

April 30, 1946.

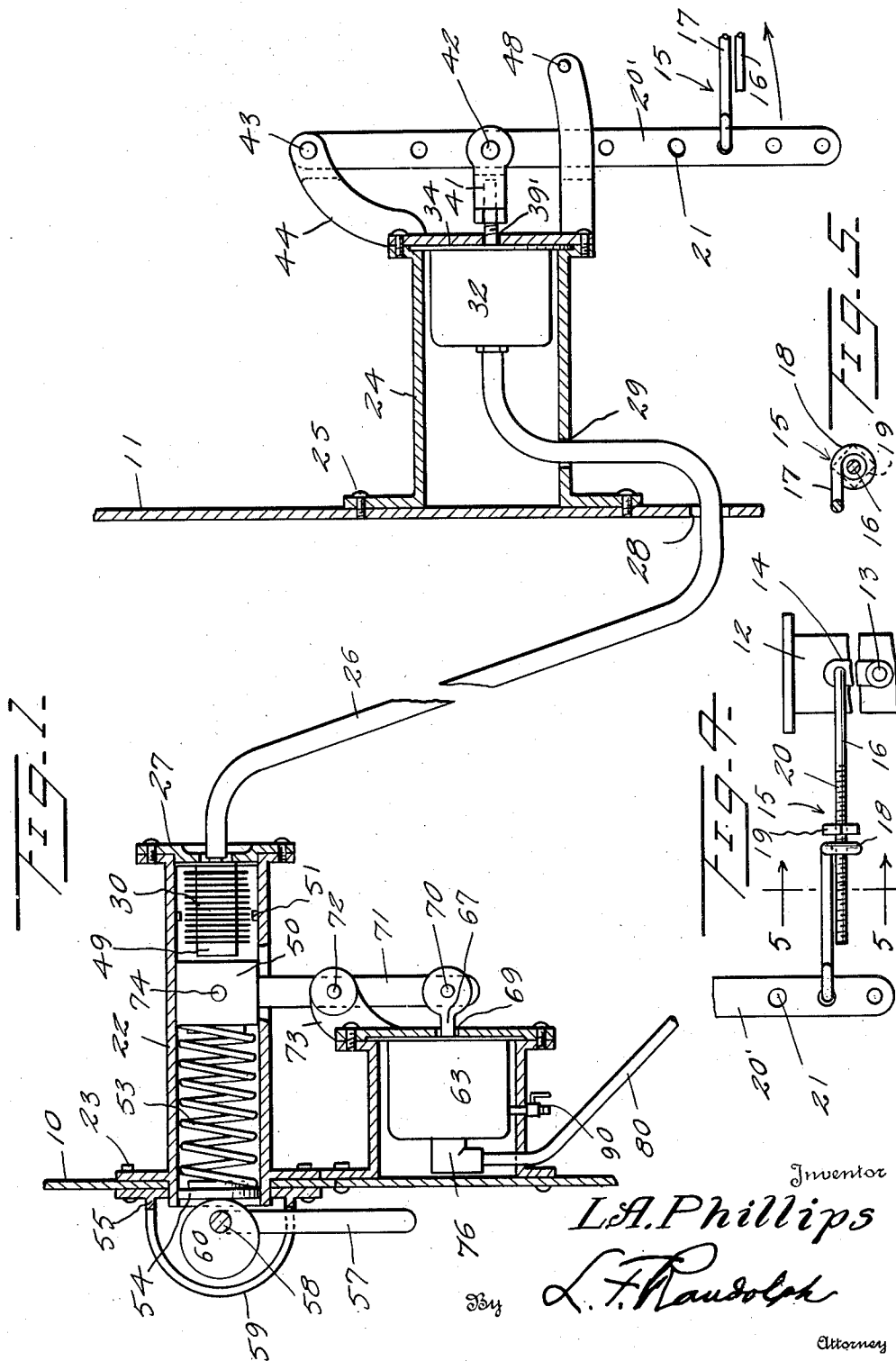
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2,399,505

THROTTLE AND PRESSURE CONTROL

Filed Aug. 12, 1943

2 Sheets-Sheet 1



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2,399,505

THROTTLE AND PRESSURE CONTROL

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Application August 12, 1943, Serial No. 498,365

5 Claims. (Cl. 60—54.5)

This invention relates to a throttle control and pressure regulator especially for use in controlling the speed of engines operatively connected to centrifugal pumps or other power sources employing throttle control, as in fire engines or fire-fighting equipment, or for remote control of motion without use of rods, levers, joints, or the like other than terminal attachments, yet permitting micrometer adjustment and being positive and smooth in operation.

A particular object is to provide such an apparatus as will maintain constant pressure in centrifugal pumps employed for fire fighting, without the use of automatic release valves or other means which must be set each time pressure is raised or lowered. The structure is adapted for unitary connection with throttle control means to maintain pump pressures, in pumps or other pressure-producing machines, synchronized with the opening of the throttle, maintaining constant speeds, and in connection with centrifugal pumps maintaining constant pressure.

The more specific objects and advantages will become apparent from a consideration of the description following taken in connection with accompanying drawings illustrating an operative embodiment.

In said drawings:

Figure 1 is a view showing the improvements partly in central longitudinal section and partly in elevation;

Figure 2 is an enlarged view of the lefthand portion of Figure 1;

Figure 3 is an enlarged view primarily in central vertical section of the righthand portion of Figure 1;

Figure 4 is a fragmentary elevation in continuation of the right of Figure 1 through the connection to the throttle of a carburetor; and

Figure 5 is a detail section taken on the line 5—5 of Figure 4.

Referring specifically to the drawings wherein like reference characters designate like or similar parts, my improvements are adapted to be suitably mounted as by connection to sheets or walls 10 and 11 of a fire engine, fire-fighting equipment, or other apparatus to be controlled, and the operating internal combustion engine of which employs a carburetor 12 employing a throttle valve mechanism including a rockshaft 13, a crank 14 extending therefrom to which is connected an accelerator rod construction 15 which is usual or conventional, consisting of rods 16 and 17, the former being pivoted to crank 14 and the latter being slidable on the rod 16 to the extent permitted by a loop 18 surrounding the same, by an abutment nut 19 adjustably mounted on screw threads 20 of the rod section 16.

The connection 15 is adapted for pivotal connection in one of the openings 21 of a control lever 20'.

A cylinder or housing 22 is fastened at 23 to the wall 10, while a cylinder 24 is fastened at 25 to the wall 11. A flexible tube 26, for instance of copper, extends loosely through an inner end closure 27 of the casing 22 and through openings 28 and 29 in the wall 11 and cylinder 24 respectively. In the casing 22 flexible tubing 26 is connected to and communicates with the interior of an expansible bellows 30 which preferably is metallic and a Sylphon bellows. At the other end flexible tubing 26 is fastened fluid tight to a tube 31 mounted by a cap or casing 32 having a flange 33 clamped in place between cylinders 24 and an end plate 34 thereon, screwed in place as at 35.

Said tube 31 extends interiorly into the cup 32, and a Sylphon bellows 36 of the same general construction and material as that at 30 is secured at its inner end to and located within the cup. Such bellows has a rigid disc or end plate 37 thereon provided with an inwardly extending stem 38 having a chamber 39 in slidable liquid-tight engagement with the tube 31.

Extending from the other end of the stem 38 is a screw rod or stud 39' slidable through an opening 40 in the end plate 34, and which is adjustably screw-threaded to a link 41 which is pivoted by a bolt 42 or the equivalent in one of the openings 21 of the lever 20'. Such lever is pivoted by a bolt or the like at its top at 43 to an arm 44 extending from the end plate 34. The movement of said lever 20' is limited since it moves in the slot 45 of a yoke 46, also extending from the end plate 34; the shoulder 47 in said slot and a pin 48 therein serving as stops at the extremes of movement of the lever.

The interior of the bellows 30, tubing 26, tube 31, and chamber 39 are evacuated and filled with a non-freezing liquid, for instance turpentine, and then sealed. Thus there will be no voids in the parts mentioned, and any pressure exerted on the outer end or head 49 of the Sylphon bellows 30 will compress that bellows, displacing the liquid or fluid and causing the Sylphon bellows 36 to slide at the chamber 39 on the tube 31, thereby sliding the connection 39', rocking lever 20', moving the linkage 15, and actuating or controlling the throttle valve of the carburetor through its shaft 13. The air within bellows 36 is compressed by such movement. In the absence of pressure at the lefthand end of Sylphon bellows 30 the same will be restored to normal position and maintained therein, through its inherent expansion and inherent expansion of the bellows 36 and the expansion of the previously compressed air within the bellows.

A suitable crosshead 50 is mounted to slide in the casing 22 to the extent limited by lugs 51 extending inwardly of said casing. Head of disc 49 provides a seat for a projection 52 on the cross head 50. An expansive coil spring 53 is disposed

in the casing 22 and at one end abuts the cross-head 50 and at the other end abuts a follower or disc 54 which is slidable in the cylinder 22.

A bracket 55 is fastened by certain of the bolts 23 to the wall 10 and cylinder 22. An operating lever 57 by means of a short shaft 58 is journaled in the side walls of bracket 55 and is movable in an arc through a slot 59 of the bracket. The lever 58 carries a cam 60 thereon within the bracket which is in peripheral contact at all times with the follower 54. The lever 57 will be maintained in any position of adjustment by the engagement of cam 60 and follower 54 in view of action of the spring 53.

An auxiliary cylinder 61 is suitably fastened to the wall 10 below the casing 22, having an inner end wall 62 suitably fastened thereto. A cup or housing 63, similar to that employed at 32, is fastened in place between the housing 61 and closure 62, and mounted therein is a bellows 64 preferably a Sylphon bellows like that employed at 30. This bellows is of the specific construction employed at 36, having an end disc at 65 from which an inwardly extending stem 66 projects. A stud or connection 67 is screw threaded at 68 to the stem 66, slides through an opening 69 in the end wall 62, and at 70 is pivoted to an equalizing lever 71, in turn pivoted at 72 to a bracket 73 extending from the end wall 62. At the upper end said equalizing lever 71 is pivoted at 74 to the crosshead 50, the latter having sufficient clearance as at 75 for operation of the equalizing lever.

A fitting 76 is secured to the cup 63 and has a passage 77 therethrough in communication with a chamber 78 in the stem 66 through the medium of a tube or projection 79 on which the bellows is slidable at the chamber 78. Connected to the fitting 76 and also communicating with its passage 77 is a flexible tube 80 which is adapted for connection to the centrifugal pump which is operated by the internal combustion engine of which the carburetor 12 forms a part.

Since bellows 64 is connected to the centrifugal pump, the action or motion of pressure built up by the pump compresses that bellows 64 and forces the stud 67 outward. Since the latter is connected to lever 71 and crosshead 50, pressure is placed on the spring 53, which retards pressure against the bellows 30, which in turn retracts the bellows 36 and closes the throttle. The closing of the throttle slows down the motor, and thus pressure generated in the pump is lessened. This balanced operation keeps the pressure at a point synchronized with the position of the lever 57.

The pressure control on fire pumps in particular is important, especially where they use centrifugal pumps. For example, when two lines of hose are being used and one line is shut off, the volume of water being pumped would be forced through a single line at a higher pressure and might result in injury to nozzle-men. Also when a portion of the volume of output is shut off the pump has a tendency to race, which might result in the motor's speeding above a safe R. P. M. peak. As a result of the invention, it thus will be seen that as the speed of the motor is brought to the desired pump-working pressure, the pressure control is automatically set, and if all flow from the pump were closed off the motor speed would not vary.

Drain valve devices may be employed as at 90, in connection with the cup 63.

I claim as my invention:

1. A fluid transmission control of the class described, comprising, a bellows, a flexible connection leading from the bellows and jointly therewith containing fluid, actuating expansible chamber motor means connected to said connection for actuation by said fluid, and a connection to compress the bellows to move the fluid, comprising a bellows, a spring, slidable means between said spring and first-mentioned bellows, and equalizing lever means between the sliding means and the second-mentioned bellows.

2. A fluid transmission control of the class described comprising, a bellows, a flexible connection leading from the bellows and jointly therewith containing fluid, actuating expansible chamber motor means connected to said connection for actuation by said fluid, and a connection to compress the bellows to move the fluid, comprising a bellows, a spring, slidable means between said spring and first-mentioned bellows, and equalizing lever means between the sliding means and the second-mentioned bellows, a follower engaged against the spring, and means adjustably to secure the follower in different positions.

3. A fluid transmission control of the class described comprising, a bellows, a flexible connection leading from the bellows and jointly therewith containing fluid, actuating expansible chamber motor means connected to said connection for actuation by said fluid, and a connection to compress the bellows to move the fluid, comprising a bellows, a spring, slidable means between said spring and first-mentioned bellows, and equalizing lever means between the sliding means and the second-mentioned bellows, a follower engaged against the spring, and means adjustably to secure the follower in different positions, comprising a lever and cam means controlled by the lever and directly engaged with the follower.

4. A fluid transmission control of the class described, comprising, a bellows, a flexible connection leading from the bellows and jointly therewith containing fluid, actuating expansible chamber motor means connected to said connection for actuation by said fluid, and a connection to compress the bellows to move the fluid, comprising a bellows, a spring, slidable means between said spring and first-mentioned bellows, and equalizing lever means between the sliding means and the second mentioned bellows, said sliding means comprising a crosshead to which the lever is directly pivoted, a casing in which the crosshead, spring, and first-mentioned bellows are mounted, said casing having stop means thereon for the crosshead.

5. A fluid transmission control of the class described comprising, a bellows, a flexible connection leading from the bellows and jointly therewith containing fluid, actuating expansible chamber motor means connected to said connection for actuation by said fluid, and a connection to compress the bellows to move the fluid, comprising a bellows, a spring, slidable means between said spring and first-mentioned bellows, and equalizing lever means between the sliding means and the second-mentioned bellows, a cup enclosing the second-mentioned bellows mounting a tube, said bellows having a stem provided with a chamber in communication with the tube and slidably mounting the second-mentioned bellows, and a connection direct from said stem to said lever.

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