

(No Model.)

D. A. PALMER.
PNEUMATIC DOOR OPENER.

No. 442,198.

Patented Dec. 9, 1890.

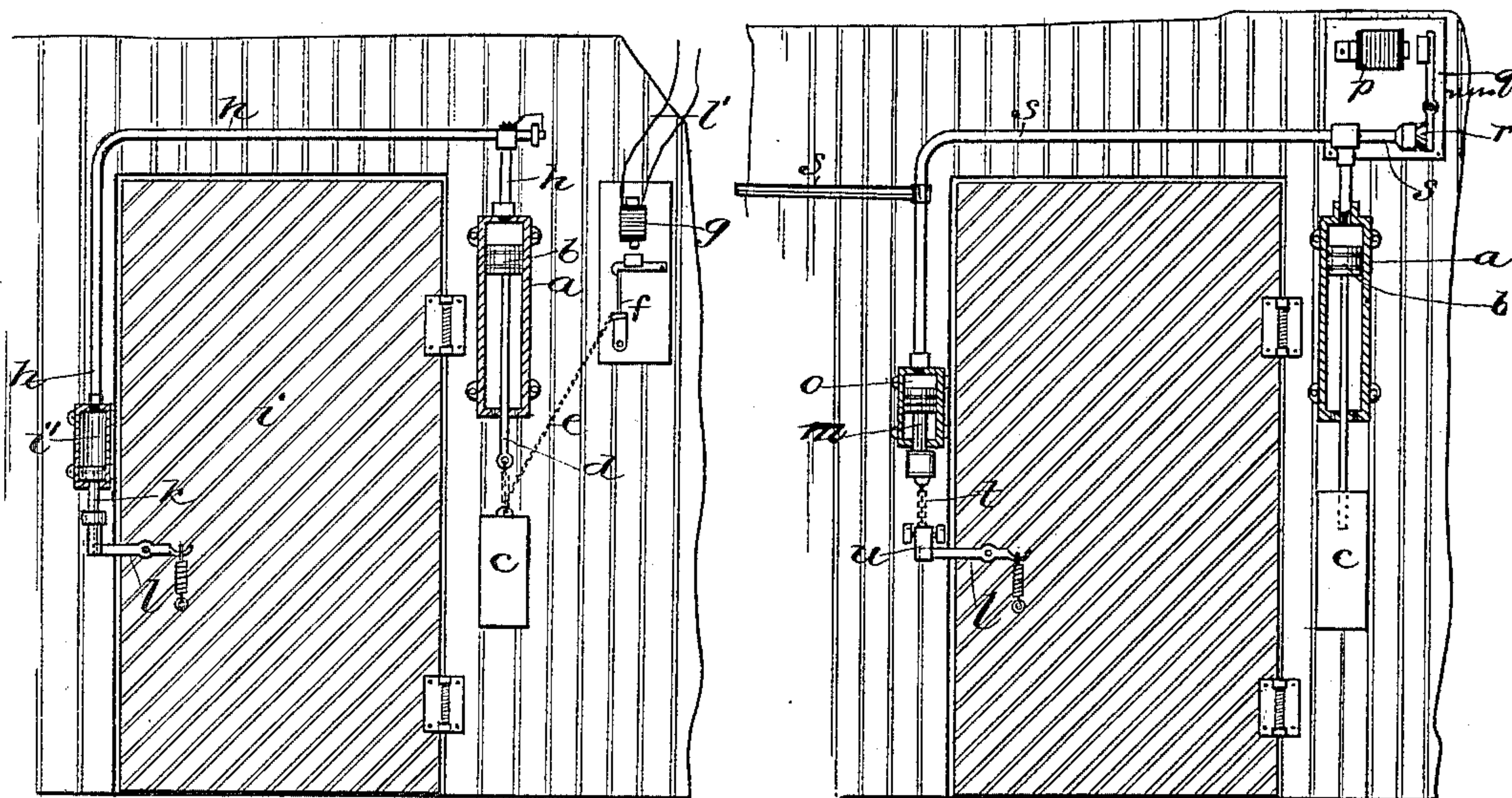


Fig. 1.

Fig. 2.

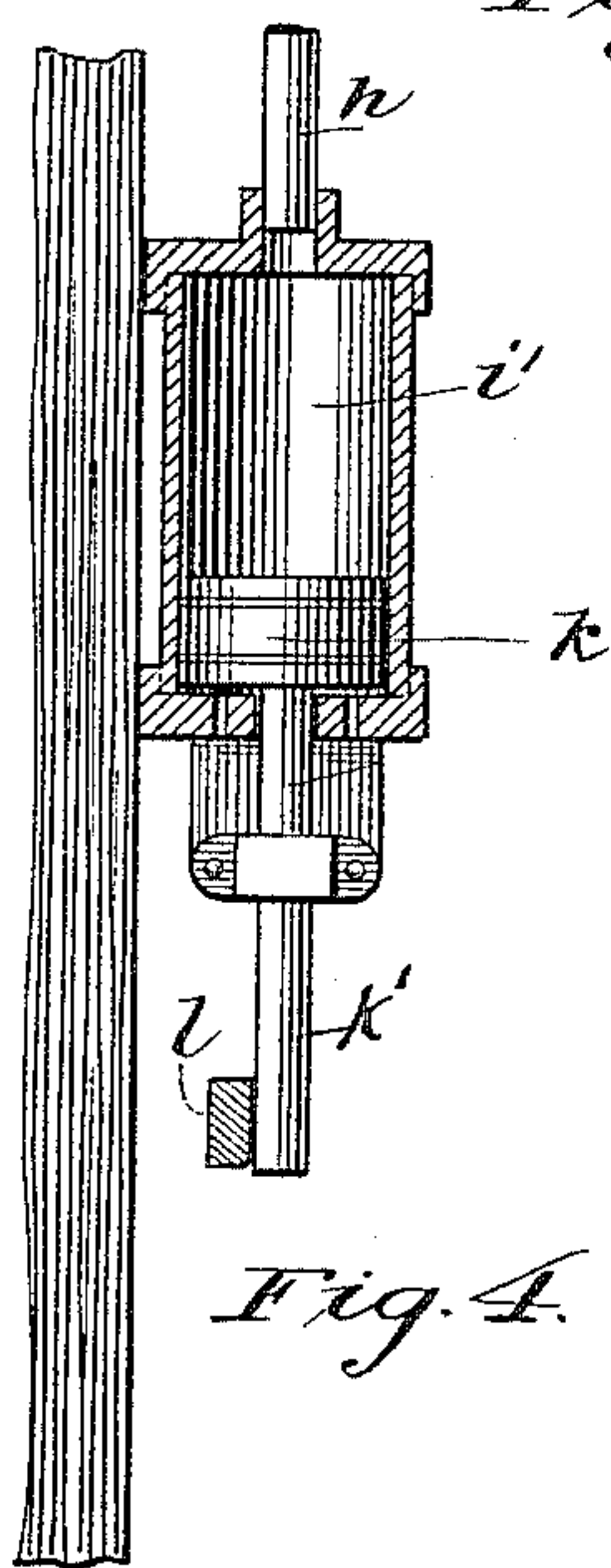


Fig. 4.

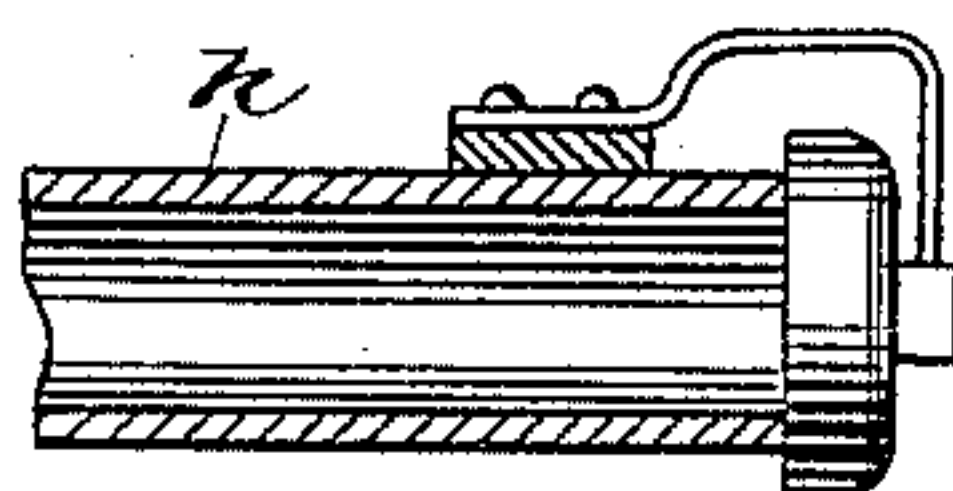


Fig. 3.

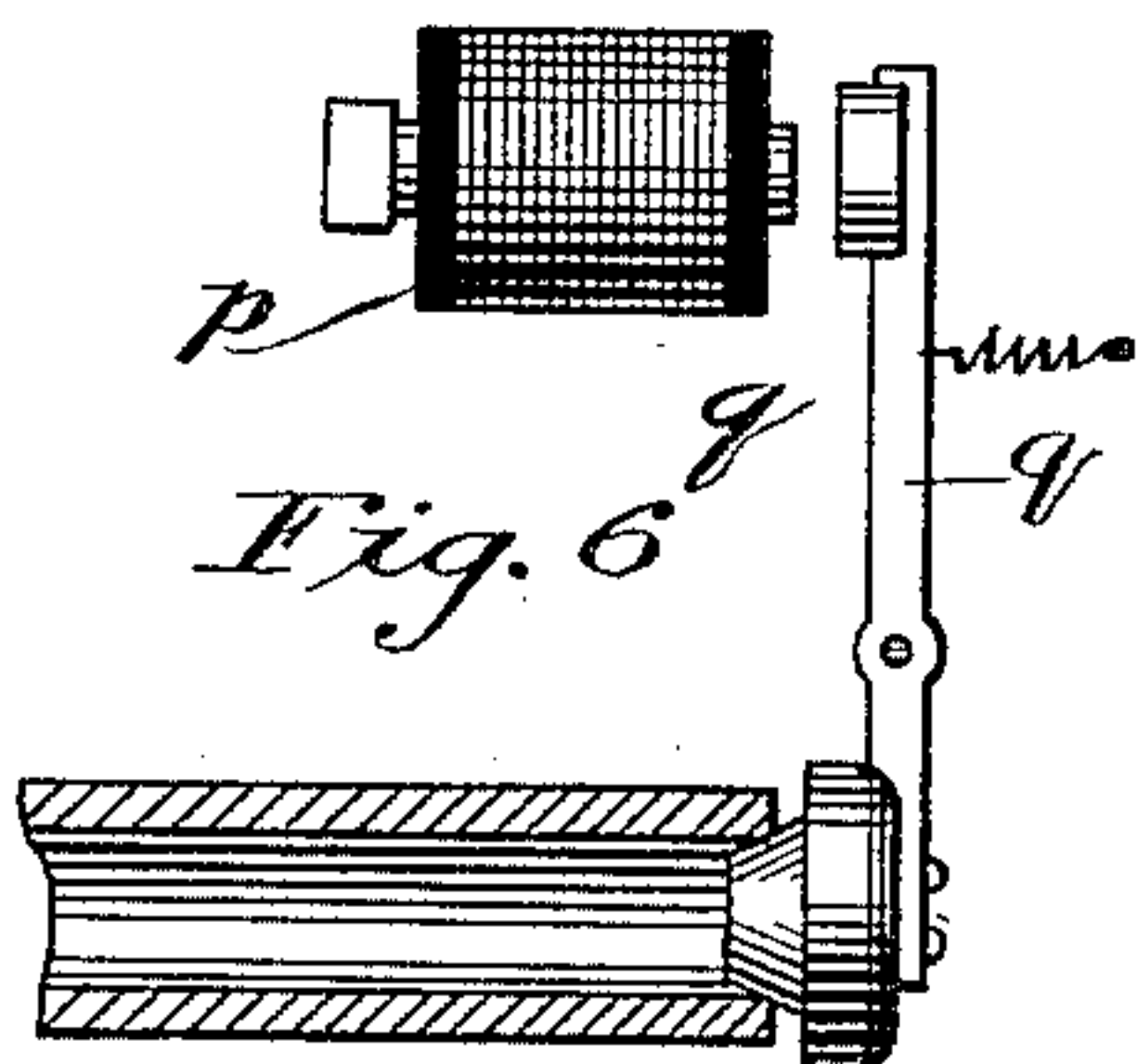


Fig. 6.

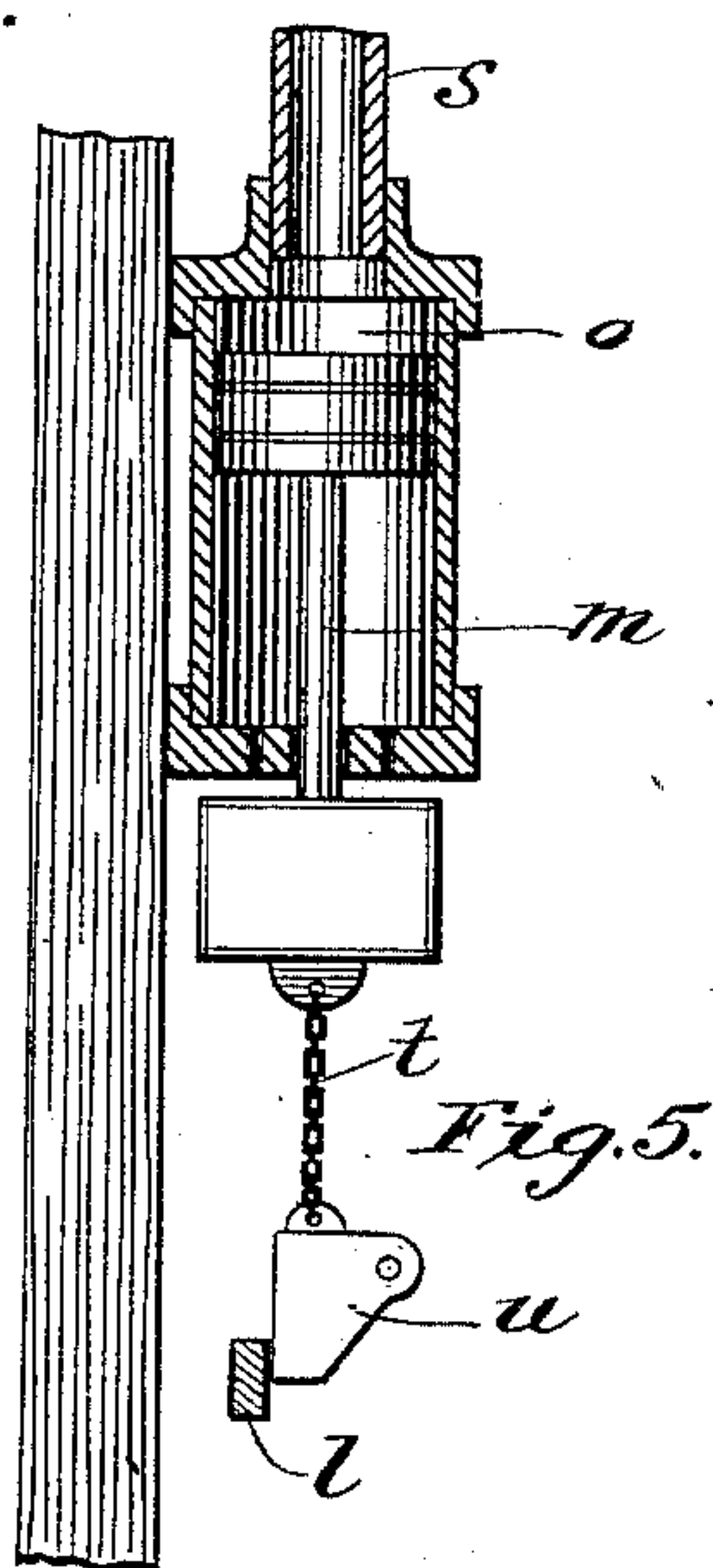


Fig. 5.

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DON A. PALMER, OF CHICAGO, ILLINOIS.

PNEUMATIC DOOR-OPENER.

SPECIFICATION forming part of Letters Patent No. 442,198, dated December 9, 1890.

Application filed May 26, 1890. Serial No. 353,201. (No model.)

To all whom it may concern:

Be it known that I, DON A. PALMER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Pneumatic Door-Openers, (Case 3,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to stall-door openers, to be used more especially in fire-engine houses, though my device might be used in connection with any spring-door.

In fire-engine houses it is usual to arrange the stalls in such a way that by automatic means the fronts of the stalls may be swung out, thus leaving a clear way for the horses to trot out to their places by the engine without delay. Heretofore various means have been employed for this purpose. Suitable cords and pendent weights have been arranged to withdraw the bars or bolts of the stall-doors when the weights are released and allowed to drop. The cords in such systems are apt to knot or kink, and hence prevent the action of the device and cause serious delay. Further, the cords are under a constant tension, and also subject to sudden strains. On this account they soon wear out, thus making frequent repairs necessary. To obviate these defects in the existing systems, I have devised an apparatus in which atmospheric pressure is utilized to withdraw the latch from engagement with its bolt or bar of the stall-door.

My invention herein consists in air-tight cylinders, tubes, and pistons, in connection with the latch of the door and an electric releasing device, so arranged that when the circuit is closed the pistons will be operated by atmospheric pressure to release the latch and permit the bolt to pass by the same.

My invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 shows the form in which I preferably embody my invention. Fig. 2 illustrates a modification thereof. Fig. 3 is a sectional elevation of the latch-withdrawing device used in Fig. 1. Fig. 4 is a detail of the light spring-valve adapted to yield and allow the

air to escape freely when the main weight-piston is pushed up to be locked in position, but tightly closes over the end of the pipe when the weight falls. Fig. 5 is a sectional elevation of the drop-latch employed in the form of apparatus shown in Fig. 1. Fig. 6 is a detail of the electro-magnetic vacuum releasing device used in Fig. 1.

Similar letters are used upon like parts throughout the different figures.

My apparatus consists in a main and comparatively large cylinder *a*, provided with a tight piston *b*, adapted to be moved up and down therein. The weight *c* is attached to the lower end of the piston-rod *d*. One end of the light chain *e* is secured to the top of the weight *c*, while the other end is secured over the catch *f* of the electro-magnetic tripping device *g* by means of a loose ring on the end of the chain. From the top of the cylinder *a* a pipe *h* passes up over the spring stall-door *i* and down to the small cylinder *i'* of the latch-lifting device *k*. The piston-rod *k'* of this cylinder forms the latch against which the bolt or bar *l* upon the stall-door constantly presses, owing to the spring-hinges thereon. Now we will say that the apparatus is in the position shown and a fire-alarm comes over the wire *l'* to the engine-house. The same current or impulse that rings the alarm-gong may energize the electro-magnet *g*. Hence the armature thereof is drawn up, the latch is released and falls over, the chain drops therefrom, and the weight is released and falls suddenly, drawing down the piston and thus creating a partial vacuum in the small cylinder *i'*, and consequently jerking the latch-piston *k* up and out of the path of the bar *l*, thus allowing the door to swing out.

In the modification shown in Fig. 2 the main piston *b*, provided with a rod and weight corresponding with those shown in Fig. 1, is forced up into the top of the cylinder *a*, and then allowed to drop back until the suction of the vacuum over the piston equals the weight thereof. As the piston *b* falls back, the dropping-bolt *m* in the cylinder *o* is drawn up and held in the top thereof. Now if current be sent through the electro-magnet *p* the armature *q* will be drawn over, thus withdrawing the rubber stop *r* from the opening in the end

of the pipe *s*, which connects with both the cylinders, thus destroying the vacuum therein and allowing both the pistons *b* and *m* to drop down of their own weight. The dropping of the bolt or piston *m* would slacken the chain *t*, thus allowing the cam *u* to be swung out of the way of the bar *l* by the pressure of the same upon the side of the cam. Thus the door is left free to swing open, actuated by its spring-hinges. The pipe *s* may be extended to connect with several doors, as indicated in Fig. 2.

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

1. The combination of the main cylinder and its weighted piston with means for releasing the same, whereby said piston is allowed to fall, the latch-device cylinder, the piston therein, the pipe connecting the upper part of the main cylinder with that of the said latch-device cylinder, whereby a partial vacuum is created in the said pipe and said cylinders to hold or release the bolt or bar of a door.

2. The combination, in a spring stall-door-releasing device, of a main cylinder, a piston adapted to work and to make an air-tight joint with the walls of said cylinder, an elec-

tro-magnetic tripping device adapted to release said piston and allow the same to fall in the said cylinder, an additional cylinder or cylinders, an air-tight pipe connecting said cylinders, a latch piston or pistons in said additional cylinder or cylinders, a stationary bolt or bolts on the door or doors adapted to normally engage with said latch-piston, whereby when the said tripping device and the said piston in the main cylinder are operated the said piston-latch will be drawn up in the said additional cylinder and out of the path of the said bar, substantially as shown and described.

3. A latch maintained by pneumatic pressure against the force of the bolt of a door, said door tending to fly open by spring-pressure, in combination with an electro-magnetic device for automatically relieving the latch from the pneumatic pressure, whereby the bolt is disengaged from the latch to permit the door to fly open, substantially as and for the purpose specified.

In witness whereof I hereunto subscribe my name this 3d day of May, A. D. 1890.

DON A. PALMER.

Witnesses:

J. W. COYLE,
S. A. BUCHANAN.