P. A. RICHMOND.

DOOR CLOSER AND CHECK.

APPLICATION FILED FEB. 28, 1914.

1,114,184.

Patented Oct. 20, 1914.

3 SHEETS—SHEET 1.

Fig. 1.

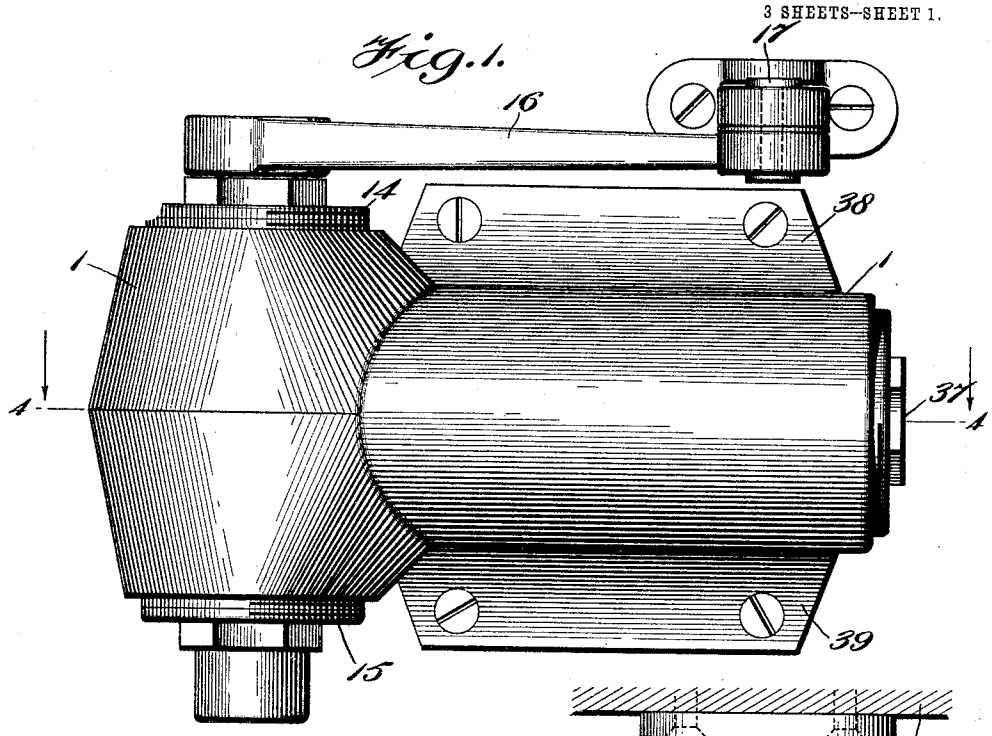
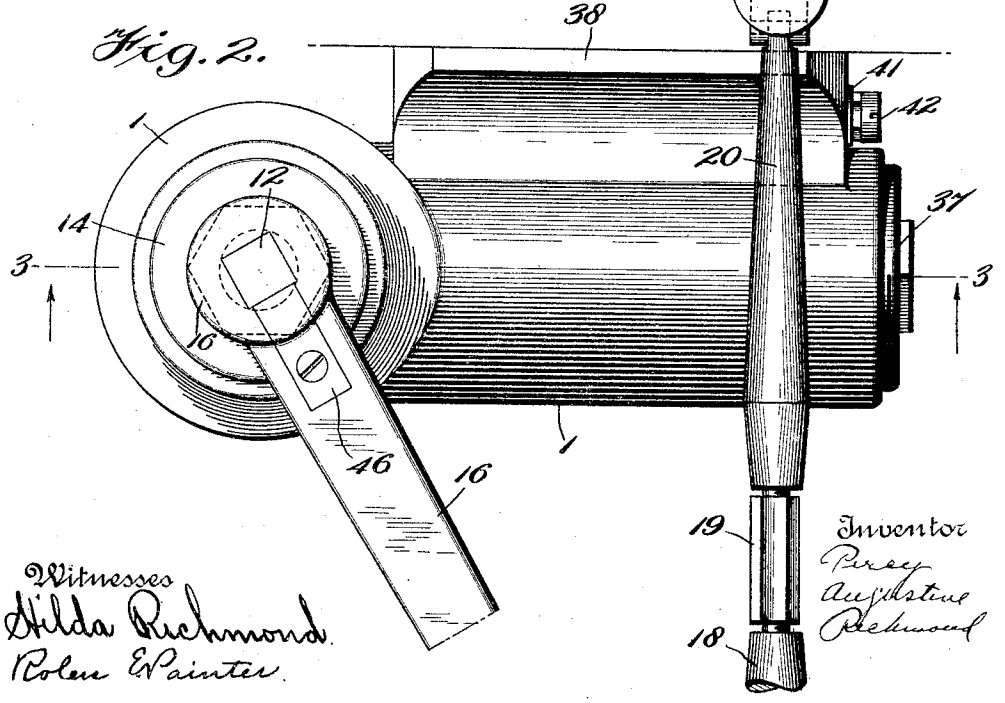


Fig. 2.



Witnesses

Hilda Richmond.

Rolen E Painter.

Inventor

Percy Augustine Richmond

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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3 SHEETS—SHEET 2.

Fig. 3.

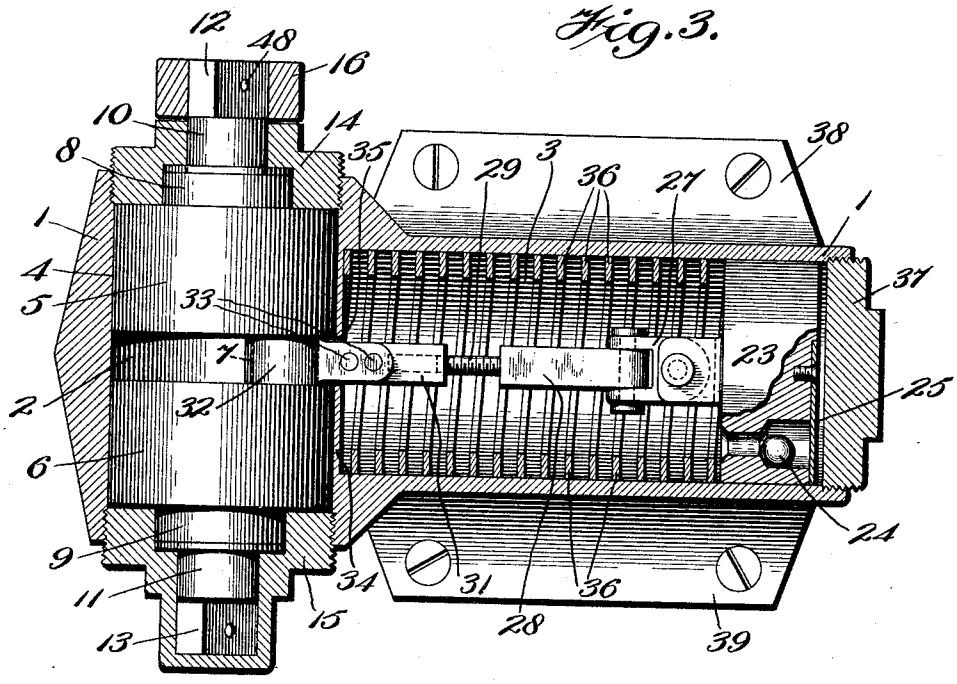
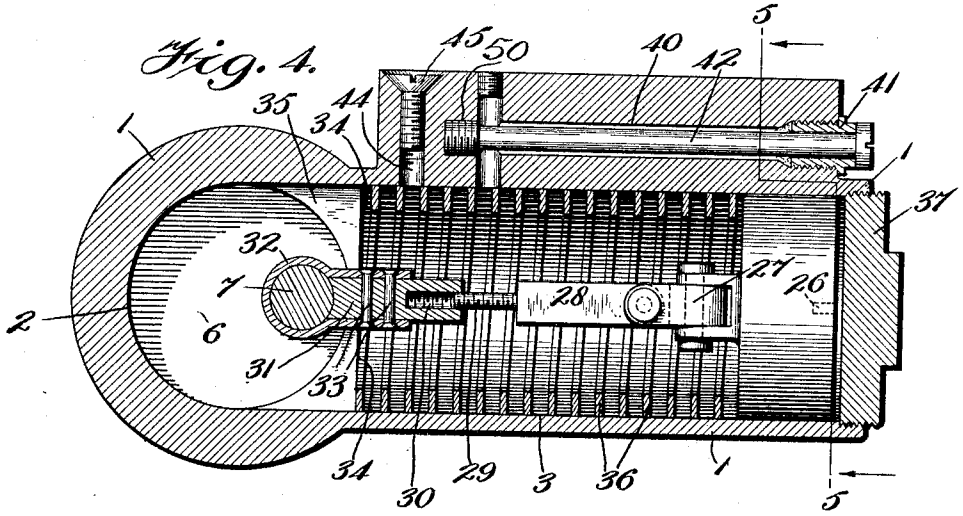


Fig. 4.



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3 SHEETS—SHEET 3.

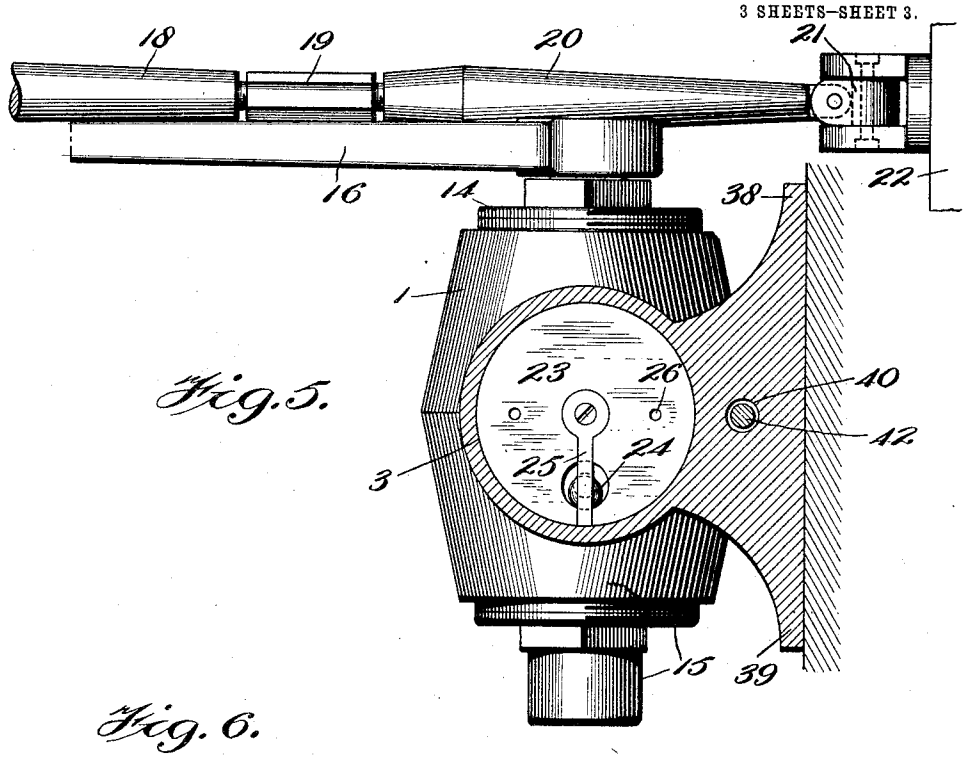


Fig. 5.

Fig. 6.

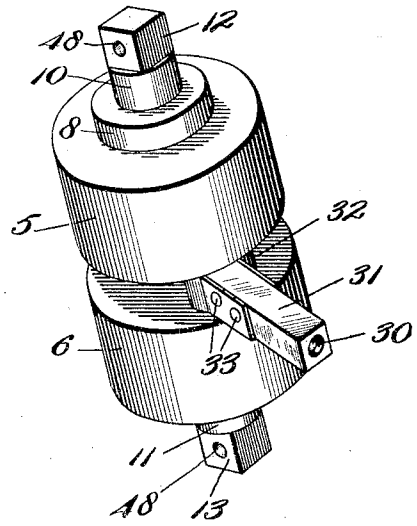
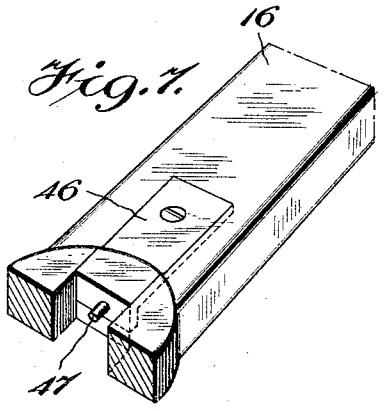


Fig. 7.



Witnesses.
Hilda Richmond.
Rolen E Painter

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Percy Augustus Richmond

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

PERCY AUGUSTINE RICHMOND, OF WASHINGTON, DISTRICT OF COLUMBIA.

DOOR CLOSER AND CHECK.

1,114,184. Specification of Letters Patent. Patented Oct. 20, 1914.

Application filed February 23, 1914. Serial No. 821,719.

To all whom it may concern:

Be it known that I, PERCY AUGUSTINE RICHMOND, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Door Closers and Checks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in door closers and checks and has for its object to provide a device of this character which will be of simple and durable construction, cheap to manufacture and more efficient in action than those heretofore proposed.

A further object of my invention is to provide a door check in which the danger of leakage is reduced to a minimum and in which the tension of the closing spring may be regulated to suit the operating conditions.

With these and other objects in view my invention consists in the novel details of construction and combinations of parts more fully hereinafter described and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals designate like parts in all the views:—Figure 1 is a side elevational view of my improved check; Fig. 2 is a top plan view of Fig. 1; Fig. 3 is a central vertical sectional view taken on the line 3—3 of Fig. 2, and looking in the direction of the arrows; Fig. 4 is a horizontal sectional view taken on the line 4—4 of Fig. 1, and looking down; Fig. 5 is a vertical cross sectional view taken on the line 5—5 of Fig. 4, and looking in the direction of the arrows; Fig. 6 is a detail perspective view of the crank member employed; and Fig. 7 is a detail perspective view of the means I prefer to employ for securing the operating arm to the crank member.

1 designates a casing which may conveniently take the form of a casting, provided with a vertical bore 2 and a horizontal bore 3. Fitting said vertical bore 2 is a crank member 4 consisting of the enlarged bearing portions 5 and 6, the connecting pin 7, the reduced portions 8, 9, 10 and 11 and the squared ends 12 and 13. The bore 2 and the circular portions of the crank member 4 are all ground to a sliding fit for a purpose to be hereafter disclosed. The bore 2 is further screw threaded at each end to receive the caps 14 and 15 which are bored and ground to accurately fit over and around the reduced portions 8, 9, 10, and 11 and the squared end 13 of the crank member 4. This accurate fitting of the caps over and around the reduced portions of the crank member 4 provides a tortuous course through which it is practically impossible for the comparatively heavy oil employed to find its way.

Fitting the squared end 12 of the crank member 4 is one end of the operating arm 16 which is pivoted at its other end as at 17 to the rod 18 which is connected by the adjusting nut 19 to the rod 20. The rod 20 is attached through the universal joint 21 to the door facing or other stationary member 22, as is well known.

Snugly fitting the horizontal bore 3 is the piston 23 provided with the usual ball valve 24 held in place by the retaining member 25. The piston 23 is also provided with two or more recesses 26 for a purpose to be more fully disclosed below. Connected to the inner face of the piston 23 as by a universal joint 27 is a piston rod 28 provided at one end with a reduced screw threaded portion 29 adapted to engage with the threaded hole 30 of a crank rod 31. Said crank rod 31 is loosely attached to the connecting pin 7 of the crank member 4 by means of a strap 32 secured thereto by rivets 33.

The bores 2 and 3 are so formed as to leave a wall 34 between them and said wall is provided with a slot 35 connecting said bores to permit the passage of the crank rod 31, as will be clear from the drawings.

Fitting within the bore 3 between the piston 23 and the wall 34 and surrounding the piston and crank rods 28 and 31 is a spiral spring 36. This spring may be of any desired construction, but I prefer to use a spring made from material having a rectangular cross section, as shown, so that should the spring break after long continued use, the flat faces of the broken coils will rest against one another and obviate the necessity of immediately replacing the spring.

The bore 3 is screw threaded at its outer end and provided with a cap 37, as shown.

Integral with the casing 1 are the flanges

38 and 39 provided with the usual screw holes whereby the check may be attached to the door.

It has been found desirable in this type of check to provide for the admission of air to the horizontal bore 3 in order that the piston 23 may operate with greater smoothness. Theoretically as the said piston moves from one end to the other of the bore 3, the oil or other fluid will be transferred from one side of the piston to the other through the ball valve 24. It sometimes happens in practice, however, that the ball 24 so positions itself over the mouth of the passage through the piston 23 as to prevent the oil from flowing through said passage, for a time at least, and thereby causes a partial vacuum on one side of said piston. The above is especially true upon the return stroke of the piston, or during the expansion of the spring 36, and causes the door to close with an uneven, jerky movement. In order to overcome this action I provide an air passage 40 communicating at one end by means of a perpendicular passage with the bore 3 and having at its other end a stuffing box 41. Loosely passing through said stuffing box and air passage is a valve rod 42 screw threaded at its inner end, as at 50, in the casing 1. Said rod 42 fits the stuffing box loosely enough to admit air slowly to the passage 40 but at the same time the packing in said box fits said rod snugly enough to prevent any of the heavy oil employed in the bore 3 from leaking out. The rod 42 is adjusted in or out by turning the same, its screw threaded end 50 opening and partially or totally closing the perpendicular passage leading to the bore 3 and thereby controlling the amount of air admitted to said bore.

At 44 I have provided an opening for introducing oil or other fluid such as is commonly used in this type of check, said opening being conveniently closed by means of a screw 45, as shown, or in any other manner desired.

I have further provided a simple and effective means for insuring the correct positioning of the operating arm 16 upon the squared end 12 of the crank member 4. This means best shown in Fig. 7, comprises an L-shaped member 46 recessed into the arm 16 and provided with a toe 47 adapted to engage a hole 48 provided in the correct face of the squared ends 12 and 13 of the crank member 4. This L-shaped member 46 is secured to the arm 16 by means of the screw as shown, or in any other suitable manner. It will thus be seen that there is only one position which the arm 16 can assume in relation to the crank member 4 and as this will be determined by the manufacturer it will be impossible to adjust my check improperly when attaching to the door.

Should it be necessary or desirable to adjust the tension of the spring 36, it may be readily accomplished by removing the cap 37 and inserting a spanner wrench in the holes 26 in the piston 23, whereupon a few turns to either the right or left will, through the threaded connection between the piston and crank rods, cause more or less tension to be placed upon said spring as desired.

I have shown my check as being applied to a right-handed door but should it be desired to use it with a left-handed door the change can be easily made by detaching the arm 16 from the squared end 12, removing the caps 14 and 15, reversing the casing 1, replacing the caps in reversed positions and attaching the arm 16 to the squared end 13, as will be clear.

It will be observed that by making the bearing surfaces 5 and 6 of the crank member 4 comparatively large, by grinding them to a sliding fit and by placing the caps 14, 15 and 37 in their proper places, I have produced a check in which the possibility of leakage of the fluid employed is reduced to minimum if not entirely obviated.

It is obvious that those skilled in the art may vary the details of construction as well as the arrangement of parts without departing from the spirit of my invention and I therefore do not wish to be limited to the above disclosure except as may be required by the claims.

What I claim is:—

1. In a door check the combination of a casing provided with a vertical and a horizontal bore; a crank member provided with a plurality of enlarged bearing surfaces and a plurality of successively reduced portions, said enlarged bearing surfaces snugly fitting said vertical bore; a piston fitting said horizontal bore; a valve in said piston; a spring mounted in said horizontal bore and coacting with said piston; a piston rod connecting said piston and crank member; and caps provided with shoulders snugly fitting said reduced portions and closing the ends of said vertical bore whereby the leakage of oil is prevented, substantially as described.

2. In a door check the combination of a casing provided with a vertical and a horizontal bore; a crank member provided with a plurality of enlarged bearing surfaces and a plurality of successively reduced portions, said enlarged bearing surfaces snugly fitting said vertical bore; a piston fitting said horizontal bore; a valve in said piston; a spring mounted in said horizontal bore and coacting with said piston; an adjustable valve for admitting air to said horizontal bore; an adjustable connection, lying wholly

within said casing, between said piston and crank member whereby the tension of said spring may be controlled; and caps provided with shoulders snugly fitting said reduced portions and closing the ends of said vertical bore whereby the leakage of oil is prevented, substantially as described.

In testimony whereof, I affix my signature in the presence of two witnesses.

PERCY AUGUSTINE RICHMOND.

Witnesses:
HILDA RICHMOND,
ROLEN E. PAINTER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."