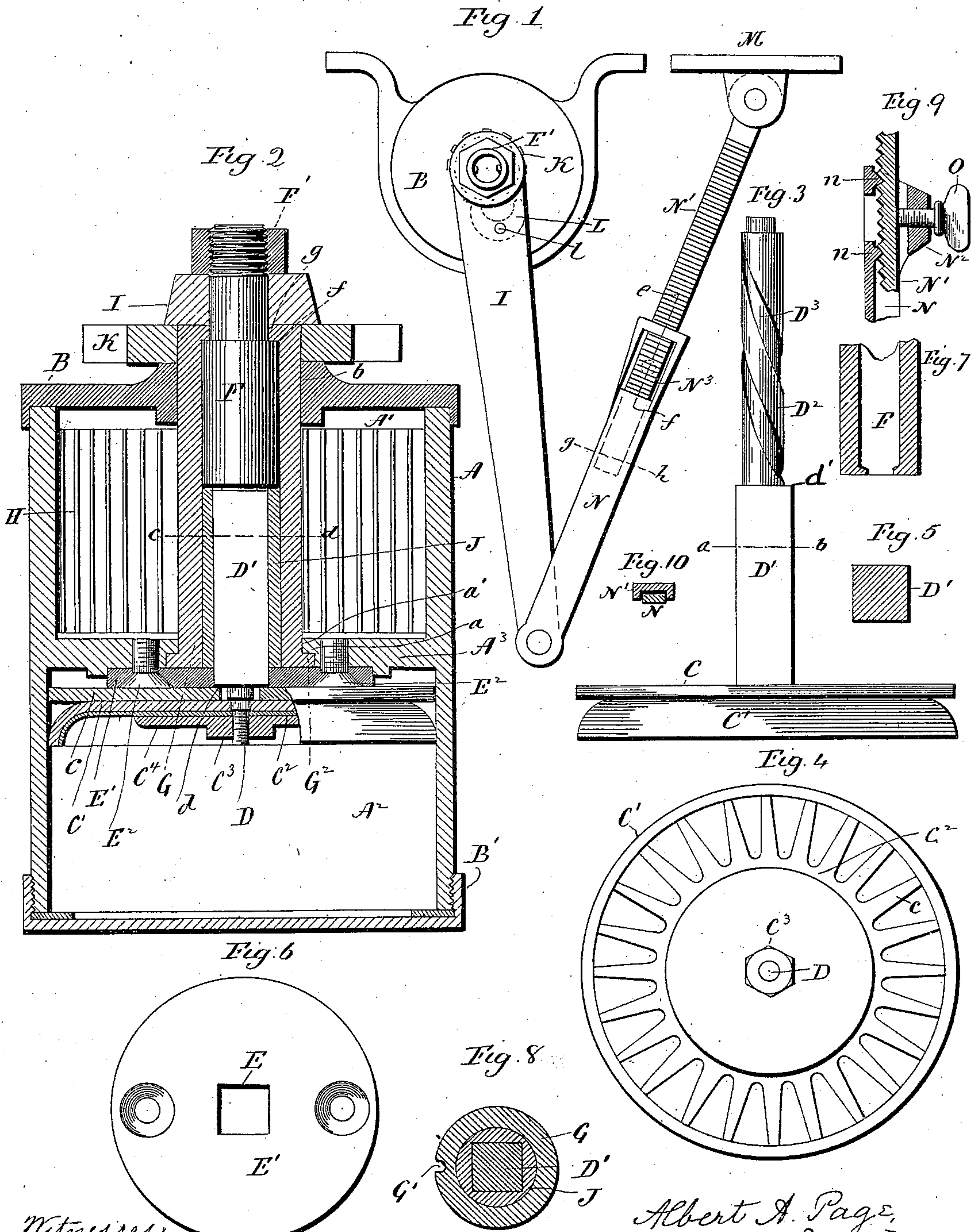


(No Model.)

A. A. PAGE.
PNEUMATIC DOOR CHECK.

No. 577,266.

Patented Feb. 16, 1897.



Witnesses
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PNEUMATIC DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 577,266, dated February 16, 1897.

Application filed April 1, 1895. Serial No. 544,026. (No model.)

To all whom it may concern:

Be it known that I, ALBERT A. PAGE, of East Haven, in the county of New Haven and State of Connecticut, have invented a new
5 Improvement in Pneumatic Door-Checks; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact descrip-
10 tion of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a plan view of a door-check constructed in accordance with my invention; 15
Fig. 2, a view of the case of the check in central longitudinal section; Fig. 3, a detached view, in side elevation, of the plunger of the check, together with its stem; Fig. 4, a reverse plan view of the plunger; Fig. 5, a
20 view in transverse section through the stem of the plunger on the line *a b* of Fig. 3; Fig. 6, a detached plan view of the retaining-plate, which is secured to the diaphragm for holding the sleeve in place, and which also pre-
25 vents the stem of the plunger from rotation; Fig. 7, a detached view, in central longitudinal section, of the internally-screw-threaded operating or spindle nut; Fig. 8, a detached view, in transverse section, through the sleeve
30 on the line *c d* of Fig. 2; Fig. 9, a sectional view of the two-part adjustable casing-lever on the line *e f* of Fig. 1; Fig. 10, a view of the two-part adjustable casing-lever, in transverse section, on the line *g h* of Fig. 1.

35 My invention relates to an improved pneumatic door-check, the object being to produce at a low cost for manufacture a simple, compact, durable, and effective check, composed of few parts and not liable to derangement.

40 With these ends in view my invention consists in a pneumatic door-check having certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

45 In carrying out my invention as herein shown I employ a case A, which is divided into a spring-chamber A' and an air-chamber A² by means of an integral diaphragm A³, the spring-chamber being closed by a flanged but unthreaded cap B, and the air-chamber
50 being closed by a flanged threaded cap B'.

It is not absolutely essential, however, that the diaphragm A³ should be formed integral with the case A, though that is my preferred construction. In the air-chamber A², I locate 55
a plunger composed of a rigid disk-shaped plate C, a flexible packing-washer C', located directly below the said plate, a flexible supporting-plate C², located in engagement with the lower face of the packing-washer, and a 60
nut C³, having a wide flange C⁴, engaging with the lower face of the supporting-plate and binding the several parts of the plunger together. The disk-shaped plate C is just
65 enough smaller in diameter than the internal diameter of the chamber A² to clear the walls thereof, while the packing-washer is made considerably larger in diameter than the diameter of the said air-chamber, but turned
70 downward at its edge, so that the extreme outer portion of its upper face constantly engages with the walls thereof.

The flexible supporting-plate C², which is made of sheet metal, is constructed upon its edge with a circular series of radially-arranged 75
tapering downwardly-bowed elastic fingers *c*, which bear against the lower face of the downwardly-curved edge of the washer and afford a yielding support for the said edge. The said rigid plate C, packing-washer C', flexible 80
supporting-plate C², and nut C³ are all centrally perforated for their application to a threaded stud D, formed upon the lower end of the square body portion D' of the plunger-stem.

85 The nut C³ is applied to the outer end of the threaded stud, as shown in Fig. 2, and crowds the rigid and elastic plates and the flexible washer interposed between the same against the square shoulder *d*, formed be- 90
tween the lower end of the body portion D' of the plunger-stem and the threaded stud D, before mentioned. Under this construction the several parts of the plunger are firmly
95 secured to the lower end of the plunger-stem. The said body portion D' of the stem, which is square in cross-section, as shown by Fig. 5, passes through a square opening E of corresponding dimensions, formed in a retaining-
100 plate E', which is secured to the lower face of the diaphragm by means of screws E² E², the said squared portion of the plunger-stem

being freely movable back and forth through the square opening E', but being held against rotation thereby.

The upper end of the plunger-stem consists of a screw D², having coarsely-pitched screw-threads D³ and formed integral with the body portion D' of the stem, from which it is separated by a stop-shoulder d'. The said screw portion of the stem enters an internally-threaded operating or spindle nut F, which has rotary but not endwise movement in the upper end of a rotary sleeve G, located within the spring-chamber A' and constructed with a vertical slot G' for the reception of the inner end of the heavy coiled spring H, the outer end of which is connected in any suitable manner with the case A, as usual in door-checks of the general class to which my invention relates.

The outer end of the operating or spindle nut F is reduced in diameter and projects above the sleeve G and receives the door-lever I, the inner end of which fits over it and is keyed to it, so that the operating or spindle nut will rotate in one direction or the other, according to the way in which the said lever is moved. The said nut F is constructed with a shoulder f, which engages with an inwardly-projecting flange g, formed by contracting the projecting outer end of the sleeve G, the said shoulders being drawn together by means of a check-nut F', bearing upon the upper face of the lever I and applied to the threaded upper end of the spindle-nut F, which projects beyond and above the said face of the lever. The spindle or operating nut is thus prevented from endwise movement, but is not held against rotation. Its rotation in one direction or the other will therefore operate, through the screw portion D² of the plunger-stem, to raise or lower the plunger in the air-chamber.

A stop-tube J, located within the lower portion of the sleeve G and encircling the squared body portion D' of the plunger-stem, rests at its inner end upon the lower face of the retaining-plate E'. The function of this sleeve is to prevent the operating or spindle nut from dropping down out of place in case the lever I and check-nut F should be removed from its upper end and the plunger-stem disconnected from its lower end. The stop-shoulder d', before mentioned, is provided for preventing the plunger from being lifted too high, which it prevents by engaging with the lower end of the operating or spindle nut.

The rotary sleeve G is constructed at its lower end with an outwardly-projecting flange G², which enters an annular recess a, formed to receive it in the lower face of the diaphragm A³, around the circular opening a', formed in the diaphragm for the reception of the sleeve, which in being assembled is inserted into the case through the air-chamber thereof. The said sleeve is retained in place, as clearly shown in Fig. 2, by the retaining-

plate E', which has the additional function, as before described, of preventing the plunger-stem, and hence the plunger, from rotating. The upper end of the sleeve projects through an opening b, formed in the cap B, and receives a ratchet-wheel K, the teeth of which are engaged by a double-ended pawl L, secured by a pivot l to the lower face of the door-lever I.

Normally, or when the door is closed, the plunger will be located at the bottom of the air-chamber, and is lifted to the upper end thereof when the door is opened. The bowed fingers c of the flexible supporting-plate C² yield sufficiently to permit the packing-washer to contract or collapse at this time to the extent required to allow the air above the plunger to escape below it, so that practically no suction is created by the lifting of the plunger, and hence that movement thereof interposes no resistance to the free opening of the door. On the other hand, when the door begins to close and the plunger begins to descend the air below it is immediately compressed, with the effect of spreading the yielding fingers c of the supporting-plate C², and so forcing the edge of the packing-washer into close contact with the walls of the air-chamber. The air is thus prevented from flowing around the edges of the plunger into the upper portion of the air-chamber, but is forced to undergo further compression or to escape. I therefore provide for its escape between the case A and the cap B', but it escapes so gradually that the descent of the plunger and the closing action of the door is much retarded and the door prevented from slamming. I might, of course, provide some very small vents in the cap or in the case for the inlet and outlet of air, but I have found that enough air sucks in between the case and cap to prevent suction in the upward movement of the plunger, and that enough air escapes in the same way to permit the plunger to descend.

The second feature of my invention relates to a compound adjustable "casing-lever," by which term I mean the lever employed to connect the outer end of the door-lever I with the bracket M, secured to the casing of the door. As herein shown, this lever consists of a chambered portion N and a rack N', the outer end of the chambered portion N being pivotally connected with the outer end of the door-lever I and its inner end being constructed with a projection N², having a longitudinal opening N³ to receive the rack and provided with a thumb-screw O, which impinges against the outer face of the rack and forces the toothed inner face of the same against two transverse ribs n n, located at the bottom of the aforesaid opening N³, formed in the projection N².

It will be readily understood that by reversing the thumb-screw O the rack may be moved inward to shorten the compound casing-lever or outward to lengthen the same,

and that when the right adjustment has been secured the two parts of the lever are easily coupled together by turning the thumb-screw O inward, so as to reengage the teeth of the rack with the ribs *n n*, before mentioned.

A compound adjustable casing-lever thus constructed I have found to be extremely convenient in use, as it permits the lever to be adjusted in length without detaching it from the casing-bracket, and also permits the bracket to be secured to the door with perfect convenience, inasmuch as the rack is readily disconnected from the chambered portion of the lever and then swung in one direction or the other, so as to be out of the way for the attachment of the opposite ends of the bracket to the casing by means of screws and a screw-driver.

It is clear that my improved compound lever is not limited in use to such a door-check as has been described, but is available for use in all checks employing such levers.

It is apparent from the foregoing that in carrying out my invention some changes in the construction herein shown and described may be made, and I would therefore have it understood that I do not limit myself to the same, but hold myself at liberty to make such alterations as fairly fall within the spirit and scope of my invention.

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

1. In a pneumatic door-check, the combination with a case divided into a spring-chamber and an air-chamber by a diaphragm having a circular central opening, of a cap applied to the case to close the open end of the spring-chamber, a spring located in the spring-chamber, a non-rotatable plunger located in the air-chamber, a rotary sleeve passing through the said opening of the diaphragm, through the spring-chamber and through the said cap beyond which it projects and having the inner end of the spring connected with it, a plunger-stem rigidly connected at one end with the plunger, and having its other end threaded, a retaining-plate located within the air-chamber, secured to the diaphragm over the central opening therein, forming a bearing for the inner end of the sleeve, and having an opening for the passage through it of the plunger-stem which it holds against rotation, and which extends into the sleeve, an operating-nut located in the outer end of the sleeve, and having internal screw-threads to coact with the threads of the stem, and means for rotating the said operating-nut, whereby the plunger is reciprocated back and forth in the air-chamber through the medium of the plunger-stem.

2. In a pneumatic door-check, the combi-

nation with a case divided into a spring-chamber and an air-chamber by a diaphragm having a circular central opening, of a cap closing the open end of the spring-chamber, a spring located in the spring-chamber, a rotatable sleeve passing through the said opening in the diaphragm, through the spring-chamber and through the said cap beyond which it projects and having the inner end of the spring connected with it, a non-rotatable plunger located in the air-chamber, a plunger-stem connected at one end with the plunger, extending into the said sleeve, and comprising a square body portion, a screw, the threads of which are of coarse pitch, and a stop-shoulder located between its said screw and body portion; a rotatable operating-nut located in the outer end of the sleeve, and internally threaded to receive the screw of the said plunger-stem, a retaining-plate located within the air-chamber, secured to the diaphragm over the opening thereof, forming a bearing for the inner end of the sleeve which rests upon it, and having a square opening through which the squared body portion of the said stem passes, a stop-tube located within the lower end of the sleeve and interposed between the said end and the retaining-plate upon which it rests, and means connected with the nut for rotating the same in one direction or the other.

3. In a pneumatic door-check, the combination with a case having a diaphragm divided into a spring-chamber and an air-chamber, of a spring located in the spring-chamber, a rotary sleeve having the inner end of the spring connected with it and constructed at its lower end with an outwardly-extending flange fitting into an annular recess formed in the lower face of the diaphragm around the opening made therein for the reception of the sleeve; a retaining-plate secured to the lower face of the diaphragm and impinging against the flanged end of the sleeve, which it holds in place, a plunger located in the air-chamber, a plunger-stem passing through the said retaining-plate in which it is held against rotation, an operating-nut located in the outer end of the sleeve, shouldered for its retention therein, and internally threaded to coact with the threads of the plunger-stem, and means connected with the said nut for rotating the same in one direction or the other, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ALBERT A. PAGE.

Witnesses:

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CHARLES L. BALDWIN.