arm and the keeper, a door-actuating lever situated above the said arm a distance equal to the movement of the keeper to release the lock-bolt, the said arm adapted to engage and actuate the door-actuating lever.

6. A door-releasing device comprising a door carrying a bolt, a keeper movable in and out of the line of the travel of said bolt, a shaft situated at one end of the door, a connection between the shaft and the keeper, an electric circuit including a thermostat, an electromagnet, and an armature-lever for said magnet, the armature-lever engaging the said shaft and holding it against rotation, a weight connected with the shaft and tending to rotate it, and a circuit closer or breaker within the said electric circuit, the parts combined to cooperate as and for the purpose described.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN H. COONEY.
JOHN H. LAING.

Witnesses:

H. A. LOGAN,
A. F. ALLEWELT.