

J. E. GIBBS.
DOOR CHECK.
APPLICATION FILED NOV. 18, 1910.

1,013,762.

Patented Jan. 2, 1912.

Fig. 1.

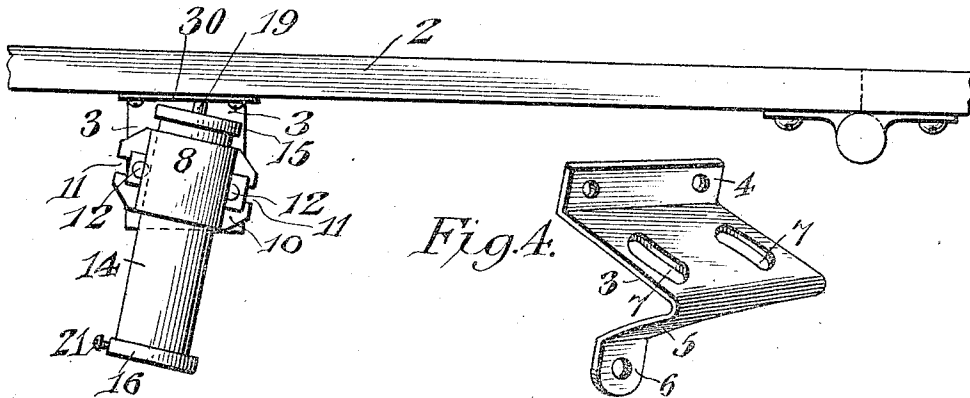


Fig. 4.

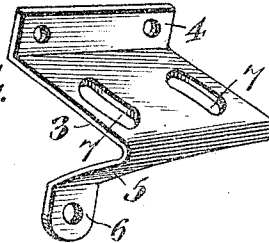


Fig. 2.

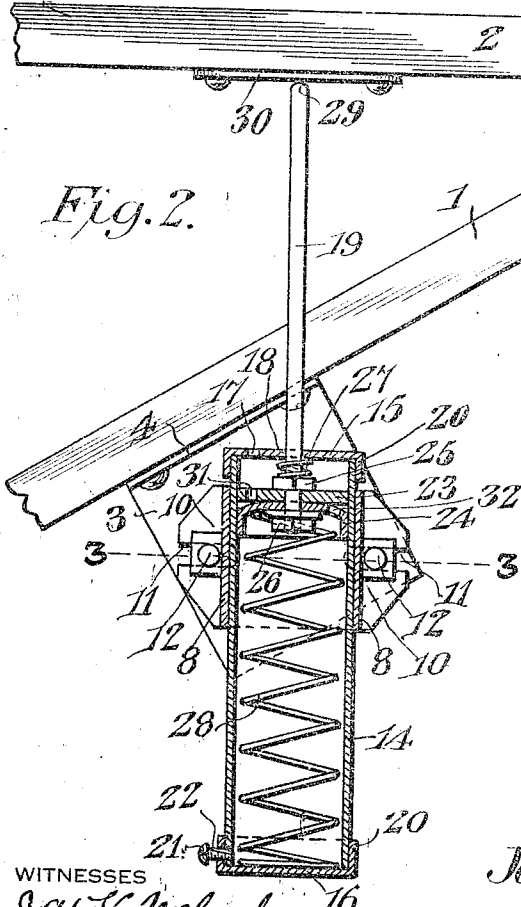
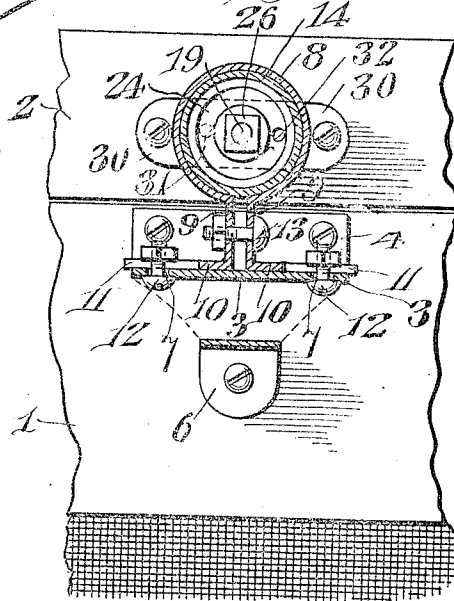


Fig. 3.



WITNESSES

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DOOR-CHECK.

1,013,762.

Specification of Letters Patent.

Patented Jan. 2, 1912.

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To all whom it may concern:

Be it known that I, JAMES E. GIBBS, citizen of the United States, residing at Covington, in the county of Kenton and State of Kentucky, have invented a new and useful Door-Check, of which the following is a specification.

This invention has reference to improvements in door checks, and while of general application for such purpose, is designed more particularly for use in connection with screen doors.

The purpose of the present invention is to provide a door check yieldable to the ordinary springs usually provided with screen doors, so that the check will not resist the closing of the door by the spring so long as the closing movement is slow, but should the closing movement be rapid then the check becomes active to resist such rapid movement and slow the same to a speed which will prevent slamming of the door.

The invention comprises essentially a door check of the pneumatic type having an engaging member with a normal tendency toward the projected position so that should the door open to any extent however small the engaging member will follow this movement, projecting from the pneumatic element, and the latter becomes immediately active to check the closing movement of the door even though the opening movement be of very small extent.

Screen doors are customarily left unlatched and it is often desirable that latches be omitted entirely so that the door will readily swing to the open position when desirable without the necessity of manipulating a latch or lock, a simple push being sufficient for the purpose. Such doors will respond to sudden and sufficiently powerful air currents to sometimes swing open but an inch or two, and as soon as the opening force has abated will slam shut to the annoyance of those within hearing, and this occurs even where door checks are provided. With the present invention, however, this undesirable feature is obviated since the door check is active to prevent the slamming of the door even though the opening movement be but slight, although the check will not prevent the ready closing of the door except at a speed such as would produce an obtrusive noise.

The invention will be best understood

from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification, with the understanding, however, that the invention is by no means limited to the details of construction shown and described, and the structure is susceptible of various modifications so long as the salient points of the invention are retained.

In the drawings:—Figure 1 is a plan view of a door check as attached to a door with the latter in the closed position. Fig. 2 is a view partly in plan, and partly in horizontal section of the door check as applied to a screen door with the latter in the partly opened position, the projecting member of the door check being in the initial engaging position with a co-acting member carried by the door jamb. Fig. 3 is a section on the line 3—3 of Fig. 2. Fig. 4 is a perspective view of a bracket adapted to support the body portion of the door check.

Referring to the drawings, there is shown a portion of a screen door 1 which may be taken as typical of any structure to which the door check is applicable, and there is also shown a portion 2 of a door jamb or casing, and this may be taken as typical of any relatively stationary member with which the swinging member 1 is in co-active relation.

Ordinarily the door check is made fast to the swinging door and travels with the same and is adapted to engage a fixed member of the door jamb, but it will be understood that the relation of the parts may be reversed without in any manner affecting the operation of the invention, but for convenience of description it will be considered that the door check is mounted on the door.

Fast to the door at a convenient point, which may be approximately, though not necessarily, one-third the distance between the hinged edge of the door and the free edge thereof, there is secured a bracket 3 near the top of the door, and in the particular structure shown in the drawings this bracket may be a stamping of sheet metal comprising a flat supporting member having one edge 4 upturned and provided with passages for screws, while the other end of the bracket is continued from the corresponding other edge of the flat portion of the bracket and is there formed into a supporting arm 5 terminating in an extension 6 which latter

may be perforated for a securing screw, the portion 5 being returned on the supporting portion of the bracket at a comparatively slight angle thereto. The supporting portion of the bracket is formed on opposite sides of an intermediate point with curved slots 7, the curvature being described about a common center.

The bracket is designed to receive a clip 8 of general cylindrical form with leg extensions 9 terminating in oppositely projecting feet 10 designed to rest on the engaging portion of the bracket, and these feet are each provided with a longitudinal slot 11 arranged to receive a bolt 12 extending through a corresponding curved slot 7 of the bracket, while the legs 9 are perforated for the passage of a bolt 13 so disposed as to force the legs of the clip together and to thereby clamp the same on the checking cylinder as will hereinafter appear. The relation of the longitudinal axis of the clip 8 with reference to the bracket 3 is readily determined by the position of the bolts 12 in the slots 7, the clip 8 being capable of movement about an axis perpendicular to the surface of the supporting face of the bracket and substantially coincident with the center of curvature of the slots 7.

The clip 8 is designed to receive and retain a checking cylinder 14 provided at its opposite ends with heads 15-16, respectively, the cylinder being thereby closed except that through the head 15 there is a perforation 17 for the ready passage of air into and out of the cylinder 14, and there is also provided through the head 15 an axial passage 18 for a rod 19, to which latter reference will presently be made.

For convenience of attachment, the heads 15 and 16 are provided with peripheral annular flanges 20 adapted to receive the corresponding end of the cylinder 14, and the head 16 has through its flange 20 a perforation matching a like perforation in the corresponding portion of the wall of the cylinder 14, and these matching perforations are tapped for the reception of a screw 21, one portion of the shank of which may be flattened, as indicated at 22, so that there is provided a passage for air into and out of the corresponding end of the cylinder 14, which passage may be regulated as to capacity by moving the screw 21 into or out of the passage provided for its reception, the flattened portion 22 being properly shaped for the purpose.

One end of the rod 19 carries a piston 60 comprising a plate 23 and a cup leather 24, the plate 23 and the leather 24 being held to the rod 19, which constitutes a piston rod, by means of a collar 25 fast on the rod 19 at a short distance from the end within the cylinder 14, and by a nut 26 applied to the

inner end of the rod 19, which, it will be understood, is suitably threaded for the purpose. Surrounding the rod 19 is a light spring 27 between the collar 25 and the inner wall of the head 15 of the cylinder 14. Within the cylinder 14 between the head 16 and the piston on the end of the rod 19, there is housed a spring 28 having a normal tendency to move the piston toward the head 15, but not of sufficient strength to prevent the door springs usually applied to screen doors from completely closing the door.

The outer end of the rod 19 is rounded, as indicated at 29, and applied to the door jamb in the path of this rounded end 29 is a wearing or engaging plate 30 preferably of fiber, though it may be made of other suitable materials.

The plate 23 of the piston is provided with a perforation 31, and the leather 24 is provided with a perforation 32, and in the assembling of the parts of the piston care is taken that these perforations are not matched, being preferably located at opposite sides of the rod 19.

When the door check is applied to a door, the clip 8 is so adjusted on the bracket 3 that the rod 19 when brought into engagement with the plate 30 will be nearly or quite perpendicular to the plane of the door jamb, so that the force tending to move the rod into the cylinder 14 will be applied practically axially to said rod.

When the door is opened, the spring 28 will force the piston rapidly toward the head 15, thus causing the projection of the rod 19 to the full extent from the cylinder 14, but the piston is held a short distance from the head 15 by the spring 27, this spring operating as an elastic buffer for preventing noise as the rod reaches its full projected position.

The spring 27 operates as a distancing means for the piston, preventing it from reaching the head 15, so the rod 19 is prevented from lateral movement by spaced bearings, one of which is formed by the piston itself, and the other by the engagement of the rod with the head 15 at the passage 17, these bearings becoming progressively further spaced apart as the piston is moved away from the head 15. Therefore, by causing the rod 19 to initially engage the plate 30 substantially perpendicular to the latter, the rod is moved to a considerable extent into the cylinder 14 before there is any material side strain thereon, and when this side strain becomes at all marked, the bearings for the rod 19 have become so separated as to effectually resist such side strain without causing movement of the rod 19 to any practical extent away from the longitudinal axis of the cylinder.

The movement of the piston toward the head 15 tends to compress the air in that

portion of the cylinder 14 between the piston and the head 15, but this is prevented by the ready escape of the air through the perforation 17 which is made large enough for the purpose, so that the air resistance to the movement of the piston toward the head 15 is practically negligible. The movement of the piston toward the head 15 tends to create a vacuum in that portion of the cylinder between the piston and the head 16, although the production of a vacuum is lessened by the inflow of air through the valved vent. It is desirable, of course, that the movement of the piston toward the head 16 should be checked and this is accomplished by throttling the outflow of air by the screw 21. When the piston moves toward the head 15 the same throttling action occurs to the inflow of air to relieve the vacuum which the movement of the piston toward the head 15 tends to produce. This means that substantially the same resistance is presented to the movement of the piston toward the head 15 as is presented to the movement of the piston toward the head 16 so far as the throttling screw 21 is concerned. It is desirable, however, that the piston should move toward the head 15 with the greatest freedom so as to respond at once and fully and rapidly to the expansive action of the spring 28, in order that any movement of the door away from the closed position will result in a corresponding projection of the rod 19, so that on the door again moving toward the closed position the rod 19 will be already projected to cause the check to actively respond.

It is in order that there may be no active resistance to the movement of the piston toward the head 15 which would prevent the desired action of the spring 28, that the perforation 31 of the plate 23 and the perforation 32 in the leather 24 are provided. The slight dragging action of the leather 24 on the inner wall of the cylinder 14 as the piston moves toward the head 15 is sufficient to move that portion of the leather 24 adjacent to the walls of the cylinder away from the plate 23 so that there is produced a shallow annular space between the outer edge of the leather 24 and the corresponding face of the plate 23, and this is sufficient to provide an air passage from the perforation 31 to the perforation 32, which passage is of sufficient area to permit a ready flow of air from one side of the piston to the other, and, therefore, the only resistance that the spring 28 has to overcome is the frictional resistance between the cup leather 24 and the walls of the cylinder 14, air resistance being nullified by the free passage for the air through the piston on its movement toward the head 15. When, however, the piston moves toward the head 16, the drag of the leather upon the wall of the cylinder 14 will move the perfo-

rated portion of the leather against the plate 23, thus cutting off communication between the portions of the cylinder on opposite sides of the piston and as the pressure within the cylinder 14 increases, engagement of the leather with the plate 23 is made more pronounced. By this means the piston may move freely in one direction under the action of the spring 28, but is retarded in its movement in the other direction by the air cushion formed between the piston and the head 16, this air cushion becoming at once active so long as the movement of the piston is sufficiently rapid to put the air within the cylinder 14 under pressure because of the throttling action of the screw 21. Slow movements of the piston toward the head 16 are resisted only by the spring 28 since the outlet for the air at the screw 21 is sufficient to prevent any material cushioning effect within the cylinder 14. The spring 28 is insufficient to overcome the action of the ordinary door springs but will resist such action to an extent as soon as the rod 19 is brought into engagement with the plate 30.

By the present invention, the door check is always in condition to respond actively to prevent any such sudden closing of the door as would produce an obtrusive noise even though the opening movement of the door be much less than the full projected length of the rod 19, this rod being pushed into the cylinder 14 to an extent presenting but a small portion of its free end when the door is in the completely closed position.

It will be observed that the rod 19 is not at all connected to the door jamb, while the plate 30 prevents any wear or marring of the door jamb because of engagement of the rod 19 therewith, and by making the plate 30 of fiber or some such material the impact of the rod 19 therewith is not productive of obtrusive noise.

What is claimed is:—

1. A door check provided with a piston having a packing member and a seating member therefor, the packing member having an extent of movement toward and from the seating member and provided with a passage adapted to be blanked or opened in accordance with the relation of the packing member to the seating member.
2. A door check comprising a headed cylinder having an air throttling means at one end, a piston within the cylinder provided with a backing plate and a ported packing leather adapted to have its port blanked by the backing plate when the ported portion is in engagement therewith, a rod carrying the piston and projecting through the cylinder head remote from the throttling means, and a spring on the rod between the piston and the head traversed by the piston rod.

3. A door check having a pneumatic cylinder, a carrying clip for the cylinder, a support for the clip upon which the latter is adjustable on an axis transverse to the longitudinal axis of the cylinder, and means for securing the clip in adjusted positions.

4. A door check having a pneumatic cylinder, a carrying clip for the cylinder, a bracket having slots therein described about a common center, and securing means traversing the clip and the slots in the bracket for fastening the clip to the bracket in any adjusted position within the length of the slots in the bracket.

5. A pneumatic door check provided with

a cylinder and a piston therein having a valve and a seat therefor, said valve being movable to the open position by the frictional engagement of the piston with the walls of the cylinder on movement in one direction and closing on the movement of the piston in the other direction.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JAMES E. GIBBS.

Witnesses:

VIRGINIA LENSE,
G. B. GROESBEEK.