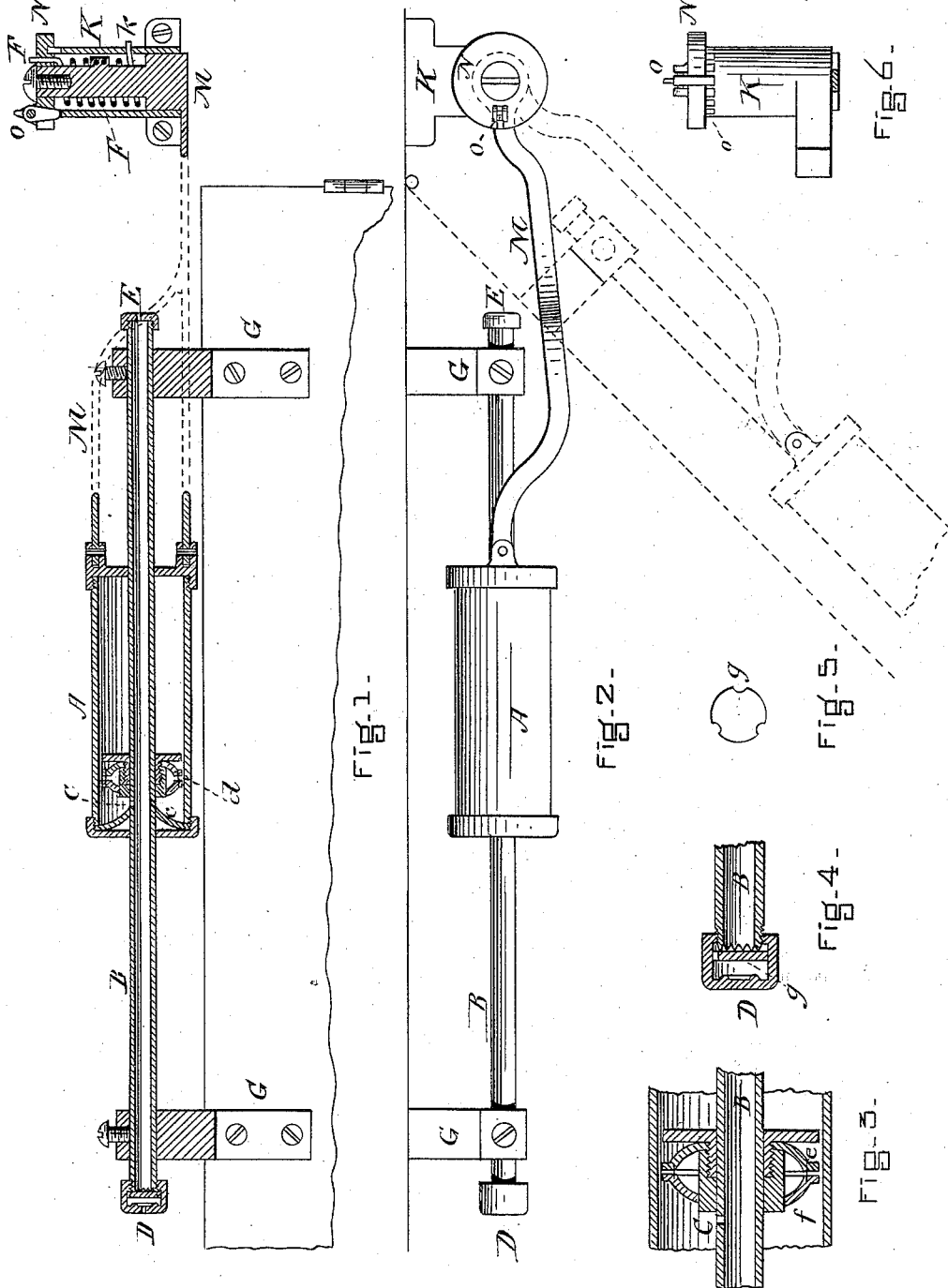


(No Model.)

S. PORTER.  
PNEUMATIC DOOR CHECK.

No. 306,350.

Patented Oct. 7, 1884.



WITNESSES

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# UNITED STATES PATENT OFFICE.

STEPHEN PORTER, OF BOSTON, MASSACHUSETTS.

## PNEUMATIC DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 306,350, dated October 7, 1884.

Application filed December 17, 1883. (No model.)

### *To all whom it may concern:*

Be it known that I, STEPHEN PORTER, of Boston, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented certain new and useful Improvements in Door-Checks, of which the following is a specification.

My invention relates to that class of contrivances known as "door-checks," or "automatic noiseless door-closing machines," in which the resistance of a body of compressed air is opposed to the closing movement of the door, so that its slamming or noisy closing is prevented; and it has for its object to provide means whereby a noiseless closure of the door will be automatically effected.

My invention, in the best form now known to me, is illustrated in the accompanying drawings, in which Figure 1 is a side view, in section, illustrating my improved check and spring as applied to a door. Fig. 2 is a top view of the same, and Figs. 3 to 6 detail views of various portions of the mechanism herein-after described.

My improved door-check contains the features of an air-compression chamber; also a spring for closing the door against the resistance of a body of compressed air, and means for regulating the tension of said spring; also suitable means for applying the device, as a whole, in proper position with regard to the door upon which it is to operate.

My present invention consists in improvements in the means of compressing the air and in the means whereby the regulated closure of the door is obtained.

A represents a barrel or cylinder arranged to move or slide upon a fixed hollow piston or plunger, B. This piston or plunger is packed at two places within the cylinder A, as shown at *c* and *d*, and an air-passage, C, is made through the shell of the piston, opening into the cylinder A between the two places where the piston is packed, so that the portion of the cylinder A between the packing and the interior of the hollow piston-rod forms an air-chamber. Through this piston-rod I obtain the supply of air required to form the air-cushion by making an aperture in the rod, as shown at D, provided with a valve, *g*, (shown in plan, Fig. 5,) which allows the inflow of air through the aperture D into the interior of

the piston, and thence into the cylinder A, but which, when the air within the cylinder and piston is compressed, is forced against and closes the aperture D and prevents the outflow of air through it. A detail of this construction is shown in section at Fig. 4. I also provide an opening from the interior of the piston B, as shown at E, of suitable size, through which the compressed air may escape as the door gradually closes. The piston B is rigidly supported on and connected to the door by the slotted brackets G G.

Attached to the cylinder A by a pivot-connection is an arm, M, the end of which enters and is supported by a hollow bracket, K, attached to the door-jamb.

To the arm M within the bracket K is attached a coiled spring, F, one end of which is secured to the shell of the bracket, as shown at *k*. The arm M is so supported within the bracket K by means of a transverse plate, N, that it can rotate freely therein.

In order that I may be able to regulate the tension of the spring F, and consequently the force with which it acts, through the arm M, to close the door, the plate N, to which the other end of the spring is attached, may be arranged, as shown in Figs. 1 and 6, so that it can be turned in either direction upon the bracket, so as thereby to tighten or relax the coiled spring F. It is then provided with an adjustable catch, O, which may be made to engage with a series of serrations, *o*, upon the rim of the bracket, and by means of which the plate N can be set and held at any desired position against the tension of the coiled spring F. By this means I am enabled to adjust the door-check to any weight of door, and also to vary its power upon the same door from time to time, if this for any reason should become necessary, and I am also enabled to do this while the door-check is in place.

The construction of the packing *d* is illustrated in detail at Fig. 3. This packing is composed of two disks, *e f*, of leather or equivalent material, one of them, *e*, which is away from the pressure of the compressed air, being secured around the piston B by means of a metal sleeve and clamp, as shown. The other, *f*, which is toward the pressure of the compressed air, is so arranged that that pressure, when applied to it, forces it, and also the op-

posed disk *e*, outwardly, so that their edges press against the interior of the barrel *A* and form an air-tight packing. When the compressed-air pressure is taken off—as, for example, when the door is closed—the resiliency of the packing causes them to withdraw slightly at their edges from the interior of the cylinder *A*, as shown at Fig. 3, and so to move readily by it while the door is being opened. The collar previously spoken of, which clamps the packing-disk *e* in place, also serves as a support on which the packing-disk *f*, or that toward the compressed-air pressure, may travel inward at its center and thereby force the edges of the two disks outwardly against the interior of the cylinder *A*, as above explained.

To prevent the disk *f* from any liability of being displaced when the door is open, I attach it at various points by flexible stitches to the disk *E*, as shown. This attachment does not interfere with its action, as before explained.

The device operates as follows: As the door is opened the difference in the length of the radii on which the cylinder *A* and the piston *B* swing causes the cylinder *A* to travel over the piston *B* and the two packings *c* and *d* thereby to separate. At the same time the circular motion of the arm *M* compresses the coiled spring *F*. The space in the cylinder *A* between the packings *c* and *d* and the interior of the piston *B* is at the same time filled with air, which enters through the aperture *D*. The compressed spring *F* will now force the door to with a tension regulated as described, and this will cause the packings *c* and *d* to approach, so that the air between them, and also that within the hollow piston *B*, is compressed and the closing of the door retarded until the slow escape of air through the aperture *E* allows the door to gradually and noiselessly close under the spring-pressure. The peculiar structure of the hollow piston and its connected parts is made the subject of an application No. 114,700, of even date herewith, and therefore is not claimed herein.

I claim—

1. In a door-check, the combination, with a fixed piston provided with means, substantially as shown, for its attachment to and support upon the door, of an air-chamber arranged to slide upon said piston, an arm pivoted to

said air-chamber and also pivotally supported upon the door-jamb, and a spring attached to said arm, so that the motion of the arm around its pivotal support will compress or relax the tension of the spring, all substantially as and for the purposes set forth.

2. In a door-check, the combination, with a fixed piston provided with means, substantially as shown, for its attachment to and support upon the door, of an air-chamber arranged to slide upon the piston, an arm pivoted to said air-chamber and also pivotally supported upon the door-jamb, a spring attached to said arm, so that the motion of the arm around its pivotal support will compress or relax the tension of the spring, and means for regulating the power of the spring upon the rotating arm *M*, all substantially as herein set forth.

3. In a door-check of the character described, the combination, with the arm *M*, pivotally attached at one end to the cylinder *A*, and having its other end extending upward within the hollow supporting-bracket *K* and retained therein, substantially as shown, of the coiled spring *F*, attached at one part to the said bracket and at another part to the said arm, all substantially as herein set forth.

4. In a door-check of the character described, the combination, with the arm *M*, pivotally attached at one end to the cylinder *A*, and having its other end extending upward within the hollow supporting-bracket *K*, of the revoluble supporting-plate *N*, carrying one part of the door-closing spring *F*, and provided with an adjustable stop, *O*, and engaging device *o*, adapted to hold the said plate *N* at any desired point, all substantially as herein set forth.

5. The herein-described double packing, consisting of two opposed concave disks, *e f*, of leather, or its equivalent, surrounding the piston, the disk *f* being movable or sliding upon the piston, substantially as and for the purposes herein set forth.

In testimony whereof I have hereunto subscribed my name this 10th day of December, A. D. 1883.

STEPHEN PORTER.

Witnesses:

CHAS. W. KNAPP,  
J. HENRY TAYLOR.