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CONTROL DEVICE FOR INTERNAL-COMBUSTION ENGINES

Filed Aug. 10, 1953

2 Sheets-Sheet 1

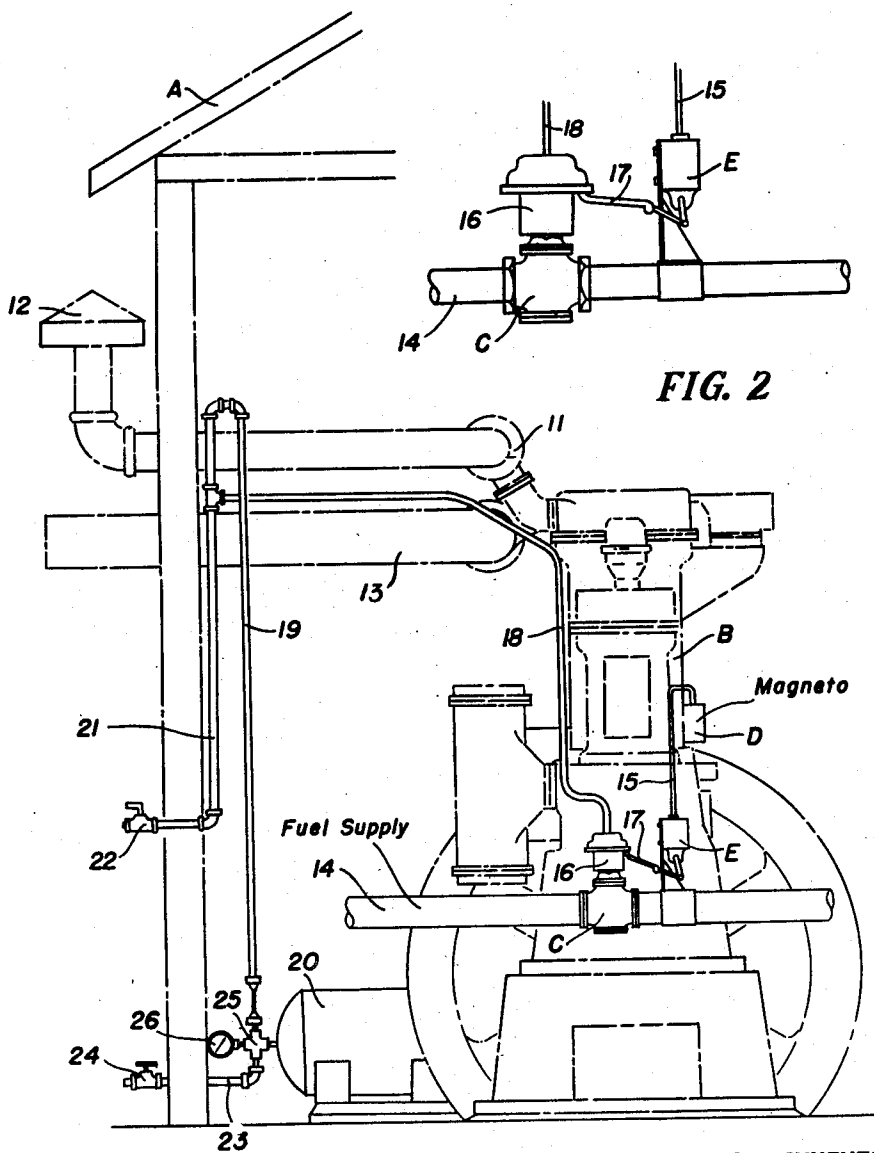


FIG. 2

FIG. 1

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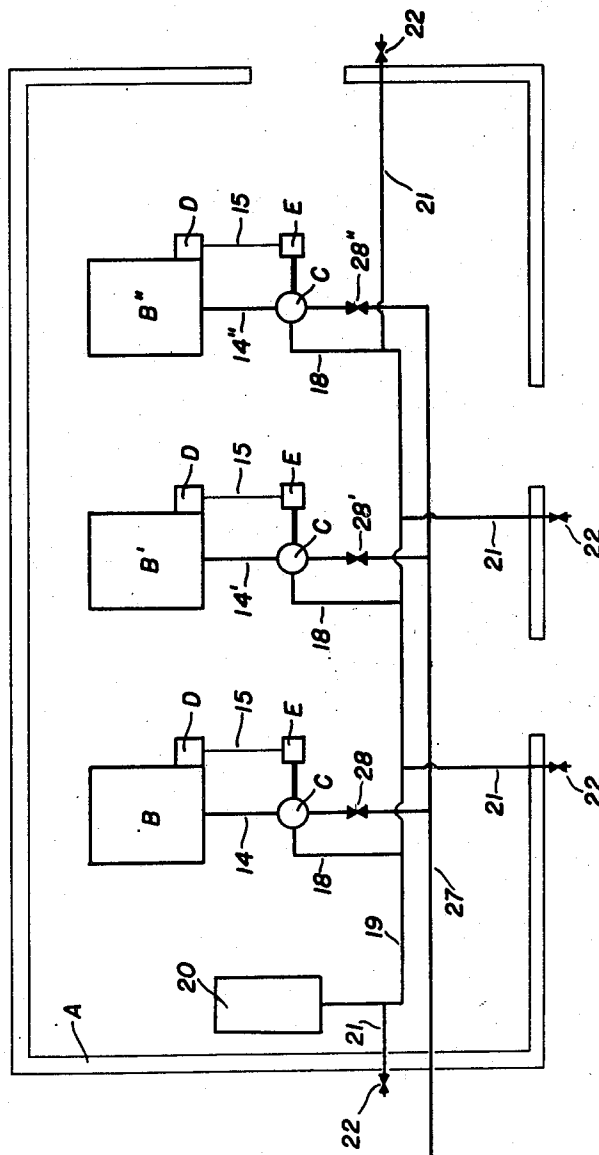


FIG. 3

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CONTROL DEVICE FOR INTERNAL-COMBUSTION ENGINES

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Application August 10, 1953, Serial No. 373,152

2 Claims. (Cl. 60-97)

This application is a continuation-in-part of my co-pending application Serial No. 232,001, filed June 16, 1951.

The present application is directed to a control device for internal combustion engines. More particularly it is directed to apparatus for shutting down one or more gas engines in an emergency.

The present invention may be briefly described as a control device or apparatus for one or more gas engines. The device comprises pressure responsive means controlling a shut off valve in the engine feed line and controlling a grounding means for the spark producing means of the engine. The pressure responsive means has a chamber which is connected by a conduit to a source of pressure. As long as the pressure exerted on the chamber of the pressure responsive means is no less than a predetermined value it maintains the valve in the feed line open and the grounding means inactive. The conduit is provided with one or more quick release valve at points remote from the shut off valve in the fuel line and the grounding means. The quick release valves are adapted to release pressure from said pressure responsive means whereby it closes the cut off valve in the fuel line and allows the magneto grounding means to ground the magneto.

The present invention is designed particularly as a means for shutting down a gas engine or plurality of gas engines used for pumping oil or for compressing gas. In pipe line operations where gas driven engines are arranged in a pump house there are occasions when the pump house and the adjacent area may be flooded with a combustible gas or vapor which may be ignited from the engine or engines while in operation. The operator who seeks to shut down the engine or engines exposes himself to danger of burns and possible loss of life. Consequently, the present invention provides a means for shutting down such engines without endangering personnel whenever any emergency occurs which might require the engines to be stopped.

The invention will be better understood by reference to the drawing in which

Fig. 1 is an elevational view of a preferred embodiment thereof;

Fig. 2 is an enlarged view showing in elevation the pressure responsive valve and magneto grounding means; and,

Fig. 3 is a view showing the control device attached to a plurality of gas engines in a pump house.

Referring now to the drawing and first to Fig. 1, A designates a pump house in which may be arranged a gas engine B. The gas engine is provided with an air intake line 11 having a covered inlet 12 arranged on the exterior of building A. An exhaust line 13 connected to engine B discharges combustion gases to the outside of building A. Engine B is provided with a fuel line 14 for supplying fuel gas thereto. Gas fuel line 14 is provided with a pressure responsive valve C which controls the flow of gaseous fuel through line 14 to the engine B.

Gas engine B is provided with a means D for causing a spark in each cylinder at the proper time in the engine cycle to cause ignition of the combustion gases in the cylinder. Conventionally this spark producing device is a magneto and is so designated hereafter. However, it will be understood that other spark producing means for igniting the gaseous combustion mixture in the cylinders of the engine may be used. A means E for grounding the magneto D is mounted on engine B. In the embodiment shown the grounding means E is connected to magneto D by means of a conductor 15. Grounding

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device E is pressure actuated. In the embodiment shown, the valve C is provided with pressure actuating means 16 which is connected through a suitable linkage 17 to grounding means E. Thus, a single pressure responsive means serves to actuate the valve C and the magneto grounding means E. It will be understood that if desired a separate pressure responsive means may be used to actuate the cut off valve and another to actuate the grounding device. The pressure responsive means 16 is connected to a branch conduit 18. Conduit 18 is connected to a compressed air line 19 which in turn is connected to a source of air supply maintained in a pressure vessel 20. A branch conduit 21 is connected to compressed air line 19 and extends to the exterior of building A and is provided with a quick release valve 22 which may be arranged at a convenient height for quick opening by an operator.

By way of explanation, it is to be pointed out that the chamber 20 must be pressured prior to starting-up operations by filling same with compressed air through a connecting line 23 containing a valve 24 which allows air to be introduced thereto. The four-way connection 25 is provided with an air gauge 26 to indicate the amount of air pressure in chamber 20. Compressed air line 19 connects to vessel 20 through the four-way connection 25.

A showing of the way the invention of the present application may be applied to a number of gas engines in a pump house is shown in Fig. 3. In this figure the gas engines are indicated by rectangles designated B, B' and B''. The compressed air line 19 extends the length of pump house A. Since each engine is provided with an identical control means these control means are designated by identical reference numbers for each engine. Thus, a series of branch lines 18 is connected to compressed air conduit 19 with a branch line 18 for each of the series of gas engines B, B', and B''. Fuel is brought into the pump house by gas main 27 and supplied to each engine of the series by a separate branch line 14. Manually operated valves 28, 28' and 28'' are provided for controlling the flow of gas to engine B, B' and B'', respectively, so that in normal operations any selected engine may be taken out of service by manually closing the valve in its respective fuel branch line 14 to terminate its supply of fuel. The branch fuel lines 14 for each of the engines of the battery are each provided with a separate valve C. Each engine is also provided with a magneto grounding means E. A separate pressure responsive means 16 for each engine is connected through a branch line 18 to compressed air conduit 19 and is arranged for actuating valve C and magneto grounding means E for said engine. In the embodiment shown in Fig. 3, several branch lines 21 are shown with each branch line provided with a separate quick release valve 22.

The present invention is operated in the following manner, first with reference to Fig. 1: If for any reason it becomes desirable to shut down gas engine B, such as a hazardous accumulation of combustible and/or explosive vapors, the operator may quickly release the system by opening valve 22. On the release of pressure, the pressure actuating means 16 which, by way of specific example, may be set to close at a pressure of about 15 pounds per square inch closes off the fuel supply by closing valve C and at the same time grounds the magneto by actuating the magneto grounding means E through linkage 17. Closing valve C shuts off the normal fuel supply to the engine. However, if an accumulation of hydrocarbon vapors or gases are present at inlet 12, these vapors would be pulled into the engine through intake line 11. If the spark producing means was not grounded, these vapors would continue to supply fuel to the engine so that it would continue to run and might, in fact, run away since normally the governor of the engine has no connection with the air intake line. Therefore, the apparatus is arranged so that the magneto D is grounded to prevent the firing of the charge in the engine in addition to the closing off of the normal fuel supply to the engine.

As shown in Fig. 3, the entire battery of engines may be quickly and positively closed down by opening any one of a number of valves. While four quick release valves 22 are shown in the drawing, it will be understood that a greater or lesser number may be provided as ap-

pears desirable. Thus, an operator who is prevented because of dangerous accumulation of vapors or by the breaking out of fire in one part of the building or outside the building adjacent some part thereof may reach a valve which can be operated without excess hazard to shut off the positively the entire battery of engines.

If the pump house contains other internal combustion engines in addition to gas engines, such engines may be provided with the control device shown in my copending application Serial No. 232,001, filed June 16, 1951, and the gas engines provided with a control device according to the present application and all types of the engines will be closed down by bleeding the air from compressed air line 19 as described.

The nature and objects of the present invention having been completely described and illustrated, what I desire to claim as new and useful and to secure by Letters Patent is:

1. A control apparatus for a gas burning internal combustion engine having an electrical spark producing means for firing the charges in its combustion chambers comprising, in combination, a gas feed line connected to said engine and adapted to be connected to a source of gaseous fuel, a cut off valve in said gas feed line, a grounding means capable of making said spark producing means ineffective, pressure responsive means having a chamber and operatively connected to said valve and to said grounding means and maintaining said valve open and said grounding means inactive when there is a predetermined pressure in said chamber and closing said valve and actuating said grounding means when the pressure in said chamber is less than the predetermined value, a compressed air conduit connected to a supply of compressed air and fluidly connected to the chamber of said pressure responsive means to supply compressed air thereto and a manually operated quick opening release valve fluidly connected to said conduit at a point remote from said cut off

valve and grounding means adapted to release compressed air pressure from said conduit and said pressure responsive means.

2. A control apparatus for a plurality of gas burning internal combustion engines each of which has a separate electrical spark producing means for firing the charges in its combustion chambers comprising, in combination, a separate gas feed line connected to each engine adapted to be connected to a source of gaseous fuel, a separate cut off valve in each gas feed line, a separate grounding means for each engine capable of making the spark producing means for each engine ineffective, a pressure responsive means for each engine having a chamber and operatively connected to the cut off valve and grounding means of said engine and maintaining said valve open and said grounding means inactive when there is a predetermined pressure in said chamber and closing said valve and actuating said grounding means when the pressure in said chamber is less than said predetermined value, a compressed air conduit connected to a supply of compressed air, a separate branch line connecting the chamber of the pressure responsive means of each engine to said conduit, a plurality of spaced manually operated quick opening release valves with each valve fluidly connected to said conduit at a point remote from the cut off valves and grounding means of said engines and adapted to release compressed air pressure from said conduit means and from said pressure responsive means.

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