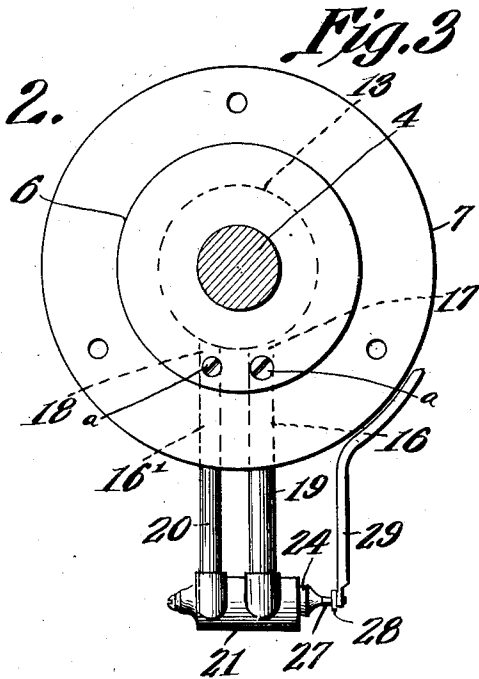
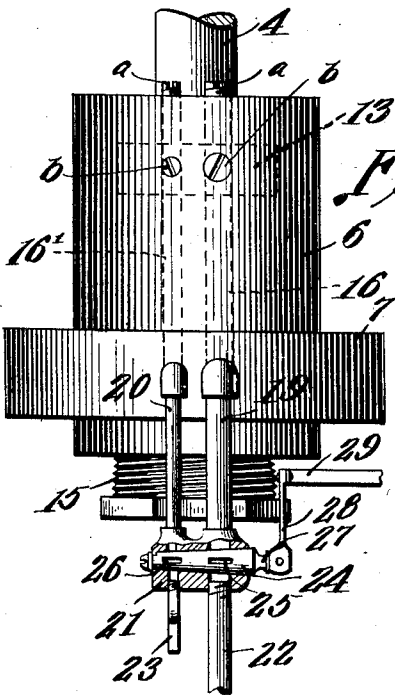
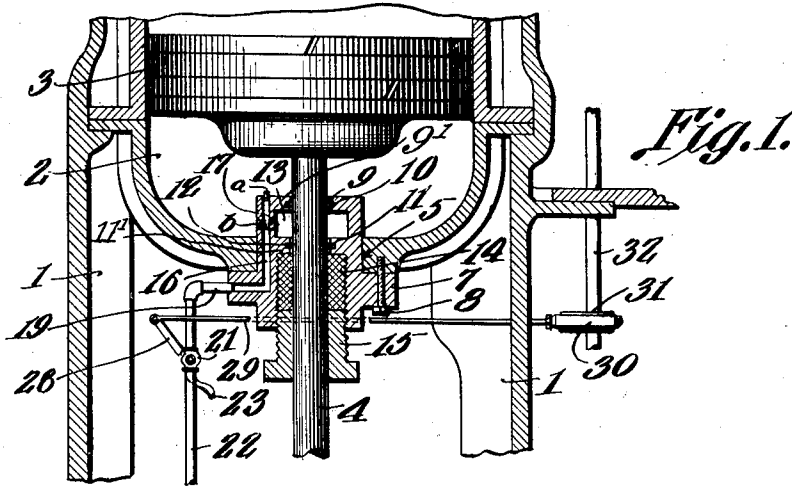


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LUBRICATING DEVICE FOR EXPLOSIVE ENGINE PISTON RODS.
APPLICATION FILED DEC. 14, 1911.

1,063,592.

Patented June 3, 1913.



Witnesses

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UNITED STATES PATENT OFFICE.

RALPH RAGAN, OF ATLANTA, GEORGIA.

LUBRICATING DEVICE FOR EXPLOSIVE-ENGINE PISTON-RODS.

1,063,592.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed December 14, 1911. Serial No. 665,726.

To all whom it may concern:

Be it known that I, RALPH RAGAN, a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented a new and useful Lubricating Device for Explosive-Engine Piston-Rods, of which the following is a specification.

The present invention relates to improvements in packing and lubricating devices for explosive engine piston rods, the primary object of the present invention being the provision of a novel form of packing and lubricating means adapted to surround a vertically reciprocatory piston rod, the same being provided with a circumferential chamber into which is led a main supply lubricant pipe, while leading therefrom is a reduced circulating pipe, so that upon the down-stroke of the piston, the lubricant which is supplied through a gravity or force feed lubricating system, enters the large pipe and into the circumferential chamber filling the same so that the piston rod which is exposed within the explosive chamber of the engine, is properly lubricated, the up-stroke of the piston automatically shutting off the supply of oil to the circumferential chamber and also to the reduced pipe, thus forming a non-compressible liquid packing in such chamber to retard the out flow and thus insure the chamber being absolutely full upon the explosive stroke of the piston.

A further object of the present invention is a novel form or means for regulating the flow of oil coincidentally or in consonance with the reciprocation of the piston and operation of the crank shaft, the same comprising a valve provided with two ports, one for each of the respective enlarged and reduced pipes which convey the oil to and from the lubricating and packing device, in combination with an eccentrically operated means directly connected to the crank shaft or other moving part of the engine and so timed as to open the valve upon the down-stroke of the piston and close the same upon the up-stroke.

The present form of lubricating device is adapted to be used in connection with the explosive engine shown in applicant's application filed June 24, 1911, Serial No. 640,267, wherein the piston head is operated to have an explosive charge actuate upon opposite sides thereof so that the piston rod is disposed through the lower end of the

cylinder, the disposition of the piston rod requiring a lubricating and packing device, and more essentially one constructed according to and embodying the present invention.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings Figure 1 is a fragmentary sectional view of the upper portion of the supporting frame and the lower portion of an explosive engine cylinder and its piston and rod, with the present lubricating and packing device in operable relation thereto. Fig. 2 is a side elevation of the lubricating and packing device *per se*, said view being taken as viewed from the left in Fig. 1. Fig. 3 is a top plan view of the lubricating and packing device *per se*.

Referring to the drawings, the two standards 1 comprise the main support or frame of the engine which as in the before mentioned application is supported from the base (not shown) and has operably mounted in the lower end thereof the usual crank shaft (not shown), the cylinder 2 being mounted in the upper portion of said framework and having mounted for reciprocation therein the piston head 3 whose rod 4 is extended downwardly and concentrically of the cylinder 2 and as in the before mentioned application is properly connected to the crank shaft.

The lower end of the cylinder 2 is provided with the enlarged concentric aperture or bore 5, in which is removably, yet snugly, fitted the lubricating and packing device consisting of the cylindrical body portion 6 and the annular rim 7, which by means of the bolts 8 is properly secured to the lower end of the cylinder 2 and assumes the position when in operable relation, as clearly shown in Fig. 1. As shown this body or casing 6 is provided with the aligned apertures 9 and 11 formed in the webs 9' and 11', respectively, and through which the piston 4 is permitted to pass and reciprocate. Carried by each of the respective projections adjacent to the apertures 9 and 11 are the two split metal contracting packing

rings 10 and 12 respectively, said rings normally bearing or impinging upon the piston rod 4 and thereby providing a tight joint so that the lubricant is permitted to flow in the circumferential lubricant holding and packing chamber or casing 13 and under a pressure, either from a gravity feed or a force feed lubricating means (not shown), thus permitting a portion of the piston rod within said chamber to be supplied with the lubricant and pass both, through the respective split rings 10 and 12 and the packing 14 mounted in the lower chamber of the casing 6 and the stuffing ring 15. By this means it will be seen that the piston rod 4 will be properly lubricated and liquid packed at all times and that the burning of the gases in the lower end of the cylinder 2 and about the piston rod 4 at such point, although to a certain extent burning the lubricant from the piston rod 4, will not detrimentally affect the rod or the lubrication thereof as the same passes through the lubricating casing 6.

Formed in the body or casing 6 of the device are the two lubricant supplying channels 16 and 16', the vertical portions of the same being bored from the inner end as clearly shown and stopped by the screw plugs *a*, while the lower horizontal portion is formed through the shouldered portion 7 of the cylindrical body, as is the usual practice. It will be noted that the capacity of the channel 16 is approximately twice that of the channel 16', and that bored from the outside and sealed by the screw plugs *b* are the two channels 17 and 18, respectively, which lead from the respective channels 16 and 16', into the lubricant holding chamber 13 of the casing or member 6. By producing the channels of varying capacities, the oil is properly fed through the enlarged channel 16 into the chamber 13 and circulates around the piston rod 4 and out of the reduced channel 16', the reducing of the channel forming a sort of retarding means and at the same time permitting the proper circulation of the lubricant and insuring at the explosive stroke a filled chamber 13 to produce a non-leaking liquid packing for the piston at this point.

Connected to the respective channels 16 and 16', are the supply pipes 19 and 20 respectively, which are connected directly to the valve casing 21 to which leads the main supply pipe 22 which is in line with the pipe 19 and the drip pipe 23 which is in line with the pipe 20, thus providing means whereby the lubricant is properly supplied to the chamber 13 and the drip therefrom is conveyed through the pipes 20 and 23 to the crank case of the engine and finally back to the proper means for resupplying or using the oil again for lubricating purposes.

In order to produce the desired circula-

tion of the lubricant to the chamber 13, that is to permit it to flow as above described upon the down-stroke of the piston 3, and to shut off the flow thereof upon the up-stroke to produce the desired liquid packing in the chamber 13 upon and during the explosive stroke of the piston 3, a valve 24 is mounted in the casing 21 and is provided, as shown in Fig. 2 with the ports 25 and 26 respectively, which are interposed between the respective pipes 19 and 22, and 20 and 23, thus when in the position as shown in Fig. 2, sealing the same against the entrance of the lubricating oil into the chamber 13 and simultaneously preventing any flowing of the oil through the pipe 20 from the said chamber 13.

In order to operate the valve in proper time so that the opening and closing thereof will be in time with the down-stroke and up-stroke of the piston 3, the stem 27 of the valve 24 carries an arm 28 to which is connected a rod 29, said rod 29 being provided with a bend adjacent to the lower end of the casing 6 and passing beyond the other side of the frame 1 where it carries an eccentric strap 30 mounted upon the eccentric 31 upon the shaft 32, which is operable from the crank shaft of the engine by any well known means and which it is not deemed as necessary to show in detail in the present application, the particular invention being entirely upon the casing 6 and the valve operating mechanism in its broader sense.

From the foregoing description taken in connection with the drawings, it is evident that with a lubricating and packing device constructed according to and embodying the present invention, the piston rod, 4 will be properly lubricated upon its movements through the chamber 13, said chamber 13 being supplied to its fullest capacity with lubricating oil by any well known means, such as a gravity feed, or force feed lubricating system, and that by means of the valve 24 and its operating mechanism, the oil will be momentarily held within the chamber 13 upon the explosive-stroke of the piston 3 and will be permitted to properly circulate upon the exhaust-stroke as heretofore described. By this means the chamber 13 is held properly filled with the lubricating and packing oil and as the rings 10 and 12 are split metallic contracting, and not expanding rings, and properly impinge the piston rod 4, the lubricant will not be unduly forced upwardly or downwardly out of the chamber 13 but will properly lubricate and pack a portion of the piston rod within the chamber 13 so that the entire stroke of the piston rod through the said chamber 13 will be properly packed, lubricated and cooled at all times reducing the friction at such point and allowing for any contraction and expansion of the piston rod

4 due to the high temperature of the explosive charge within the explosive end of the cylinder 2.

Although the construction herein described has been shown as applied to a separate shaft 32, such shaft 32 being the shaft shown in the aforementioned application for operating the rotary valves, it is evident that the valve 24 may be operably connected to the piston rod 4 or to the crank shaft (not shown), it simply being necessary to provide a timed means for opening and closing the valve, said valve being opened as before stated upon the exhaust stroke of the piston head 3 and closed upon the explosive stroke thereof.

What is claimed is:

1. The combination with an explosive engine having an explosive cylinder with a concentric bore in the explosion end thereof, a piston head reciprocatingly mounted in the cylinder, and a rod connected to said head and passing through the said bore, of a lubricating and packing device for said rod disposed in the bore of the cylinder about the rod, and having a circumferentially disposed lubricant holding chamber through which the rod passes, said casing being provided with two channels leading thereinto and into the chamber thereof for permitting the circulation of the lubricant within said chamber and about the rod, and means controlled through the reciprocation of the piston head for intermittently opening and closing the supply of lubricant to said chamber.

2. The combination with an explosive engine having a cylinder with a concentric bore in the explosion end thereof, a piston head reciprocatingly mounted in the cylinder, and a rod connected to the piston head and projecting through said bore, of a lubricating and packing device for the piston rod, comprising a casing fitted within the bore of the cylinder and surrounding the piston rod, said casing being provided with a chamber surrounding the piston rod and with a supply channel and outlet channel leading to and from said chamber, an adjustable solid packing means mounted in the lower end of said casing about the piston rod, conduits leading to and from the respective channels of the casing, a single valve control for controlling simultaneously the admission and escape of the lubricant from and for sealing the chamber, and means for actuating said valve.

3. The combination with an explosive engine having a cylinder with a concentric bore in the explosion end thereof, a piston head reciprocatingly mounted in the cylinder, and a rod connected to the piston head and projecting through said bore, of a lubricating and packing device for the piston rod, comprising a casing fitted within the

bore of the cylinder and surrounding the piston rod, said casing being provided with a chamber surrounding the piston rod, and with a supply channel and outlet channel leading to and from said chamber, an adjustable solid packing means mounted in the lower end of said casing about the piston rod, conduits leading to and from the respective channels of the casing, a single valve control for controlling simultaneously the admission and escape of the lubricant from and for sealing the chamber, and means operable through the reciprocation of the piston for closing the valve upon the explosive stroke of the piston and for opening the valve upon the exhaust-stroke thereof.

4. The combination with an explosive engine, of a lubricating and packing device for the reciprocating piston rod of the engine, having a casing surrounding the piston rod and through which the rod reciprocates, said casing being provided with an upper lubricant retaining and packing chamber and a lower solid packing retaining chamber, means for retaining the solid packing in the lower chamber, said casing being provided with two channels leading from the outside into the lubricant chamber, the supply channel being of greater area than the escape channel thereof, and a single valve for controlling the circulation of the lubricant to and from and for sealing the chamber, and through the respective channels.

5. The combination with an explosive engine, of a lubricating and packing device for the reciprocating piston rod of the engine, having a casing surrounding the piston rod and through which the rod reciprocates, said casing being provided with an upper lubricant retaining and packing chamber and a lower solid packing retaining chamber, means for retaining the solid packing in the lower chamber, said casing being provided with two channels leading from the outside into the lubricant chamber, the supply channel being of greater area than the escape channel thereof, two conduits leading to and from the respective channels of the casing, the larger conduit being a supply conduit and the smaller conduit being an outlet conduit, and a valve connected in both of said conduits for controlling the supply and escape of the lubricant and the consequent circulation and sealing thereof within the chamber of the casing.

6. The combination with an explosive engine, of a lubricating and packing device for the reciprocating piston rod of the engine, having a casing surrounding the piston rod and through which the rod reciprocates, said casing being provided with an upper lubricant retaining and packing chamber

and a lower solid packing retaining chamber, means for retaining the solid packing in the lower chamber, said casing being provided with two channels leading from the outside into the lubricant chamber, the supply channel being of greater area than the escape channel thereof, two conduits leading to and from the respective channels of the casing, the larger conduit being a supply conduit and the smaller conduit being an outlet conduit, a valve connected in both of said conduits for controlling the supply and escape of the lubricant and the consequent circulation and retardation thereof within the chamber of the casing, and means controllable through the reciprocation of the piston rod for closing the valve upon the explosive-stroke of the piston and opening the valve upon the exhaust-stroke of the piston.

7. The combination with an explosive engine, of a circulating lubricating and pack-

ing device for the piston rod of the engine comprising a casing disposed to surround the rod and through which the rod reciprocates, and having an upper lubricant retaining and packing chamber and a lower solid packing retaining chamber, two split metal contracting rings carried by the casing and surrounding the piston rod upon opposite sides of the lubricant chamber, means for adjusting the packing, said casing being provided with an inlet channel leading to the chamber and an outlet channel leading therefrom, and a single valve for controlling the flow of the lubricant to and from the lubricating chamber of the casing.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

RALPH RAGAN.

Witnesses:

SELINA WILLSON,
W. H. C. CLARKE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,"
Washington, D. C."