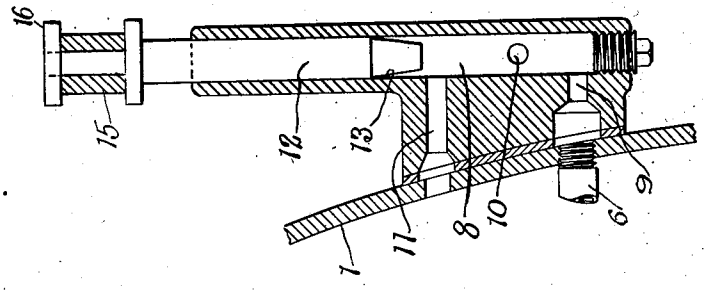
C. R. GREEN.

OIL FEED REGULATOR.

APPLICATION FILED AUG. 16, 1915.

1,201,038. Patented Oct. 10, 1916.

Fig. 2.



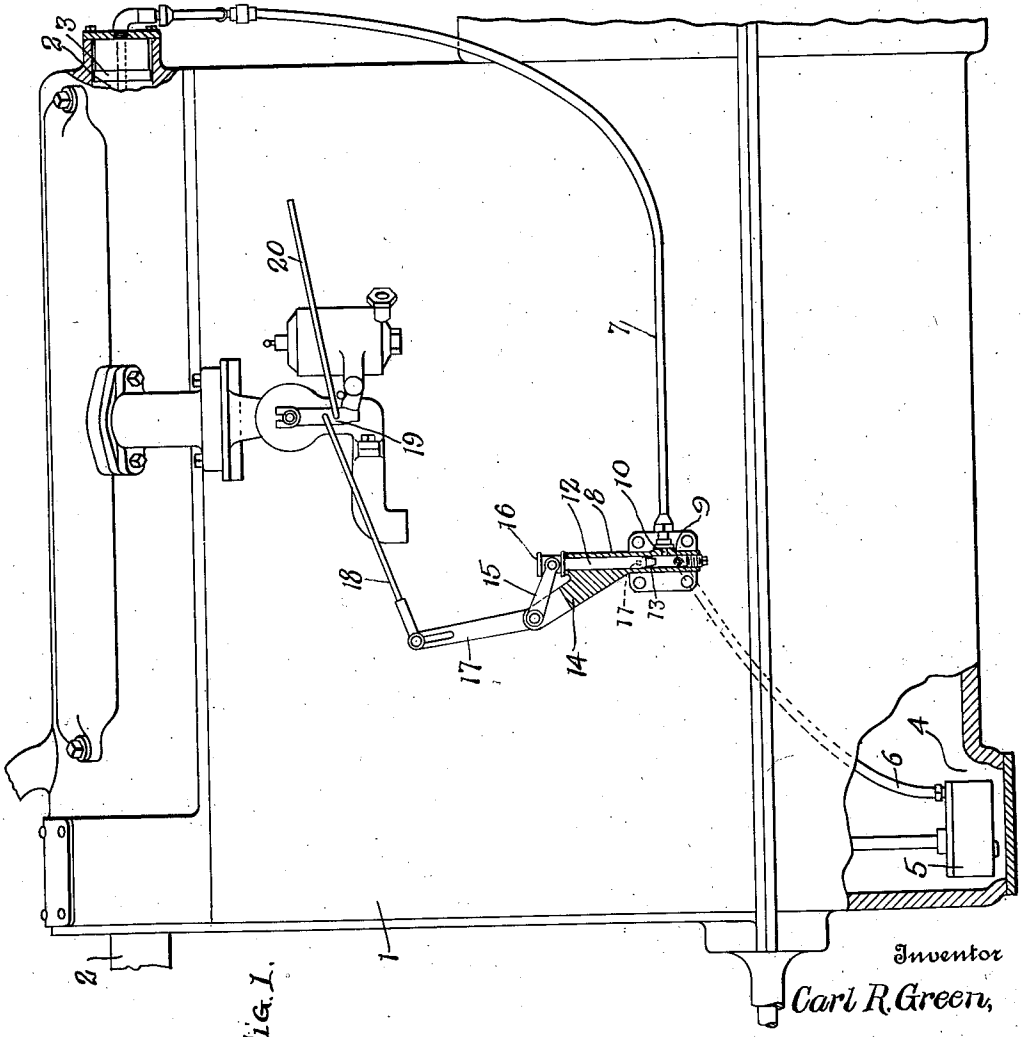


Fig. 1.

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CARL R. GREEN, OF DAYTON, OHIO, ASSIGNOR TO THE MEAD ENGINE COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO.

OIL-FEED REGULATOR.

1,201,038. Specification of Letters Patent. Patented Oct. 10, 1916.

Original application filed February 15, 1915, Serial No. 8,159. Divided and this application filed August 16, 1915. Serial No. 45,738.

To all whom it may concern:

Be it known that I, CARL R. GREEN, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Oil-Feed Regulators, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to oil feed regulators and is a division of the application for patent filed by me Feb. 15th, 1915, Ser. No. 8159.

The object of the invention is to provide means for controlling the amount of oil delivered to the parts to be lubricated, to cause it to be delivered in the quantities in which it is needed and, to this end, it is a further object of the invention to provide means for controlling the feed of oil according to the speed at which the part to be lubricated is moving.

It is a further object of the invention to provide means for regulating the delivery of oil by varying the pressure at which it is delivered to the point of consumption.

It is a further object of the invention to provide a device of this kind which will be very simple in its construction, which will be positive in its operation and will comprise but a few parts, these parts being of such a character that there is little liability of their becoming broken or of their adjustment being interfered with.

In the accompanying drawings I have shown in Fig. 1, partly in section, one embodiment of my invention illustrating the same as applied to a rotary valve internal combustion engine; Fig. 2 is a sectional, detail view of the regulating device.

In these drawings I have illustrated one embodiment of my invention and have shown it as designed for use in connection with the lubricating system for the valve of a rotary valve internal combustion engine. It will be understood, however, that the device is useful in connection with lubricating systems of other kinds and for other purposes, whether they be used for lubricating other parts of an internal combustion engine or for lubricating parts of other mechanisms.

The engine is shown as cast *en bloc* and as having a rotary valve 2 mounted in the upper part thereof in a manner common to the "Mead engine" and as more fully described in the above-mentioned application for patent. This valve is preferably provided with a series of packing rings 3 to facilitate the distribution of oil, as described in said application, and as here shown the oil is admitted to the valve at one end of the valve chamber, although it can, of course, be admitted at any suitable point. The manner in which the oil is delivered to the valve or other part to be lubricated is unimportant, it being only necessary that the oil line should be of such a character that the regulating device can be interposed therein, as will hereinafter appear. As shown in these drawings the oil is supplied from an oil chamber 4 in the bottom of the crank case 1, it being pumped out of this chamber by a small rotary pump 5 and delivered to the valve through a conduit, such as a flexible tube comprising two parts 6 and 7. The oil is thus delivered to the valve under pressure. In may be here noted, however, that the use of the oil forcing device is not essential to the operation of the invention, as the pressure necessary can, in many instances, be secured in other ways, as by a gravity feed or the like.

In the present arrangement of the lubricating system I have interposed my regulating device between the two parts 6 and 7 of the conduit. This device comprises a chamber which is connected with both parts of the conduit, 6 and 7. The device is further provided with means for controlling the flow of oil through the chamber to that part of the conduit leading to the part to be lubricated, in the present instance, the valve. Preferably, this is accomplished by regulating the pressure at which the oil is delivered to that part of the conduit leading to the valve,

To this end, I have provided the oil chamber with a relief port through which, when open, the oil can escape, it being preferably returned to the source of supply, in the present construction, the oil well in the crank case. By providing means to regulate the size of the relief port between the two extremes of fully open and fully closed I can regulate the pressure at which the oil is delivered to the part 7 of the conduit. If the relief port is fully open the column of oil in the part 7 of the conduit will be subjected to very little pressure but nevertheless a suppply of oil will be maintained constantly at the part to be lubricated and will thus prevent the part from becoming entirely dry. At the same time the oil being under practically no pressure there will be no waste of oil.

In that form of the invention here shown the oil chamber is in the form of an elongated housing or tube 8 which is rigidly secured to the crank case of the engine and is connected with the part 6 of the conduit by a port 9 and with the part 7 of the conduit by a port 10. The oil chamber 8 is provided, in the present instance, at a point above the ports 9 and 10, with a relief port 11 which leads to the crank case so that the oil can pass from the oil chamber 8 unobstructedly to the crank case, this relief port constituting in effect a by-pass, by which the oil may be taken from the conduit and returned to the crank case. The relative positions of the ports may be varied but where the flow of oil is controlled by regulating the pressure the arrangement must be such that the relief port can be closed without closing the ports communicating with the conduit. In the present device the relief port is controlled by means of a plunger 12 which is slidably mounted in the upper part of the chamber 8. Hence, by arranging the relief port above the other ports it can be opened and closed by the plunger without affecting these other ports. With the plunger in its elevated position, as shown in the drawings, the relief port is wide open and the flow of oil from the inlet portion of the conduit 6 to and through the relief port being unobstructed the oil will naturally follow this, the path of least resistance, in preference to the path leading through the conduit 7 to the part to be lubricated, where more or less resistance is offered to the passage of the oil. If the plunger be gradually lowered the escape of the oil through the relief port is gradually restricted and the pressure exerted upon the oil in the part 7 of the conduit is increased. To facilitate this action the lower end of the plunger 12 is preferably tapered slightly, as shown at 13. When the tapered portion of the plunger has passed the relief port the latter will be completely closed and the oil in the part 7 of the conduit will be subjected to the full pressure of the pump 5.

To control the position of the plunger 12 and, consequently, regulate the amount of oil that can escape through the relief port I prefer to connect the plunger with the carbureter devices whereby the speed or load of the part to be lubricated is controlled. In the present application of the invention I have connected it with the operating device for the throttle valve so that as the throttle valve is open the relief port will be closed. The connection may be accomplished in various ways but, in the present construction, the housing 8 is provided with an arm or bracket 14 on which is pivotally mounted a bell crank lever, one arm, 15, of which comprises a yoke which engages a grooved collar 16 at the upper end of the plunger 12. The other arm, 17, of the bell crank lever is connected, by a pin and slot connection, with a rod 18 leading to an arm 19 which is operatively connected with the throttle valve and to which is connected a second rod 20 leading to a remote point from which the throttle valve is to be controlled. In this manner the adjustment of the throttle valve simultaneously regulates the supply of oil delivered to the valve.

By means of this mechanism I am enabled to deliver to the valve or other part to be lubricated, at all times, the exact amount of oil required, this supply being regulated without conscious effort on the part of the operator whereby the amount of oil delivered is not left to the judgment of the operator. It will be noted further that the device serves not only to provide an accurate, regulated supply of oil to the engine, but that it will be of such a character that its accuracy is not affected by adjustments of the throttle because any adjustments of the throttle will affect the movement of the plunger 12 so slightly that its effect upon the feed of the oil will be negligible. Where such connection is established between a seated valve and the throttle, any adjustment of the throttle is liable to interfere with and may prevent the seating of the valve and thus either destroy or seriously impair the regulation of the oil feed. The operation of the throttle valve and the device for controlling the pressure of the oil need not be synchronous.

While I have shown and described one embodiment of the invention it will be understood that this has been chosen for the purposes of illustration only, and that I do not desire to be limited to the details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

Having thus fully described my inven-

tion, what I claim as new and desire to secure by Letters Patent, is:—

1. In a device of the character described, a part comprising a source of oil supply under pressure, a part to be lubricated, means for conducting oil from one part to the other, and means associated with said conducting means and positively controlled mechanically for regulating the pressure at which the oil is delivered to the part to be lubricated.

2. In a device of the character described, an oil chamber communicating with a source of supply for oil under pressure and with a part to be lubricated, carbureter devices, and means whose position is regulated by adjusting the carbureter devices, whereby the pressure by which the oil is delivered to said part to be lubricated is regulated.

3. In a device of the character described, a part comprising a source of supply for oil under pressure, a part to be lubricated, means for conducting oil from one part to the other, a relief port normally communicating with said source of oil supply, and means to positively control the flow for oil through said relief port, whereby the pressure at which the oil is delivered to the part to be lubricated is regulated.

4. In the regulating device of the character described, a part comprising a source of supply for oil under pressure, a part to be lubricated, means for conducting oil from one part to the other, a relief port in said conducting means, carbureter devices, and means whose position is regulated by adjusting the carbureter devices, whereby the amount of oil flowing through the relief port is controlled, thereby regulating the pressure at which oil is delivered to the part to be lubricated.

5. In a regulating device of the character described, a part comprising a source of oil supply under pressure, a part to be lubricated, means for conducting oil from one part to the other, a relief port associated with said conducting means and positively controlled means to open and close said relief port, thereby regulating the amount of oil flowing through the same and thereby regulating the pressure at which the oil is delivered to the part to be lubricated.

6. A regulating device comprising an elongated oil chamber having an inlet port and an outlet port and also having a relief port, and a plunger mounted in said chamber and arranged to be moved across said relief port without obstructing either of the other ports.

7. The combination, with an internal combustion engine having a crank case forming an oil receptacle, a pump communicating with said oil receptacle, and a conduit connecting said oil receptacle with a part to be lubricated, of a regulating device interposed between said pump and the part to be lubricated and comprising a chamber having an opening communicating with said pump and with said part to be lubricated, said chamber also being provided with a relief port normally communicating with said oil receptacle, and means positively controlled for regulating the amount of oil flowing through said relief port, whereby the pressure at which the oil is delivered to the part to be lubricated is also regulated.

8. The combination, with an internal combustion engine comprising a throttle valve and having an oil receptacle, and a pump to deliver oil from said oil receptacle to a part to be lubricated, of a regulating device interposed between said pump and the part to be lubricated and comprising a chamber in open communication with said pump and said part to be lubricated, said chamber also having a relief port, and means to regulate the amount of oil flowing through said relief port according to the position of said throttle valve and thereby regulating the pressure at which the oil is delivered to the part to be lubricated.

9. The combination, with an internal combustion engine comprising a throttle valve and having an oil receptacle, and a pump to deliver oil from said oil receptacle to a part to be lubricated, of a regulating device interposed between said pump and said part to be lubricated and comprising an elongated chamber having ports connecting the same with said pump and with said part to be lubricated and also having a relief port, a plunger mounted in said chamber to regulate the flow of oil through said relief port, and means to adjust said plunger according to the position of said throttle valve.

10. The combination, with a rotary valve having an oil conduit communicating with the periphery thereof and a pump to deliver oil to said conduit, of a regulator interposed between said pump and said valve, said regulator having a relief port, said relief port being in open communication with said oil conduit, and means to positively open and close said relief port, whereby the amount of oil flowing through the same is controlled and the pressure at which oil is delivered to said rotary valve is varied.

11. In an engine having a crank case forming an oil receptacle, a rotary valve having lubricating means, a pump mounted in said oil receptacle and connected with said lubricating means of said valve, a regulator interposed between said pump and said lubricating means and comprising a casing having a longitudinal chamber connected at one end with said pump and having near its

other end a relief port commuicating with said crank case, said chamber being connected at a point between its ends with said lubricating means for said valve, a plunger slidably mounted in said longitudinal chamber to control the flow of oil through said relief port, and means whose position is variable for actuating said plunger.

12. A pressure regulator comprising a tubular casing having an inlet port and an outlet port and also having a relief port arranged beyond both the inlet port and the outlet port, and a plunger mounted in said casing and adapted to be moved across said relief port to open and close the same.

In testimony whereof, I affix my signature.

CARL R. GREEN.