

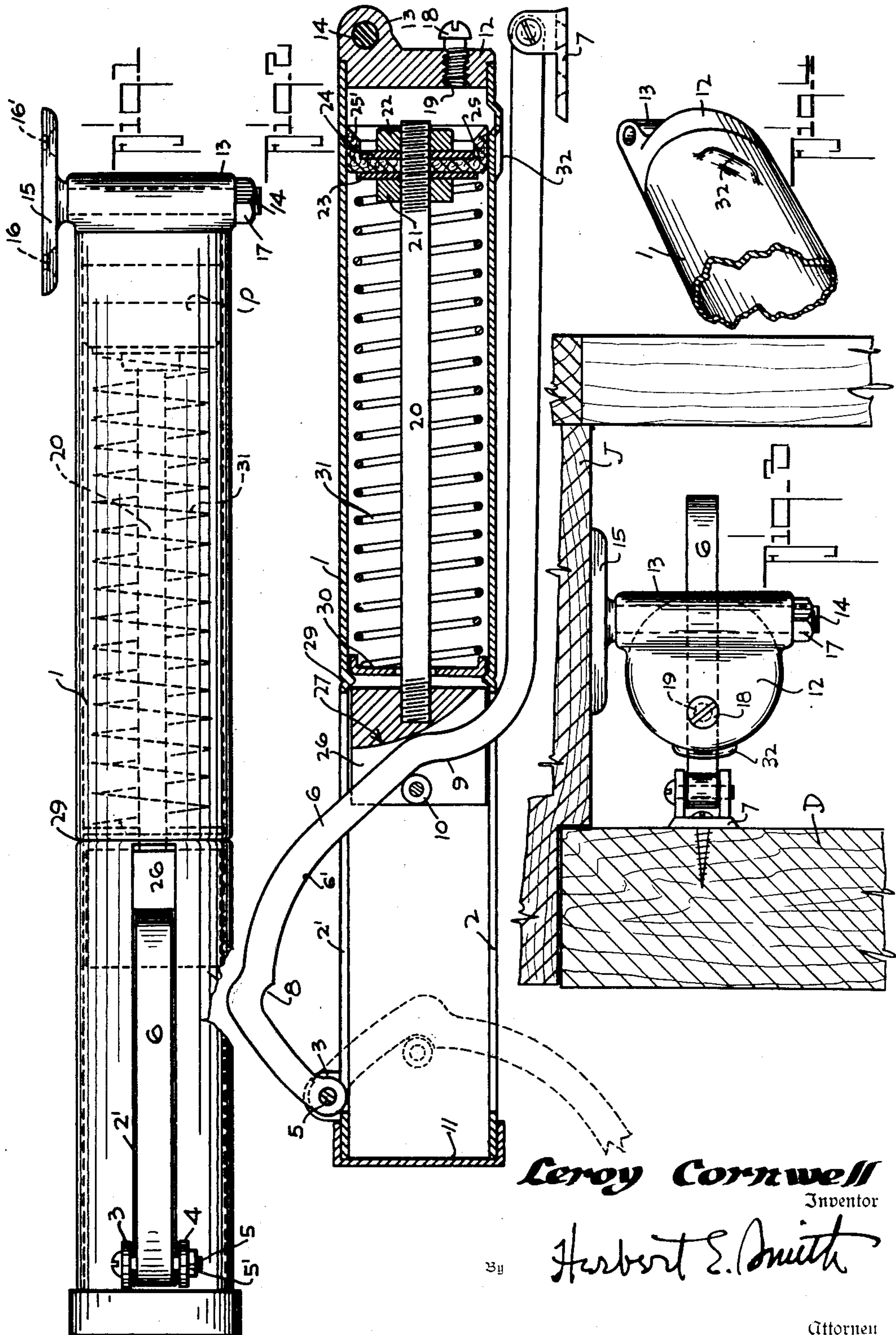
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DOOR CLOSER

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## DOOR CLOSER

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2 Claims. (Cl. 16—70)

My present invention relates to improvements in door closers of the spring and lever operating type with which is employed a pneumatic check to control the closing of the door.

5 The primary purpose of this invention is the means provided whereby the door, after being opened manually and automatically swung toward closing position by the tension of the spring against the pneumatic check, is snapped shut to  
10 effect the locking of the latch.

I am aware of the several prior spring lever and pneumatic types of door closers, and therefore my present invention is directed principally toward means for insuring the locking of the  
15 door when it is automatically closed.

Other improvements and objects closely related to the closing means will be hereinafter fully set forth and claimed.

The invention is primarily adapted for use on  
20 swinging doors, as for example, doors between rooms, outside doors, and screen doors, and broadly consists of a pivoted lever adapted to reciprocate a spring pressed plunger or piston within a pneumatic cylinder and a by-pass in  
25 the cylinder effecting a quick release of air under pressure when the door is near closed position.

The invention consists in certain combinations and arrangements of these parts as will be hereinafter more specifically described and claimed.

30 In the accompanying drawing I have illustrated one complete example of the physical embodiment of my invention wherein the parts are combined and arranged according to the best mode I have thus far devised for the practical  
35 application of the principles of my invention, but it will be understood that changes and alterations may be made in the exemplified structure within the scope of the appended claims without departing from the principles of my invention.

40 In the drawing:

Figure 1 is a side elevation of the closer of my invention.

45 Figure 2 is a vertical sectional view of the closer showing the parts in their normal position as when the door is closed.

Figure 3 is an end view of the closer showing the device of my invention mounted upon a door jamb and attached to a door.

50 Figure 4 is an enlarged perspective view of a portion of the cylinder showing the by-pass therein.

Referring now to the drawing, I illustrates the cylinder of my device. The cylinder, preferably of metal, is provided with longitudinal, diametrically opposed slots 2 and 2' adjacent one end of

the cylinder. Exterior of the cylinder and proximate the outer end of the slot 2 I have formed a pair of spaced lugs 3 and 4 having openings therethrough adapted to receive the bolt 5. A  
5 nut as 5' is provided for the bolt to retain the bolt in position. Journaled upon the bolt 5 I provide the lever 6 formed generally in a compound curve extending through the slots 2 and 2' of the cylinder and provided with pivotal  
10 means, as the attaching plate 7, which plate is adapted to be secured upon a door D.

The lever 6 on its bearing face 3' is provided with indentations or notches 8 and 9 for engagement with the roller 10 as will be hereinafter  
15 more fully described.

The slotted end of the cylinder is closed by means of a frictionally retained cap 11, and the opposed end of the cylinder is closed as by means of a frictionally retained cap 12. This cap 12 is  
20 fashioned with a perforate lug extension 13 of considerable depth through which is journaled the bolt 14 having an attaching plate 15 on one end thereof. The plate 15 is provided with screw  
25 holes 16 and 16' by means of which the plate 15 is securely attached to a door jamb as J. The bolt 14 is retained as by a nut 17 thereon.

The cap 12 is also provided with an air valve, as the tapered bolt 18 threaded into the hole 19, providing an adjustable vent for the air under  
30 pressure in the cylinder to permit the closing of the door.

Adapted to reciprocate within the cylinder 1, I have provided the piston P comprising the piston rod 20 having a piston head including the  
35 spaced retaining nuts 21 and 22, and spaced washers 23 and 24. Between the washers 23 and 24 I provide a sealing disk 25 of flexible and durable material as leather, having the flange 25' fashioned in such a manner as to seal the  
40 piston in the cylinder and prevent the passage of air thereby.

Approximately central of the longitudinal length of the cylinder is fashioned an interior annular ridge 29 and this ridge forms the retaining means for the disk 30 slidably mounted  
45 on the piston rod 20.

A coiled spring 31 is mounted about the piston rod 20 and between the disk 30 and the washer 23 providing for the automatic return of the  
50 piston when the piston has been reciprocated against the tension of the spring.

The opposite end of the piston rod 20 is threadedly secured in a block 26 slidably mounted in the cylinder exterior of the pressure chamber and having a cam surface 27. The roller 10  
55



aforementioned is rotatably mounted on this block 26 spaced from the said cam surface.

It will be apparent that the door is maintained in open position due to the fact that the roller 10 engages the notch 8 of the operating arm 6, and the pressure which is exerted by spring 31 interposed between the washer 30 and the piston. When the pressure is released, of course, the spring tension overcomes the frictional contact between the notch 8 and the roller 10 and the door is swung toward closed position.

Near the valved end of the cylinder is fashioned a by-pass comprising a struck out portion or depression 32. This by-pass is formed at an angle to the longitudinal center of the cylinder in such a manner that the disk 25 of the piston head may not be deformed in passing thereover. The by-pass in its angular position extends over a greater longitudinal length of the cylinder than does the sealing disk flange 25' and thus it will be seen that when the flange 25' of the disk 25 passes over the by-pass, air under pressure will pass around the flange 25' and instantaneously release the pressure of air, and the piston will snap to its normal position, allowing the door to close completely and latch the lock.

In the normal operation of the device, the cylinder 1 is secured on a door jamb as by plate 15, and the plate 7 of the lever 6 is secured on the door, the device being mounted longitudinally of the floor.

The air vent 18 is adjusted to meet the requirements of the particular door and the device is ready for use.

When the door is opened the lever 6 is swung about its pivot 5 and bears against the roller 10 forcing the roller ahead of the lever toward the slotted end of the cylinder. The roller 10 being attached to the block 26 pulls the block and the piston P therewith, against the tension of the spring 31.

When the door reaches its open position, having passed through an arc of approximately 90°, the notch 8 engages the roller 10 and the door is maintained in open position by the tension of spring 31.

When the door is released, the spring tends to force the piston toward the valved end of the cylinder, and the air in the piston chamber is compressed and forced slowly through the air vent 18.

As the door approaches its closed position, the flange 25' of the piston head disk 25, reaches and passes over the by-pass 32. As soon as the rear or trailing edge of the flange 25' passes the rear end of the by-pass, the air compressed by the piston on its return to normal position, rushes

through the by-pass and rearward of the piston head. The air pressure is thus released and the spring snaps to its extended position, and the door is urged to closed position in such a manner as to assure the positive engagement of the lock to latch the door.

From the foregoing it is believed apparent that my improvement precludes the usual inefficient closing of doors by the usual spring lever and pneumatic closers, which when used in the normal manner often fail to completely close the door due to the lack of force at the end of the piston stroke, to overcome the tension of the lock spring.

As set forth above, my device permits the piston, toward the end of its stroke, to complete its movement with a snap sufficient to overcome the spring tension of the lock, and thereby completely close and latch the door.

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

1. In a door closer the combination with a slotted pivotally mounted cylinder having an interior annular shoulder, and a perforated washer at one side of the shoulder, of a slotted block reciprocable in the cylinder and located at the other side of the shoulder, said annular shoulder forming a stop for the washer and for the block, a piston in the pivotal end of the cylinder, a stem for the piston passing through the washer and fixed to the block, a spring interposed between the piston and the washer, an angular lever having a rigid pivotal mount adjacent one side of the cylinder and passing through the slotted cylinder and the slotted block and a pivotal connection for the other end of the lever mounted on the cylinder at its opposite side.

2. In a door closer, the combination with a slotted pivotally mounted cylinder having an interior annular flange, and a perforated washer at one side of the flange, of a slotted block reciprocable in the cylinder at the other side of the flange, a piston in the pivotal end of the cylinder, said cylinder having an obliquely extending depression forming a by-pass of greater length than the width of the piston, a piston stem passing through the washer and fixed to the block, a spring interposed between the piston and washer, an angular lever having a rigid pivotal mount adjacent one side of the cylinder and passing through the slotted cylinder and the slotted block, an anti-friction guide roller for the lever journaled in the slotted block, and a pivotal connection for the other end of the lever mounted on the cylinder at its other side.

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