

No. 608,462.

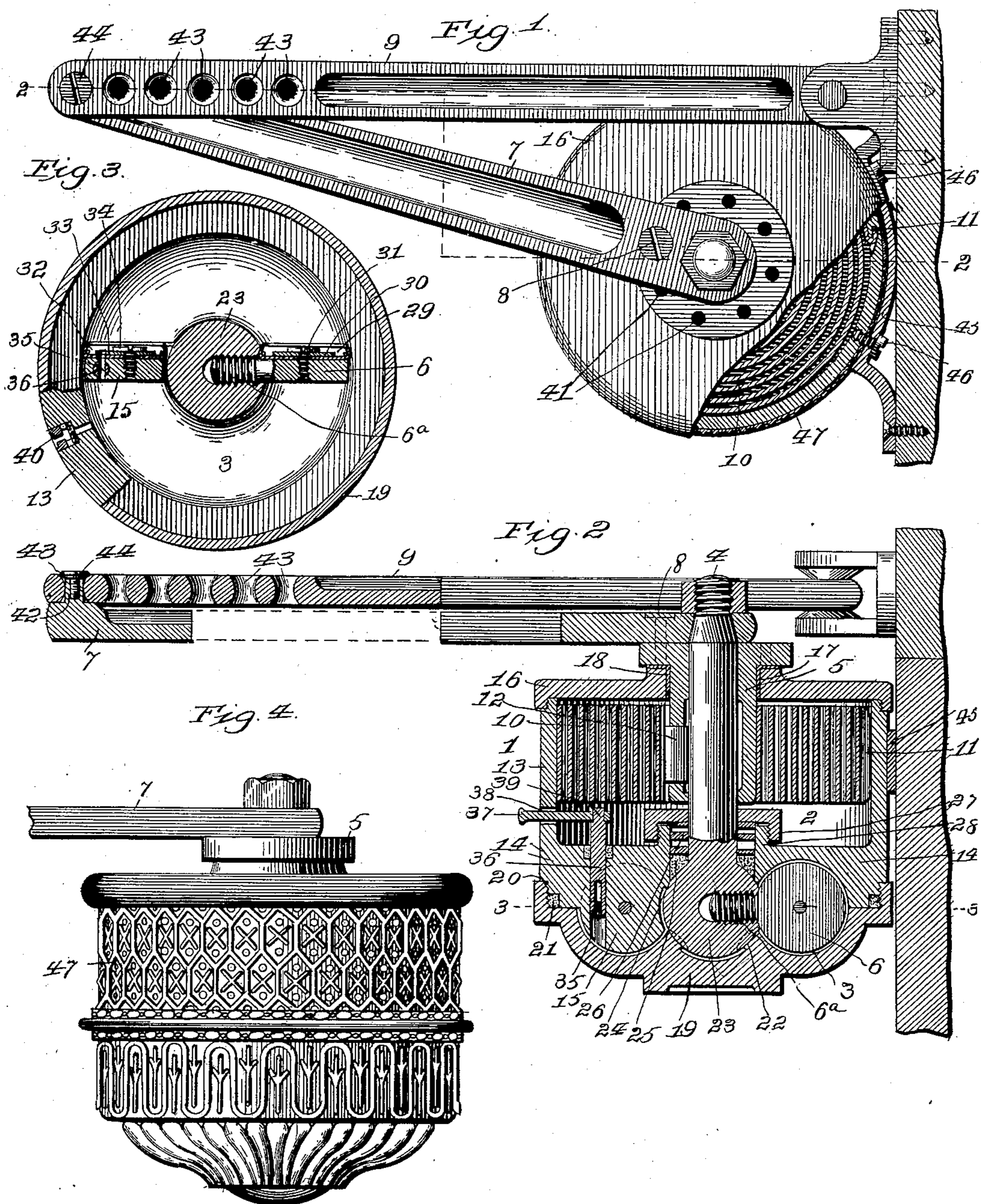
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P. J. LENNART.

DOOR CHECK.

(Application filed Feb. 20, 1897.)

(No. Model.)



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# UNITED STATES PATENT OFFICE.

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## DOOR-CHECK.

SPECIFICATION forming part of Letters Patent No. 608,462, dated August 2, 1898.

Application filed February 20, 1897. Serial No. 624,472. (No model.)

*To all whom it may concern:*

Be it known that I, PEHR J. LENNART, a citizen of the United States, residing at Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Door-Checks, of which the following is a specification.

My invention relates to door-checks in which either liquid or air or both liquid and air or air only is employed for resisting the free action of the door-closing spring.

My check is a rotary check and differs from other rotary checks which have been made heretofore in that it employs a true piston—that is to say, a piston substantially surrounded by its cylinder—instead of the wings which have been heretofore attached to the rotating spindle for controlling the action of the spring. To enable me to accomplish this result of having a truly close-fitting piston, I have devised an improved construction of that portion of the casing of the check which constitutes the piston-chamber, so that I am not only able to form the piston-chamber so accurately as to make a proper fit between it and the piston, but I can do this by ordinary machine processes efficiently and cheaply. I am therefore the first to produce a check which combines the advantages of the true or substantially circular piston with the additional advantage of the rotary action of the piston as distinguished from the reciprocating type of check, these advantages being, first, greater simplicity of parts, as my piston is directly and rigidly connected to the operating-spindle and the shape of the piston is such that the piston can be readily packed or made tight by the ordinary cup-leather notwithstanding it projects laterally from a rotary spindle; second, a less number of parts; third, greater compactness and neatness of the check, and, fourth, greater cheapness of manufacture.

My invention further consists in a greatly-improved form of spindle, and this consists in making the spindle with an enlarged journal, which is preferably of an approximately spherical form, which journal works in a bearing of a corresponding form in the lower part of the shell or casing. The result of this is that the spindle is automatically centered

during the operation and cannot be turned out of line by any twisting or distorting of the parts, and it also makes possible a very simple and easily-adjustable packing, as will be hereinafter explained, to prevent any escape of the liquid from the liquid or piston chamber. To provide for the accurate and cheap construction of said piston-chamber, I have devised a casing which is divided on a plane at right angles to the axis of the spindle, so that one portion of the piston-chamber is formed in the part of the casing above and the other portion of said piston-chamber is formed in the part of the casing below the plane of division, each of these portions therefore being entirely open and accessible not only for manufacturing, but also for assembling or subsequent examination, if necessary.

It will thus be seen that my improved check combines with great simplicity of manufacture entire mechanical accuracy and easy adjustability and compensation for any wear of the parts in use.

I will now proceed to describe my invention more in detail, with reference to the accompanying drawings, which form a part of this specification.

In the said drawings, Figure 1 is a top view of my improved door-check, partly broken away and shown applied as in use. Fig. 2 is a vertical section on the line 2 2, Fig. 1, the sheathing being omitted. Fig. 3 is a horizontal section on the line 3 3, Fig. 2. Fig. 4 is an elevation showing the sheathing.

The device comprises a casing 1 of special construction, in which are formed the spring-chamber 2 and annular piston-chamber 3, which is shown circular in cross-section.

4 represents the operating-spindle, surrounded by the adjusting-sleeve 5 and provided at its lower end with a ball or enlargement 23 and carrying at its upper end the arm 7, which is secured to the sleeve 5 by screw and to the adjustable link 9, which is connected to one of the relatively-moving parts to be controlled.

10 represents the spring, which is anchored at one end 11 in the spring-chamber and secured at its other end 12 to the sleeve 5.

The casing is formed of the central shell

13, having the partition 14, separating the spring-chamber 2 from the piston-chamber 3, and also having formed integrally in it the radially-arranged dividing-wall 15, which divides the piston-chamber 3 radially. Said shell further comprises the cap 16, forming a cover to the spring-chamber and having an opening 17, in which is placed a flanged lining 18, forming a bearing for the sleeve 5. Partition 14 forms one half of the annular chamber or cavity, while the base or bottom 19 forms the other half, it being secured to the casing by means of the screw-threads shown at 20, with an interposed packing 21. With this arrangement the annular chamber can be easily machined. Moreover, other forms of cross-section—such as polygonal but substantially or approximately circular—could be adopted for the annular piston-chamber. The sections of the casing are so formed that the piston-chamber has a restricted opening along the inner periphery, which is closed by the ball or enlargement 23 on the spindle—that is to say, the sections of the casing form the top, bottom, and sides of the piston-chamber, and said sections fit together on the outer side and form a closed outer periphery, while on the inner side or periphery they approach but do not meet, and thus form the restricted circular opening of the inner periphery, which is closed by the spindle, but at the same time affords an opening for travel of the connection between the piston and spindle. The bottom 19 is further provided with a step 22, in which the ball end 23 on the operating-spindle is fitted. This ball on the said spindle also fits the under side of the partition 14, as shown at 24, and is there provided with a packing 25, which is kept pressed down upon the upper side of the ball by means of a flat spiral spring 26. The upper portion of the partition 14 is further provided with a screw-cap 27, threaded upon the neck 28 and thereby adapted to hold the spring 26 to its work and regulate pressure of the same. By screwing the bottom 19 pressure may be maintained between the ball 23 and the bearing 24, as well as the bearing 22, and leakage at these annular bearings thereby prevented. This construction is very advantageous for the reasons that in addition to forming a readily-tightened bearing it maintains the accuracy of the shaft 4 and provides a ready means of adjustment to take up wear and causes the bearings to wear smooth at all times.

The piston 6 in the form shown consists of a disk having a screw-shank 6<sup>a</sup>, by which it is screwed into one side of the ball 23, thereby causing it to move synchronously with the operating-spindle. This piston is faced by a leather cup-packing 29, (see Fig. 3,) held in place by washer 30 and screw 31. The cup-packing being presented in the direction in which the piston is moved by the spring in closing the door, said cup-packing spreads against the walls of the chamber and the side of the ball 23 to prevent escape of fluid while

the piston is performing its function; but when the piston is moving backward in the act of opening the door the cup-packing yields to the pressure of liquid from behind and the piston offers no material resistance. 32 represents a similar cup-packing on the dividing-wall 15, so as to pack it in a manner similar to that described with reference to the piston, said cup 32 being secured by washer 33 and screw 34, as shown. The partition-wall 15 is further provided with a vertical by-pass 35, through which fluid may escape slowly before the returning piston, and this by-pass is controlled by a rotating cylindrical valve 36, the stem of which extends vertically through the partition 14 into the spring-chamber and is there accessible for turning by a laterally-extending key 37, introduced through the key-opening 38 in the central shell and applied to the squared end 39 of said valve-stem. The lower end of the valve is of such shape that the by-pass 35 may be accurately adjusted at will.

From the foregoing description it will be obvious that opposition to the quick action of the spring may be controlled at will by regulating the escape of pressure, and any desired amount of friction may be added by screwing up the bottom 19. It will also be obvious that either air or some liquid may be employed as the opposing fluid. If air is employed, it may be desirable to have a check-valve 40, controlling an opening into the piston-chamber in rear of the wall 15 and of the piston 6.

To provide for adjusting the tension on the spring, the flange of the sleeve 5 is provided with a series of threaded perforations 41, in any of which the screw 8 may be introduced, and thus the relative position of the sleeve 5 and arm 7 may be adjusted at will. The outer end of the arm 7 is connected to the link 9 by means of a stud 42, which enters any one of the series of openings 43 in the link and is there secured by a screw 44. This offers a convenient means for adjustably connecting the link and arm.

My improved door-check is preferably provided with an attaching-bracket 45, which is detachably secured to the casing of the door-check by means of screws 46. This enables me to employ an extra ornamental sheathing, as shown at 47 in Figs. 1 and 4, and this sheathing can be held in place by having its edges caught beneath the attaching-bracket. I am thus enabled to provide a door-check of common stock which may be provided with trimming of any special design desired to match other fittings and the general appearance of the door-check greatly improved at small expense.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In a door-check, the combination of a spindle, a casing in which said spindle is mounted, provided with an annular piston-

chamber formed of two parts, divided on a plane at right angles to the axis of rotation of the spindle, and having a suitable by-pass, and a piston connected with the spindle and working in the piston-chamber; substantially as set forth.

2. In a door-check, the combination of a spindle provided with a piston and a casing in which said spindle is mounted, formed with an annular chamber in which said piston works; said chamber being concentric with said spindle and having approaching inner walls separated by a restricted opening which is closed by the spindle, but which affords a way for travel of the connection between the piston and spindle and a suitable by-pass for said chamber; substantially as explained.

3. In a door-check, the combination of the shell formed with an annular chamber having a restricted circular opening in its inner periphery, a spindle journaled in the casing concentrically with the annular chamber, an enlargement providing a bearing for the spindle and closing the circular opening and a suitable passage communicating with said chamber and permitting escape of fluid from in front of the piston; substantially as set forth.

4. In a door-check, the combination of a spindle having a piston, and a casing in which said piston is mounted formed with an annular piston-chamber concentric with the spindle approximately circular in radial section, divided transversely to the spindle into an upper half which carries a radially-arranged dividing-wall, and a bottom or lower half which is fitted to said upper half a suitable by-pass being provided which permits the escape of fluid from in front of the piston; substantially as described.

5. In combination with a door-check; a spindle provided at one end with an enlargement and an adjustable cup-bearing in which the enlargement of said spindle turns, and by which it is automatically centered and readily adjusted to take up wear; substantially as described.

6. In a door-check, the combination of a shell having a partition formed with the upper half of an annular piston-chamber, approximately circular in radial section, a bottom formed with the lower half of the piston-chamber, the operating-spindle working through the partition and formed with a ball providing an inner wall to the piston-chamber, and the approximately circular piston secured radially to the ball of the shaft and working in the piston-chamber and suitable means for

allowing restricted passage of fluid from one side to the other of the piston during the advance movement of said piston and the free passage of said fluid during the return movement of the piston; substantially as described.

7. In a door-check, the combination of a shell having a partition formed with the upper half of an annular piston-chamber approximately circular in radial section, and with a radially-arranged dividing-wall formed wholly and integrally with said upper half dividing the piston-chamber, a bottom formed with the lower half of the piston-chamber, the operating-spindle working through the partition, formed with a ball providing an inner wall to the piston-chamber, and the approximately circular piston secured to the ball of the shaft and working in the piston-chamber a suitable by-pass being provided which permits the escape of fluid from in front of the piston; substantially as described.

8. In a door-check, the combination of a shell having a partition formed with a central bearing, and with the upper half of an annular piston-chamber, approximately circular in radial section, the adjustable bottom formed with a central step, and with the lower half of the piston-chamber, and the operating-spindle formed with a ball fitting between the central bearing and the central step; substantially as described.

9. In a door-check, the combination of a shell having a partition formed with a central threaded neck, with a central bearing and with the upper half of an annular piston-chamber, the adjustable bottom formed with a central step and with the lower half of the piston-chamber, the operating-spindle formed with a ball fitting between the central bearing and the step-bearing, the packing and spring located within the neck, and the cap adjustable on the neck; substantially as described.

10. In a door-check, the combination of a shell having a spring-chamber, a key-opening extending into the spring-chamber, and a partition formed with the upper half of an annular piston-chamber, and with a dividing-wall having a vertical by-pass and dividing the piston-chamber, the rotating cylindrical valve located in the by-pass and having its stem extending into the spring-chamber in rear of the key-opening, and the bottom formed with the lower half of the piston-chamber; substantially as described.

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Witnesses:

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