Aug. 4, 1925. 1,548,501

H. A. ARNOLD

DOORCHECK

Filed Feb. 23, 1924 2 Sheets-Sheet 1

Fig. 1

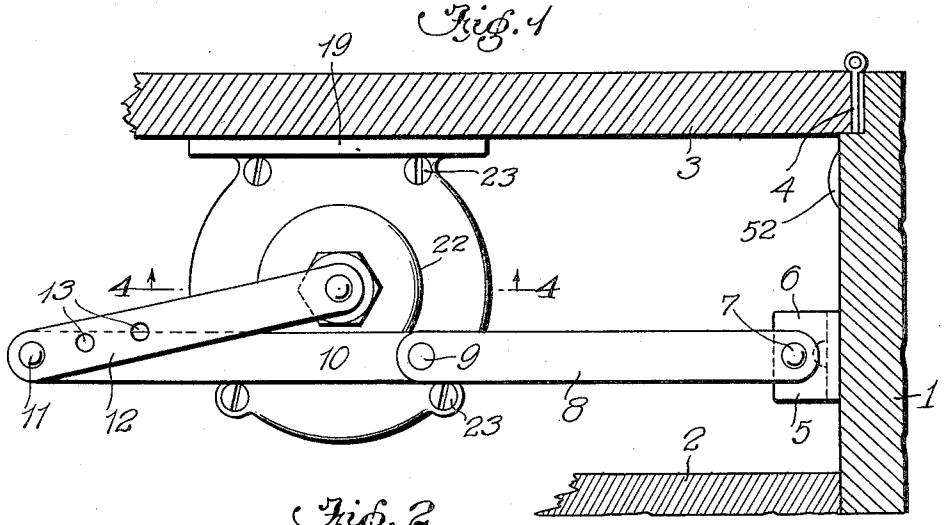
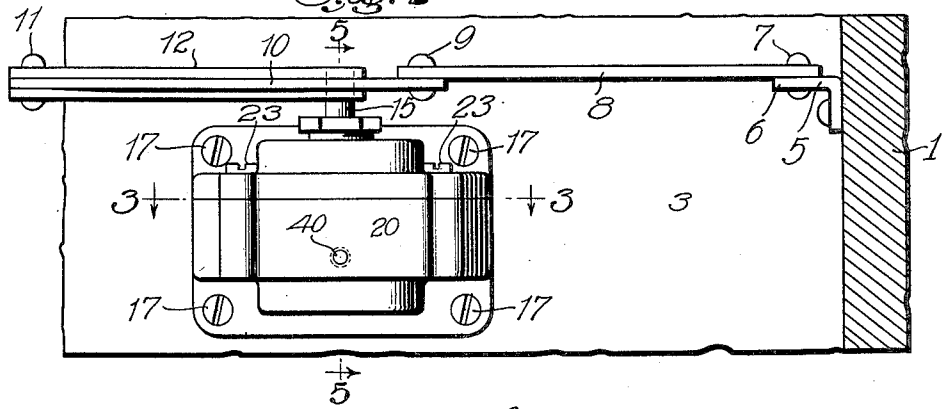


Fig. 2



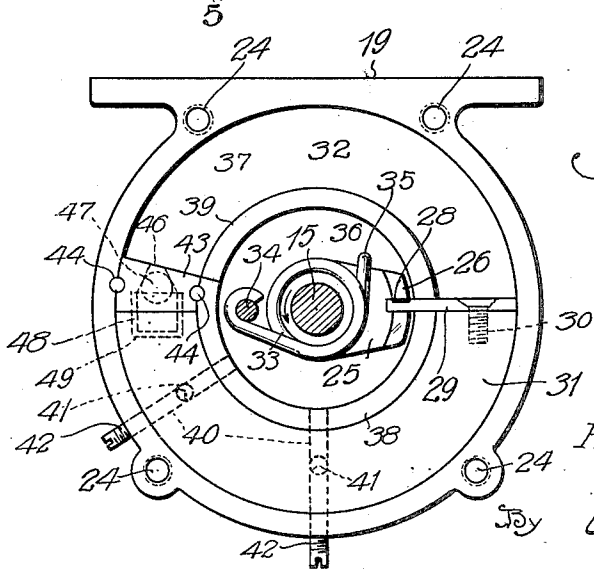


Fig. 3

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Fig. 4

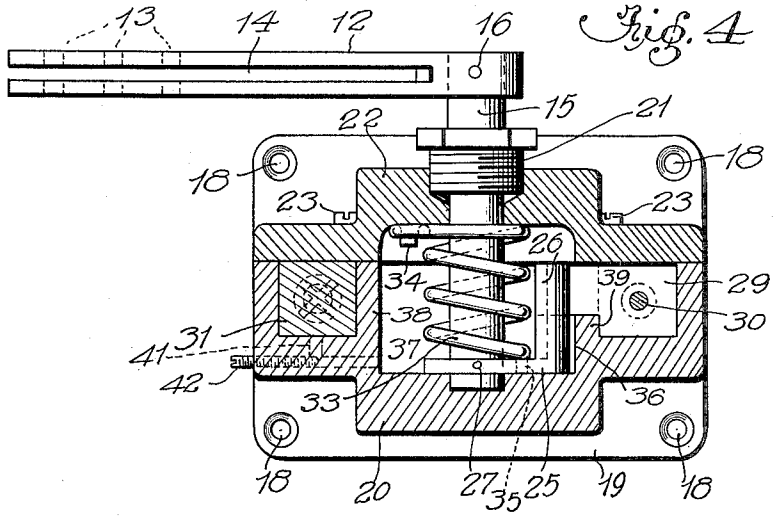


Fig. 5

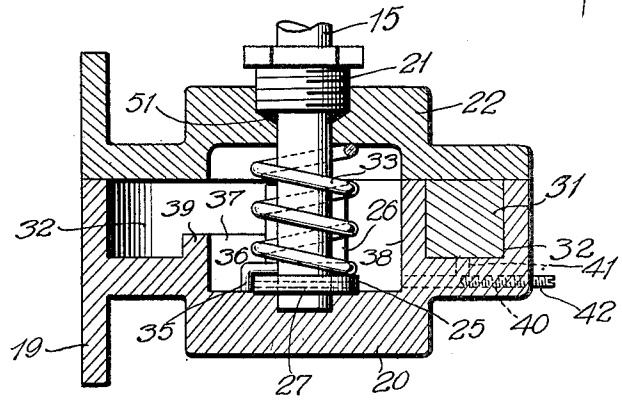


Fig. 6

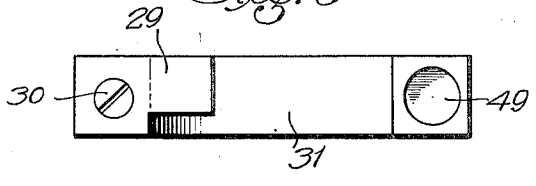
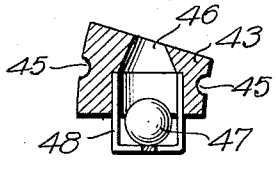


Fig. 7



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UNITED STATES PATENT OFFICE.

HAROLD A. ARNOLD, OF LENORA, KANSAS.

DOORCHECK.

Application filed February 23, 1924. Serial No. 694,627.

To all whom it may concern:

Be it known that I, HAROLD A. ARNOLD, a citizen of the United States, residing at Lenora, in the county of Norton and State of Kansas, have invented certain new and useful Improvements in Doorchecks, of which the following is a specification.

This invention relates to certain new and useful improvements in checks for doors, lids, covers and the like, and more particularly for screen doors, and it has for its objects among others to provide an improved liquid check that will occupy but little space so that it can be easily mounted between the main door and the screen door.

It has for further objects to provide a check of this nature that shall be simple, composed of few parts, those capable of manufacture at small cost, readily assembled and adjusted, not liable to get out of order, yet reliable and efficient in use.

My present improvement comprises broadly a wing piston, semi-circular in shape, with a casing having a semi-circular channel in which said piston oscillates, the said casing having two chambers with a partition therebetween, a check valve, and a slidably mounted piston, with provision for the flow of a liquid from the one chamber into the other.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be specifically defined by the appended claims.

The invention, in its preferred form, is clearly illustrated in the accompanying drawings, which, with the numerals of reference marked thereon, form a part of this specification, and in which

Figure 1 is a top plan, with portions in section and parts broken away, showing the check attached to the screen door, between the latter and the main door, the screen door being in its closed position.

Figure 2 is a side elevation of the parts seen in Figure 1, with the main door removed.

Figure 3 is an enlarged elevation of the check casing, with the end closure removed, and the central shaft and the securing means for one end of the spring shown in cross section, the section being taken as on the line 3—3 of Figure 2, looking in the direction of the arrows.

Figure 4 is a section on the line 4—4 of Figure 1, looking in the direction of the arrows.

Figure 5 is a section on the line 5—5 of Figure 2, looking in the direction of the arrows.

Figure 6 is an elevation of the semi-circular piston removed.

Figure 7 is an enlarged section through the sector with its ball valve guide or cage, with the ball valve in elevation.

Like numerals of reference indicate like parts throughout the several views.

Referring to the drawings

1 designates the door frame, a portion 2 of the main door only being shown, while 3 designates the screen door, or other movable member hinged at 4 to the door frame, as seen clearly in Figure 1.

The attachment and operation of my improved check will be substantially the same no matter whether it be attached to a door, or any other hinged or movable member in connection with which it is desired that it shall serve. Its connection to a screen door as in the present instance is given merely as an illustration of the relative disposition of the check with reference to the movable and relatively fixed parts, in the present instance showing how the check can be readily disposed between the main and screen doors.

Attached to the door frame 1 is a bracket 5 of any suitable character and secured in any suitable manner, the bracket in the present instance being shown as of angular form, one portion of which engages and is secured to the door frame, while to the other member 6 is pivoted as at 7 one end of the lever 8, to the other end of which is pivoted as at 9 the lever 10, the other end of which is pivotally mounted as at 11 in the forked or bifurcated lever 12, the side walls of which are provided with a plurality of holes 13, providing for such adjustment of the check as may be necessary or advisable. The lever 10 works in the slot 14 of the said lever 12 as will be readily understood from reference to Figure 2.

The other end of the lever 12 is connected with the outer end of the shaft 15 by means of pin 16 or the like, as will be seen in Figure 4.

The check is shown as secured to the door by means of screws or the like 17 passed

through holes 18 in the base portion 19 of the check.

The check may be mounted at the top of a door, or on the middle cross bar of the door as may be desired.

The shaft 15 is rotatably mounted in the body or casing member 20 and in a bearing or bushing 21 held in the cover member 22 of the check, screws or the like 23 passing through holes 24 in the body portion and corresponding holes in the cover serving to hold these two parts in position and allowing ready access to the interior of the check when desired.

25 is a connecting washer having a right angled projection 26, this washer being received within a depression in the bottom of the body portion of the check and secured to the shaft 15 near the inner end of the latter in any suitable manner as by pin or the like 27 as seen in Figure 3 to engage the dog 29 secured in any manner as by screw to one end of the semi-circular piston 31 movable in the circular groove or channel 32 formed in the body portion of the check as seen in Figures 3 and 5.

33 is a spring encircling the shaft 15 with one end engaged with a pin or lug or the like 34 within the cover 22 as seen best in Figure 4, and the other end of this spring is turned at an angle as seen at 35 and engaged with the edge of the member 25 as seen best in Figure 3.

The member 20 has two chambers, 36 and 37, formed by the partition 38 which is of greater height for substantially one half its circumference than for the other half, 39, see Figures 3, 4 and 5 being shorter, or portion of less height.

40 are passages drilled or otherwise formed in the wall of the member and extended through the partition 38 as seen in Figure 3 and communicating with the chamber 36. 41 are vertical passages, or passages at substantially right angles to the passages 40 and communicating with the channel 32 beneath the piston 21 as seen by dotted lines in Figures 4 and 5. The capacity of these passages is regulated by suitable means as the screws 42, see Figure 3 adjustable in the passages 40.

43 is a sector disposed in the channel 32 as shown best in Figure 3. It may be secured in position in any convenient manner; in Figure 3 it is shown as secured by the pins 44 which are engaged in openings formed partly in the partition 39 and partly as at 45 in the sector. The upper wall of this sector is formed with an opening 46 providing a seat for a ball check valve 47 as seen clearly in Figures 3 and 7. This sector has also a guide or cage 48 seen best in Figure 7 to protect and guide the ball valve, this guide or cage finding a seat in an opening 49 in the end of the piston 31 as seen in Figure 3 in dotted lines, the seat or opening 49 being seen clearly in Figure 6.

52 is a guard on the door frame against which will rest the lever 8 when the screen door is swung open against the wall of the house.

With the parts constructed and arranged substantially as above described the operation will be readily understood, and briefly stated, is as follows;—

Supposing the door to be closed, upon opening the door the check, moving with the door and away from the casing or frame, moves the pivot end of the lever 12, thus rotating the shaft 15 which rotates the connecting washer 31 through the connections hereinbefore described, thus increasing the tension of the spring 33 which is adapted to move the said washer in the opposite direction and through the means of the shaft, levers and connections close the door. The bushing with its packing 51 forms a tight bearing for the shaft and between the cover and bearing so as to allow no oil to leak out between the bearing and shaft in the operation of the door. It is to be understood that oil is placed in the chambers of the check, and is allowed to flow in and out of the channel 31 in the actuation of the door, the flow of the oil being regulated by means of the screws 42 in a manner which will be readily understood. Thus when the door is closed the semi-circular piston is close to the sector 43, it being understood that when the cover is fastened in position on the body of the check the channel 31 is closed on the sides, top and bottom except for the holes 41 as the cover fits tight on the rims of the body portion. When the door is opened the piston is moved away from the sector through the dog, the shaft 15 and the lever 12. The valve in the sector lets the oil in the check on the other side of the sector flow into the space occupied by the piston. The coiled spring pulls the piston and door back to their original position, but the piston and hence the door cannot move back into position any faster than the oil can escape from between the piston and the sector. The check valve will not let the oil through the sector so that the oil can only escape slowly through the openings 41, this allows rapid closing on the initial movement but causes a gradual constraining of the motion as the door closes. The rapidity of the escape of the oil from the chamber between the piston and sector can be easily regulated by set screw 42 in the passage 40 which will regulate the size of the opening 41 and in this way the motion of the piston and the door may be regulated as may be desired.

One of the most important advantages of my improved form of check is that while in the ordinary form with wing type piston there is much trouble due to oil leakage.

This trouble is entirely obviated in my form of check. When the door is wide open it may close quickly and leakage is no disadvantage, but when the door is nearly opened its motion should be checked. It is then that the oil is likely to leak past the wing piston and casing of the ordinary wing type. Such is not the case with my construction, and the leakage is entirely prevented due to the surface contact between the casing and piston which is so greatly increased when the piston slides into the sleeve due to the closing motion of the door, and there is little chance of oil leaking between the piston and casing. This type of piston has more surface contact with the casing and thus reduces oil leakage past the piston.

Furthermore, in my construction the checking member is removed away from the shaft which increases the leverage of the wing piston for the checking member, making it more effective, reduces troubles due to leakage, and makes the check more compact in that it allows room for the spring near the shaft and between the shaft and the piston, making it unnecessary to have an extra chamber above the check for the spring.

Modifications in detail may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

What is claimed as new is;—

1. A check comprising a casing having two chambers of different heights, a shaft rotatably mounted therein, said chambers being communicating a coiled spring and a lever connected to said shaft, and an oscillatory checking member in said casing.

2. A check comprising a casing having two chambers of different heights, a shaft rotatably mounted therein, said chambers being communicating a coiled spring and a lever connected to said shaft, an oscillatory checking member in said casing, and means for regulating the movement of said checking member.

3. A check comprising a casing having two chambers of different heights, a shaft rotatably mounted therein, said chambers being communicating a lever connected with said shaft, and carrying means for connection with a door frame, and an oscillatory piston movable in said casing and actuated by said shaft.

4. A check comprising a casing having two chambers of different heights, a shaft rotatably mounted therein, said chambers being communicating a lever connected with said shaft and carrying means for connection with a door frame, and an oscillatory piston movable in said casing and actuated by said shaft, said casing having a circular channel in which said piston moves.

5. A check comprising a casing, having two chambers of different heights, a shaft rotatably mounted therein, said chambers being communicating a lever connected with said shaft, and carrying means for connection with a door frame, an oscillatory piston movable in said casing and actuated by said shaft, said casing having a channel in which said piston moves, and fluid-control means cooperable with said piston.

6. A check comprising a casing having two chambers of different heights and having an annular channel, a shaft rotatably mounted in said casing and carrying a rotatable member, said chambers being communicating a piston in said channel actuated by said member, and means for actuating said member from said shaft.

7. A check comprising a casing with two chambers of different heights and an annular channel, a shaft rotatably mounted in said casing, means carried by said shaft for attachment to a door frame said chambers being communicating an oscillatory piston movable in said channel, means whereby said piston is actuated by connection with said shaft, and a spring controlled by the movement of the said shaft.

8. A casing having two chambers of different heights, a shaft rotatably mounted in said casing, said casing having a circular channel, said chambers being communicating a semi-circular piston movable in said channel and connected with said shaft, and a check valve mounted in said channel.

9. A casing having two chambers of different heights and having an annular channel, a shaft rotatably mounted in said casing, a check valve located in said casing, a spring connected with the said shaft, said chambers being communicating a semi-circular piston movable in said channel and actuated from said shaft, and means for regulating the movement of said piston.

10. In a door check, a casing having two chambers of different heights, a shaft rotatably mounted therein, said chambers being communicating an oscillatory piston in said casing, and cooperating means forming a connection between said shaft and piston.

11. In a door check, a casing having two chambers of different heights, a wing piston therein actuated by but removed from the shaft of the check, said chambers being communicating and a spring interposed between said shaft and the piston.

12. In a door check, a casing, a wing piston therein actuated by but removed from the shaft of the check, and a spring interposed between the said shaft and piston, the casing having two chambers concentric, and communicating, and the spring arranged in one chamber and the piston in the other.

13. A door check comprising a casing having two chambers of different heights, a rotatable shaft mounted in one of said cham-

bers, a semi-circular piston mounted for movement in the other chamber, said chambers being communicating and means for actuating said piston from said shaft.

14. A door check comprising a casing having two chambers of different heights, said chambers being communicating a check valve in one chamber, a semi-circular piston in the other chamber, said valve and piston being arranged at the openings into said chambers.

15. A door check comprising a casing with two chambers of different heights, a partition between the chambers, embodying a semi-circular flange with a check valve at one end of the flange, said chambers being communicating, and a piston slidably mounted at the other end of said flange.

16. A door check comprising a casing having two chambers of different heights, a partition between the two chambers, said chambers being communicating a check valve at one end of the one chamber, a piston slidable upon the other end of the flange, a shaft rotatably mounted in the other chamber, and a spring in the last-named chamber and connected with said shaft.

17. A door check comprising a casing, a shaft rotatably mounted therein, a piston connected to the shaft to be actuated thereby, a sleeve within which said piston is slidably disposed, a check valve in said sleeve, controlling the passage from said sleeve to another chamber in said casing to allow oil in said casing to flow from one chamber to another, the piston being connected so as to move into the sleeve when the door is closing, the oil in the sleeve serving to regulate the movement of said piston, and means whereby the surface contact increases or decreases according to the direction of movement of the piston.

18. A casing, a sleeve therein, a shaft rotatably mounted in said casing, a spring connected to said shaft, a piston connected to said shaft to be actuated thereby, said piston being slidably disposed in said sleeve a check valve in said sleeve, controlling the passage from said sleeve to another chamber in said casing to allow oil in said casing to flow from one chamber to another, said piston being connected to move into the sleeve when the shaft is rotated in one direction, the oil in the sleeve serving to regulate the movement of said piston, and means whereby the surface contact increases or decreases according to the direction of movement of the piston.

19. A door check comprising a casing having two communicating chambers of different heights with a plurality of openings between said chambers to allow the flow of oil through said openings to regulate the movement of a piston, a shaft rotatably mounted in one of said chambers, and a semi-circular piston connected with said shaft and mounted for movement in the other of said chambers.

20. In a door check, a casing, a sleeve therein, a shaft rotatably mounted in the casing, a spring connected to said shaft, a piston connected to the shaft to be actuated thereby, said piston being slidably mounted in said sleeve, a check valve connected with the sleeve, a chamber in the casing, the passage of oil from which to another chamber is controlled by said valve, said chambers being communicating and of different heights said piston being connected to move into the sleeve when the shaft is rotated in one direction, the oil in the sleeve serving to regulate the movement of the piston, there being provision to allow the oil to move freely to and from said sleeve and the openings being closed gradually as the piston moves into the sleeve, thereby preventing the movement of the oil from said sleeve thus causing the piston to come to a gradual stop.

In testimony whereof I affix my signature.

HAROLD A. ARNOLD.