

No. 748,178.

PATENTED DEC. 29, 1903.

O. M. EDWARDS.  
DOOR OPENING DEVICE.  
APPLICATION FILED OCT. 2, 1901.

NO MODEL.

2 SHEETS—SHEET 1.

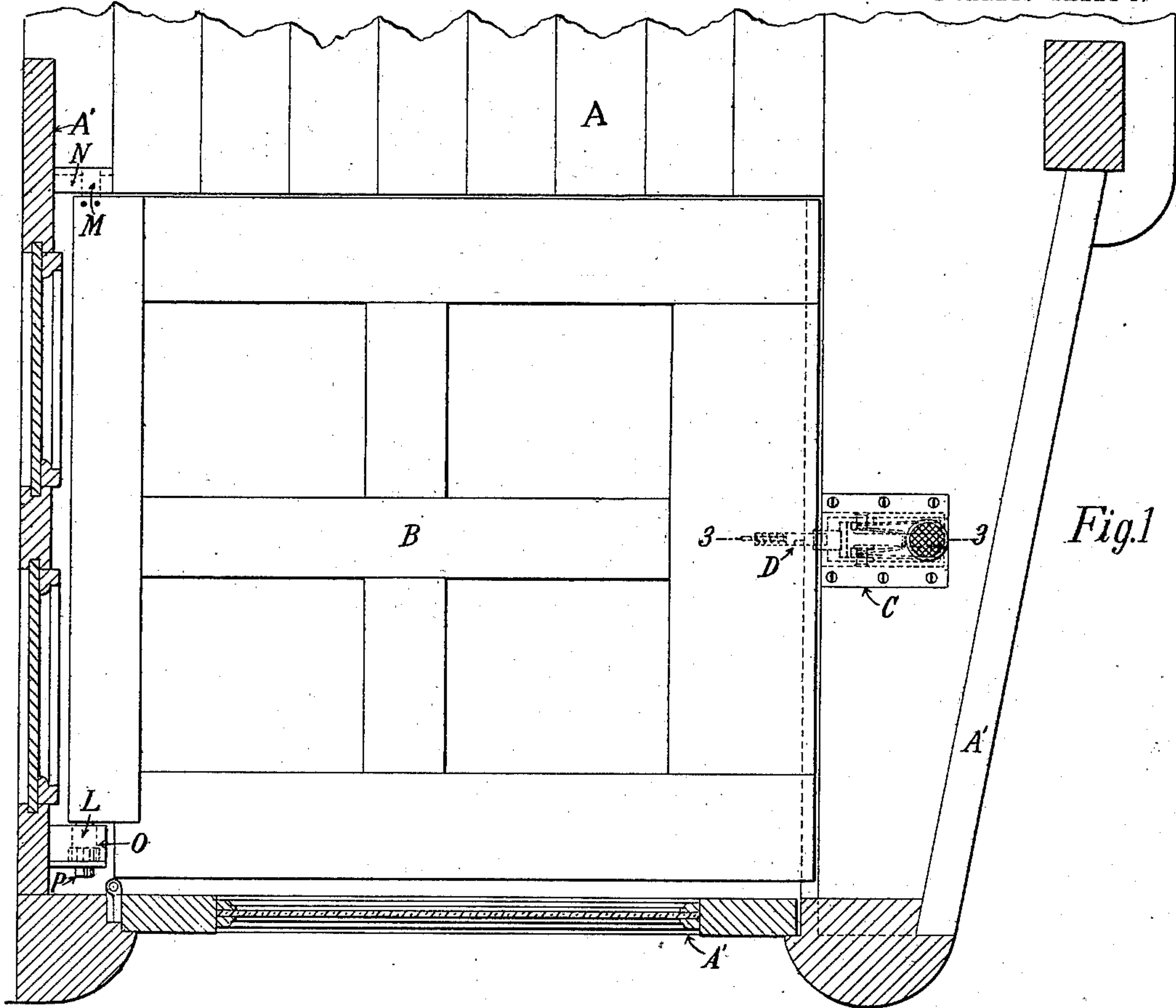


Fig. 1

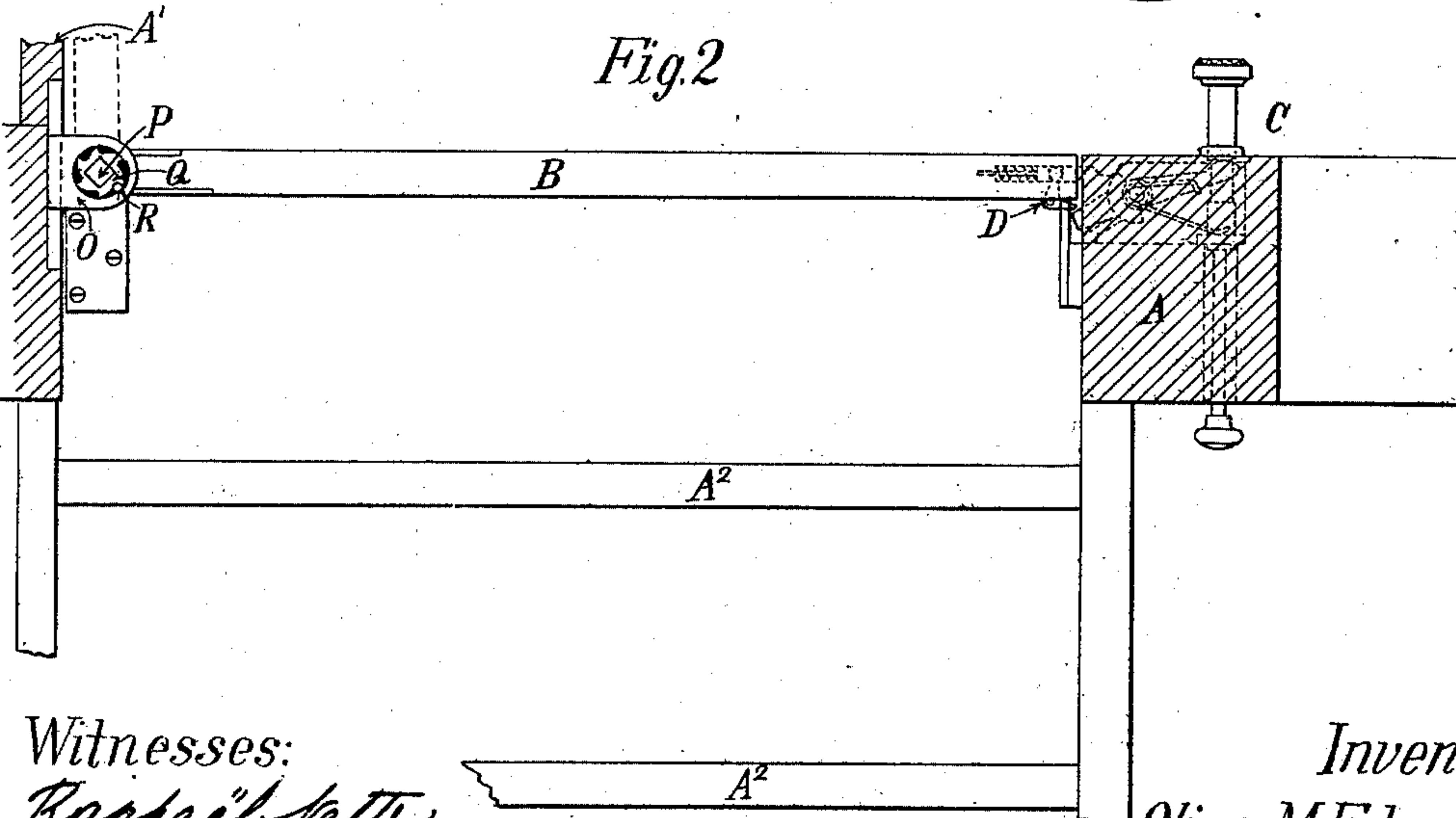


Fig. 2

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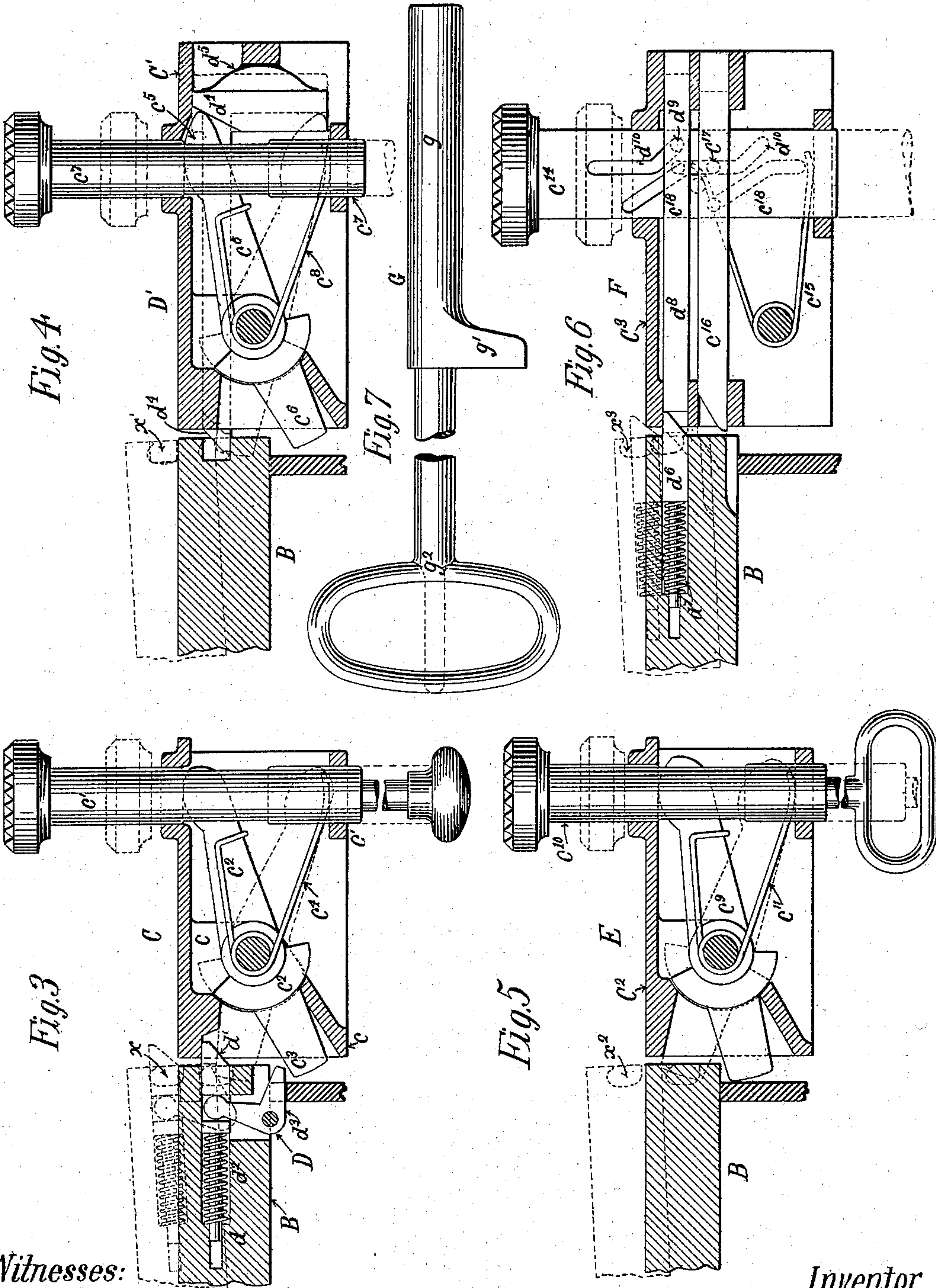
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# UNITED STATES PATENT OFFICE.

OLIVER M. EDWARDS, OF SYRACUSE, NEW YORK.

## DOOR-OPENING DEVICE.

SPECIFICATION forming part of Letters Patent No. 748,178, dated December 29, 1903.

Application filed October 2, 1901. Serial No. 77,302. (No model.)

*To all whom it may concern:*

Be it known that I, OLIVER M. EDWARDS, a citizen of the United States, residing at Syracuse, in the county of Onondaga, State of New York, have invented certain new and useful Improvements in Door-Opening Devices, of which the following is a full, clear, and exact description, reference being had to the drawings accompanying and forming a part of the same.

My invention relates to a device to be used to aid in opening doors, and more especially to what are known as "platform" trap-doors covering the steps of railway-cars; and it has for its objects, first, to provide a device to aid in partially opening such doors without forming any depression in the upper or that surface forming a portion of the floor of a vestibule of a car and with the operating means somewhat removed from the door and adjacent to the walls of the vestibule or car, and, second, to combine with such a device locking devices to be actuated for unlocking the door by the same operating means that actuate the parts which aid in partially opening the door; and it consists in the combinations of parts or devices hereinafter set forth, and particularly pointed out in the claims, which form a part of this specification.

I have shown in the drawings different embodiments of my invention; but it is to be understood that the invention may take on other forms or embodiments than those shown.

Like letters of reference wherever they occur indicate corresponding parts in the several figures of the drawings.

Figure 1 is a plan view of a platform trap-door having one form of my improvement applied thereto, the vestibule inclosing the same being in section, as seen. Fig. 2 is a side elevation of the trap-door and two steps of a car, over which the door forms a platform or flooring on which passengers may step the same as on any other portion of the floor of the vestibule of which this door temporarily forms a part and which when the steps are to be used for the ingress and egress of passengers is turned up into a nearly vertical position, as indicated in the short dotted lines. Fig. 3 is a vertical sectional view, on an enlarged scale, of that portion of the car to which my improvement may be applied and of the door

on which it operates on line 3 3 of Fig. 1, the working parts being shown in full lines in their normal positions and ready to be actuated and in dotted lines when fully actuated ready for the door to be moved into the nearly vertical position by other means. Fig. 4 is a vertical sectional view of a different form of my improvement, wherein the locking-bolt and operating device are mounted on the car with the working parts being partly shown in full lines in their normal positions and in dotted lines in the positions they occupy when fully actuated, the locking-bolt being partly in dotted and partly in full lines. Fig. 5 illustrates a modification of the constructions shown in the preceding figures and wherein the locking-bolt is dispensed with, the working parts being shown in full lines in their normal positions and in dotted lines in their actuated positions. Fig. 6 illustrates in vertical section still another form of my improvement, in which the movable locking-detent is mounted upon the door, as in Fig. 3, but the means by which such detent is moved into the unlocking position are mounted on the car, and in which the door is partially opened by the wedge or inclined-plane action of the movable part which gives movement to the door. Fig. 7 illustrates a different form of plunger than shown in the other figures, and it may be used in place of either one of those seen in Figs. 3, 4, 5, and 6, it being understood that the lower part of the same is to be formed to properly enter the casing and receive the end of the lever accordingly as desired. If desired, the handhold end of this plunger may be turned one-quarter way around, as indicated in dotted lines, relatively to the other portion, or it may be used as shown in full lines, the length of this portion being such as to bring the handhold in convenient position for use either by hand or by foot, as desired.

In Figs. 1, 2, and 3, A is the floor of the car, having the usual steps for the use of passengers in entering and leaving the car. B is a trap-door to cover over the space occupied by such steps and hinged to the car in such manner that it may, when desired, be moved up into nearly a vertical position next to the end of the body of the car and leave



the steps of the car uncovered and free to be used as such steps are usually used and then to be let down in a horizontal position to form a substantially smooth and continuous floor over the steps, and thus temporarily forming a vestibule-floor of about the width of the car itself, there being a trap-door for each set of steps of the car, if desired. This trap-door B may be hinged to the platform of the car—that is, that portion of the car included at the ends and outside of the interior thereof and adjacent to the steps of the car usually used for ingress and egress thereto or therefrom—in any desired manner, either with or without means connected therewith to aid in counterbalancing the weight of the door or to render it more or less self opening or closing, the mere hinging of the trap-door generally being no necessary part of my invention. When any counterbalancing means are employed, I prefer to use the means set forth in reissued Letters Patent No. 11,844, dated August 7, 1900; but it is to be understood that any desired means or manner of hinging the door to the platform of the car may be employed so long as the work accomplished by such means is essentially the same.

When the manner of hinging the trap-door to the platform and the means by which such door is more or less counterbalanced set forth in this Patent No. 11,844 are employed, one hollow journal or hinge-pivot L may be employed, (see Figs. 1 and 2,) through which one end of the spring or springs (not shown) pass and connect with the platform, so that end of the spring or springs remains substantially stationary, while the other end of the spring or springs are connected with the door, so as to move therewith. A second hinge pivot or journal M is used to complete the hinging of the door to the platform, suitable journal or pivot bearings being provided in brackets N and O, attached to the platform of the car in proper places to receive and hold the door in the desired position relatively to the platform and steps. As shown, the end of the spring is connected with a squared part P, which receives a sort of ratchet-wheel Q, which in turn may revolve in a circular recess, (seen in the bracket Q,) and a roll or pin R is inserted in the space between two of the teeth of the ratchet-wheel Q and the circular opening in bracket O, and thus holds the ratchet-wheel and spring in any desired relation to the bracket O and the platform to which the bracket is attached. A further detailed description of this particular manner of hinging and counterbalancing the trap-door will be found in said Letters Patent No. 11,844. When the means set forth in this Patent No. 11,844 are employed, the door may be so counterbalanced by the spring or springs that the weight of the door in the horizontal position will fully overcome the stress of the spring or springs and the door remain closed, but as

the door is moved toward the vertical or open position the weight of the door is thrown upon the hinge-pivots in proportion to the extent of movement of the door toward such vertical position. When in the vertical position substantially all of the weight of such door is upon such pivots. As the weight of the door is thrown onto the hinge-pivots it is removed from the counterbalancing spring or springs, and as a result the door during its opening movement is overbalanced by the spring or springs, notwithstanding the decreasing force or tension thereof, and becomes self-opening or automatic in this direction, and the door when in nearly the vertical position is forcibly held by the spring in the fully-opened position until force is used to overcome that of the spring. From this it follows that the weight of the door may hold it in the closed position and the force of the spring or springs hold the door in the opened position and less force is required to open the door as such operation proceeds, and the same is the case in the operation of closing such door.

It is desirable that the top surface of the door remain continuous and that no depression therein be formed into which dirt may enter and be retained therein and also that force may be conveniently applied to the desired part of the door to open the same. To avoid the use of such a depression, and thus apply force to the door, I provide the device or devices hereinbefore illustrated.

The vestibule-inclosing portions are designated as A', and the car-steps A<sup>2</sup>, which may be of any desired construction or constructions, and the steps may be of any desired number.

That part of my device shown in Figs. 1, 2, and 3 as attached to the car is designated as C, and that portion attached to the trap-door as D. C has a casing c, in which a plunger c' works up and down and engages with one end of a lever c<sup>2</sup>, pivotally mounted in the casing, as shown. The upper end of this plunger c' may, if desired, be formed, as shown in full lines, for convenient use by the foot of the person who wishes to open the trap-door by pressing downward on such plunger with his foot, or, if desired, it may be pulled downward by hand from below the platform, the plunger being conveniently arranged, as shown in dotted and full lines in Fig. 2, for this purpose. The plunger in each of the forms shown is designed to be placed as near to the walls of the car or of the vestibule as can conveniently be done, so they may be as much out of the way as is thought desirable and yet have them convenient for use by the foot or hand of the operator. The plunger is not shown as close in Figs. 1 and 2 to the wall of the vestibule as it may sometimes be thought desirable. The lever c<sup>2</sup> is conveniently made to engage with this plunger c' by forming a slot in the plunger to receive the end of the lever, as shown. The end c<sup>3</sup> of this lever c<sup>2</sup> protrudes from the cas-



ing in any desired manner and to the desired extent to engage with a portion of the trap-door or some part attached thereto, so that the movement of this end of the lever by actuating the plunger may cause the free or unhinged edge of the door to be partially opened, as seen in dotted lines in Fig. 3, when such edge may be taken hold of and the door fully opened, and, if desired, any convenient form of handhold may be used for this purpose. If for any reason it is thought desirable to keep this trap-door locked in the closed position more positively than by gravity, then the locking device D, such as is shown in Fig. 3, may be employed. The movable locking-bolt  $d$  is mounted in the casing of D to slide back and forth, with its engaging end  $d'$  beveled at its under side, as is common with lock-bolts which are spring-actuated in the locking direction, so that such bolt will be forced back against the stress of spring  $d^2$  as the door closes. An elbow or bell crank lever  $d^3$  is pivotally mounted, as shown, with one end engaging with the bolt  $d$  and the other end arranged in position to receive the end  $c^3$  of lever  $c^2$  at or near the beginning of the movement of lever  $c^2$  when actuated by plunger  $c'$  or otherwise, as desired. As shown, the lever  $c^2$  engages with this elbow-lever  $d^3$  and moves it as far as is necessary to fully withdraw the bolt  $d$  from its locking engagement, and then it rests against the door itself, and this lever and the door are bodily moved by the lever  $c^2$  to the extent of movement of such lever  $c^2$  into position to be taken hold of and fully opened. This lever  $c^2$  is provided with a spring of any convenient form, such as  $c^4$ , by which the lever  $c^2$  and plunger  $c'$  are returned to their normal positions after they are actuated.

In Fig. 4 a different construction D' of locking device is shown, wherein all actuated parts are mounted on the car and the end of the locking-bolt engages with the edge of the door to hold it in the closed position. The lock-bolt  $d^4$  is mounted in a casing C' to slide back and forth, as shown, and it is provided with a spring  $d^5$  to force the bolt into the locking position, the engaging end of the bolt being beveled, as before. The opposite end of this lock-bolt  $d^4$  engages with the end of lever  $c^5$ , as seen, in such manner that the lock-bolt, as before, is withdrawn from its locking engagement before the protruding end  $c^6$  of lever  $c^5$  engages with the door itself or a part attached thereto adapted to bodily move such door. This lever  $c^5$  is actuated by a plunger  $c^7$ , notched to receive the lever, as shown, and a spring  $c^8$  being provided to move the lever and plunger into their normal positions, as shown.

The operation of the construction shown in Fig. 4 is the same as that shown in Figs. 1, 2, and 3.

The modification E (shown in Fig. 5) omits locking devices entirely and is adapted for use where gravity is sufficient for holding the

trap-door in the closed position or some locking means disconnected from and independent of the lever  $c^9$  and plunger  $c^{10}$  are to be used for locking the trap-door. A lever  $c^9$ , somewhat similar to levers  $c^2$  and  $c^5$ , is pivotally mounted in position in a casing C<sup>2</sup>, as shown, with a plunger  $c^{10}$  engaging therewith by means of an open recess in the side of the plunger or otherwise, so that as the plunger is depressed the lever is actuated and the edge of the trap-door is partially opened, as shown in dotted lines in Fig. 5. A spring of any suitable form—as, for instance,  $c^{11}$ —is arranged in connection with lever  $c^9$  for its stress to hold the lever and plunger in their normal positions, as shown. The operation of partially opening the trap-door is the same in this modification as it is in preceding constructions hereinbefore described.

The modification shown in Fig. 6 has the movable lock-bolt mounted on the trap-door, but with the means for moving it into the unlocked position mounted on the car and with a sliding bar provided with an inclined plane to partially open the door as the bar is moved toward and under the door, as shown, which bar is also mounted on the car. The parts mounted on the car are preferably mounted in a casing C<sup>3</sup>, which in turn is mounted on the car, the casing and its parts being designated as F. The lock-bolt  $d^6$  is mounted in the door to slide back and forth therein, a spring  $d^7$  being provided to constantly press the bolt into the locked position, it being moved in the unlocking direction by a sliding bar  $d^8$ , which in turn is provided with a pin  $d^9$ , working in a cam-slot  $d^{10}$ , formed in or on plunger  $c^{14}$ , which may be square, oblong, or any other desired form in cross-section, it being understood that this plunger is oblong in cross-section when as seen in Fig. 6. This plunger is mounted to move up and down in casing C<sup>3</sup>, as desired, any desired form of hand or foot operating means being connected with such plunger to move it in one direction and any other convenient means—as, for instance, spring  $c^{15}$ —being provided for moving the plunger in the other direction. As shown in Fig. 6, a roughened head is formed on this plunger and in convenient position to be pressed against the spring  $c^{15}$  by the foot of the person who desires to unlock and open the door. A sliding bar  $c^{16}$ , provided with a pin  $c^{17}$ , works in cam-slot  $c^{18}$  in the plunger  $c^{14}$ . These cam-slots  $d^{10}$  and  $c^{18}$  may be arranged in any convenient portion or portions of the plunger. As shown in Fig. 6, they are arranged in one side of the plunger and in quite close proximity to each other—in fact, so that the vertical part of slot  $d^{10}$  moves down into the position occupied by the vertical portion of the slot  $c^{18}$ , as shown in dotted lines. As seen, each of these cam-slots has an inclined portion and a vertical or straight portion, and they are so arranged that when the inclined portion of slot  $d^{10}$  is in engagement



with pin  $d^9$  the vertical portion of slot  $c^{18}$  is in engagement with pin  $c^{17}$ , and vice versa. Because of this arrangement of pins and slots the bar  $d^8$  is on the downward movement of the plunger  $c^{14}$  moved as the inclined portion of slot  $d^{10}$  acts on pin  $d^9$  until the lock-bolt  $d^6$  is moved back against the stress of its spring  $d^7$  into the position seen in dotted lines, and then on the continued downward movement of this plunger the pin  $d^9$  is in the straight or vertical portion of slot  $d^{10}$  and such bar  $d^8$  is held in such position until the pin  $d^9$  reaches the inclined portion of slot  $d^{10}$  on the upward or return movement of the plunger. While the bar  $d^8$  is moved forward, the pin  $c^{17}$  remains in the straight or vertical portion of slot  $c^{18}$  and the bar  $c^{16}$  remains in the position seen in full lines in Fig. 6. On the further downward movement of this plunger  $c^{14}$  the inclined portion of slot  $c^{18}$  begins to act on pin  $c^{17}$  when the pin  $d^9$  has reached the straight or vertical portion of slot  $d^{10}$ , so that bar  $d^8$  stands still while bar  $c^{16}$  is moved from the position seen in full lines into that seen in dotted lines, and then the bar  $c^{16}$  moves back again on the return or upward movement of the plunger until pin  $c^{17}$  reaches the vertical portion of slot  $c^{18}$ . From this it will be seen that only one of these two bars is moving at a time. This permits of the door being released from its lock-bolt  $d^6$  before the inclined plane on bar  $c^{16}$  begins to act on the door, which is then free from bolt  $d^6$  to move in the opening direction. The bolt  $d^6$  by reason of being mounted on the door is free to move against the stress of its spring  $d^7$  at all times, while bar  $d^8$  is moved only by moving plunger  $c^{14}$  in one direction or the other.

If desired, a conveniently-shaped recess to receive the hand of the operator may be formed in the edge of the door to aid in taking hold of after such door has been partially opened, or any other desired form of handhold may be employed. I have indicated in dotted lines in Fig. 6 at  $x^3$  such a recess or handhold. I have also in Figs. 3, 4, and 5 indicated in dotted lines such handholds, they being designated as  $x$ ,  $x'$ , and  $x^2$ , respectively.

From the foregoing it will be seen that whether it be the sliding bar  $c^{16}$  or one of the levers  $c^2$ ,  $c^5$ , or  $c^9$  it is a movable part or a part movably mounted which acts upon the trap-door to partially open the same upon actuating any one of the plungers described, also that such part is connected with operating means by which it is moved or actuated to partially open the door.

In Fig. 7 a modified form of plunger  $G$  is shown. That portion  $g$  which connects with the moving parts mounted on the car may be of any desired shape or construction to do its work. It may be provided, if desired, with a part  $g'$ , adapted to receive the foot of the operator to press the same downward, as the plungers in preceding figures are pressed down to partially open the door, or, if desired, it may be provided with a handhold,

as  $g^2$ , and the foothold  $g'$  dispensed with. If the handhold  $g^2$  be used, it may be of any convenient shape and dimensions to adapt it for use, and it may be arranged with such handhold as shown in full lines or as shown in dotted lines, or the plunger may be extended downward through the car, as shown in Fig. 2, and provided with the handhold there indicated in dotted and full lines or otherwise, as desired. If desired, the handhold  $g^2$  and the foothold  $g'$  may be used together and only one or both used to partially open the door, or the handhold seen in Fig. 2 and the foothold can be used together or only one used at a time or any other arrangement of hand and foot holds desired.

Trap-doors are liable to bind and stick in their closed positions from various causes, as is well known to those familiar with their use—as, for instance, from changes in the openings in which they are received when closed owing to conditions of weather, changes in the structures themselves in which they are used, or dirt or other matter interposed between the edges of the doors and the openings in which they are used. The binding of vestibule trap-doors of passenger-cars is quite common owing to their forming a portion of the floor or platform of the car when in the closed position and the twisting action on the car-body arising from the frequent changes in the level of the road-bed on which the car rests. When these doors do bind and stick in the closed position, it many times requires considerable force to be applied to them to overcome such binding action and partially open the doors. The extent of this binding action varies under different conditions and may occur at short intervals of time, as between one station and the next, and therefore it is more or less difficult to open them at different times and places. In use these doors require to be opened quickly, and it is desirable that this be done by a single effort, and this requires the application of a force which may be largely in excess of what is actually required, because repeated efforts consume time and tend to delay the egress and ingress of passengers at way-stations, which it is desired to avoid. The present constructions provide means by which the attendant may quickly and conveniently apply a comparatively large force to the door in a direct and effective manner. In fact, he may apply his whole weight to the plungers and with a leverage which is most advantageous in overcoming this binding of the doors.

In each of these constructions of door-opening devices the operating means connects with the movable part in such manner as to give movement thereto in one direction, and the spring in each case tends to move the movable part and its operating means to their normal positions—that is, to the positions they occupy when ready to be actuated. The movable locking-detent is shown as connecting



with the movable part or operating means in different ways. In Fig. 3 the elbow-lever  $d^3$  connects with the lock-bolt  $d'$ , as seen, and the lever  $c^2$  contacts with  $d^3$  at one end and at the other end connects with plunger  $c'$ .

In Fig. 4,  $d^4$  contacts with the end of lever  $c^5$ , which end also is received in a recess in the side of plunger  $c^7$ . In Fig. 6 the beveled end of lock-bolt  $d^6$  contacts with end of sliding bar  $d^8$ , whose pin  $d^9$  enters cam-slot  $d^{10}$  in plunger  $c^{14}$ .

My improvement may take on other forms than those herein specifically shown and described and yet perform the same work in essentially the same way as herein indicated, and therefore I do not wish to confine my invention to the particular forms shown.

What I claim as new is—

1. In a door-opening device the combination, substantially as set forth, of a part adapted to be movably mounted adjacent to a door and arranged to engage therewith when moved and operating means having an unyielding connection with such part to move it in one direction and partially open the door.

2. In a door-opening device the combination, substantially as set forth, of a lever adapted to be pivotally mounted adjacent to the door and arranged in position to engage with and move the door in the opening direction when the lever is moved and operating means connecting with the lever, whereby the lever is moved and the door is partially opened upon actuating the operating means.

3. In a door-opening device the combination, substantially as set forth, of a part adapted to be mounted and arranged with a portion thereof adjacent to a door and normally free to engage therewith, and operating means having an unyielding connection with such part and adapted to move it into engagement with the door, whereby the door may be partially opened by the movement of such part through actuating the operating means.

4. In a door-opening device the combination, substantially as set forth, of a lever adapted to be pivotally mounted with a portion thereof adjacent to a door, which lever is normally free to engage with such door, and operating means having an unyielding connection with the lever to move it into engagement with the door, whereby the door may be partially opened by the movement of such lever through actuating the operating means.

5. In a door-opening device the combination, substantially as set forth, of a lever adapted to be pivotally mounted adjacent to a door and arranged with one end in position to engage with and move the door in the opening direction and with its other end out of engaging position with the door and extending in a direction away therefrom, and operating means connecting with such extending end of the lever, whereby the door may be partially opened by the movement of the lever through the actuating means.

6. In a door-opening device the combination, substantially as set forth, of a part adapted to be movably mounted adjacent to a door, operating means connecting with such part by an unyielding connection and adapted to move the same, a movable locking-detent adapted to engage with the door and movable relatively to such part, and means connecting the detent with the operating means, whereby the locking-detent is moved into the unlocking position and the door is partially opened by actuating the operating means.

7. In a door-opening device the combination, substantially as set forth, of a lever adapted to be pivotally mounted adjacent to a door and arranged in position to move the door in the opening direction as the lever moves, operating means connecting with the lever, a movable locking-detent adapted to lock and unlock the door and movable relatively to the lever, and means connecting the locking-detent with the operating means, whereby the locking-detent is moved into the unlocking position and the door is partially opened by actuating the operating means.

8. In a door-opening device the combination, substantially as set forth, of a part adapted to be movably mounted in position to engage with a door, operating means having an unyielding connection with such part and adapted to move the same, a movable locking-detent adapted to engage with a fixed part to lock the door and movable out of locking engagement with the door before such movable part engages with and moves the door, and means connecting the locking-detent with the operating means, whereby the locking-detent is moved out of the locking position and the movable part is free to partially open the door upon partially actuating the operating means.

9. In a door-opening device the combination, substantially as set forth, of a lever adapted to be pivotally mounted adjacent to a door and in position to move it in the opening direction, operating means adapted to engage with the lever, a movable locking-detent adapted to lock the door and movable relatively to the lever, and means connecting the locking-detent with the lever, whereby the locking-detent is moved into the unlocking position and the door is partially opened by actuating the operating means.

10. In a door-opening device the combination, substantially as set forth, of a lever adapted to be movably mounted in position for one end thereof to engage with a door, and operating means provided with a plunger adapted to be manually operated and move the lever in one direction, whereby the lever is moved into engagement with the door to partially open the same upon operating the plunger.

11. In a door-opening device the combination, substantially as set forth, of a part adapted to be movably mounted in position to engage with a door, and operating means pro-



vided with a plunger adapted to be manually operated and move such part in one direction, whereby such part is moved into engagement with the door to partially open the same upon operating the plunger.

12. In a door-opening device the combination, substantially as set forth, of a part adapted to be movably mounted in position to engage with a door, and operating means provided with a plunger adapted to be manually operated and move such part in one direction by engaging directly therewith, whereby such part is moved into engagement with the door to partially open the same upon operating the plunger.

13. In a door-opening device the combination, substantially as set forth, of a part adapted to be movably mounted in position to engage with a door, a movable locking-detent adapted to lock the door and movable relatively to such part, and operating means provided with a plunger adapted to be manually operated and move both the movable part and locking-detent, whereby the locking-detent is moved into the unlocking position, and such part is moved into engagement with the door to partially open the same upon operating the plunger.

14. In a door-opening device the combination, substantially as set forth, of a part adapted to be movably mounted in position to engage with a door and operating means provided with a plunger adapted to be manually operated to move such part in one direction, and a spring adapted to move such part in another direction, whereby such part is moved into engagement with the door to partially open the same by the operation of the plunger and the spring restores such part to its normal position.

15. In a door-opening device the combination, substantially as set forth, of a part adapted to be movably mounted in position to engage with a door, and operating means provided with a plunger adapted to be manually operated and to engage directly with such part and move it into engagement with the door to partially open the same upon operating the plunger.

16. In a door-operating device the combination, substantially as set forth, of a part adapted to be movably mounted in position to engage with a door, and operating means having an unyielding connection with such part and adapted to be manually operated from two different points to move such part into engagement with the door and partially open the same.

17. In a door-opening device the combination, substantially as set forth, of a part adapted to be movably mounted in position to engage with a door, and operating means provided with a plunger adapted to be manually operated from two different points, to move such part into engagement with the door and partially open the same.

18. In a door-opening device the combina-

tion, substantially as set forth, of a casing adapted to be mounted adjacent to a door and to receive a movable part and operating means, a part adapted to be movably mounted in the casing in position to engage with a door, and operating means adapted to be mounted in the casing and to connect with such movable part and move the same into engagement with the door and partially open the same.

19. In a door-opening device the combination, substantially as set forth, of a casing adapted to be mounted adjacent to a door and to receive a movable part and form a fixed abutment for a movable locking-detent mounted outside of the casing, and adapted to lock the door to the casing; a part movably mounted in the casing in position to move the locking-detent, and operating means a portion of which is movably mounted in the casing and adapted to connect with such movable part, and thereby actuate the locking-detent to unlock the door.

20. In a door-opening device the combination, substantially as set forth, of a casing adapted to be mounted adjacent to a door and to receive a lever and operating means, a lever pivotally mounted in the casing in position to engage with a door, and operating means a portion of which is mounted within the casing, and connects with the lever to move it into engagement with the door and partially open the same.

21. In a platform the combination, substantially as set forth, of a door hinged at one edge to the platform, counterbalancing means therefor, a part adapted to be movably mounted in position to engage with the door, and operating means having an unyielding connection with such part, adapted to move the same in one direction, and partially open the door.

22. In a platform the combination, substantially as set forth, of a door hinged at one edge to the platform, counterbalancing means therefor, a part adapted to be movably mounted in position to engage with the door, and operating means provided with a plunger connecting with such part and adapted to move the same and partially open the door.

23. In a platform the combination, substantially as set forth, of a door hinged at one edge to the platform, counterbalancing means therefor adapted to act continuously on the door and overcome the weight of the same, when open, a part adapted to be movably mounted in position to engage with the door, and operating means having an unyielding connection with such part, adapted to move the same in one direction and partially open the door.

24. In a platform the combination, substantially as set forth, of a door hinged, at one edge to the platform, counterbalancing means therefor adapted to act continuously on the door and overcome the weight of the same when open and the weight of the door, when



free to move, overcomes the counterbalancing means when fully closed, a part adapted to be movably mounted in position to engage with the door, and operating means having  
5 an unyielding connection with such part adapted to move the same in one direction and partially open the door.

25. In a platform the combination, substantially as set forth, of a door hinged at one edge  
10 to the platform, counterbalancing means therefor, a movable locking-detent mounted on the door, a part adapted to be movably mounted in position to engage with the door, and operating means adapted to connect with  
15 such locking-detent and move it into the unlocking position, and by a movement in the same direction move such movable part into engagement with the door and partially open the same.

26. In a platform the combination, substantially as set forth, of a door hinged at one edge  
20 to the platform, counterbalancing means therefor, a movable locking-detent adapted to coact with a locking-abutment, one of which is mounted on the door, a part adapted  
25 to be movably mounted in position to engage with the door, and operating means having a connection between such means and both the movable locking-detent and movable part, whereby the detent may be moved  
30 into the unlocking position and the part may be moved into engagement with the door to partially open the same by the movement of the operating means.

OLIVER M. EDWARDS.

Witnesses:

JAMES MURPHY,

MARTIN J. W. ATTEY.