Nov. 30, 1926. 1,608,589

G. W. ENGSTROM

PUMP CONTROLLING MEANS

Filed June 8, 1922

Fig. 2.

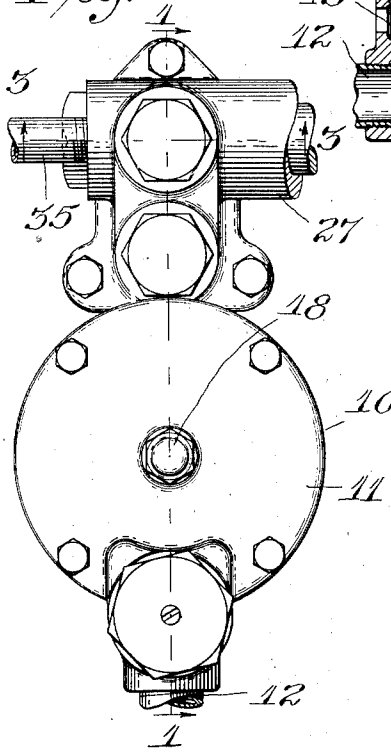
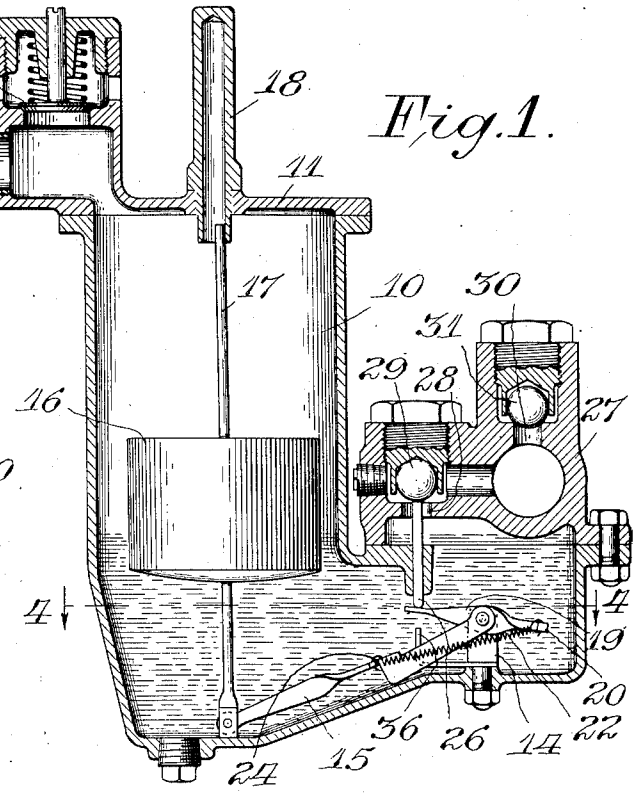


Fig. 1.



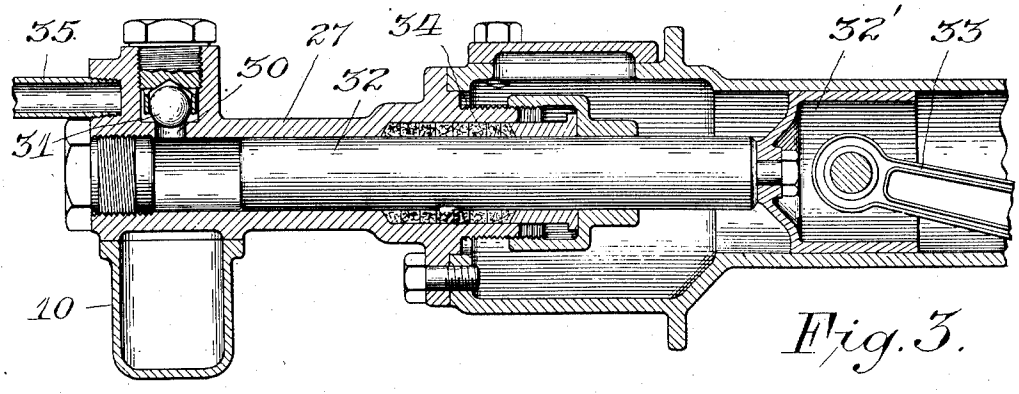
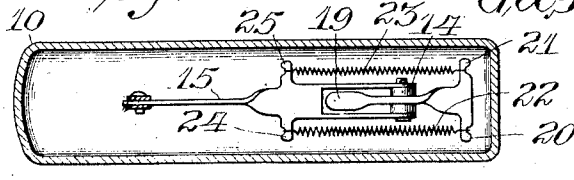


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

GUSTAF W. ENGSTROM, OF RIVERSIDE, ILLINOIS, ASSIGNOR TO INTERNATIONAL HARVESTER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

PUMP-CONTROLLING MEANS.

Application filed June 8, 1922. Serial No. 566,919.

My invention relates to a control device for feed pumps and particularly to a means for controlling the intake valve.

The feed pumps used in automotive steam power plants are usually single stage pumps which draw water from a hot well or direct from a condenser and deliver it to the boiler at a pressure of 600 pounds or more per square inch. It frequently happens that such pumps draw in air or become air bound through failure of the water supply.

The object of my invention is to provide means whereby the pump will be prevented from drawing in air when the supply of water falls below a predetermined level.

In the drawings, I have illustrated an embodiment of my invention adapted to attain the object sought.

Fig. 1 is a vertical section of the pump and control means taken on the line 1—1 of Fig. 2;

Fig. 2 is a plan of Fig. 1;

Fig. 3 is a section of the pump taken on the line 3—3 of Fig. 2; and

Fig. 4 is a section on line 4—4 of Fig. 1 showing the valve trip mechanism.

In Fig. 1 I have shown a float chamber or reservoir having a body 10 closed by cover 11 into which the pipe 12 leading from a condenser discharges. The cover is also provided with a relief valve 13 through which steam from the condenser or air trapped in the float chamber may escape. In the bottom of the float chamber there is secured a support 14 to which one end of a float lever 15 is pivotally connected, the other end of the lever being connected to a float 16 having a stem 17 extending upward into the guide 18 secured to the cover. The trip lever 19 is pivoted intermediate its ends to the standard 14 and at one end has two laterally projecting lugs 20, 21 to which one end of each of the springs 22, 23 is connected, the opposite ends of the springs being connected to similar lugs 24, 25 on the float lever 15. The other end of the lever 19 engages a plunger 26 slidably mounted in a guide in the body of the reservoir. The cylinder 27 of the feed pump has an intake passage 28 controlled by a valve 29 and a discharge passage 30 controlled by a similar valve 31, the cylinder being secured to the body of the reservoir with the intake passage in communication therewith. The piston 32 reciprocates in the bore of the cylinder and is connected to a cross head 32′ which is reciprocated by the connecting rod 33. A stuffing box 34 prevents leakage of water past the piston 32.

In the operation of my device, the pump is driven from the engine and water from the condenser enters the float chamber through the passage 12, the pump drawing its supply through the inlet passage 28 and discharging it through the outlet 30 and pipe 35 leading to the boiler. Assume now that the reservoir contains enough water so that the float 16 is raised and the plunger 26 lowered so as to permit the valve 29 to seat. The pump then supplies water to the boiler as long as the supply of water entering the float chamber through the pipe 12 is sufficient to keep the float 16 raised and let the valve 29 seat. But, if the pump, for any reason, delivers water faster than it is supplied through the pipe 12, the float will drop with the water lever until a point is reached at which the springs 22 and 23 pass below the pivotal connections of the levers 15 and 19 when the free end of a lever 19 will be suddenly thrown upward against the plunger 26 and hold the valve 29 from its seat. As the pump now continues to operate, it will draw in water through the passage 28 on its intake stroke and on its delivery stroke will force the water back through the passage 28 into the float chamber. This operation continues until sufficient water accumulates in the reservoir to elevate the float until the springs 22 and 23 pass above the pivotal connections of the levers when the free end of the lever 19 will be thrown down against the stop 36 and permit the inlet valve to seat, after which the pump will again discharge through the pipe 35.

It will be apparent to those skilled in the art that I have provided a device which absolutely prevents the feed pump from drawing in air when the water supply fails, since the trip mechanism will be operated and the inlet valve held open before the water lever falls to such a point that the pump may draw in air.

While I have described an embodiment of my invention in which the valve controlling means is float actuated, it is to be understood that I am not to be limited to the exact mechanism shown but claim as

my invention any equivalent means that may fall within the scope of my claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a device of the class described, the combination of a pump having valve controlled intake and discharge passages, a fluid reservoir connected to the intake passage, and means for holding the intake valve open when the fluid in the reservoir falls to a predetermined level.

2. In a liquid circulating system, the combination of a casing constituting a reservoir having a supply opening, a pump mounted on the casing having intake and discharge passages with a valve controlling ach of said passages, the intake passage communicating with the casing, and a float and valve control means operable thereby mounted in the casing for controlling the intake valve and passage to prevent the discharge of liquid through the discharge valve of the pump when the liquid in the reservoir falls to a predetermined level.

3. In a device of the class described, the combination of a pump having intake and discharge passages, valves controlling the respective passages, a reservoir from which the pump receives its supply connected to the intake passage, means for supplying fluid to the reservoir, and means controlled by the level of the fluid in the reservoir for holding the intake valve open when the fluid falls to a predetermined level.

4. In a device of the class described, the combination of a pump clyinder having valve controlled intake and discharge passages, a receiver connected to the pump cylinder in communication with the intake passage, a float in the receiver, means for supplying liquid thereto, and means operatively connecting the float and intake valve whereby the valve may close when the liquid is above a predetermined level and is held open by the float when the liquid is below a predetermined level.

5. In a device of the class described, the combination of a pump having intake and discharge passages, valves controlling the respective passages, a reservoir connected to the inlet passage, a float in the reservoir adapted to rise and fall with the level of the liquid therein, means for supplying liquid to the reservoir, and means actuated by the float to hold the intake valve from its seat when the float falls below a predetermined level and to permit the valve to seat when the float rises above another predetermined level.

6. In a pump controlling device, the combination of a water reservoir, means for supplying water thereto, a pump having an inlet passage connected to the reservoir, a valve controlling the inlet passage, trip mechanism controlled by the level of the water in the reservoir for holding the valve open when the water reaches a predetermined level and to permit the valve to close when the water reaches another predetermined level.

7. In a pump controlling mechanism, the combination of a reservoir, a lever pivoted at one end to a support within the reservoir, actuating means connected to the other end of the lever, a second lever pivoted intermediate its ends to the support, a valve actuating plunger adapted to engage one end of the second lever, and resilient means connecting the other end of the second lever to the first named lever intermediate its ends.

8. In a water circulating system for steam power plants, the combination of a reservoir, means for supplying water to said reservoir, means for pumping water from the reservoir to a boiler in the system, and means for causing the pump to return water to the reservoir when the water supply means for the reservoir fails.

9. In a water circulating system for steam power plants, the combination of a reservoir, an inlet for supplying water to the reservoir, a pump for taking water out of the reservoir, and means for causing said pump to return water to the reservoir when the supply therein diminishes to a predetermined level.

10. In a water circulating system, the combination of a supply reservoir, means for feeding water to the reservoir, means for pumping water therefrom, and automatically acting means for causing said pumping means to return water to the reservoir when the supply therein becomes diminished to a predetermined point.

11. In a water circulating system, the combination of a supply reservoir, means for feeding water to the reservoir, a pump for taking water from the reservoir, and means in the reservoir for automatically controlling the pump to cause it to return water to the supply reservoir when the amount of water contained therein diminishes to a predetermined point.

12. In a water circulating system, the combination of a supply reservoir, a constantly acting pump for taking water from the reservoir, and means for controlling said pump to cause it to return water to the reservoir when the supply therein diminishes to a predetermined extent.

In testimony whereof I affix my signature.

GUSTAF W. ENGSTROM.