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LUBRICATING SYSTEM FOR EXPLOSIVE ENGINES.

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1,203,290. Patented Oct. 31, 1916.

Fig. 1.

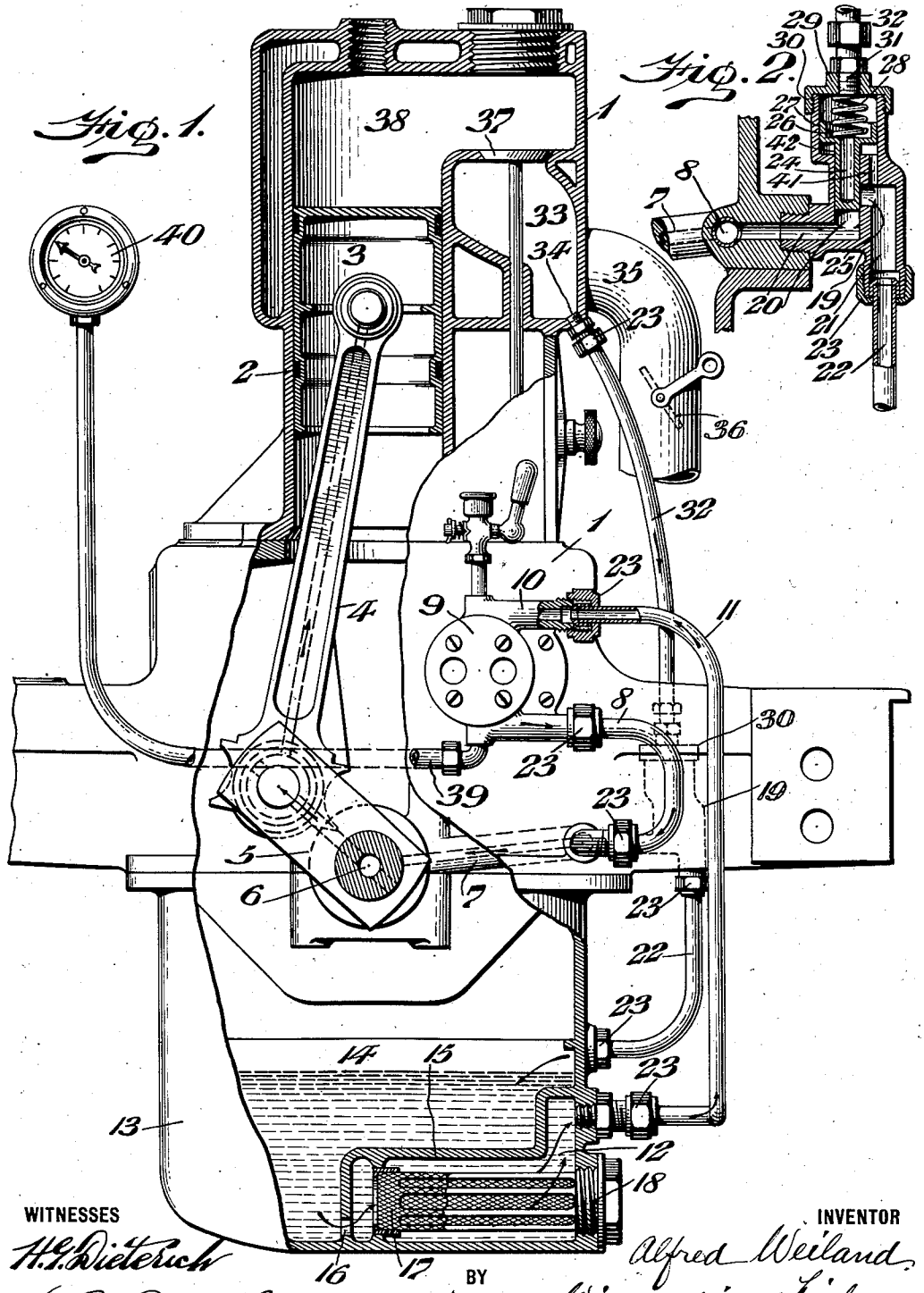

Fig. 2.

WITNESSES

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LUBRICATING SYSTEM FOR EXPLOSIVE-ENGINES.

1,203,290. Specification of Letters Patent. Patented Oct. 31, 1916.

Application filed April 19, 1913. Serial No. 762,190.

To all whom it may concern:

Be it known that I, ALFRED WEILAND, a citizen of the United States, residing in the city of Reading, county of Berks, State of Pennsylvania, have invented a new and useful Lubricating System for Explosive-Engines, of which the following is a specification.

This invention relates to a lubricating system for explosive engines, and has for an object to provide a system in which the oil is supplied to the engine in quantities proportional to the demands or load conditions of the engine.

It has, as further objects, to eliminate gummy oil deposits in the engine cylinder or on the piston, to economically control the supply of lubricating oil, thereby reducing materially the operating expense and to avoid excessive oil mingling with the exhaust products and discharging by way of the muffler to the atmosphere.

It has heretofore been supposed to mechanically or manually regulate the oil supply in accordance with the load conditions of the engine, but such means have not only been demonstrated as unsatisfactory and unreliable, but in addition, claim the almost constant attention of the operator, thereby adding complications which should be avoided, if possible.

In my present system, I have devised a construction wherein the oil supply is automatically controlled, varied and regulated in accordance with the changing pressure conditions within the engine and the quantity of oil supplied to the engine varies in direct proportion to the demand of the engine.

It further consists of other novel features of construction, all as will be hereinafter fully set forth.

For the purpose of illustrating my invention, I have shown in the accompanying drawings one form thereof which is at present preferred by me, since the same has been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 represents a side elevation, partly in section, of a portion of an explosive engine, showing the lubricating system embodying my invention. Fig. 2 represents a vertical section of a regulating valve used in my novel system.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings:—1 designates the casing of an explosive engine, having formed therein, the cylinder 2, containing the reciprocating piston 3, which is joined by the connected rod 4 to the crank-shaft 5. In the present instance, the crank-shaft 5 is suitably bored to form a conduit or passage 6 leading, as shown by the arrow, to the piston rod connection in order to deliver oil to the interior of the cylinder for lubricating purposes, as will be readily understood. The conduit 6 has communication by way of the pipe 7, with the discharge pipe 8 of an oil pump 9, preferably of the gear driven type, which is located at a suitable point, for the purpose of circulating the oil to the parts of the engine.

10 designates the inlet of the pump 9, having connection with a pipe 11, leading to and communicating with an oil supply reservoir or chamber 12, located in the bottom of the crank-case 13, and separated from the main oil supply, in the crank-case chamber 14, by a wall or partition 15, having an opening 16 to permit free passage of the oil to the chamber 12. This latter chamber 12 contains a strainer 17 or like oil separating device, so that the oil drawn to the pump is free from dirt or sediment collected by the oil in its travel through the engine.

18 designates a cap plug which serves to permit access to the chamber 12 so that the strainer 17 may be removed for purposes of cleaning or the like.

19 designates a valve casing provided with a port 20 communicating with the oil pump discharge pipe 8 at a point adjacent the connection of the latter with the conduit 7, so that the oil discharged from the pump 9 may either discharge through the pipe 7 to the various parts of the engine or be bypassed by way of the conduit 20 to the casing 19. This casing 19 is provided with an outlet port 21 connected to and communicating with a return pipe 22, the discharge end of which enters the crank-case 13 and returns the oil to the main reservoir. It will, of course, be understood that suitable unions

23, or like connectors, are utilized, where necessary, to connect adjacent pipes or conduits.

24 designates, in the present instance, a plunger type of slide valve mounted in the conduit 20 and serving as a means to control the opening and closing of a port 25, which forms a communication between the conduits 20 and the port 21. The plunger 24, as here shown, terminates in a follower head 26, located in the enlarged tubular head 27 of the casing 19 and forming a seat for one end of a spring 28, the opposite end of which bears against the cap 29, which serves as a closure for the end of the head 27. The connection between the cap and head is preferably by threading the respective parts, as shown at 30. The cap 29 is of annular form to receive the threaded end 31 of a pipe 32, which leads to the gas inlet chamber 33, where it is connected to the casing 1 by a suitable nipple 34 and union 23. The explosive mixture is drawn to the gas inlet chamber by way of the intake pipe 35, which is, of course, in communication with the carbureter (not shown) and the supply of mixture is controlled, as usual, by a throttle valve 36 located at a suitable point.

37 designates the inlet valve controlling the admission of the gas to the compression chamber 38 in the ordinary manner.

39 designates a pipe leading from the discharge end of the lubricator pump 9 to a gage 40, which is located at a convenient point, so that the pressure and operation of the lubricating system may be observed.

41 designates a relief port forming a communication between the conduit 21 and the space 42 at one side of the follower 26, so that the plunger valve may freely operate under the spring pressure, and be relieved of fluid pressure at the necessary times.

The operation of the device is as follows:—When the engine is operating under load conditions with the throttle 36 wide open, the vacuum in the gas inlet 33 is lowered and consequently, reduces the suction upon the plunger valve 24, so that the spring 28 causes the valve to close so that the oil from the pump cannot pass by way of the conduit or by-pass 20 to the return pipe 22, but is forced through the conduit 7 to the various oil passages in the cranks and connecting rods and lubricates the engine. When, however, the engine is operating on a decreased load and the throttle is closed or partially closed, the vacuum in the inlet chamber 33 is correspondingly raised and the plunger valve 24 is forced upwardly against the tension of the spring 28 and opens the port 25. This action by-passes a quantity of the oil to the return pipe 22, so that it is conducted directly to the main reservoir 14, while only a portion passes to the engine. It will therefore be apparent that the supply of oil to the engine is regulated in accordance with the pressure conditions existing in the gas admission chamber, and the oil is supplied practically in direct proportions to the demand of the engine.

In actual operation of the device, it will be apparent that the port 25 is seldom opened or closed for any considerable period, since the varying conditions within the admission chamber 33 cause the plunger 24 to move up and down, and the valve therefore may be called a floating valve, which continually varies the supply of oil to the engine. Thus, for example, if the engine is used in an automobile and the latter is traversing a level road with a light load, at say a speed of 15 miles an hour, the throttle will be practically closed and the vacuum in the admission chamber increased, so that the plunger valve 24 is partially or completely open, thereby allowing a large portion of the oil from the discharge end of the pump to be by-passed directly to the oil reservoir in the crank-case. In case an upgrade is reached and the same speed maintained, more power is, of course, needed to take care of the increased load and the throttle is partially or fully opened, thereby causing a lowering of the vacuum in the admission chamber, so that the pressure conditions on opposite sides of the plunger valve follower 26 are more nearly balanced, and the spring 28 causes the plunger to entirely cut off or materially reduce the by-pass port 25, so that more oil passes by way of the pipe 7 to the parts of the engine.

It will now be apparent that I have devised a complete unitary lubricating system, wherein the supply of oil to the engine is varied in accordance with the demand made upon the engine and, at no time, will there be an excess of oil within the engine. By my novel regulating means, I supply to the engine a quantity of oil always sufficient to lubricate the parts, but not sufficient to gum the cylinder or piston or causing a quantity of oil to be burned in the exhaust, which thereby avoids sooty deposits in the muffler and obnoxious smoke from being discharged to the atmosphere.

It will now be apparent that I have devised a novel and useful construction of a lubricating system for explosive engines, which embodies the features of advantage enumerated as desirable in the statement of the invention, and the above description, and while I have, in the present instance, shown and described a preferred embodiment thereof which has been found in practice to give satisfactory and reliable results, it is to be understood that the same is susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a device of the character stated, an explosive engine, a gas admission chamber therein, a pump connected with said engine for supplying lubricating oil thereto, a source of oil supply, a by-pass from the discharge end of said pump connected to said source of supply, and means controlled by pressure conditions within said gas chamber for controlling the operation of said by-pass.

2. In a device of the character stated, an explosive engine, a gas admission chamber therein, a pump connected with said engine for supplying lubricating oil thereto, a source of oil supply, a by-pass from the discharge end of said pump connected to said source of supply, a valve for controlling said by-pass, and means controlled by pressure conditions within said gas chamber for opening and closing said valve.

3. In a device of the character stated, an explosive engine, a gas admission chamber therein, a pump connected with said engine for supplying lubricating oil thereto, a source of oil supply, a by-pass from the discharge end of said pump connected to said source of supply, a valve for controlling said by-pass, pressure means controlled by conditions within said gas chamber for moving said valve in one direction, and means for moving said valve in the opposite direction.

4. In a device of the character stated, an explosive engine, a source of oil supply, a pump for supplying oil to said engine, and means, controlled by pressure conditions in said engine, for regulating the amount of oil discharged from said pump to said engine and back to said source of oil supply.

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