L. C. NORTON.

Door-Check.

No. 228,776. Patented June 15, 1880.

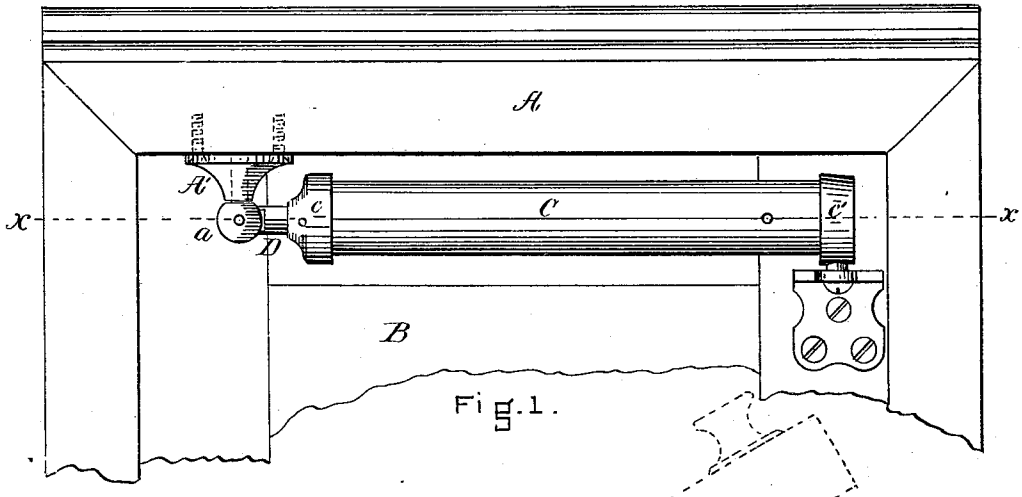

Fig. 1.

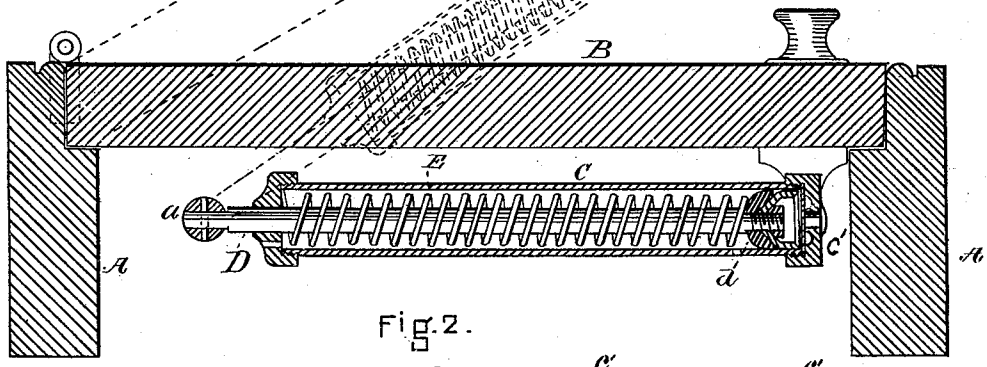

Fig. 2.

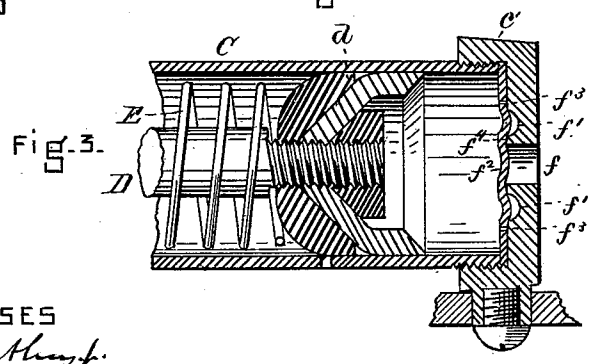

Fig. 3.

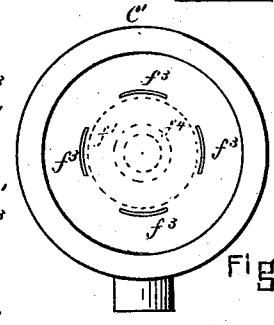

Fig. 4.

WITNESSES

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UNITED STATES PATENT OFFICE.

LEWIS C. NORTON, OF BOSTON, MASSACHUSETTS.

DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 228,776, dated June 15, 1880.

Application filed February 2, 1880.

To all whom it may concern:

Be it known that I, LEWIS C. NORTON, of Boston, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Improvement in Door-Fenders, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, making a part thereof.

A great deal of annoyance is often caused to the audience in a church, lecture-room, or theater by the slamming of doors; and the object of my door-fender is to do away with this annoyance by preventing the door upon which it is used from striking the door-frame unless it is moving very slowly, so slowly that when it does strike no appreciable noise will be heard. Many devices have been used to prevent this disturbance, but all known to me up to the date of my present invention have failed to accomplish the object for which they were made.

My invention consists in a cylinder, piston, and self-adjusting valve, of the kind described below, combined together, so that the quantity of air which can escape from the cylinder through the valve during the forward stroke of the piston will depend upon the force exerted upon the forward stroke of the piston—the greater the force exercised upon the piston the less the escape of air through the valve, the whole being adapted to be used upon a door and door-frame in a way to be described below.

The best form of apparatus known to me, embodying my invention, is shown in the drawings, in which—

Figure 1 is an elevation of my device attached to the upper part of a door and its frame, the door being closed. Fig. 2 is a section on the line *x x* of Fig. 1, the dotted lines showing the relative position of the parts when the door is open. Fig. 3 is a section of the piston-chamber, showing the position of the valve during the forward stroke of the piston. Fig. 4 shows the details of the valve.

A is the door-frame, and B the door. C is a cylinder having at each end a cap, *c c'*. The cap *c* is provided with a hole in its center, through which hole passes a piston-rod, D, to one end of which is attached a piston, *d*, provided with suitable packing, as shown, and adapted to move backward and forward in the cylinder C. The other end of the rod D is jointed to the swiveling-piece *a* of the bracket A', attached to the door frame A.

Around the rod D in the cylinder is a spiral spring, E, adapted to be compressed between the cap *c* and the piston *d* when the piston is drawn back. The cap *c* is provided with two small holes, by which the air in the cylinder behind the piston can escape while the piston is being drawn back.

The cap *c'* is provided with a valve, which is adapted to open when the piston *d* is drawn back, but which will close more or less tightly, in proportion as the force exerted in forcing the piston forward is greater or less. The best form of valve known to me for this purpose is that shown in the drawings, Figs. 2, 3, and 4.

The cap *c'* is provided with a small hole, *f*, passing through its center. Around this hole, and but a short distance from it, is a small groove, *f'*.

f^2 is a disk made of soft leather, rubber, or like substance, of a diameter about equal to the interior diameter of the cap *c'*. That part of the disk which rests upon the flat part of the cap *c'* has three or four slits, f^3, cut in it, as shown in Fig. 4.

The operation of the valve is as follows: While the piston is being drawn back all pressure is removed from the disk f^2, and the outside air passes through the hole *f*, between the inner surface of the cap *c'* and the disk f^2, and through the slits f^3 into the cylinder. While the piston is being forced forward it, of course, compresses the air in the cylinder more or less, and the disk f^2 is thereby forced against the inner surface of the cap *c'*, as shown in Fig. 3, the disk f^2 forming, with the inner surface of the cap *c'*, a joint more or less air-tight, according to the pressure exerted by the piston.

If great pressure be used to force the piston forward, the disk is forced tightly into the hole *f* and the groove *f'*, and the amount of air which can escape through the slits f^3, between the disk and the inner surface of the cap *c'*, and through the hole *f* into the open air, is very small. Consequently the air is compressed by the piston and retards its motion.

If, however, but little pressure be used to force the piston forward a much larger amount of air can escape, and there is a much less amount of compressed air by which to retard the motion of the piston.

By means of the groove f', a ridge, f^4, is formed on the inner surface of the cap c', next to the hole f. I have found this necessary, for when the air in the cylinder is compressed it forces the disk into both the hole f and the groove f', and consequently draws that part of the disk which rests on the ridge f^4 very tightly over the ridge, and causes the formation of a joint which will be very much more air-tight than if no ridge were there. It will, of course, be seen that if the force acting upon the piston be sudden enough and strong enough the valve will close, so as to be practically air-tight.

The cap c' is attached to the door B by means of a bracket, B'.

The operation of my device will be readily understood by reference to Fig. 2. Before the door is opened the parts are in the position shown by the full lines in Fig. 2. The action of opening the door causes the piston to be drawn back and to compress the spring E against the cap c, allowing the outside air to flow through the valve in the cap c' into the chamber in front of the piston. When the spring is left free to act upon the piston it drives it toward the cap c', thus drawing the door to; but the more force is brought to bear upon the piston the more the air is compressed in front of the piston, as described above, and its motion becomes more and more retarded as the chamber in front of it becomes smaller and the pressure in it becomes greater; and the piston cannot be pressed home, and so allow the door to be shut tight, until air enough has leaked out through the valve to make the pressure in the chamber equal the atmospheric pressure. When the force is great and sudden enough to close the valve entirely, a perfect air-cushion will be formed, which will prevent all motion of the piston until the force diminishes or a portion of the air in the cylinder leaks out by the piston-packing. A gust of wind acting upon an open door to which my device is attached often produces this result, and upon doors upon the outside of buildings my invention is of especial use; for no matter how strongly the wind blows upon doors so provided they will never slam.

In practice I have found it best to bore a very small hole, c^2, in the wall of the cylinder C, about three or four inches from the cap c', so that until the piston passes the hole in its forward stroke a portion of the air which is being compressed will be forced out of the chamber. The door will shut to rapidly so long as any air is escaping through the hole c^2. When, however, this hole is passed by the piston in its forward stroke, the motion of the piston will be retarded suddenly by the sudden increase of pressure in front of it, and the door will strike the jamb very gently.

The spring E is not necessary for the proper operation of the piston, though very desirable.

Spring-hinges, or any other device, may be used for shutting the door upon which the fender is used, and the fender operates equally well whether the door closes automatically or not.

My device is very simple, and is easily and cheaply made. The piston-packing and disk f' can easily be replaced in case of necessity. For use on doors of ordinary size I make the cylinder of a piece of seamless brass tubing, eighteen inches long and one and three-eighths inch internal diameter.

In putting my device into use the bracket A' should be screwed upon the door-frame from four to six inches from the hinges, depending, of course, upon the desired length of piston-stroke. The fender may be put upon the outside of the door or upon the inside, as shown in the drawings. If used outside, it will be seen that the end of the bracket A' to which the rod D is attached must not only swivel, but must be so made that the end of the rod D can be pivoted to it. The device shown in the drawings may be used either inside or outside of the door. It will also be seen that if used inside the door can only be opened to an angle of ninety degrees with the door-frame, while if used outside the door can be swung through an arc of one hundred and eighty degrees.

I am aware that door-fenders have been heretofore made in which the quantity of air which escapes from the air-chamber in front of the piston depends directly upon the force exerted by or upon the piston—the greater the force the more air escapes. These I disclaim, my door-fender differing from them in that the escape of air from the air-chamber in front of the piston is greater or less according as the force exerted upon the piston in its forward stroke is less or greater.

What I claim as my invention is—

The improved door-fender above described, consisting of the cylinder C, piston d, cap c', and the valve composed of the hole f, ridge f^4, and disk f^2, provided with slits f^3, all arranged together substantially as and adapted for the purposes set forth.

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Witnesses:
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GEORGE O. G. COALE.