N. E. DAVIES.

FLUID CHECKING DEVICE.

APPLICATION FILED SEPT. 19, 1919.

1,347,017.

Patented July 20, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

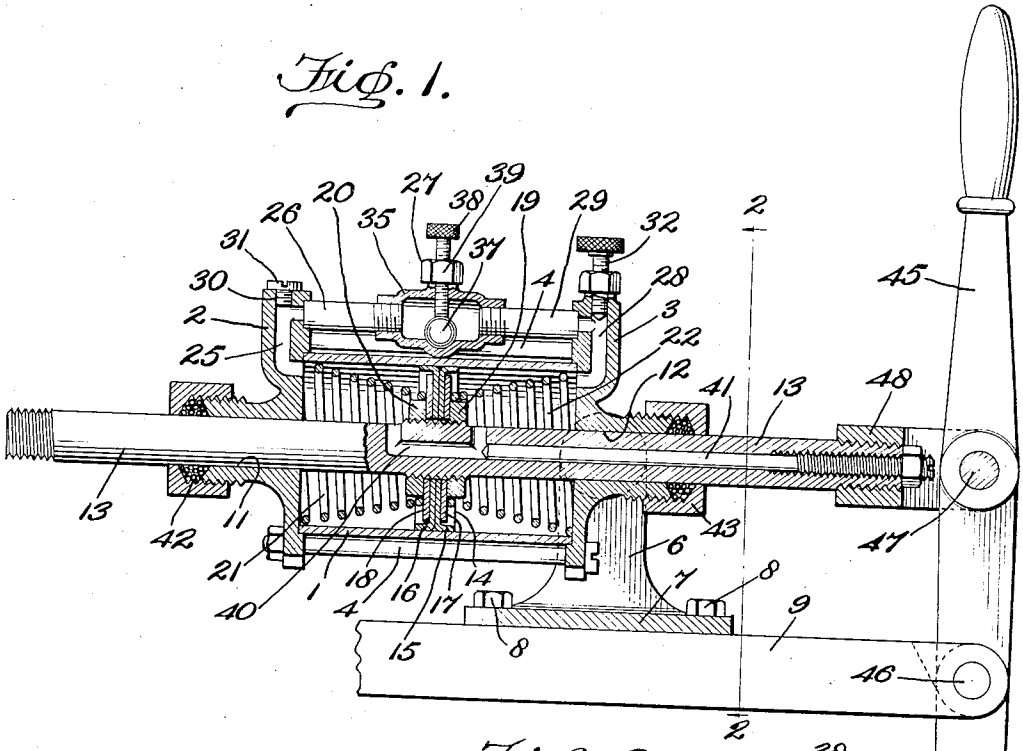


Fig. 2.

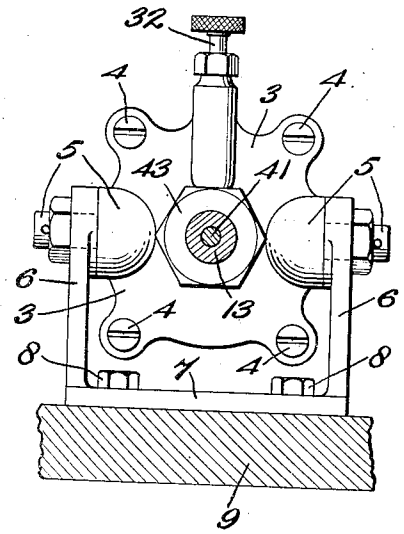


Fig. 3.

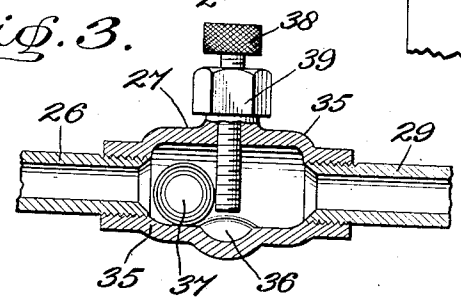
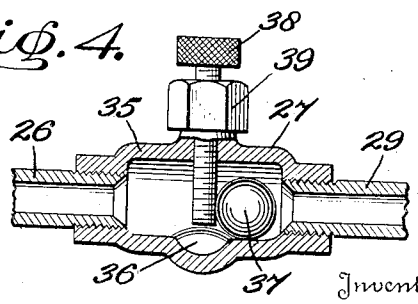


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 5.

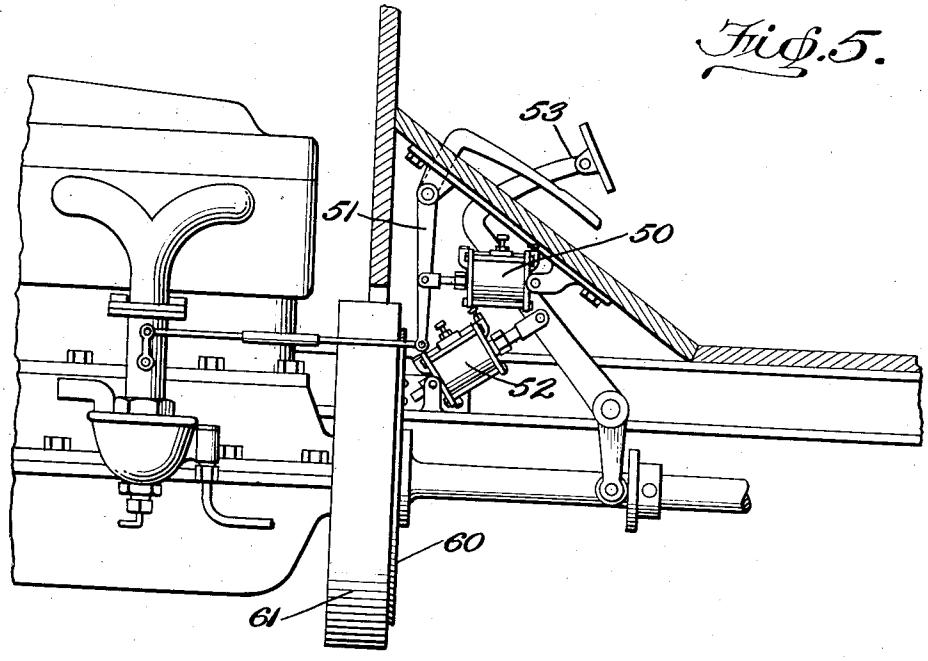


Fig. 6.

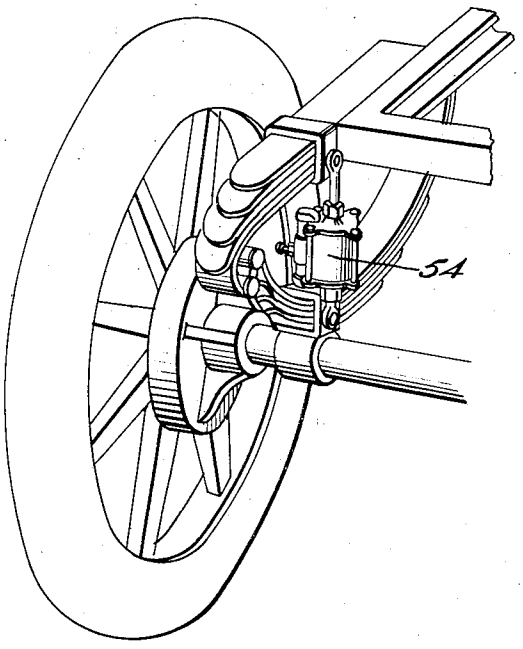
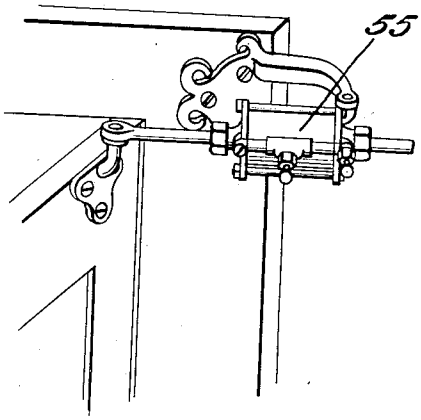


Fig. 7.



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UNITED STATES PATENT OFFICE.

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FLUID-CHECKING DEVICE.

1,347,017. Specification of Letters Patent. Patented July 20, 1920.

Application filed September 19, 1919. Serial No. 325,042.

To all whom it may concern:

Be it known that I, NELSON E. DAVIES, a citizen of the United States, residing at Redwood City, in the county of San Mateo and State of California, have invented certain new and useful Improvements in Fluid-Checking Devices; 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.

This invention relates to fluid checking devices and has for its object to provide a device of this character which will be simple in construction, comparatively inexpensive to manufacture, and more efficient in action than those heretofore proposed.

With this and other objects in view the invention consists in the novel details of construction and combinations of parts more fully hereinafter disclosed 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 central longitudinal sectional view of a device made in accordance with the present invention;

Fig. 2 is a sectional elevational view taken on the line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is a fragmentary sectional view of a portion of the parts shown in Fig. 1;

Fig. 4 is a view similar to Fig. 3, showing the parts in a somewhat different position;

Fig. 5, is a diagrammatic sectional elevational view, illustrating the application of the present invention to the foot throttle and clutch pedal levers of a motor vehicle;

Fig. 6 is a diagrammatic perspective view showing a somewhat modified form of the device used as a shock absorber; and

Fig. 7 is a perspective view showing a still further modified form of the device in use as a door check.

Referring more especially to Figs. 1 to 4, 1 indicates a cylinder or casing, provided with the end members or heads 2 or 3, secured together by the bolts 4. The head 3 is provided with the trunnions 5, mounted in the ears 6 of a bracket member 7, which may be secured as by the bolts 8 to any suitable support 9.

The end members 2 and 3 are provided with suitable bores 11 and 12 respectively, to accommodate a piston rod 13 which carries a piston 14, working in the cylinder 1, see Fig. 1. The said piston comprises a pair of leather cupped washers 15 and 16, having associated with them the metal disks 17 and 18, held in place by the nuts 19 and 20, threaded to the said rod 13, as will be clear from said figure. A suitable spring 21 is located between the said piston 14 and the head 2, while a similar spring 22 is located between the piston 14 and head 3.

The cylinder head 2 is provided with a restricted passage 25 leading from the interior of the cylinder 1 to a short pipe or nipple 26, which in turn leads to one side of a ball check valve 27, while the head 3 is provided with a similar restricted passage 28, leading from the cylinder 1 to the short pipe or nipple 29, joined to the other side of the said check valve 27, as will be readily apparent. A threaded opening 30, adapted to be closed by the screw member 31, communicates with the passage 25, providing means whereby oil or other liquid may be introduced into the cylinder 1, while the passage 28 is provided with a threaded valve stem 32 adapted to control the passage of fluid therethrough.

The check valve 27 comprises a substantially cylindrical casing member 35, see Figs. 1, 3, and 4 into the ends of which are threaded the pipes or nipples 26 and 29, as above stated. The interior of the said casing 35 is provided on substantially its median line with a hemispherical depression 36, into which may rest the check ball 37, as shown in Fig. 1. A screw 38 passes through a gland or stuffing box 39 directly above the said depression 36 and is adapted to hold the ball 37 either in the said depression, as shown in Fig. 1, or to prevent it from entering therein, as shown in Figs. 3 and 4.

When held in the depression 36, as illustrated in Fig. 1, the ball is prevented from acting as a check, and fluid may freely pass through the casing 35 in either direction, as will be readily apparent. On the other hand, if the ball 37 is held to the left of the screw 38, as shown in Fig. 3, then fluid may pass from left to right, as seen in said figure, but will be checked should it attempt to flow in the opposite direction, while if the ball is positioned to the right of the screw, as seen in Fig. 4, precisely the re-

verse will be true. That is to say, fluid may then flow from right to left, but not from left to right.

An auxiliary by-pass 40, leading from one side of the piston 14 to the other is provided in the piston rod 13, and the said by-pass may be controlled by the threaded valve stem 41, in the well known manner. Suitable glands or stuffing boxes 42 and 43 may be provided upon the heads 2 and 3 respectively, to prevent leakage about the piston rod 13, through the bores 11 and 12.

The invention as above described is adapted to a wide number of uses, and in Fig. 1 I have illustrated it as controlling the movements of a lever 45 which is pivoted at 46 to the support 9. The piston rod 13 is here shown as pivoted to the said lever as at 47 by means of a strap member 48. In Fig. 5, I have shown two of the fluid checks applied to the power of a motor vehicle, one of them 50, controlling the movements of the foot-throttle lever 51, while the other one 52 is connected to the clutch pedal 53. In Fig. 6 the check 54 is shown performing the function of a shock absorber on a motor vehicle, while in Fig. 7 the check 55 is shown as a door check for a door, gate or other swinging member.

The operation of the invention will be clear from the foregoing but may be briefly summarized as follows:—

Referring more particularly to Fig. 1, should the lever 45 be moved toward the right as seen in said figure its motion will be transmitted through the pivot 47 and the strap 48 to the piston rod 13 and piston 14, likewise causing them to move to the right against the pressure of the spring 22. A portion of the fluid which is trapped in the cylinder 1 between the said piston and the head 3 will be forced through the restricted passage 28, pipe 29, valve 27, pipe 26, and passage 25, to the other side of the piston, while another portion of the said fluid will change sides through the auxiliary by-pass 40 in the piston rod 13.

Now when the lever 45 is released, the spring 22 will exert a pressure on the piston 14, causing it and its associated parts to move toward the left, as seen in Fig. 1, forcing the fluid trapped between the said piston and the head 2 back through the passage 25, pipe 26, valve 27, pipe 29 and passage 28, and also through the auxiliary by-pass 40, to the right hand side of the piston. Should the lever 45 be moved toward the left from its position shown in Fig. 1, the spring 21 will be compressed and the fluid flow will be just the opposite from that above disclosed.

The restricted passages 25, 28 and 40 necessarily retard the flow of fluid, as will be readily apparent even when the valves 32 and 41 are wide open and retard to some extent the motion in either direction, producing a smooth movement without any noticeable jerks. By suitably adjusting the said valves 32 and 41, the flow of fluid may be even more restricted and the time of movement thereby controlled to suit the particular purpose for which the mechanism is being employed.

In some instances, as for example, in the clutch control shown in Fig. 5, or in the door check shown in Fig. 7, it is desirable that motion in one direction be relatively free and unretarded, while in the other direction it be much slower. That is to say, in engaging the clutch of an automobile, for example, it is desirable that the engagement be made slowly and regularly, to prevent the jerky starting of the car and possible stopping of the motor. Or in a door check, it is desirable that the door open readily, and its motion be retarded only in closing. The present invention is especially adapted to be adjusted for such purposes as will now appear.

As shown in Fig. 5, when the clutch pedal 53 is depressed to disengage the clutch member 60 from the fly wheel 61, such movement should be relatively free and unrestricted. On the other hand, when the pedal 53 is released to engage the members 60 and 61, the movement should be comparatively slow and steady. To this end, if the check valve 27 be so adjusted that the ball 37 is held to the left of the depression 36, as shown in Fig. 3, then when the piston moves toward the left, as it would when the pedal 53 is depressed to disengage the clutch, the fluid may freely pass through the passage 25, pipe 26, past the ball 37 of the valve 27, pipe 29 and passage 28, as well as through the auxiliary by-pass 40 to the right hand side of the cylinder 1, and the motion will be relatively free and easy. However, when the pedal 53 is released to engage the clutch members, the spring 21 will force the piston 14 to the right, and tend to force the fluid back through the passage 28, pipe 29 and valve 27. This will however, cause the ball 37 to seat against the end of the pipe 26, which as shown in Figs. 3 and 4 may be beveled for this purpose, thereby preventing the return of the fluid through the pipe 26 and passage 25, and causing it all to return to the left hand side of the piston by way of the auxiliary by-pass 40. The area of this one by-pass is of course smaller than the combined area of the two by-passes, with the result that the motion toward the right will be much slower than it was in the other direction. Further, as above pointed out, the area of this by-pass 40 may be controlled by suitably adjusting the valve stem 41.

The fluid used in this check may be either liquid or gaseous, as conditions require.

That is to say, under certain circumstances the cylinder 1 may contain only air, while under other circumstances it may be filled with water, oil, grease or other liquid or semi-liquid medium.

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 the invention and therefore I 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 device of the class described the combination of a closed cylinder; a piston in said cylinder; a piston rod carrying said piston and provided with a passage whereby fluid may flow from one side of said piston to the other; means for controlling said passage; resilient means mounted in said cylinder and associated with said piston; a restricted connection adapted to permit fluid flow from one side of said piston to the other; an adjustable valve in said connection, adapted to permit free fluid flow in both directions, and to check such flow in either direction at will; and means adapted to control the restriction of said connection, substantially as described.

2. In a device of the class described the combination of a cylinder; a head closing each end of said cylinder, each of said heads being provided with a restricted passage; a check valve comprising a casing having a recess, a ball and means adapted to positively hold said ball in said recess, and to prevent it from entering therein at will; connections between said casing and each of said passages; a piston mounted in said cylinder; a piston rod carrying said piston; and springs coacting with said piston to normally maintain the same in a central position in said cylinder, substantially as described.

3. In a device of the class described the combination of a cylinder; a head closing each end of said cylinder, each of said heads being provided with a restricted passage; a check valve comprising a casing having a recess, a ball and means adapted to positively hold said ball in said recess, and to prevent it from entering therein at will; connections between said casing and each of said passages; a piston mounted in said cylinder; a piston rod carrying said piston, and provided with a by-pass leading from one side of said piston to the other; an adjustable valve controlling said by-pass; and springs coacting with said piston to normally maintain the same in a central position in said cylinder, substantially as described.

4. In a device of the class described the combination of a bracket; a cylinder; a cylinder head closing one end of said cylinder and provided with a restricted passage and a bore; a second head pivoted to said bracket, closing the other end of said cylinder and also provided with a restricted passage and a bore; means for controlling said last mentioned passage; a check valve comprising a casing having a recess, a ball and means to positively hold said ball in said recess, and to prevent it from entering therein at will; connections between said casing and each of said passages; a piston rod carrying said piston, slidably mounted in said bores, and provided with a by-pass leading from one side of said piston to the other; an adjustable valve carried by said rod adapted to control said by-pass; and a pair of springs coacting with said piston to normally maintain the same in a substantially central position in said cylinder, substantially as described.

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

NELSON E. DAVIES.

Witnesses:
JNO. F. FITZPATRICK,
MICHAEL SHEEHAN.