

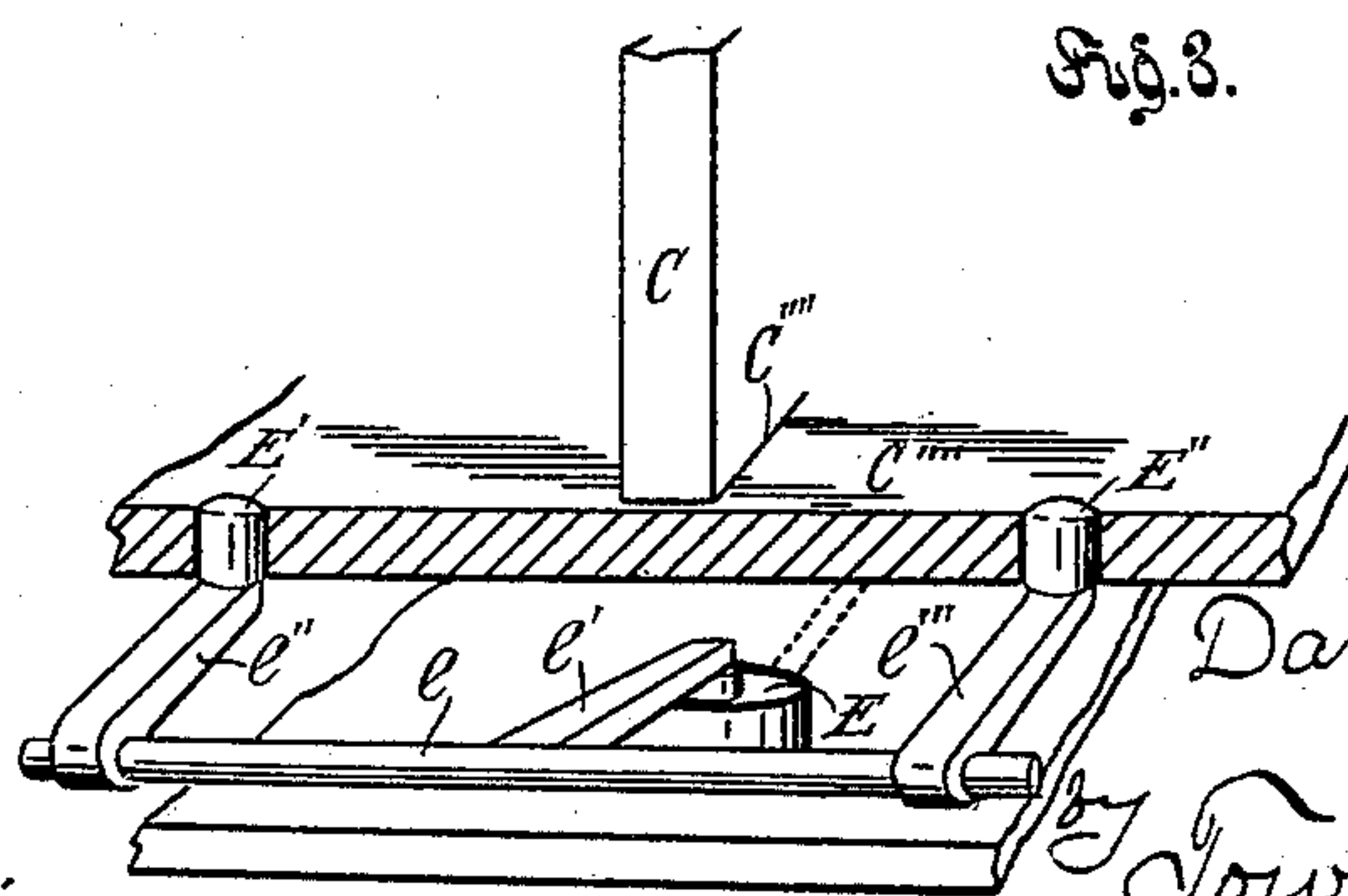
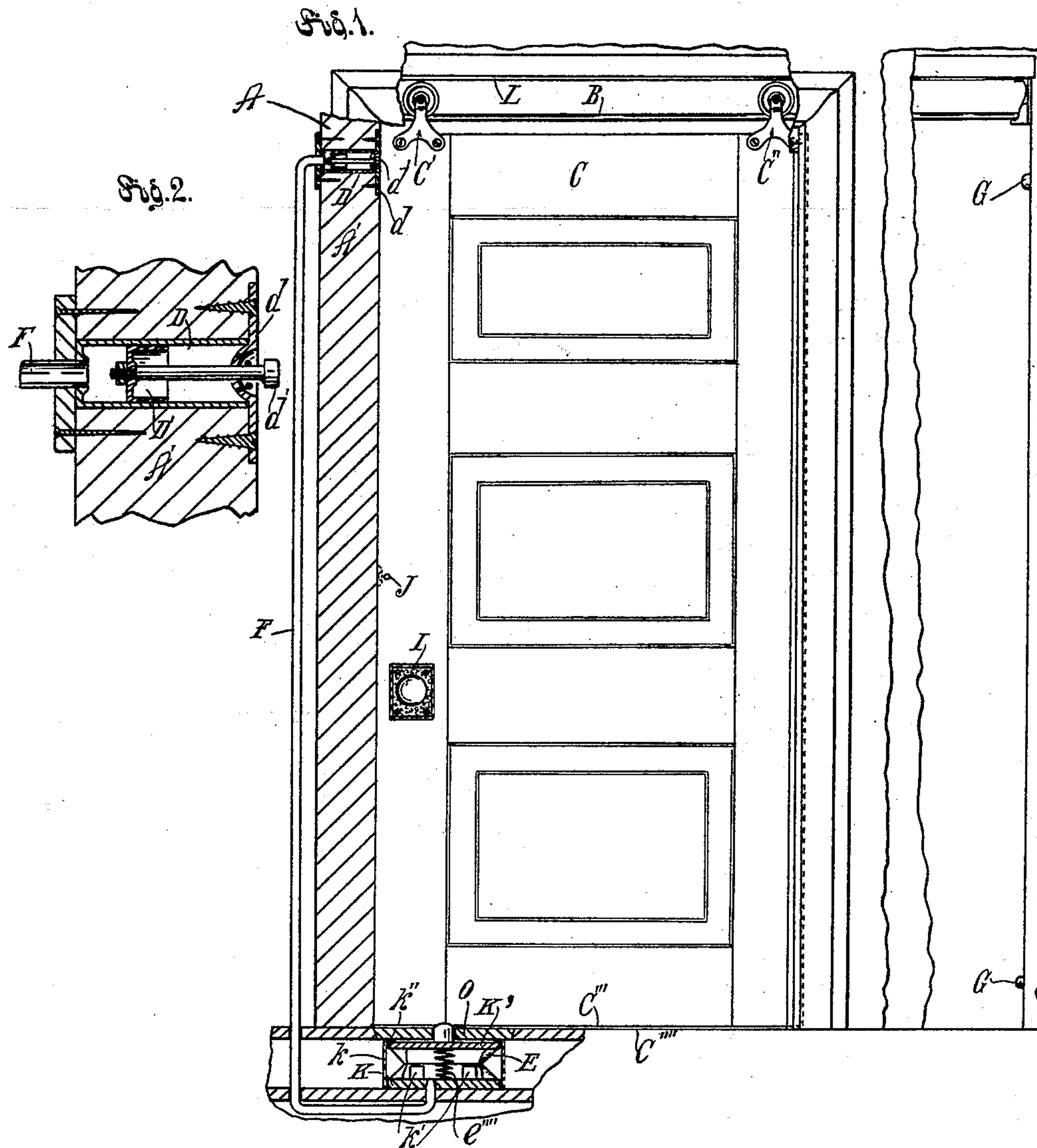
No. 622,823.

Patented Apr. 11, 1899.

D. SCHUYLER.
AUTOMATIC SLIDING DOOR.

(Application filed June 9, 1898.)

(No Model.)



Witnesses
Seymour Kingman.
Geo. A. Johnson.

Fig. 3.

Inventor
Daniel Schuyler
by Townsend Bros
his Attys.

UNITED STATES PATENT OFFICE.

DANIEL SCHUYLER, OF SAN DIEGO, CALIFORNIA, ASSIGNOR OF ONE-HALF
TO AUGUSTUS NEWELL, OF PASADENA, CALIFORNIA.

AUTOMATIC SLIDING DOOR.

SPECIFICATION forming part of Letters Patent No. 622,823, dated April 11, 1899.

Application filed June 9, 1898. Serial No. 683,029. (No model.)

To all whom it may concern:

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

My invention relates particularly to those doors which are supported by means of hangers running upon a rail or track.

A few disadvantages of the ordinary swinging doors are that they are slammed by wind or careless people, children oftentimes are struck and hurt by slamming doors or have their fingers caught and pinched or mangled, and when used between the dining-room and kitchen and arranged to swing both ways a person passing through in one direction is liable to swing the door against a person endeavoring to pass through in the opposite direction and cause breakage of dishes or spilling of food, to say nothing of the ill temper engendered and contusions produced. Double swinging doors avoid a few of these objections, but produce other objectionable results almost as bad, and, in addition, are much more expensive than single doors. Furthermore, a swinging door is often left ajar or held partially open by a strong draft, thus admitting flies and other insects and in inclement weather producing colds.

One object of my invention is to produce a sliding door which will have normally a tendency to close itself and by its movement in closing will so adjust itself as to close the crack which ordinarily exists between the bottom of the door and the floor or the threshold to thereby prevent the admission of drafts and also of flies or other insects into the room.

A further object of my invention is to provide a door which will be especially adapted for use between dining-rooms and kitchens and whereby the servants or other persons having their hands full of dishes or other things will be enabled to open the door quickly without using their hands and without delay or any inconvenience whatever and after they have passed therethrough the door will automatically close.

It is an especial object of my invention to produce a device of this kind in which a movement of very slight amplitude will suffice to throw a door wide open, the pushing device not being attached to the door and being free to return to its normal position while the door is opening.

My invention comprises the various features of construction and combinations of parts hereinafter fully set forth and claimed whereby I accomplish the objects hereinbefore specified.

The accompanying drawings illustrate my invention.

Figure 1 is a perspective side elevation of a door and support, illustrating my invention as applied to use. Fig. 2 is a fragmental sectional view illustrating the pusher, whereby the door is readily opened. Fig. 3 is a view of the means which I employ for operating the bellows from either side of the doorway.

In the drawings, A represents the supporting structure, upon which the entire device is mounted.

B represents a supporting-rail which is inclined from a horizontal, as shown in the drawings, and C is a sliding door which is provided with hangers C' C'', which run upon the rail and support the door. These hangers are of an improved antifriction type, such as the hangers set forth and claimed in a specification prepared and executed by Augustus Newell upon this 26th day of May, 1898, preparatory to obtaining Letters Patent of the United States therefor. These hangers are especially adapted for this purpose in that they are practically devoid of friction, and therefore the door, which is supported thereupon, will move readily in response to the force of gravity. It is essential to the successful operation of my invention in this respect that the hangers which are used be of the highest type of antifriction-hangers; otherwise the operation may be impaired in that the rail must be given so great an inclination as to be objectionable in order to insure that the door close without fail.

The bottom C''' of the door is arranged in a horizontal plane, and the floor or threshold C'''' is also horizontal, so that when the

door is closed it will rest closely against or near to the floor or threshold, as shown in the drawings. By reason of the rail B being inclined as soon as the door is pushed backward along the rail to open the door the bottom of the door is raised from the floor, and all friction and rubbing are thereby avoided, and when the door closes it gradually lowers and can be so regulated that when fully closed it will almost or quite touch the floor or threshold.

In order to provide means whereby the door may be conveniently opened by a person having his hands full of dishes or other articles, I provide a pneumatic pusher, whereby a quick sharp movement may be imparted to the door to throw it open. This pushing device, as shown, comprises a cylinder D, which is chambered within the jamb A' of the door, to which the face or end plate *d* is secured by screws, and a piston D', arranged to slide within the cylinder and provided upon its outer end with a preferably padded head *d'*, which when the piston is in its retracted position will lie substantially flush with the face of the door-jamb.

E is a bellows which is preferably arranged beneath the floor C''' of the dwelling and by means of a tube F, which connects the bellows with the cylinder, is adapted to operate the pusher. If it is desired, an independent bellows may be arranged upon each side of the doorway and each connected with the tube F and provided with means whereby it may be operated when desired. Ordinarily, however, I believe it to be preferable to provide a single bellows for operating the pusher and to provide means whereby such bellows may be operated from either side of the doorway. As shown in the drawings, this means comprises a shaft *e*, which is pivoted or journaled beneath the floor and is provided with a crank-arm *e'*, which rests upon top of the bellows and is adapted to compress it, and has two operating-arms *e'' e'''*, arranged upon opposite sides of the doorway and provided with tread-plates E' E'', respectively, which project through suitable openings provided in the floor. These tread-plates may be arranged beneath the carpet, if desired, and their location determined by any suitable markings, so that to an ordinary observer there will be no appearance of anything unusual. *e''''* is a spring to hold the bellows expanded and the tread-plates in their elevated position. A further use of this spring is that after the piston has been forced forward in the cylinder by the operation of the bellows and the pressure upon the bellows is released the spring in expanding the bellows produces a suction within the cylinder, which immediately draws the piston back until the head thereof is flush with the door-jamb. This operation is so instantaneous that unless a person is watching very closely he will be unable to detect by what means the door is opened. It will be

noticed that this pusher is placed near the top of the door and entirely out of the way of persons passing through the doorway. This bellows is very simple and cheap and, as shown, is of the accordion variety and comprises two heads K K', connected with each other by a flexible sheet of material in the ordinary manner, and is provided with an outer casing or protecting-shield *k*, of sheet metal, which is provided at its top with a flange *k''* and slips downward over the top head and is lightly tacked to the bottom, so as to prevent mice or other vermin from getting at the flexible material of the bellows and destroying it. This casing also forms a guide which causes the heads to maintain their proper relative position, and blocks *k'* are arranged upon the inside of the bellows to limit its compression, and thereby limit the movement of the tread-plate. The flange *k''* prevents undue expansion of the bellows.

It is necessary in order that the operation be not retarded by friction that the piston be not fitted too tightly within the cylinder. For this reason a slight leakage is allowed, and therefore it is ordinarily unnecessary to provide any inlet to the bellows, since after the piston is retracted by the suction produced by the expansion of the bellows if additional air is required to fill the bellows it will enter between the sides of the piston and the walls of the cylinder.

When the bellows is operated by a person treading upon either tread-plate, the air will rush from the bellows through the tube into the cylinder and will force the piston D' rapidly outward therefrom, so that the padded head *d'* will engage with the door and will force the door backward along the inclined rail. The force with which the door is thrown open may be regulated by the pressure of the foot upon the tread-plate. If it is desired to cause the door to be thrown wide open, a heavier pressure is given than is necessary when it is only desired to force the door partially open. The operator can quickly determine the pressure required and can regulate the width of opening to suit.

G represents a yielding stop which is arranged to receive the door when it is thrown violently open and to prevent any undesirable jar or shock which might otherwise occur should the operator press too hard upon the bellows. This also prevents any noise.

In practice when the parts are assembled, as shown, if it is desired to open the door the operator as he walks toward the door so regulates his pace that he places one foot upon the tread-plate E' and delivers sufficient pressure thereupon to operate the pusher to throw the door open to the desired extent. He then passes through the door, and by the operation of gravity the weight of the door causes the hangers to roll down the inclined rail and the door is closed behind him. When it is desired to return through the door, the opera-

tion is repeated upon the tread-plate upon the opposite side of the door and with the same result.

It will be noted that the opening of the door is effected by the operator in walking and that therefore there is no delay or inconvenience whatever. Should the force exerted be so great as to throw the door violently open, the yielding stop G will receive the door and prevent any jar, shock, or noise. If it is desired to open the door in the usual manner, the operator may with his hand grasp the handhold I, and thereby throw the door open, and after passing through it will close behind him. It will be seen that the door is entirely disengaged from the pushing mechanism, and, if desired, it may be opened by hand the same as any ordinary sliding door.

Should it be deemed necessary, a suitable yielding stop may be arranged to check the forward motion of the door to thereby prevent any jarring when the door closes. Ordinarily, however, the inclination of the rail will be so slight that the closing movement of the door will be so gentle that there is no liability of the noise produced by the closing of the door being at all undesirable.

The especial feature of my invention consists in providing a door which may be readily opened either by or without the use of the hands and which when opened either by the use of a pusher or by the hand will automatically close itself. It is immaterial in this respect whether the closing is effected by means of the inclined rail shown or whether a spring is arranged for this purpose. It is obvious that the inclined rail is not only the most satisfactory and the cheapest way in which to automatically close the door, but that the closing of the door thereby is effected with much more uniformity than is possible where a spring is used. It can also be seen that the inclined rail always operates to hold the door in proper position to be operated upon by the pusher. It is also obvious that other mechanical means for pushing the door open may be provided without departing from the spirit of my invention. The pneumatic means, however, which I have shown is not only extremely cheap and simple, but is easily regulated, so that the exact force which it is desired to deliver to the door can be delivered by the operator without miscalculation. Furthermore, air is in itself a spring, and therefore by delivering the impulse to the door through the medium of a column of air there is no sudden shock and the movement is gentle, but increases as the inertia of the door is overcome.

My invention differs from all other devices of this class in that the pushing device is not attached to the door, and therefore when sufficient momentum is given to the door to enable it to temporarily overcome the means for holding the door closed the pusher is free to return to its normal position as soon as

the pressure is removed from the tread-plate. This permits the door to be opened by a very slight movement of the tread-plate and also allows the plunger to withdraw from the doorway before the person passes through the door. This also permits the use of a device much more compact and simple than is possible where the actuating means must follow all the motions of the door.

The only parts of the device which are liable to wear out or get out of order are the piston and the bellows. The bellows may be reached and removed through a suitable trap-door O, provided in the floor, and by removing the screws by which the face-plate or head of the cylinder is secured to the jamb A' the piston may be also removed, if necessary.

My automatic sliding door is especially designed to be applied in a sliding door structure which is described and claimed in an application for patent to which oath was made by Augustus Newell upon this 26th day of May, 1898. In this structure, however, the rail is shown horizontal, and in order to adapt this structure to my improved door with its inclined rail and to cause both rails to assume exactly the same inclination I provide a tapered strip L, which preferably feathers to nothing at the rear end and gradually thickens toward the front end, as shown, so that when this strip is placed in the structure to which I have referred the upper track-rail and the lower track-rail are secured in place in the manner in which he describes and are thereby brought into exact parallelism with each other.

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

1. The combination set forth of the door; means for normally holding the door closed; a cylinder chambered in the door-jamb; a piston arranged to slide in the cylinder and having its stem adapted to deliver a quick forcible push against the door, and to be retracted while the door is opening.

2. The combination set forth of a door; means for yieldingly holding the door closed; a pushing device adapted to impart momentum to the door to temporarily overcome the means for holding the door closed, said pushing device being disconnected from the door, and free to return to its normal position as soon as the actuating-pressure is relieved.

3. In a sliding door, the combination set forth of an inclined rail; a sliding door provided with hangers to run upon the rail; an air-cylinder chambered in the door-jamb; a piston arranged in the cylinder and having its stem adapted to engage the door and to push it backward along the inclined rail; a bellows; means for operating the bellows; and a tube connecting the bellows with the cylinder.

4. In a door-opener, the combination set forth of a pneumatic pusher; a bellows for

operating the pusher; a shaft journaled to rotate and provided with an arm for operating the bellows, and also with two operating-arms arranged upon opposite sides of the doorway.

- 5 5. The combination set forth of a door; a pneumatic pusher for opening the door; a bellows for operating the pusher; tread-plates, one arranged upon each side of the doorway;

and means connecting each tread-plate with the bellows and adapted to operate the bellows.

DANIEL SCHUYLER.

Witnesses:

ALFRED I. TOWNSEND,
JAMES R. TOWNSEND.