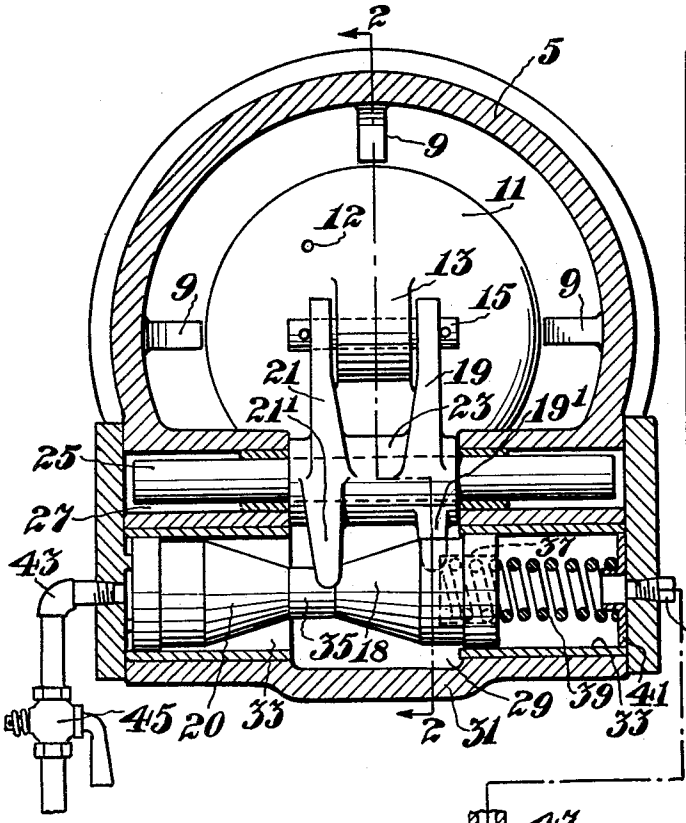
April 17, 1934. C. S. BAKER 1,955,448

STOP DEVICE

Filed June 1, 1932



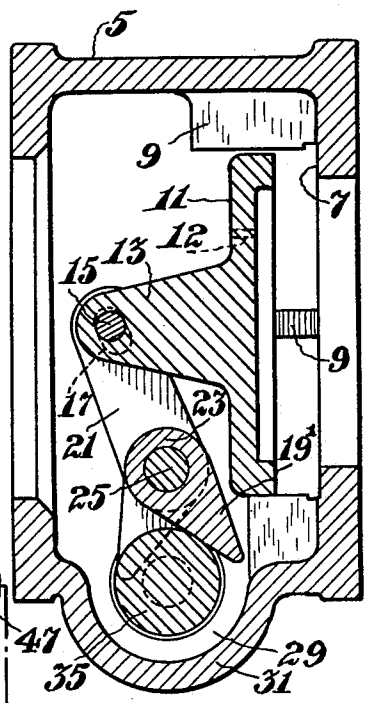


FIG.-2.

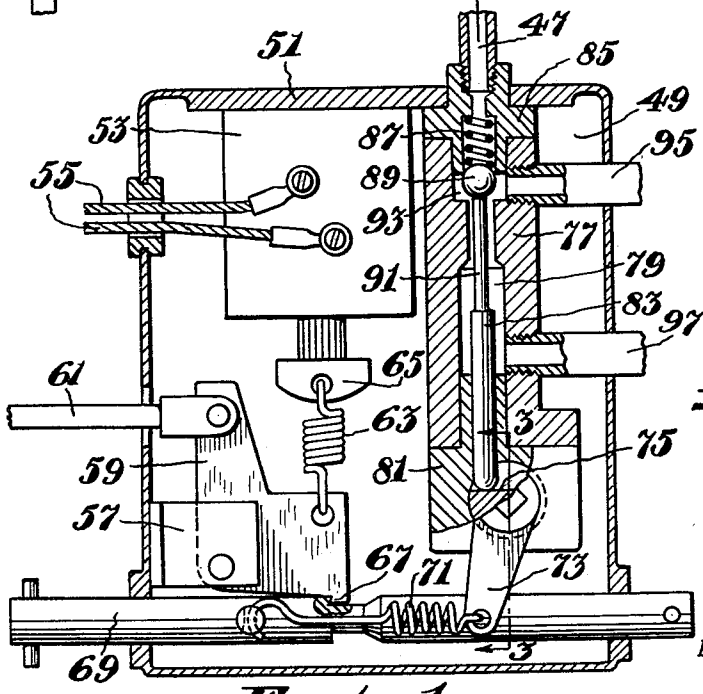


FIG.-1.

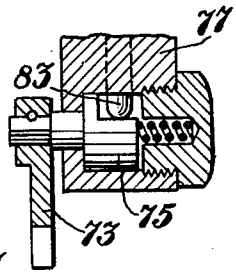


FIG.-3.

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Patented Apr. 17, 1934

1,955,448

UNITED STATES PATENT OFFICE

1,955,448

STOP DEVICE

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Application June 1, 1932, Serial No. 614,717

7 Claims. (Cl. 137—139)

This invention relates to a stop device and more particularly to a device in the nature of a safety stop adapted to close a shut-off valve in the supply line of a steam engine or the like.

An object of the invention is to produce a simple, inexpensive device readily applicable to practically any type of supply line and capable of being actuated either by electrical or mechanical means or by both such means. Other objects will be either apparent or will be referred to hereinafter.

In the accompanying drawing, Figure 1 represents the plan view of the shut-off valve inserted in the supply line with a valve operating mechanism shown in section and connected to a control device shown in section, and

Figure 2 is a sectional view of the shut-off valve and its operating members taken on the line 2—2 of Figure 1 looking in the direction of the arrows, and

Figure 3 is a section of an actuating device taken on the line 3—3 of Figure 1 looking in the direction of the arrows.

Referring to the drawing, a valve chest 5 of a type which may be readily introduced into a conduit is provided with a valve seat 7 and guides 9. A valve 11 having a lug 13 is loosely fitted between the guides 9 and adapted to seat upon the seat 7. A leakage port 12 is provided in the valve 11 to permit of equalized pressure on each side of the valve when closed. Through the end of the lug 13 extends a pin 15, the ends of which are engaged in slotted bores 17 in the ends of rocker arms 19 and 21.

The arms 19 and 21 are formed integrally with a tube 23 through which projects an axis pin 25 suitably journaled in a transverse bore 27 of the casing 5. A downwardly tilted nose 19′ forms a short arm of the rocker 19 and an upwardly tilted nose 21′ forms a short arm of the rocker 21. The noses 19′ and 21′ extend into a chamber 29 in an enlargement 31 of the valve chest 5. Through the enlargement 31 is a bore 33. The ends of a freely slidable shuttle 35 in the bore 33 are loosely fitted in the bore 33 to permit the passage of pressure fluid along the shuttle into the ends of said bore.

The center of the shuttle 35 is greatly reduced and tapering surfaces join the reduced center to the enlarged ends. These tapering surfaces form cams 18 and 20, the cam 18 being adapted to actuate the nose 19′ and the cam 20 being adapted to actuate the nose 21′ for opening and closing the valve 11.

The right hand end of the shuttle 35 is provided with a recess 37 in which is seated one end of a spring 39, the other end being seated upon the end plate 41 of the bore 33. A pipe 43 having a pet-cock 45 is connected to the left end of the bore 33, and a pipe 47 connects the right end of the bore 33 to a control device 49.

The control device 49 consists of a casing 51 in which is housed an electromagnet 53 having suitable control wires 55 leading to a switch (not shown) which may be automatically controlled. Mounted in the casing 51 on a bracket 57 is a trigger 59 which is connected to a cross head trip (not shown) or other suitable governing mechanism by a rod 61. The trigger 59 is also connected by a spring 63 to an armature 65 of the electromagnet 63.

A latch 67 of the trigger 59 engages a suitable recess in a rod 69 slidably mounted in the casing 51. Connected to the rod 69 by a spring 71 is a lever 73 which is keyed to a cam 75.

In the casing 51 is an auxiliary valve chest 77 having a bore 79 therethrough. The bore 79 is closed at the lower end by a plug 81 in which is seated the cam 75 and which has a bore coaxial with the bore 79 in which is slidable a rod 83 the lower end of which rests upon the face of the cam 75.

The upper end of the bore 79 is closed by a plug 85 having a bore therethrough connecting with the pipe 47. In a recess in the plug 85 is seated one end of a spring 87 the other end of which bears against a ball 89, which is held against the spring by an extension 91 of the rod 83.

An opening 93 intersects the bore 79 to form upper and lower seats for the ball 89, the upper seat being formed in the plug 85 and the lower seat being formed by shoulders in the bore 79 of the valve chest 77. A pipe 95 leads from the opening 93 and a pipe 97 leads from the lower end of the bore 79.

The operation of the device is as follows. When the parts are in the position shown in the drawing the valve 11 is opened and is held in that position by the shuttle 35 which is at the extreme left of its stroke in the bore 33. The chamber 29 and the bore 33 are open to steam or other pressure fluid from the interior of the valve chest 5 and as the shuttle 35 fits loosely in the bore 33 the pressure fluid passes freely about it and the pressure is equalized at the opposite ends of the shuttle.

The valve 45 is closed so that there is no reduction of pressure at the left end of the bore 33 and the ball valve 89 is held upon its upper seat in the valve chest 77 so that there is no leakage of

fluid from the right hand end of the bore 33. The pressure on each side of the shuttle being equal, the balance is upset by the spring 39 which forces the shuttle to the left end of the bore, the nose 19' rides up on the cam 18 and the tube 23 is rotated upon the axis pin 25 and the valve 11 is lifted.

When operating circumstances become such that it is necessary to shut off the supply of pressure fluid to the engine the governing device may either pull the rod 61 or may close the circuit to the electromagnet 53 depending upon the type of governor employed. Either of these acts will serve to pull the trigger 59 and lift the latch 67 out of engagement with the rod 69. The tension on the spring 71 and the pressure on the ball 89 will tend to move the rod 69 to the right and the cam 75 will be rotated by its arm 73, permitting the rod 83 to drop.

The spring 87 then pushes the ball 89 from its upper seat and forces it against its lower seat thereby opening the fluid pressure conduit 47 from the right end of the bore 33 and permitting the pressure to drop at that end of the bore thereby enabling the pressure in the left end of the bore to drive the shuttle to the right overcoming the resistance of the spring 39. The cam 20 bears against the nose 21' at the same time that the cam 18 is relieving its pressure upon the nose 19' with the result that the tube 23 is rotated and the valve 11 forced down upon its seat.

Fluid pressure forces the shuttle 35 to seat against the end plate 41 thereby preventing continual leakage through the pipe 47 and the opening 93. While the shuttle 35 is held in this position the valve 11 may not be opened until the equilibrium of the device is reestablished.

This is done by manually thrusting the rod 69 to the left and re-engaging the latch 67 thereby rotating the cam 75 and pushing the rod 83 and its extension 91 upward in the bore 79, unseating the ball 89 from its lower seat and reseating it upon its upper seat thereby preventing the further escape of pressure fluid from the right hand end of the bore 33. The pressure balance may then be restored in the bore 33 and the shuttle 35 may once more move to the left.

If the movement of the shuttle to the left should be dilatory owing to the effective seating of the right end of the shuttle against the end plate 41 a momentary opening of the valve 45 will permit the exhaust of pressure fluid from the left hand end of the bore 33. The shuttle, driven by the spring 39, will then move quickly to its left hand position thereby disengaging the cam 20 from the nose 21' and re-engaging the cam 18 with the nose 19' and reopening the valve 11. The stop mechanism is once more in its original position and ready to act upon closing of the circuit of the electromagnet 53 or in response to a pull on the rod 61.

The pipe 97 and its opening to the bore 79 are provided for the drainage of the condensed steam from the bore 79.

Having thus described my invention and shown how the objects hereinbefore referred to have been accomplished I do not desire to be restricted to the precise form described for it will be apparent to those skilled in the art that many modifications may be made without departing from the spirit of the invention.

I claim:

1. A stop device for shut-off valves and the like, comprising a valve casing, a main valve with valve operating means therein, a chamber having a bore communicating with the casing, a shuttle slidable in the bore, cambered faces on the shuttle adapted to engage the valve operating means, means to constantly maintain pressure fluid balance on the ends of the shuttle, resilient means bearing on one end of the shuttle to augment the pressure fluid acting against said end for moving the same in the bore to cause operation of the valve in one direction, and means connected to one end of the bore to unbalance the shuttle thereby permitting the pressure fluid acting against the other end of the shuttle to overcome the pressure of the resilient means to cause operation of the main valve in the opposite direction.

2. A stop device for shut-off valves and the like, comprising a valve casing, a main valve with valve operating means therein, a chamber having a bore therein communicating with the casing, a shuttle slidable in the bore, cambered faces on the shuttle adapted to engage the valve operating means, means to constantly maintain pressure fluid balance on the ends of the shuttle, resilient means bearing on one end of the shuttle to augment the pressure fluid acting against said end for moving the shuttle in the bore for opening the valve, and an auxiliary valve connected to one end of the bore to unbalance the shuttle and thereby permit the pressure fluid acting against the other end of the shuttle to overcome the pressure of the resilient means for closing the main valve.

3. A stop device for shut-off valves and the like, comprising a valve casing, a main valve with valve operating means therein, a chamber having a bore communicating with the casing, a shuttle slidable in the bore, cambered faces on the shuttle adapted to engage the valve operating means for opening and closing the main valve, means to constantly maintain pressure fluid balance on the ends of the shuttle, resilient means bearing on one end of the shuttle to move the same in the bore to open the valve, and a mechanically actuated auxiliary valve connected to one end of the bore to exhaust the pressure fluid therefrom and thereby enable the pressure fluid acting against the other end of the shuttle to overcome the pressure of the resilient means and cause the shuttle to close the main valve.

4. A stop device for shut-off valves and the like, comprising a valve casing, a main valve with valve operating means therein, a chamber having a bore communicating with the casing, a shuttle slidable in the bore, cambered faces on the shuttle adapted to engage the valve operating means, means to constantly maintain pressure fluid balance on the ends of the shuttle, resilient means bearing on one end of the shuttle to move the same in the bore to cause operation of the valve in one direction, and an electro-mechanically actuated auxiliary valve connected to one end of the bore to exhaust the pressure fluid therefrom and thereby enable the pressure fluid acting against the other end of the shuttle to overcome the pressure of the resilient means and cause operation of the main valve in the opposite direction.

5. A stop device for shut-off valves and the like comprising a valve casing, a main valve with valve operating means therein, a chamber having a bore therein, a shuttle slidable in the bore, inclined faces on the shuttle to engage the valve operating means, means to constantly admit pressure fluid from the valve casing to both ends of the shuttle to balance the same, resilient means at

one end of the shuttle to force it to the opposite end of the bore to cause operation of the valve in one direction, and means connected to one end of the bore to overcome the effect of said resilient means and move the shuttle to cause operation of the valve in the opposite direction.

6. A stop device for shut-off valves and the like comprising a valve casing, a main valve with valve operating means therein, a chamber having a bore therein, a shuttle slidable in the bore, inclined faces on the shuttle to engage the valve operating means, means to constantly admit pressure fluid from the valve casing to both ends of the shuttle to balance the same, resilient means at one end of the shuttle to force it to the opposite end of the bore to cause operation of the valve in one direction, a conduit leading from one end of the bore to permit flow of pressure fluid therefrom, an auxiliary valve controlling said conduit, and mechanical means to open said auxiliary valve to permit unbalancing of the shuttle and consequent movement thereof against the pressure of the resilient means, thereby causing operation of the main valve in the opposite direction.

7. A stop device for shut-off valves and the like comprising a valve casing, a main valve with valve operating means therein, a chamber having a bore therein, a shuttle slidable in the bore, inclined faces on the shuttle to engage the valve operating means, means to constantly admit pressure fluid from the valve casing to both ends of the shuttle to balance the same, resilient means at one end of the shuttle to force it to the opposite end of the bore to cause operation of the valve in one direction, a conduit leading from one end of the bore to permit flow of pressure fluid therefrom, an auxiliary valve controlling said conduit, and electro-mechanical means to open said auxiliary valve to permit unbalancing of the shuttle and consequent movement thereof against the pressure of the resilient means, thereby causing operation of the main valve in the opposite direction.

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