

No. 671,637.

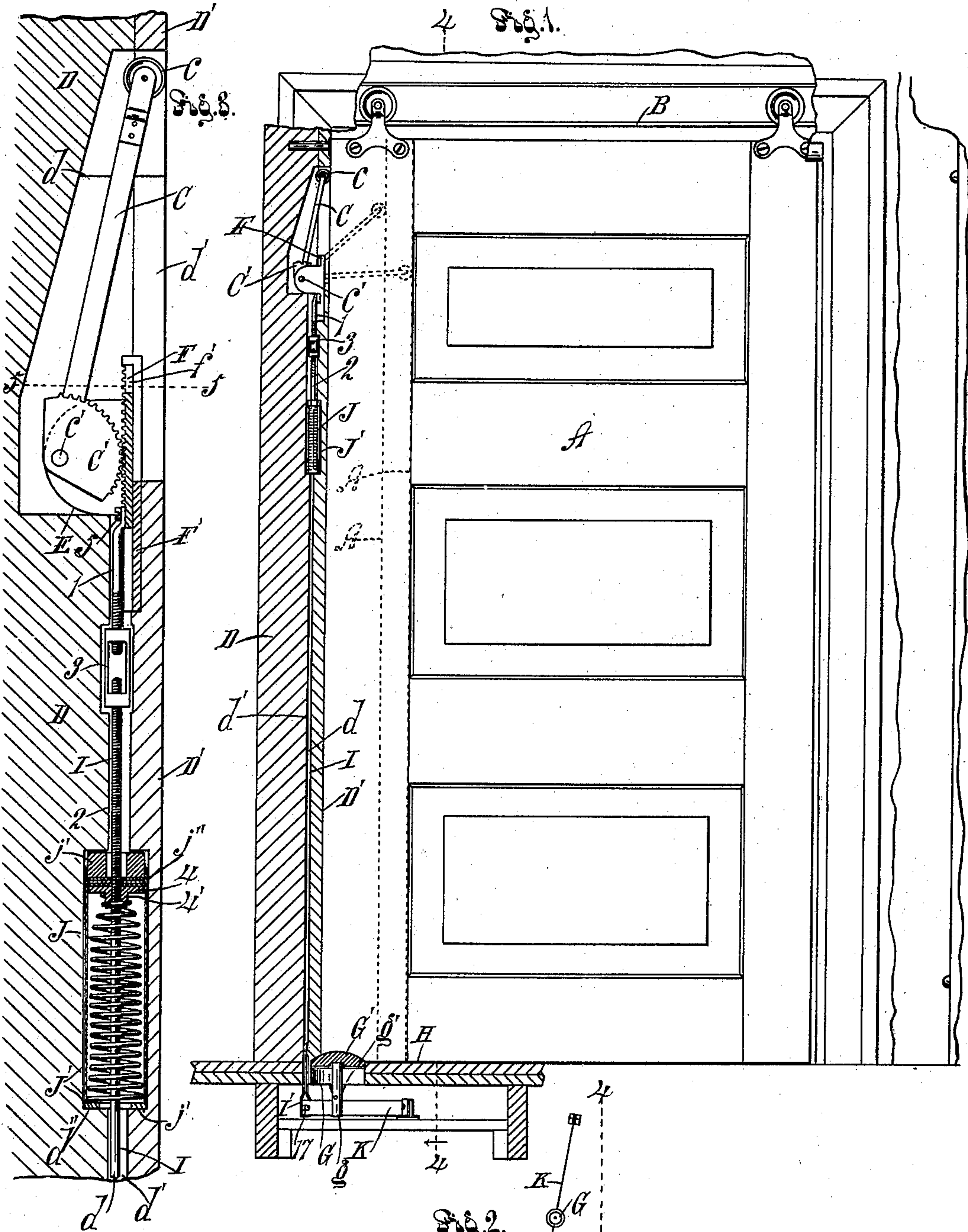
Patented Apr. 9, 1901.

D. SCHUYLER.
AUTOMATIC SLIDING DOOR OPENER.

(Application filed Apr. 3, 1899.)

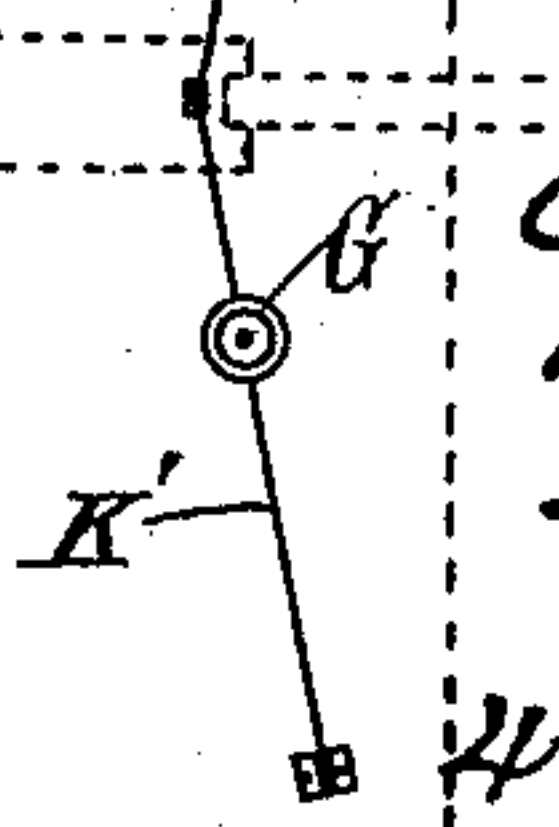
(No Model.)

3 Sheets—Sheet 1.



Witnesses
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Fig. 2.



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AUTOMATIC SLIDING DOOR OPENER.

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(No Model.)

3 Sheets—Sheet 3.

Fig. 13.

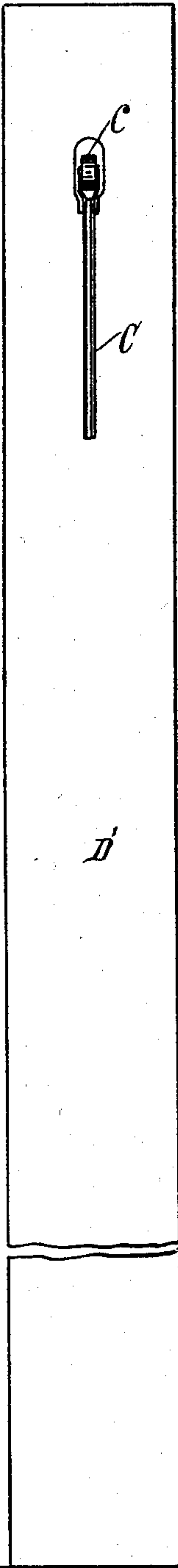


Fig. 14.

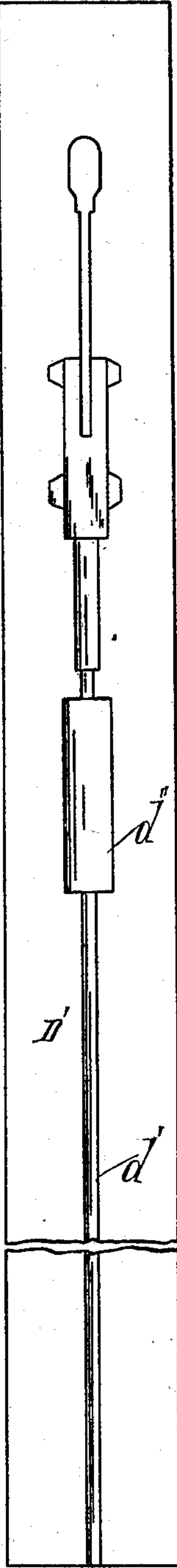
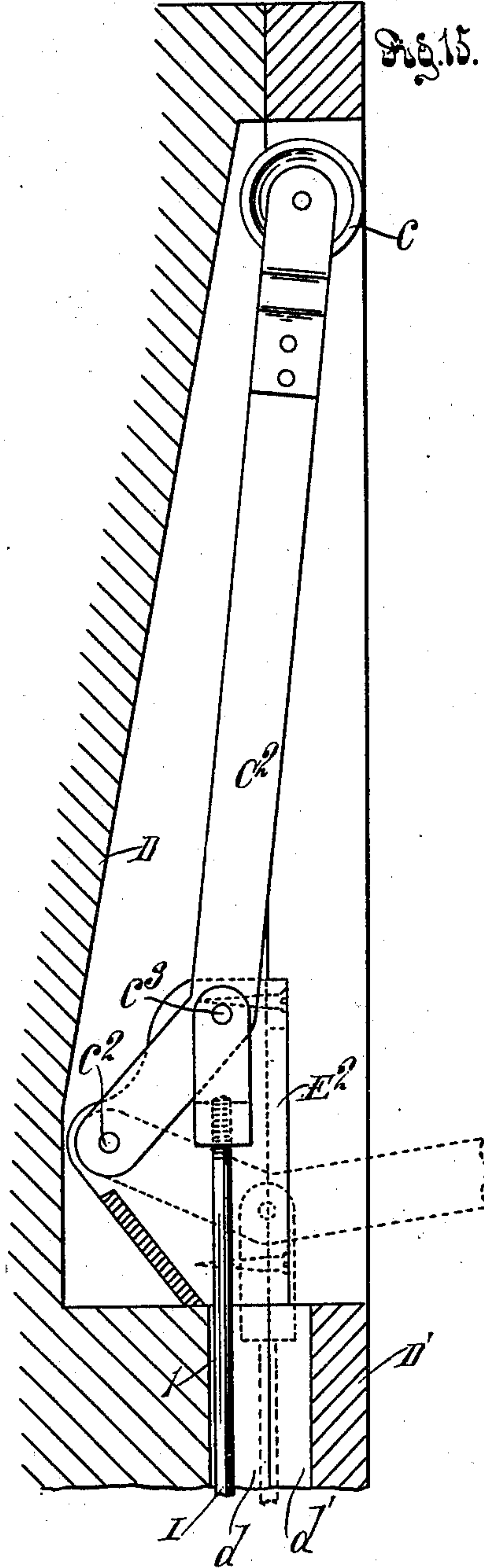


Fig. 15.



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UNITED STATES PATENT OFFICE.

DANIEL SCHUYLER, OF SAN DIEGO, CALIFORNIA, ASSIGNOR TO THE PERFECT SLIDING DOOR COMPANY, OF LOS ANGELES, CALIFORNIA.

AUTOMATIC-SLIDING-DOOR OPENER.

SPECIFICATION forming part of Letters Patent No. 671,637, dated April 9, 1901.

Application filed April 3, 1899. Serial No. 711,598. (No model.)

To all whom it may concern:

Be it known that I, DANIEL SCHUYLER, residing at San Diego, in the county of San Diego and State of California, have invented a new and useful Automatic-Sliding-Door Opener, of which the following is a specification.

This invention relates to devices for opening automatic sliding doors of the character referred to in my patent on automatic sliding doors, No. 622,823, dated April 11, 1899.

One object of my invention is to provide a simple strong durable mechanical appliance which can be operated to open the door by the foot with the same positiveness and satisfaction as if done by the hand, but without any loss of time, because the operator opens the door while walking and can pass through without stopping, and the door closes automatically behind him without any further attention.

Another object of my invention is to provide means whereby the pusher can be accurately adjusted to the exact point at which the edge of the door stands when the door is at rest, so that there will be no blow struck on the door to cause any noise or mar.

My device is so arranged that the door can be thrown open to any desired extent by regulating the pressure applied upon a tread device located in the floor about two feet from the door and in the appropriate position to be easily stepped upon by a person advancing toward the door. This appliance is designed to be operated by a tread-plate set in the floor to be pressed upon by the foot, and ordinarily the tread-plate will be made of expensive and highly-finished hard wood, and the edges of its top will be flush with the floor, the top surface of the plate being made flat or rounded, as may be desired. The tread-plate is removable.

Another object of my invention is to provide convenient means for the removal of the plate, which means will not be obtrusive or cause any mutilation to the exposed surface.

Another object of my invention is to provide a device for cushioning the mechanism upon its return after the door has been thrown open.

A further object is to so construct the device as to make the parts easily accessible without the aid of a skilled mechanic, none of the parts being placed beneath the floor excepting two steel levers.

The accompanying drawings illustrate my invention.

Figure 1 is a view of a door provided with my newly-invented door-opener. Parts are shown in section. The door is shown closed. Dotted lines indicate opening positions. Fig. 2 is a diagrammatic plan of the appliance in position. Fig. 3 is a fragmental sectional detail of the operating parts, which are located in the door-post and its facing. Fig. 4 is a fragmental sectional elevation looking from the right of line 4 4, Figs. 1 and 2, the door being open and the facing of the jamb shown removed. Fig. 5 is a plan section on line 5 5, Figs. 3 and 4. Fig. 6 is a detached view of the rack for operating the cogged segment. Fig. 7 is a detail of the frame for the cogged segment and rack. Fig. 8 is a fragmental detail of the stirrup for the operating-rod. Fig. 9 is a vertical mid-sectional detail of the tread device. Fig. 10 is a plan section of the tread-plate stem on line 10 10, Fig. 9. Fig. 11 is a perspective view of the fulcrum-support for the lever. Fig. 12 is a detail of the end of the push-arm. Fig. 13 is a view of the face of the door-jamb provided with my invention. Fig. 14 is a view of the back of the door-jamb facing removed. Fig. 15 is a view of a modified form of push-arm, in which the rod is pivoted directly to the arm.

A indicates a sliding door of the character referred to in my said patent, the door being hung on an inclined rail B.

C is a push-arm pivoted to a support in the door-post D, which is chambered, as at *d*, to receive the push-arm and its mechanism, the facing D' of the door-post being channeled and slotted, as at *d'*, to allow the arm to play freely through the face of the door-jamb, the path of the free end of the arm being in the path of the door, so that when the door is closed and the arm is swung outward the door will be thrown open. Suitable means are provided for normally holding the arm in its re-

tracted position, and suitable means are provided for throwing the arm to cause its free end to push the door. Various appliances for operating the arm may be devised without departing from the spirit of my invention; but in the drawings I have shown mechanism which I deem preferable for this purpose.

c indicates a door-engaging roller on the free end of the push-arm, the same being provided to roll down along the edge of the door as the arm is thrown outward and the door recedes, thus avoiding friction and marring of the door. The opening movement of the door is completed by the momentum the door acquires while it is under the influence of the push-arm, so that it is possible with but slight practice upon the part of the operator to operate the mechanism to throw the door any desired distance.

The roller *c* may be of wood, hard fiber, metal, or any suitable material or materials and may or may not be provided with the ball-bearing *c*², (shown in Fig. 12,) and it may or may not be provided with the soft-rubber tire *c*³ shown in that view. The necessity of such tire is practically done away with by the accurate adjustment for bringing the roller to the exact line of the edge of the door when at rest, but is desirable in case of careless use—such, for instance, as where the operator holds the tread-plate down, thus keeping the arm extended until the door should return and strike it.

One means which I prefer for operating the push-arm comprises a cogged segment *C'* at the lower end of the arm and pivoted by a pivot *c'* to a supporting gear-frame *E*, which is mounted in the door-post *D* and its facing *D'*, and a rack *F*, also mounted in the gear-frame and meshing with the cogged segment, suitable means being provided for operating the rack. Such means preferably comprise a push-plate *G*, set in the floor *H*, means being provided for operatively connecting the push-plate with the rack and means being provided for normally retracting the push-arm and holding it in the upright position shown in Fig. 3 and by the solid lines in Fig. 1.

I indicates a rod extending down from the rack.

J indicates a spring for normally holding the rod and rack in position to retract the arm.

K indicates a lever connected with the rod to operate the same. The tread-plate *G* is arranged to operate the lever *K*.

The rod *I* is preferably made in two parts 1 2, connected by a turnbuckle 3 for adjusting the length of the rod.

The spring *J* is supported by the door-post. It is mounted in a barrel *J'*, which is inserted in a chamber *d''*, provided in the post *D* and its facing *D'*, thus supporting the spring against downward pressure. The lower end

of the barrel has an inwardly-projecting ledge *j*, upon which the spring rests, and the upper end of the barrel is screw-threaded, and an adjustable stop *j'* is screwed therein.

4 indicates a rod-support fastened to the rod and resting upon the spring *J*, so that the tension of the spring can be regulated, as hereinafter set forth.

j'' indicates a cushioning-washer, of leather or other soft material, between the rod-support 4 and the plug *j'* to cushion the upward stroke of the rod. The rod-support 4 fits the inside of the barrel, so as to center the rod, and preferably the lower face of the support is provided with a projecting collar 4' of less diameter which projects into and fits the top end of the spring to center and hold the spring, the spring being contracted at its upper end to fit the collar. The part *j'* being screwed into the end of the barrel *J'* forms an adjustable stop for the rod-support 4. By adjusting the rod-support 4 on the rod *I* and adjusting the stop *j'* in the barrel *J'* a permanent tension of any desired strength will be given to the spring, so that the spring will exert an initial resistance to the rod exactly as may be required. In practice this tension will be adjusted at the factory; but it can readily be changed at any time, if desired.

The face or casing *D'* and the post *D* are each preferably channeled to chamber the rod, turnbuckle, and barrel equally, so that the channels will fit the barrel snugly, thus to hold the same in a true position. This avoids the necessity of any screws for holding the barrel in place. The post and casing are also both chambered to receive the gear-frame which supports the arm, and the arm-support of said frame extends rearward from the front face of the post in order to give sufficient space to chamber a cogged segment of considerable radius—say an inch and a half, for example. In order that the construction above stated may be employed, it is necessary that the cogged segment be mounted rearward from the rack. In order to provide for such construction, the arm is planted in and projects from the cogged face of the segment and the rack which meshes therewith is slotted, as at *f*, to receive the arm, and the gear-frame *F* is also slotted, as at *f'*, thus to allow the push-arm to be fully operated by the vertical movement of the rack mounted between the cogged segment and the face of the post. The frame *F'* is secured to the face of the post by screws *f''*.

5 indicates a pivot inserted through the top of the rod *I* and secured to the rack, thus pivotally securing the rod to the rack.

I' indicates a stirrup fastened to the lower end of the rod *I* to receive the ends of the levers *K K'*, which are provided for operating the door from the opposite sides thereof.

i indicates a pin extending across the stirrup to hold the ends of the levers from contact with each other. The top of the stirrup

may be cut away, as indicated at i' , to allow the stirrup to be removed downward from the levers, thus to become detached from the levers if occasion should require. The stirrup, however, can be made of any form desired.

The tread device comprises a socket-piece G' , set in the floor and provided in the bottom with a centrally-arranged hole g' , and the tread-plate G , which fits in the socket and is provided with a stem g , extending downward through the hole and resting upon the lever K . The stem is preferably hollow and slotted, as at g'' , to embrace the lever K and to afford a chamber inside the hollow stem for a spring L , which presses against the lever and holds it firmly against one of the walls of the slot g'' , thus preventing any rattling.

g''' indicates a round pin inserted across the stem g to rest upon the top of the lever K to avoid friction.

The tread-plate G is preferably rounded on top, as shown in the drawings, and in practice the parts are adjusted to bring the margin of the top of the plate flush with the rim of the socket-piece G' , which is set in the floor H .

In order to provide means for withdrawing the tread-plate from the socket-piece, a socket 6 is provided in the top of the face-plate, and in this is seated a handle 7, provided with a screw-thread at the lower end thereof and provided with a slot 8 in the top, so that it can be turned by a screw-driver. The handle is ordinarily screwed into the socket to bring the top of the handle normally flush with the top of the tread-plate. When it is desired to withdraw the tread-plate from the socket-piece, the handle 7 will be turned with a screw-driver to partially withdraw it from its socket, so that it can be grasped for the purpose of lifting the tread-plate from its socket.

lg indicates screws which detachably fasten the socket to the floor.

The lever K is pivoted to any suitable support underneath the floor; but in order to prevent any looseness or rattling I provide a fulcrum-piece M , composed of a base 9 and two standards $9'$ and $9''$, which are made of spring metal and are set at a distance apart, so that the end of the lever will snugly fit between them. The standards $9'$ $9''$ are preferably riveted to the base 9, and the lever is pivoted to the standard by a bolt and nut 11, by which the standards can be sprung inward to clamp snugly upon the lever, thus making a perfect fit and preventing any looseness or rattle.

In order to afford a pneumatic-cushion resistance to the action of the spring J , so that the return of the parts to their normal position will be noiselessly accomplished, the bottom of the socket-piece is provided with a valved outlet 12, through which the air will pass readily when the tread-plate is pushed downward; but upon the return movement

the valve being closed by the spring 13 and suction will prevent the rapid ingress of the air, and the partial vacuum thus created will slowly be filled by the ingress of the air through the other openings, such as that around the stem and tread-plate, so that the return of the tread-plate to the normal position will be resisted by the pressure of the outer atmosphere and a pneumatic cushion thus be provided for the entire mechanism. By omitting the valve the cushioning action is omitted; but the operation remains otherwise the same. In Fig. 4 only one of the sockets is provided with the valve.

The socket-piece G' is preferably provided with a downward extension or collar, as at 14, and the hole g' in the bottom of the socket tapers downward to the lower end of the collar, so that only the lower end of the collar engages the stem, thus avoiding any bearing of the parts excepting between extreme limits. This avoids any binding which would otherwise result. The stem g is fastened to the under side of the tread-plate G by means of a base-plate 15, into which the stem is screwed, the base-plate being fastened to the tread-plate by screws 16. If the top face of plate G becomes worn, the plate can be removed from the base-plate and surfaced to the desired form and reinforced on the under side by cheaper material—such as any suitable wood, pasteboard, &c.—to bring it to the desired thickness, and the base-plate will then be refastened to the face-plate, and the tread-plate will thus be repaired to be as good as new.

17 indicates springs on the free ends of the levers K to engage the inside of the stirrup I' to prevent any possibility of rattling at that point.

In the form of push-arm shown in Fig. 15 the push-arm C^2 is a bent lever pivoted at c^2 in the frame E^2 . c^3 indicates a pivot which pivots the rod I to the push-arm at the bend of the lever.

Now, having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a sliding door, of a push-arm pivoted to a support and wholly disconnected from the door, thereby allowing the door to slide independently of the push-arm, the path of the free end of the push-arm being in the path of the edge of the door; means for normally holding the arm in a retracted position to allow the door to close; a tread device; a lever to be operated by the tread device; and means connecting the lever with the push-arm to operate the same.

2. The combination with a sliding door, of a push-arm pivoted to a support, and normally slanting upward from the pivot toward the path of the door and having its free end free from and independent of the door, the path of the free end of the arm extending in the path of the door; a door-engaging roller

on the free end of the push-arm; means for normally holding the arm out of the path of the door; and means for operating the push-arm to move the roller in the path of the edge of the door to throw the door open.

3. A door-opener comprising a push-arm provided with a cogged segment pivoted to a support; a rack to operate said segment; and a tread device set in the floor and operatively connected with the rack.

4. A door-pusher comprising a push-arm provided with a cogged segment pivoted to a support; a rack to operate said segment; a tread-plate set in the floor; means operatively connecting the tread-plate with the rack; and means for normally retracting the push-arm.

5. The combination of a push-arm provided with a cogged segment pivoted to a support; a rack meshing with the segment to operate the arm; a rod extending down from the rack; a spring for normally holding the rod and rack in position to retract the arm; a lever connected with the rod to operate the same; and a tread-plate in the floor, operatively connected with the lever.

6. The combination of a push-arm provided with a cogged segment pivoted to a support; a rack meshing with the segment to operate the arm; a rod connected with the rack and provided with a turnbuckle for adjusting the length of the rod; a spring arranged to hold the rod and rack up to retract the arm; a lever connected with the rod to pull the same down; and a tread-plate connected with the lever to operate the same.

7. In a door-opener, the combination of the door-pushing arm; a gear-frame in the door-post; a cogged segment to which the arm is attached pivoted in the frame; a rack meshing with the cogged segment to operate the same; a rod connected with the rack; a barrel through which the rod plays; a spring on a support in the barrel; a rod-support fastened to the rod and resting on the spring in the barrel; and the door post and casing chambered to hold the gear-frame and barrel in fixed relation with each other.

8. In a door-opener, the combination of a pivoted push-arm; a rod for operating the same; a lever for operating the rod; a spring mounted on a support; and a rod-support screwed upon the rod to compress the spring adjustably.

9. In a door-opener, the combination of a pivoted push-arm; a rod for operating the same; a lever for operating the rod; a barrel through which the lever plays; a support for the barrel; a spring seated in the barrel; a rod-support adjustably mounted on the rod to rest on the spring; and a stop adjustably mounted in the barrel to limit the upward movement of the rod-support.

10. The combination of the door-pushing arm provided with a cogged segment pivoted to a support; a rack meshing with the cogged segment to operate the same; an adjustable

rod connected with the rack; a barrel through which the rod plays; a spring on a support in the barrel; a rod-support adjustably mounted on the rod and resting on the spring in the barrel; a fixed support for the barrel; a lever connected with the lower end of the rod; and a tread-plate connected with the lever to operate the same.

11. In a door-opening device, the combination with door-opening mechanism of a socket-piece set in the floor and provided in the bottom with a hole; a mechanism-operating lever extending across beneath the hole; and a tread-plate to fit in the socket and provided with a stem extending downward through the hole and resting upon the lever.

12. In a door-opener, the combination with door-opening mechanism of a socket-piece set in the floor and provided in the bottom with a hole; a lever extending across beneath the hole; a tread-plate fitting in the socket and provided with a stem which extends downward through the hole and is slotted at the lower end and rests upon and embraces the lever.

13. The combination with door-opening mechanism of the socket-piece set in the floor and provided in the bottom with a hole; a lever extending across beneath the hole; a tread-plate in the socket provided with a stem which extends downward through the hole and is slotted at the lower end to embrace the lever; and a pin inserted in the stem across the slot to engage with the top of the lever.

14. The combination with door-opening mechanism of the socket-piece set in the floor and provided in the bottom with a downwardly-extending collar having a downwardly-tapering hole; a lever extending across beneath the hole; and a tread-plate fitted in the socket and provided with a cylindrical stem which extends downward through the collar to rest upon the lever.

15. The combination with door-opening mechanism of the socket-piece provided in the bottom with a central hole; a lever extending across beneath the hole; a tread-plate provided with a stem extending down through the hole and slotted at the lower end to embrace the lever and chambered to receive a spring; and a spring in the chamber to press against the side of the lever.

16. The combination with door-opening mechanism of the socket-piece provided in the bottom with a hole; a lever extending across beneath the hole; a tread-plate fitted in the socket and provided with a hollow stem which extends down through the hole and is slotted at its lower end to embrace the lever; a spring in the hollow stem to press against the side of the lever and provided with a hole at its upper end; and a pin inserted through the stem and through the hole in the spring across the upper end of the slot to rest upon the lever.

17. In a door-opener, the combination of a socket-piece set in the floor and provided in its bottom with a central hole and with a valved outlet; a lever extending across beneath the hole; a push-plate fitted in the socket and having a stem extending downward through the hole to engage the lever; a push-arm; means connecting the lever with the push-arm to operate the same; and means for returning the parts to their normal position.

18. In a door-opener, the combination of the socket-piece set in the floor and provided in the bottom with a central hole and with a valved opening; a lever extending across beneath the central hole; and a tread-plate in the socket and provided with a downwardly-projecting stem which fits in the central hole and rests upon the lever.

19. In a door-opener, the combination of a pivoted push-arm in the door-post; means for operating the arm connected with a downwardly-extending rod; such rod; a stirrup fastened to the bottom of the rod; a lever beneath the floor pivoted at one end and with its other end inserted in the stirrup; and a tread device for operating the lever.

20. In a door-opening device, the combination of a push-arm pivoted in the door-post; means connected with the arm for operating the same; a rod extending downward from such means; a stirrup at the bottom of the rod; a pin extending through the stirrup; and two levers pivoted below the floor and having their free ends inserted in the stirrup against opposite sides of the pin.

21. In a door-opener, the combination of a push-arm pivoted in the door-post; means for operating the arm; a rod extending down from the arm; two levers under the floor operatively connected with the rod at their free ends and extending away from the door on

opposite sides thereof; and two tread devices, one on each side of the door at a distance therefrom to operate the levers respectively.

22. A tread device for door-openers comprising a socket-piece to fit in the floor; a tread-plate fitting in the socket-piece and provided in its top with a screw-threaded socket; and a screw-threaded handle provided in its top with a slot and screwed into the screw-threaded socket with its head flush with the top of the plate whereby means for withdrawing the plate from the socket are provided by partially unscrewing the handle from its socket.

23. In a door-opener, the combination with a door-post provided at its upper end with a chamber, of a push-arm provided with a cogged segment pivoted in the chamber, said arm extending upward and outward in the chamber; a rack for operating the arm and to normally hold the arm in the chamber; and a tread-plate operatively connected with the rack to move the rack to throw the free end of the arm out of the chamber.

24. In a door-opener, the combination of a pivoted cogged segment with push-arm projecting from the cogged face thereof and a rack meshing therewith and slotted to receive the arm.

25. A door-opener comprising a gear-frame provided with a rackway slotted at the upper end; a cogged segment pivoted thereto and provided with a push-arm projecting from the cogged face thereof; a rack meshing with the segment and provided with a slot to receive the arm; and means for operating the rack.

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