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G. C. SCHMIDT
AUTOMATIC ENGINE CUT-OFF

Filed Nov. 23, 1923

Fig. 1,

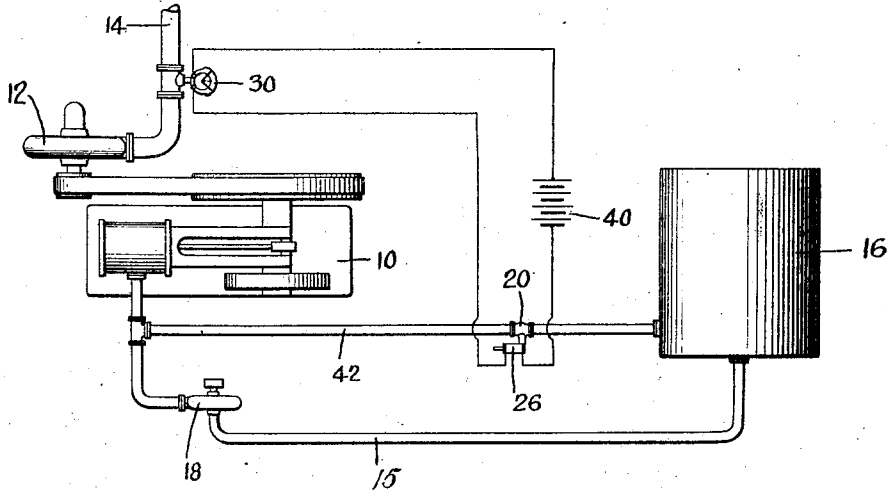


Fig. 2,

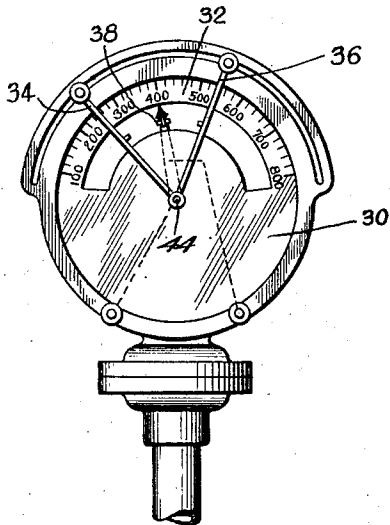
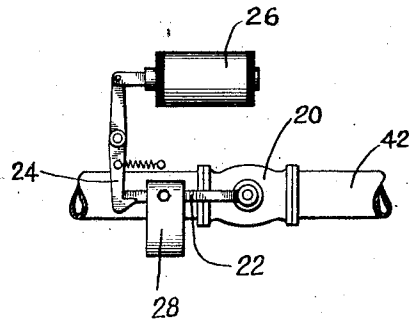


Fig. 3,



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UNITED STATES PATENT OFFICE.

GEORGE C. SCHMIDT, OF HOUSTON, TEXAS, ASSIGNOR TO THE TEXAS COMPANY, OF NEW YORK, N. Y., A CORPORATION OF TEXAS.

AUTOMATIC ENGINE CUT-OFF.

Application filed November 23, 1923. Serial No. 676,548.

To all whom it may concern:

Be it known that I, GEORGE C. SCHMIDT, a citizen of the United States of America, and a resident of Houston, county of Harris, and State of Texas, have invented certain new and useful Improvements in Automatic Engine Cut-Offs, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

This invention relates to automatic engine cut-offs, particularly, those intended for use in pipe-line systems.

The transportation of petroleum products, particularly gasoline and crude oil, through pipe-lines is attended with numerous dangers, one of which is the possibility of a break occurring in the line due to an excessive increase of pressure at some point, thereby causing the loss of a considerable quantity of valuable gasoline or oil before the flow can be cut off, or the break repaired. Breaks in pipe-lines are frequently caused by the mere closing of a gate at some point in the line through which the gasoline or oil is being pumped and as it is quite impossible to maintain a strict watch over the entire line to detect such breaks, it is necessary to employ automatic means for that purpose. When breaks occur, it is ordinarily advisable to cut off the flow of fluid through the pipe-line until the necessary repairs can be made, and as most breaks are occasioned by excessive pressure within the lines, it is necessary to detect unusual increases in pressure which might cause breaks and to relieve the pressure before a break occurs, or if a break should occur, to shut off the flow of oil before a large quantity of oil is lost. A break in the pipe line generally causes a decrease of pressure in the line and a corresponding speeding up of the engine which is likely to cause injury to the engine if not to the entire system.

Accordingly, one object of the present invention is to provide automatic means in the nature of a pressure gage for detecting

unusual or excessive increases and decreases of pressure in pipe-line systems.

Another object of the invention is to provide automatic electrical means adapted to cooperate with the pressure gage for operating mechanism by means of which the flow of oil or gasoline from the fuel pump is diverted away from the engine used to pump the gasoline or oil through the main pipe-line.

A still further object of the invention is to provide a device of the character described which can easily be installed in connection with any pipe-line system and which is in itself sufficiently simple in construction to minimize the possibility of its failing to operate when occasion demands.

Other objects of the invention will readily be seen as the description proceeds.

Similar reference numerals refer to like parts throughout the description and on the drawing.

Fig. 1 is a conventional representation of an apparatus embodying the present invention and showing the general arrangement of the novel features comprising the same.

Fig. 2 is an enlarged view of the pressure gage shown in Fig. 1 as connected to the pipe-line outlet connection.

Fig. 3 is an enlarged view of the valve, latch and solenoid shown in Fig. 1 as disposed in the by-pass line.

The apparatus consists in general of an engine 10, adapted to operate a pump 12 by means of which fluid is pumped through a pipe-line 14, a fuel supply tank 16, a pressure gage 30 connected to the pipe-line 14, and a valve 20 in a by-pass line 42 for shunting fuel oil away from the engine when pressure in the pipe-line becomes excessive or exceeds a predetermined low point.

The engine 10 is preferably of the well known Diesel type and is arranged to operate the pump 12 which forces gasoline or oil obtained from an outside source (not shown) through the pipe-line 14. The pump 12 is of a well known and commonly

used type and particularly adapted for this purpose. Fuel oil is supplied to the engine 10 from the fuel supply tank 16 through a fuel pump 18 positioned in the fuel supply line 15 between the fuel supply tank 16 and the engine 10. In the fuel supply line, at a point between the engine 10 and the fuel pump 18, a by-pass line 42 extends and leads back to the fuel supply tank 16 through the valve 20, which is normally closed and establishes a head of pressure in the by-pass line which prevents oil from flowing through the by-pass line.

The valve 20 is provided with a normally horizontally disposed lever arm 22 which is adapted to actuate the opening of the valve to relieve the pressure in the by-pass line 42. The outer end of the lever arm 22 is normally supported by a latch 24 which responds to the actuation of a solenoid 26. The lever arm 22 also carries a weight 28 sufficiently heavy to open the valve 20 when the supporting latch 24 is drawn from beneath the outer end of the lever arm 22 by the action of the solenoid 26.

A pressure gage 30 is connected to the outlet connection 14 of the main pipe-line pump 12 and is adapted to register the pressure of the oil or gasoline passing into the pipe-line 14 from the pump 12. The pressure gage 30 has a circular face 32 and is equipped with contact arms 34 and 36 which are positioned at predetermined high and low points and adapted to be contacted by a needle 38 which is pivotally connected to the gage at 44 when the pressure reaches either the high or low limit as indicated by the positions of the contact arms 34 and 36. When so contacted an electrical circuit is closed through a battery 40 and the solenoid 26. The establishing of the electrical circuit energizes the solenoid 26 whereby the latch 24 is withdrawn from beneath the outer end of the lever arm 22 with the result that the valve 20 is opened by gravity, the weight suspended on the end of the lever arm 22 tending to provide the necessary impetus.

The opening of the valve 20 decreases the resistance within the by-pass line 42 and the fuel which is normally pumped by the fuel pump 18 to the engine 10 is discharged into the by-pass line 42 instead of to the engine cylinder, because of the fact that there is less resistance in the by-pass line 42 than in the engine cylinder, the oil naturally following the course of least resistance. When the supply of fuel oil is thus shunted away from the engine, the engine necessarily ceases to operate and the pumping of oil or gasoline into the main pipe-line 14 is consequently stopped.

It will thus be seen that by means of the device described excessive pressure within the pipe-line 14 can be detected before any damage is done and that by means of the

automatically operated valve, the supply of oil normally used for operating the engine is shunted away from the engine and back to the fuel supply tank and the engine necessarily ceases to operate at once. When the engine stops the pump 12 no longer operates and no more oil or gasoline is pumped through the pipe-line 14. When it is desired to resume pumping operations, it is simply necessary to close the valve 20 so that fuel will once more be supplied to the engine 10 whereupon pumping through the pipe-line will be resumed.

What I claim is:

1. The combination with an engine, a pump operated thereby and adapted to pump liquids through a pipe-line, a fuel supply tank and a fuel pump, of automatically operated means for diverting the flow of fuel from the engine to stop it from running when the pressure present in the pipe-line exceeds a predetermined high or low point.

2. The combination with an engine, a pump operated thereby and adapted to pump liquids through a pipe-line, a fuel supply tank and a fuel pump, of automatically operated means responsive to pressure changes in the pipe line for cutting off the supply of fuel to the engine so that it will cease to operate the pipe-line pump when a predetermined high or low pressure is exceeded in the pipe line.

3. The combination with an engine, a pump operated thereby and adapted to pump liquids through a pipe-line, a fuel supply tank and a fuel pump for supplying the engine with fuel from the fuel tank, of means for registering changes in pressure in the pipe-line cooperating with means for simultaneously cutting off the flow of fuel to the engine when the pressure in the pipe-line reaches a predetermined high or low point.

4. The combination with an engine, a pump operated thereby and adapted to pump liquids through a main pipe-line, a fuel supply tank, a fuel pump interposed in the fuel supply line between the supply tank and engine, of a by-pass line extending from a point in the fuel supply line between the fuel pump and engine to the fuel tank, a normally closed valve interposed in the by-pass line for maintaining a head of pressure in the by-pass line, and automatic means for opening the valve and releasing the pressure in the line when the pressure in the main pipe-line exceeds a predetermined high or low point and for shunting fuel from the fuel pump back to the supply tank so that the engine will cease to operate.

5. The combination with an engine, a pump operated thereby and adapted to pump liquids through a main pipe-line, a fuel supply tank, a fuel pump interposed in the fuel supply line between the supply tank

and engine, of a by-pass line extending from a point in the fuel supply line between the fuel pump and the engine to the fuel tank, and means disposed in the by-pass line comprising a normally closed valve, a lever arm secured to the valve and supporting a weight, a latch normally supporting the weighted end of the lever arm and means for withdrawing the latch to permit the weight to actuate the opening of the valve so that the fuel will flow through the by-pass line instead of to the engine. 10

In witness whereof I have hereunto set my hand this 15th day of November, 1923.

GEO. C. SCHMIDT.