July 27, 1926. 1,594,136

I. A. WEAVER

INTERNAL COMBUSTION ENGINE OIL APPLIANCE

Filed Feb. 25, 1924 2 Sheets-Sheet 1

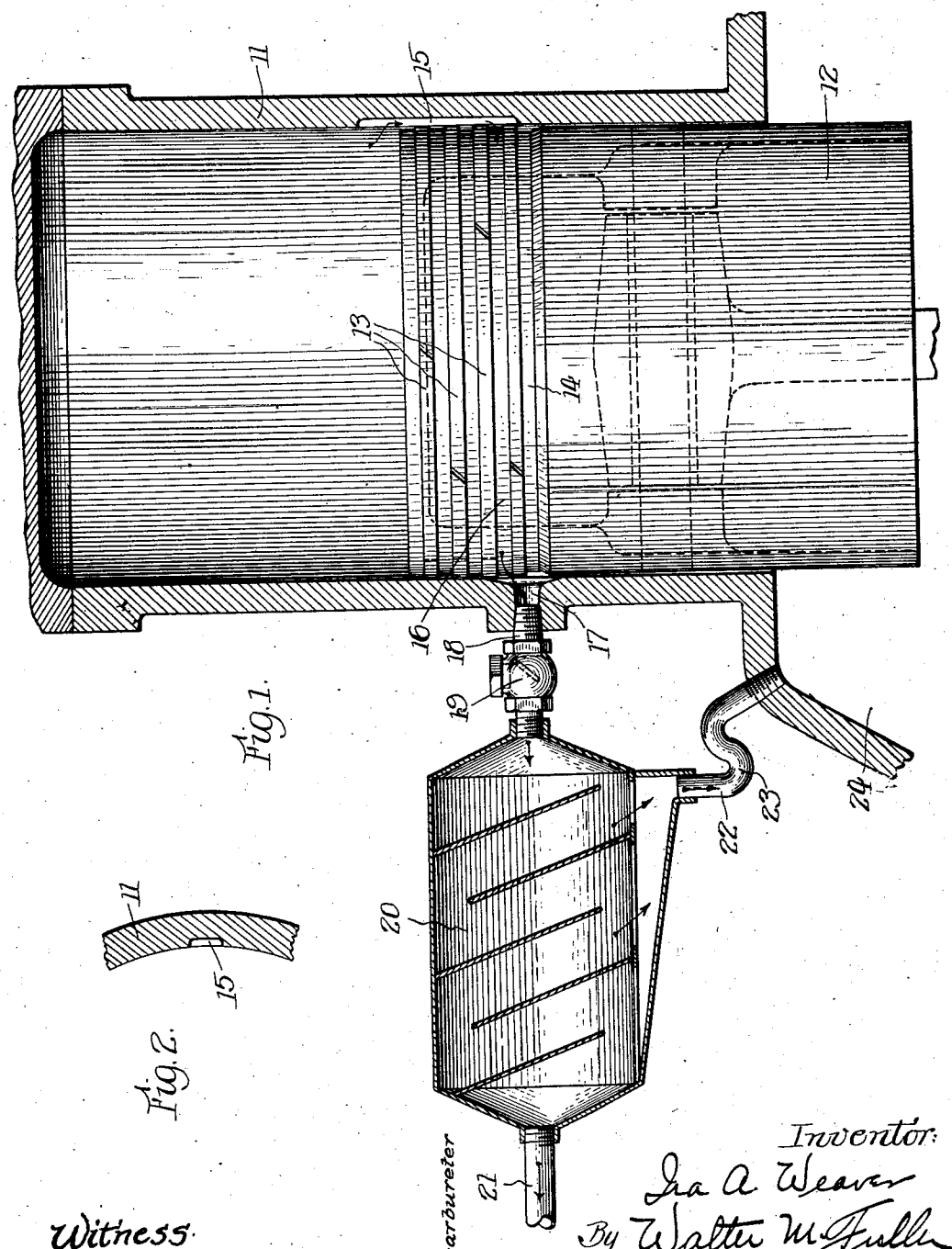


Fig. 1.

Fig. 2.

Witness
A. J. Sauer

Inventor:
Ira A Weaver
By Walter M. Fuller
Atty

July 27, 1926. 1,594,136

I. A. WEAVER

INTERNAL COMBUSTION ENGINE OIL APPLIANCE

Filed Feb. 25, 1924 2 Sheets-Sheet 2

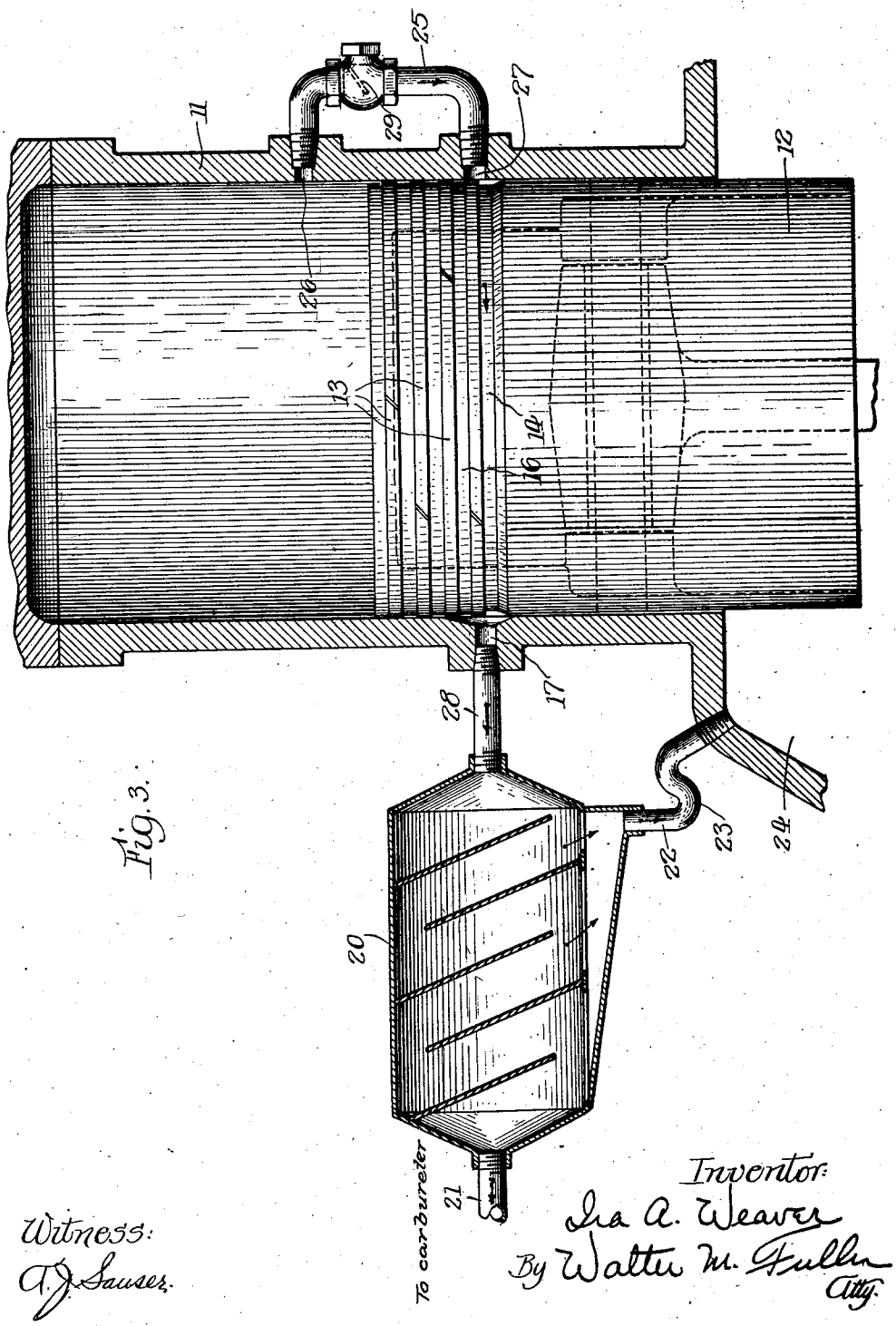


Fig. 3.

Witness:
A. J. Sauser.

Inventor:
Ira A. Weaver
By Walter M. Fuller
Atty.

Patented July 27, 1926. 1,594,136

UNITED STATES PATENT OFFICE.

IRA A. WEAVER, OF SPRINGFIELD, ILLINOIS, ASSIGNOR TO WEAVER MANUFACTURING COMPANY, OF SPRINGFIELD, ILLINOIS, A CORPORATION OF ILLINOIS.

INTERNAL-COMBUSTION-ENGINE OIL APPLIANCE.

Application filed February 25, 1924. Serial No. 695,048.

It has been found to be desirable to cause a free flow of lubricating oil on the surfaces of the reciprocating pistons of internal-combustion engines and to remove such oil before it has an opportunity to pass by the pistons into the combustion-chambers where is would become carbonized, foul the spark-plugs, reduce the compression volume, and interfere with the proper action of the valves.

It has also been found to be of merit to prevent the combustion or fuel gases from passing downwardly by the pistons into the engine crank-case where they dilute and contaminate the lubricating oil, seriously decreasing its friction reducing qualities.

The present invention relates to simple means for effectively securing the desired results in a very simple manner and without in any way interfering with the carburetion as by employing the suction of the intake-manifold to withdraw the oil and gases from around the pistons.

In accordance with the principles of this invention, the pressure of the exploded gases during a portion of the explosion stroke of the piston is used to force out the contents of one or more grooves around the piston, and, after separation or reclamation, the withdrawn oil is returned to the engine crank-case and the gases, if desired, may be delivered into the carbureter-intake.

In some cases, it is of advantage to subject such groove or grooves to suction during the intake stroke of the piston to draw the oil up around the piston and into or near such groove or grooves and this is accomplished, in the preferred embodiment of the invention, by subjecting such groove or grooves to the suction in the combustion-chamber during at least a part of the piston intake stroke.

In the accompanying drawings illustrating desirable and preferred embodiments of the invention, and throughout the views of which like reference characters designate the same parts, a single engine or motor cylinder and its piston have been shown, but it is to be understood that each cylinder of the engine would be similarly equipped, a single separator or trap and its return connection to the crank-case of the motor being sufficient for the whole engine.

In these drawings:

Figure 1 illustrates in section one of the embodiments of the invention;

Figure 2 is a fragmentary section through the cylinder side wall; and

Figure 3 is a view similar to Figure 1 illustrating a somewhat modified construction.

Referring first to the structure depicted in Figures 1 and 2 it will be perceived that the structure comprises an internal-combustion motor cylinder 11 containing the customary reciprocatory piston 12 fitted near its top end with a plurality of piston-rings 13 in the usual, circumferential piston-ring grooves spaced longitudinally of the piston.

Just below the lowermost piston-ring, the piston has a shallow fluid and oil collecting groove 14 extended completely around it.

Internally at one side, the cylinder has a lengthwise groove 15 which, when the piston is at or near the limit of its downward stroke, temporarily or momentarily connects the combustion chamber above the piston with the groove 14 and with the shallow annular space 16 between the lowermost piston-ring and the next one above it.

At a point diametrically opposite the groove 15, the motor cylinder has a port or opening 17 extended through its wall which when the piston is in the position shown, connects with the two, circumferential channels 14 and 16, such port being connected by a pipe 18, equipped with an outwardly-opening or inwardly-closing check-valve 19 to an internally-baffled oil-trap or separator 20 which has a discharge 21 for the gases to flow to the intake of the carbureter and a delivery pipe 22, preferably equipped with a trap 23, for returning the recovered or reclaimed oil to the crank-case 24 of the motor.

Assuming that the cylinder and piston are being lubricated in any usual or approved manner, as for example by the ordinary splash system, during the downward fuel-intake stroke of the piston a partial vacuum of sub-atmospheric pressure occurs in the cylinder chamber above the piston.

When the piston approaches or is at its lowermost position of its stroke, its top end or head slides below the upper end of the longitudinal cylinder groove 15 thereby

submitting such groove, the two piston channels 14 and 16, and the pipe 18 to the partial vacuum causing the automatic inward closing of such valve 19.

This suction or partial vacuum in the circumferential piston channels causes a free flow of oil about or along the surface of the piston and some of it flows into such channels, the main purpose of effecting such oil movement being to adequately lubricate the piston and cylinder and to assist in cooling them by such oil.

When the piston nears the end of its downward firing or fuel explosion stroke, it similarly permits the momentary opening or connection of the groove 15 to the combustion-chamber and a small portion of the more or less spent exploded gases flow through such groove, the two piston channels, the pipe 18, and past the now-open check-valve 19 into the trap or separator where the oil laden gases by contact with the series of baffles deposit their oil which returns to the crank-case through the connection 22, 23, the gases flowing on to the carbureter intake through the pipe 21.

In this way the contents of the piston channels, including the oil and any liquid or gaseous fuel or combustion gases which have escaped downwardly past the piston-rings, are blown out of such channels and from the cylinder through its port.

Thus the objectionable entrance of the oil, although it is flowing freely on the surface of the piston, into the combustion chamber is overcome and the dilution and contamination of the oil supply in the crank-case is prevented by stopping the downward escape of fluids and liquids past the piston-rings into such crank-case.

In some cases all that may be required or desired is the application of the pressure to the piston channel or channels without subjecting the latter to the suction or reduced atmospheric pressure.

In other cases, it may be preferred to install the new system without taking out the pistons or internally longitudinally grooving the cylinders.

To meet both of these conditions, I have provided the easily installed system shown in detail in Figure 3.

In this structure, the parts are as in the other instance, except that an unvalved pipe 28 connects the cylinder port or opening 17 with the interior of the trap or separator 20 and, instead of having a longitudinal groove 15 inside the cylinder, a pipe 25 equipped with a check-valve 29 connects two, vertically-spaced, cylinder ports 26 and 27, the former port being above the piston head and the latter port in register with the piston channel 14 and also possibly channel 16 when the piston is at or near the end of its downward stroke.

In this device when suction or subatmospheric pressure occurs in the chamber above the piston, for example, during the intake-stroke, as soon as the port 26 is opened by the descent of the piston the check-valve 29 closes so that such suction is not exerted on the circumferential piston-grooves.

On the other hand, however, when the port 26 is uncovered by the descent of the piston, during its explosion or firing stroke, then the pressure, greater than atmospheric pressure, is transmitted through the pipe 25, the check-valve remaining open, to the two piston-channels, or to only one of them, as the case may be, so that the fluid contents thereof are forced out through the pipe 28 into the separator 20, the gases passing on to the carbureter intake, the oil being returned automatically to the crank-case.

The showing in these drawings is more or less diagrammatic but it will suffice to give a complete understanding of the invention and its various benefits and advantages.

It is to be borne in mind, however, that the invention is susceptible of a variety of embodiments without departure from its fundamental principles and accordingly the appended claims are to be interpreted as liberally as is permissible in view of the state of the prior art.

Stated somewhat otherwise, many minor mechanical changes may be made in the structure shown and described without departure from the heart and essence of the invention and without the sacrifice of any of its substantial benefits.

I claim:

1. In an internal-combustion engine, the combination of a cylinder, a reciprocatory power piston therein having a channel on its external curved surface, means to lubricate said cylinder and piston, means to permit the contents of said channel to be delivered therefrom, and means to subject said channel intermittently to the pressure of the exploded gases of the engine to deliver the contents of the channel therefrom.

2. In an internal-combustion engine, the combination of a cylinder, a reciprocatory power piston therein having a channel on its external curved surface, means to lubricate said cylinder and piston, means to permit the contents of said channel to be delivered therefrom, and means to subject said channel alternately to the pressure of the exploded gases of the engine and to the intake suction of the engine.

3. In an internal-combustion engine, the combination of a cylinder, a reciprocatory power piston therein having a transverse channel on its external curved surface, means to lubricate said cylinder and piston, means to permit the contents of said channel to be

delivered therefrom, means to open and close said delivery means, means to subject said channel at a point remote from said delivery means to a pressure above atmospheric when said delivery means is open, and means to subject said channel to a pressure below atmospheric when said delivery means is closed.

4. In an internal-combustion engine, the combination of a cylinder, a reciprocatory power piston therein having a channel on its external curved surface, means to lubricate said cylinder and piston, means to permit the contents of said channel to be delivered therefrom, and means, independent of said delivery means, to alternately subject said channel to pressure above and below atmospheric.

5. In an internal-combustion engine, the combination of a cylinder, a reciprocatory piston therein having a channel on its external curved surface, means to lubricate said cylinder and piston, means to permit the contents of said channel to be delivered therefrom, and means to intermittently connect said piston channel with the cylinder chamber above the piston.

6. In an internal-combustion engine, the combination of a cylinder, a reciprocatory piston therein having a channel on its external curved surface, means to permit the contents of said channel to be delivered therefrom, means to lubricate said piston and cylinder, and means to subject said channel alternately to the pressure of the exploded gases in the chamber above the piston and to the intake suction in said chamber.

7. In an internal-combustion engine, the combination of a cylinder, a reciprocatory piston therein having a channel on its external curved surface, means to lubricate said cylinder and piston, means to permit the contents of said piston channel to be delivered therefrom, and means to intermittently subject said piston channel to the pressure of the exploded gases in the cylinder chamber above said piston.

8. In an internal-combustion engine, the combination of a cylinder, a reciprocatory piston therein having a channel on its external curved surface, means to lubricate said cylinder and piston, means to permit the contents of said channel to be delivered therefrom, and means to intermittently subject said piston channel to the subatmospheric intake pressure in the cylinder chamber above said piston.

9. In an internal-combustion engine, the combination of a cylinder having a longitudinal groove in its inner face and a discharge port through its side wall at a distance from said longitudinal groove, a reciprocatory piston in said cylinder having a channel on its external curved surface communicating with said cylinder discharge port and with said cylinder groove when the head of the piston during its descent uncovers the upper portion of said cylinder groove, and means to lubricate said cylinder and piston.

10. In an internal-combustion engine, the combination of a cylinder having a longitudinal groove in its inner face and a discharge port through its side wall at a distance from said longitudinal groove, a reciprocatory piston in said cylinder having a channel on its external curved surface communicating with said cylinder discharge port and with said cylinder groove when the head of the piston during its descent uncovers the upper portion of said cylinder groove, means to lubricate said cylinder and piston, and means to prevent air entering the cylinder chamber above the piston through said cylinder groove during the intake stroke of the piston.

11. In an internal-combustion engine, the combination of a cylinder, a reciprocatory piston therein having a channel on its external curved surface, means to lubricate said cylinder and piston, means to permit the contents of said piston channel to be delivered therefrom, means to intermittently subject said piston channel to the pressure of the exploded gases in the cylinder chamber above the piston, and means to conduct at least a portion of the discharged contents from said channel to the intake of the carbureter associated with the engine.

12. In an internal-combustion engine, the combination of a cylinder, a reciprocatory piston therein having a channel on its external curved surface, means to lubricate said cylinder and piston, means to permit the contents of said piston channel to be delivered therefrom, means to intermittently subject said piston channel to the pressure of the exploded gases in the cylinder chamber above said piston, and means to conduct at least a portion of the discharged contents from said piston channel to the oil supply compartment of the engine.

13. In an internal-combustion engine, the combination of a cylinder, a reciprocatory piston therein having a channel on its external curved surface, means to lubricate said cylinder and piston, means to permit the contents of said piston channel to be delivered therefrom, means to intermittently subject said piston channel to the pressure of the exploded gases in the cylinder chamber above said piston, means to separate the liquid and gaseous ingredients of the discharged contents of the piston channel, means to convey the separated liquid ingredients to the oil supply compartment of the engine, and means to convey the separated gaseous ingredients to the fuel intake of the engine.

14. In an internal-combustion engine, the combination of a cylinder, a reciprocatory piston therein having a channel on its external curved surface, means to permit the contents of said channel to be delivered therefrom, means to lubricate said piston and cylinder, means to subject said channel alternately to the pressure of the exploded gases in the chamber above the piston and to the intake suction in said chamber, means to separate the liquid and gaseous ingredients of the discharged contents of the piston channel, means to convey the separated liquid ingredients to the oil supply compartment of the engine, and means to convey the separated gaseous ingredients to the fuel intake of the engine.

In witness whereof I have hereunto set my hand.

IRA A. WEAVER.