

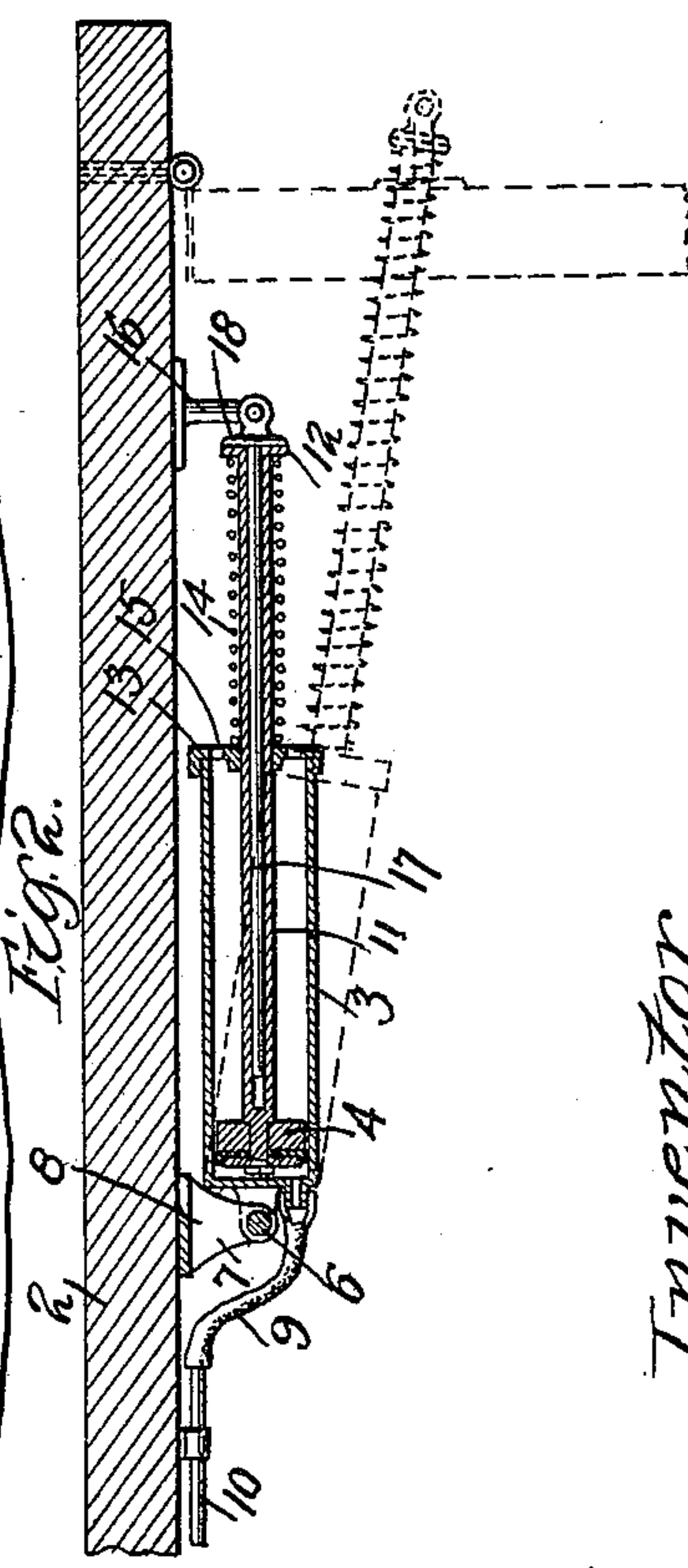
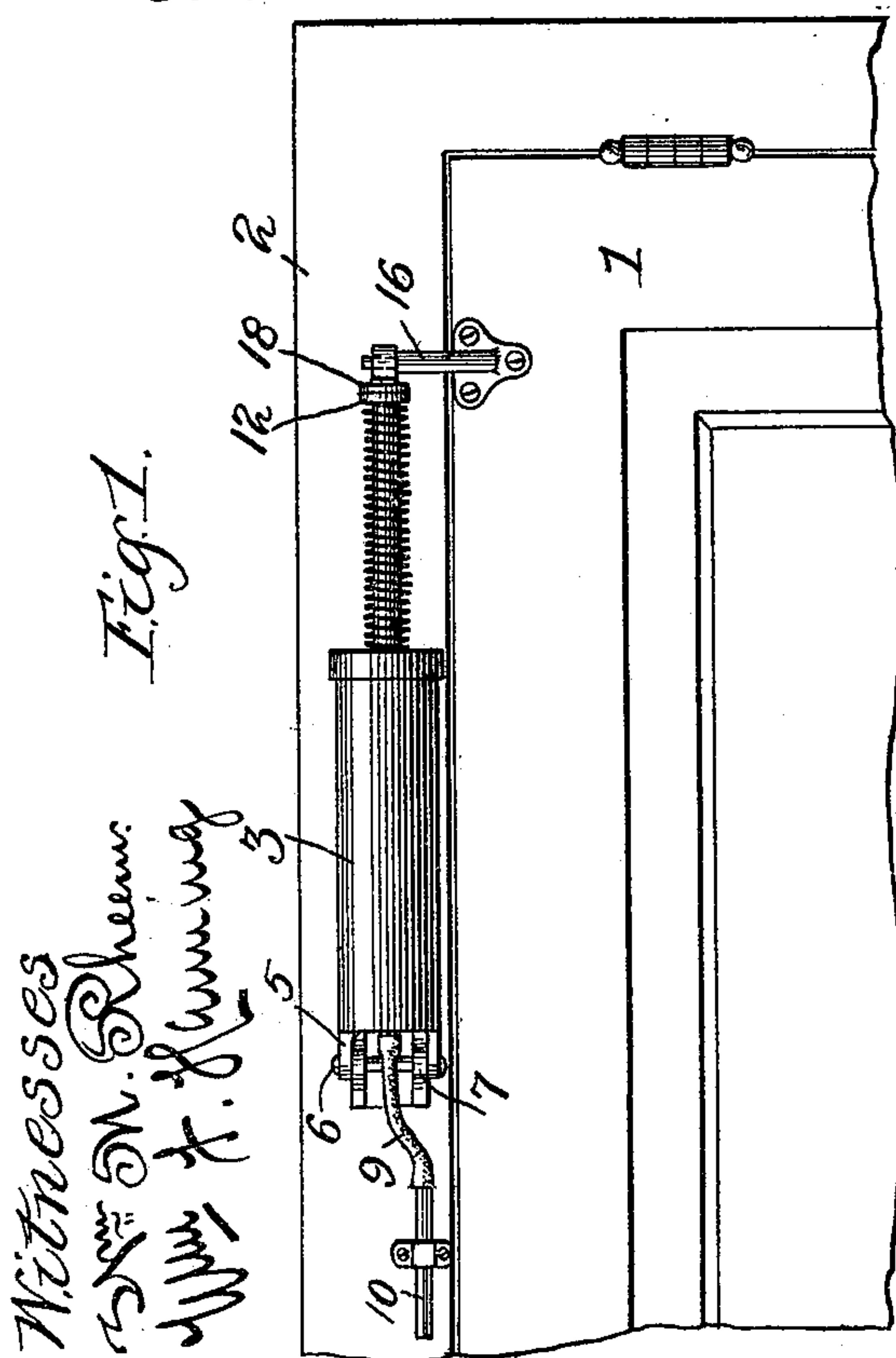
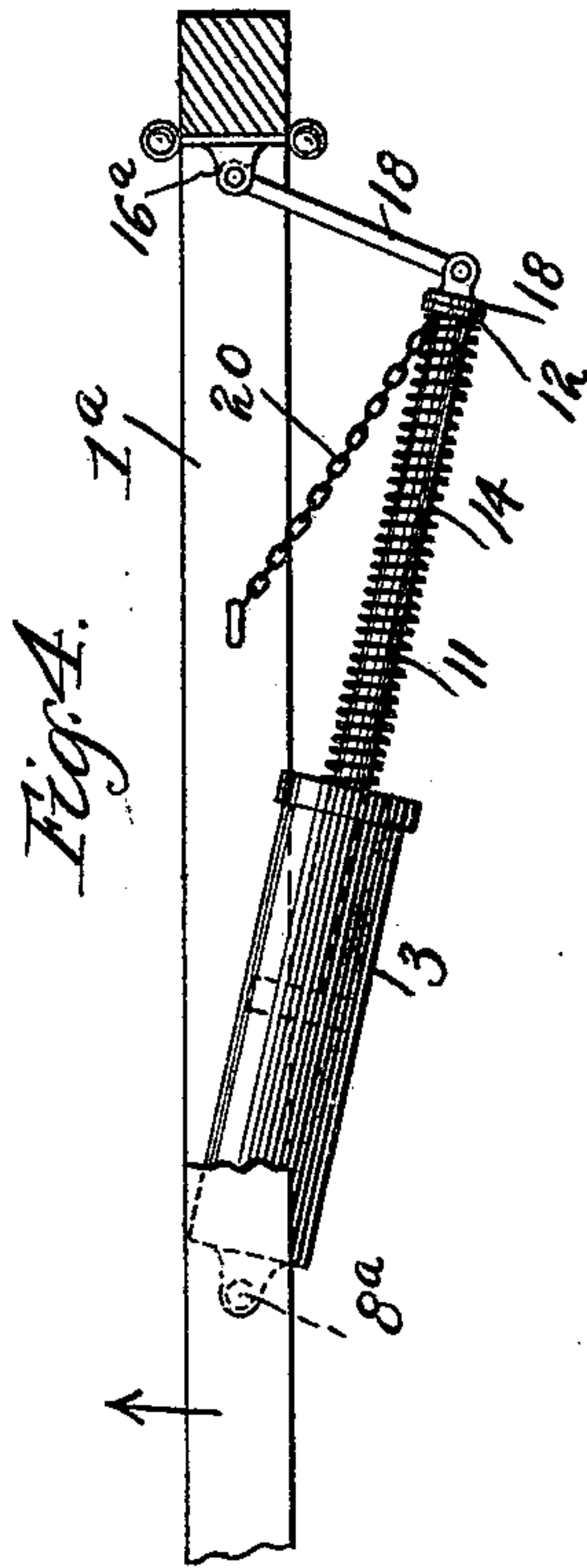
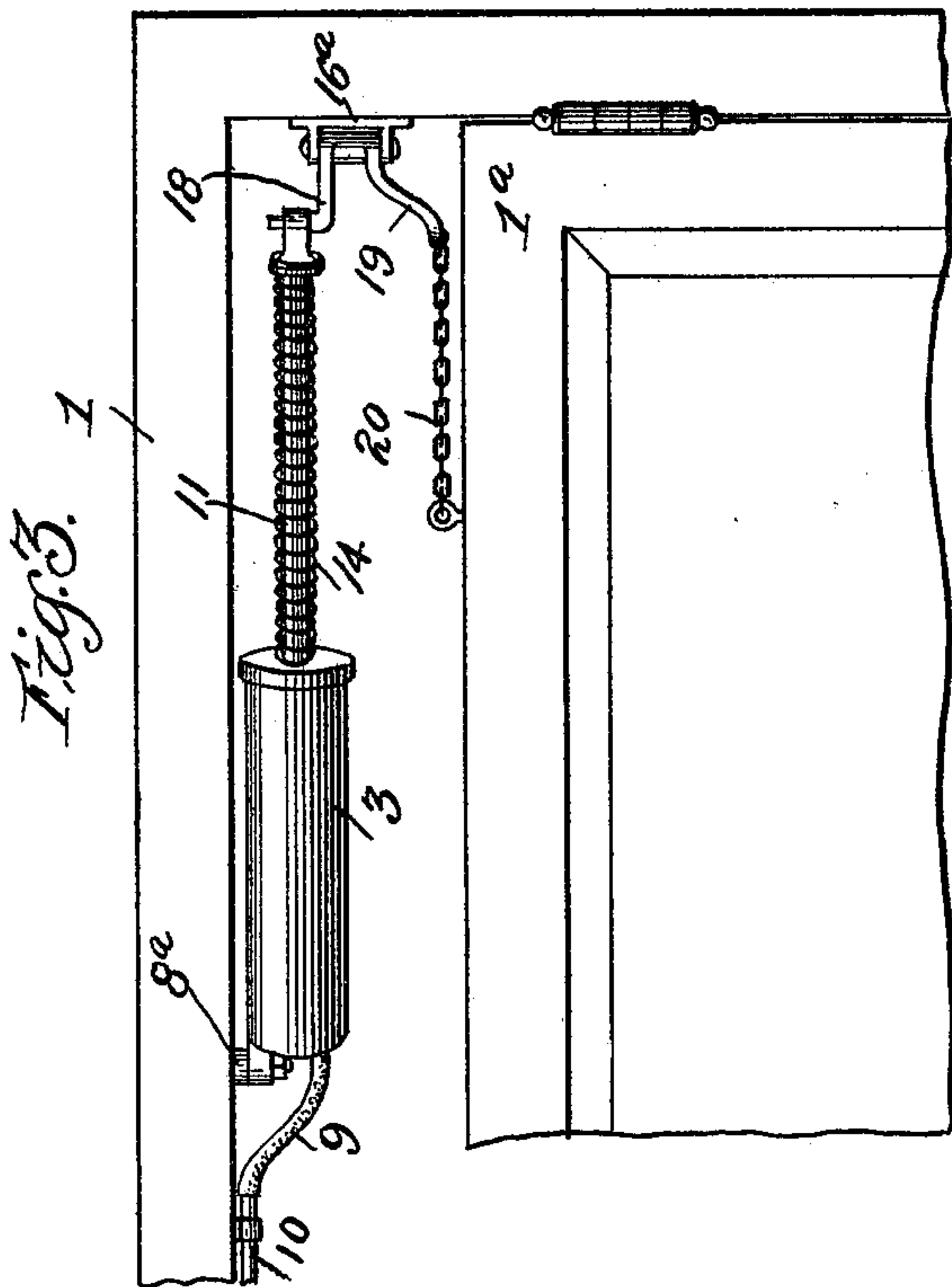
No. 624,002.

Patented May 2, 1899.

F. W. ENSIGN.
AIR FORCING OR COMPRESSING DEVICE.

(Application filed Feb. 2, 1898.)

(No Model.)



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UNITED STATES PATENT OFFICE.

FRED W. ENSIGN, OF CHICAGO, ILLINOIS, ASSIGNOR TO ALFRED J. COHEN,
OF SAME PLACE.

AIR FORCING OR COMPRESSING DEVICE.

SPECIFICATION forming part of Letters Patent No. 624,002, dated May 2, 1899.

Application filed February 2, 1898. Serial No. 668,793. (No model.)

To all whom it may concern:

Be it known that I, FRED W. ENSIGN, a citizen of the United States, residing at Chicago, county of Cook and State of Illinois, have invented certain new and useful Improvements in Air Forcing or Compressing Devices, of which the following is a full, clear, and exact specification.

My invention relates to devices for compressing or forcing air generally; but it has more special reference to that class of devices in which the air is forced or compressed by the opening and closing action of a door.

My invention has for its primary object to provide an improved and simple form of air-forcing device of this character adapted to be secured to a door of either the swinging or the one-way type, and will permit the door to freely open and close any desired extent without danger of injury to the apparatus.

With these ends in view my invention consists in certain features of novelty in the construction, combination, and arrangement of parts by which the said objects and certain other objects hereinafter appearing are attained, all as fully described with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the said drawings, Figure 1 is a side elevation of my improved air-forcing apparatus or device applied to a door and its jamb or frame, the door being the one-way type or kind which opens in one direction only. Fig. 2 is a plan section thereof, showing the door open in dotted lines. Fig. 3 is a view similar to Fig. 1, illustrating a slight modification of my invention as applied to a swing-door; and Fig. 4 is a plan section thereof.

Referring now more particularly to the form of invention shown in Figs. 1 and 2, 1 represents the door, and 2 its jamb or frame, while 3 is a pump cylinder or chamber containing a piston or plunger 4, the cylinder and the plunger having operative connection the one with the door-frame and the other with the door. The pump constituted by the cylinder 3 and plunger 4 may be constructed on the principle of any ordinary bicycle-pump in which the plunger-packing is a cup-leather adapted to pack the plunger when moving in one direction or inwardly and to permit it to work freely when moving in the other direc-

tion or outwardly, and, in fact, any construction of pump that will force air will serve the purpose. I have shown the cylinder 3 connected to and supported upon the frame 2. This may be conveniently effected by providing the rear end of the cylinder with a pair of perforated ears 5, which, together with a pivot-pin 6 and a pair of perforated lugs 7, provide the cylinder 3 with hinge-support upon a bracket 8, secured in any suitable way to the jamb or frame 2.

The piston or plunger 4 has operative connection with the door 1, so that when the door is swung upon its hinges, preferably when it closes, the plunger or piston will be forced into the cylinder and compress the air therein, forcing the air through a flexible connection or tube 9, communicating with the end of the cylinder at one end and having its other end attached to a pipe or tube 10, which may convey the air to any desired point of consumption, such as an atomizer, motor, or any other device where air under pressure is needed. In effecting this operative connection with the door I provide the piston 4 with a hollow piston-rod 11, having at its outer end a flange or head 12, between which and the cap 13 of the cylinder is located a coil-spring 14, which when pressure upon the piston-rod 11 is relieved forces the piston or plunger outwardly, so as to transfer the air in the cylinder to the inner side of the plunger or piston, the cylinder being replenished through the induction-port 15. The mechanism is designed to cause this to take place when the door is opened, as shown in dotted lines in Fig. 2. As the door is closed a bracket 16, secured to the door, forces the piston-rod inwardly. Pivotaly secured to the upper end of this bracket 16 is a rod 17, which is inserted within the hollow piston-rod 11, as clearly indicated in Figs. 1 and 2. When the door is opened, the spring 14 will cause the flange 12 and rod 11 to follow up the head 18 until the plunger reaches the outer extremity of its stroke, whereupon the outward movement of the rod 11 ceases; but the internal rod continues to follow the door and bracket 16 while supporting and guiding the hollow rod 11, thus permitting the door to be opened to any desired extent without regard to the air-forcing apparatus and without danger of damag-

ing the apparatus or placing the parts thereof in an inoperative condition.

The form of my invention shown in Figs. 3 and 4 embodies a slight modification, adapting it for use on a swinging door 1^a. In the majority of instances doors of this character are hung in the frame at a considerable distance from the top, thus leaving a space, as shown in the drawings, in which I locate my air-forcing device, the cylinder 3 being pivoted to a bracket 8^a on the under side of the upper member of the frame, so that the cylinder may swing back and forth through the doorway as the door swings from side to side. To one of the sides of the jamb is secured a bracket 16^a, in which is pivoted a double arm, one of whose members 18 is pivotally connected to the internal member 17 of the telescopic piston-rod, while the other arm member 19 is connected by a chain or other suitable attachment 20 to the door 1^a. The relation and proportions of the arm member 18, rod 11, and cylinder are such that when the arm member 18 and piston-rod 11 are in direct line the piston or plunger 4 will be at the inner extremity of its stroke, causing the air to be compressed or forced out of the cylinder; but as soon as the arm member 18 and rod 11 are deflected to one side of such direct line the spring 14 will force the arm and rod 11 into the angular relation illustrated in Fig. 4, drawing the plunger or piston partly or wholly to the outer end of its stroke. When the parts are in this relation, compression of the air in the cylinder 3 is effected, as before described, when the door is opened in the direction indicated by the arrow in Fig. 4, the movement of the door in that direction being imparted to the arm member 18 by means of a chain 20, thus pulling the arm member 18 and piston-rod 11 to the other side of the center or direct line and affording opportunity for the spring 14 to continue the movement in that direction and place the parts in the angular position illustrated in Fig. 4, but on the opposite side of the door. Now if the door be opened in the reverse direction the operation will be repeated, as will be understood. To accomplish these movements, the combined length of the arm 18 and the piston-rod member 11 is greater than the distance between the pivot of the arm 18 and the outer extremity of the stroke of the piston, but not greater than the distance between such pivot and the inner extremity of such stroke, so that the arm 18 may swing to either side of a straight line between the pivot of the cylinder and the pivotal support 16^a.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. A device for the purpose described having in combination a cylinder containing a plunger or piston, a hollow rod secured to said piston, and having the flange 12, a spring sleeved on said rod between said flange and cylinder, a second rod working loosely in said

first rod, and having an abutment adapted to come against one end of said first rod and force it into said cylinder against the inertia of said spring, and means for attaching the outer end of said second rod to a door, substantially as set forth.

2. A device for the purpose described having in combination a cylinder pivotally supported at one end, a piston in said cylinder, a piston-rod secured to said piston, a spring forcing said piston-rod outwardly, a pivotal arm having operative relation to said piston-rod, and means for connecting said arm with a swinging object, the combined length of said arm and piston-rod being greater than the distance between the said pivotal support of said arm and the outer extremity of the stroke of the piston but less than the distance between such support and the inner end of the stroke of the piston whereby said arm may swing to both sides of a straight line passing between the pivot thereof and the pivot of the cylinder, substantially as set forth.

3. A device for the purpose described having in combination an air-compressing chamber or cylinder, a plunger or piston therein, a telescopic piston-rod having one member connected to said piston, means for forcing said member in one direction, and means for attaching the other member of said rod and the said cylinder or chamber, the one to a fixed support and the other to a door, both members of said rod being disconnected with and movable independently of said chamber or cylinder, substantially as set forth.

4. A device for the purpose described having in combination a cylinder, a piston therein, a telescopic piston-rod both of whose members project from the same end of the cylinder and one of which is connected with said piston but both movable independently of the cylinder, a spring acting to protrude the first said member of said rod from the cylinder and means for pivotally attaching said other member and cylinder the one to a fixed support and the other to a door, substantially as set forth.

5. A device for the purpose described having a cylinder provided with a pivotal support, a piston in said cylinder, a piston-rod secured to said piston, a pivotal arm having one end pivoted to said piston-rod, means for normally protruding said rod from said cylinder and holding the same at an angle to said arm in combination with a door-frame, a two-way-opening door hinged in said frame with a space between its edge and said frame, means for mounting said pivotal support of the cylinder in said space and means for mounting said pivotal arm in said space and operatively connecting said arm to said door, substantially as set forth.

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