No. 786,167. PATENTED MAR. 28, 1905.

W. S. SHERMAN.

OIL PUMP.

APPLICATION FILED JAN. 15, 1903.

Fig. 1.

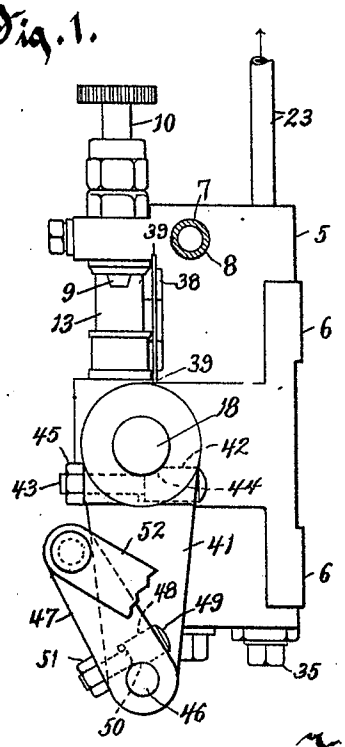


Fig. 2.

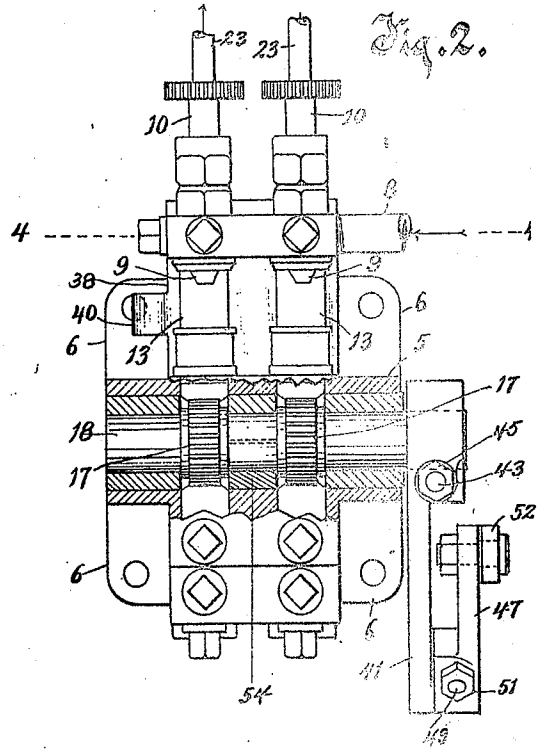


Fig. 3.

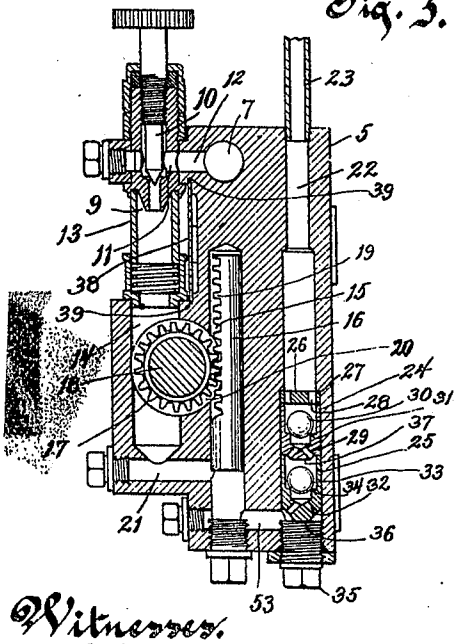
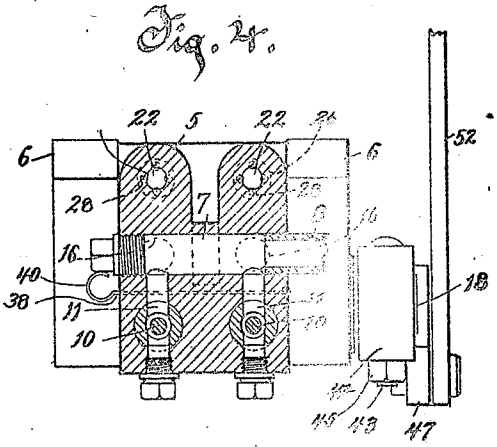


Fig. 4.



Witnesses.

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No. 786,167. Patented March 28, 1905.

UNITED STATES PATENT OFFICE.

WILLIS S. SHERMAN, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO SIGHT FEED OIL PUMP CO., A CORPORATION OF WISCONSIN.

OIL-PUMP.

SPECIFICATION forming part of Letters Patent No. 786,167, dated March 28, 1905.

Application filed January 15, 1903. Serial No. 139,216.

To all whom it may concern:

Be it known that I, WILLIS S. SHERMAN, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Oil-Pumps, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention has relation to improvements in oil-pumps for lubricating purposes.

The primary object of the invention is to provide a construction whereby the different parts of the device are so disposed that not only is the utmost compactness in arrangement secured, but, furthermore, a saving in metal, as well as in expense of manufacture and an advantage in lightness of weight are secured.

With the above primary object and other incidental objects in view the invention consists of the devices and parts or their equivalents, as hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a side elevation of the invention. Fig. 2 is a front view with parts broken away. Fig. 3 is a vertical section on a plane through one of the sight-feeds, and Fig. 4 is a horizontal section on the line 4 4 of Fig. 2.

Referring to the drawings, the numeral 5 indicates the frame of the pump, which may, if desired, be constructed from a single casting. The frame is provided at its rear with projecting flanges 6, adapted to receive therethrough bolts for securing the frame to a suitable supporting medium. The top portion of the frame is intersected by a passage 7, with one end of which an oil-inlet pipe 8 connects, said pipe leading from any suitable source of oil-supply. Fitting in openings therefor at the front and upper portion of the frame or casting are drip-nozzles 9 9. Each drip-nozzle is provided at its lower end with a discharge-orifice which is controlled by means of an adjustable needle-valve 10, the lower pointed end of which will enlarge or restrict the discharge-orifice of the nozzle in accordance with the particular movement given to the handle of the valve. The bore of each discharge-nozzle has a port 11 leading therefrom through the side of the nozzle and communicating with a branch passage 12, leading from the oil-inlet passage 7. The upper end of a transparent sight-tube 13 surrounds the discharge-orifice at the lower end of each nozzle, and the lower end of each sight-tube connects with the upper end of an oil-chamber 14. Back of the oil-chambers 14 the frame or casting is formed with upright plunger-chambers 15, in each of which is movably fitted a plunger 16. These plungers are reciprocated by means of teeth forming gear members 17 17, said teeth being disposed around a shaft 18, which shaft extends across the frame or casting and across the oil-chambers 14, the inner walls of said oil-chambers being recessed inwardly to accommodate a portion of the circumference of the shaft. The gear members 17 engage with rack-teeth 19, formed on the plungers 16, and this engagement is made possible by reason of openings 20 through the rear walls of the oil-chambers, which openings permit the teeth of the gear members to enter the plunger-chambers sufficiently far to engage the rack-teeth of the plungers. The lower end of each oil-chamber 14 communicates with each plunger-chamber a short distance above its lower end by a passage 21.

In the rear portion of the frame or casting are vertical outlet-passages 22 22. To these passages are connected outlet-pipes 23 23, which lead to the machinery to be lubricated. In the lower end of each outlet-passage 22 are fitted valve-casings, the upper valve-casing being indicated by the numeral 24 and the lower valve-casing by the numeral 25. The upper valve-casing of each pair is provided with a separate top piece 26, which fits against a shoulder 27, formed in the wall of the passage 22 relating thereto. This top piece is provided with openings 28 for the passage of the oil out of the upper valve-casing. The lower end of each upper valve-casing is provided with diagonal ports 29, which converge toward their upper ends. Within the chamber of the upper valve-casing is a ball-valve 30, which normally rests on a valve-seat 31. The lower end of the lower valve-casing tapers to the lower extremity thereof, and this tapered portion is provided with diagonal ports 32,

which converge toward their upper ends. The upper end of this lower valve-casing is open and bears against the lower end of the upper valve-casing. Within the interior chamber of the lower valve-casing is a ball-valve 33, which normally rests on a valve-seat 34.

The form of double valve-casing above described is quite desirable not only from the consideration of convenience in inserting the valve-casings in place, but also for other reasons. With reference to inserting these casings in place the ball-valve of the upper valve-casing is first placed in said casing, and the top piece 26 is then adjusted to the upper end of the casing. The said casing is then inserted upwardly in its particular passage 22 from the lower end of said passage until the top piece 26 contacts with the shoulder 27. The ball-valve 33 is then placed in the lower valve casing or section, and this casing or section is then inserted into the said passage 22 from the lower end thereof and to the limit permitted by contact of the upper open end of the lower valve-casing with the lower end of the upper valve-casing. The two sections of valve-casing are then secured in place by means of a screw-plug 35, which turns on interior threads formed at the lower end of the wall of the passage 22, the said plug being turned inwardly sufficiently far to cause its upper end to contact with and bear firmly against the lower flat end 36 of the lower valve-casing. From the construction described it will be seen that not only are the two valve casings or sections readily inserted in place, but are also capable of being quickly removed whenever this is desirable merely by turning the screw-plug 35. The particular construction of the lower ends of the valve casings or sections equipped with the diagonal ports also possesses advantages. The diagonal ports of the lower valve-casing permit the oil to flow freely into the interior of said casing. If straight vertical ports were employed, the upper end of the screw-plug 35 would close said ports against the entrance of the oil therein. By making the ports diagonal, however, and providing the flat lower extremity 36 the screw-plug can be turned up against said flat extremity without closing the ports referred to. The diagonal ports in the lower end of the upper valve-casing also permit a free flow of the oil from the lower valve-casing into said upper valve-casing even though the lower ball-valve 33 be raised against the lower end of the lower valve-casing, inasmuch as when said ball-valve is so raised it will contact with the solid surface 37, which is intermediate of the lower ends of the diagonal ports 29, and hence will not close the lower ends of said ports. The diagonal ports also effect another advantage in that they provide for an equal capacity of flow of oil through each valve-casing without increasing the size of the upper valve, the valve-casings, and screw-plug, whereby a saving in cost is effected. It will be understood, of course, that the lower valve-casings have a capacity equal to the amount of oil that may be fed from the feed-nozzle and that therefore it is unnecessary with the particular construction described to increase the size of the upper valve-casings and screws.

In oil-pumps in which the sight-tubes are composed of some transparent material, such as glass, and which are used for the purpose of enabling the operator to determine whether or not the drip-nozzles are dripping the oil properly at all times some objection has existed by reason of the fact that the tranparent medium becomes clouded by oil or through other causes, and hence the operator has difficulty in seeing whether or not the nozzles are properly acting to drip the oil. It has been found that a plate of some reflecting medium—such as highly polished, burnished, or white enameled plate—arranged back of the transparent sight-tubes will render it possible for the operator to quickly see through said tubes even though they become clouded. I therefore show in connection with the device a sheet of reflecting material, preferably highly polished or burnished or white enameled plate, arranged back of the sight-tubes and indicated in the accompanying drawings by the numeral 38. It is desirable that this plate of reflecting material may be movably disposed back of the sight-tubes, and to secure this I arrange the upper and lower edges of said reflecting medium in grooveways 39 39, and for the purpose of conveniently sliding the reflecting medium in or out I provide said medium with a projecting handle 40.

For the purpose of rocking the shaft 18 so as to cause an up-and-down reciprocating movement to be imparted to the plungers I project one end of said shaft outwardly and connect thereto an arm or crank 41. This arm or crank may be connected up in any desirable manner to some movable mechanism, so that the desired movement may be given to shaft 18. I prefer that the connection shall be such that the extent of the rocking movement of the shaft 18 may be readily regulated. For this purpose I provide the crank or arm 41 with a transverse opening 42. This opening is adapted to receive a pin 43, said pin provided with an enlargement, a portion of the edge of said enlargement being curved, as indicated by the numeral 44. The said curved edge fits against the shaft 18. The outer end of the pin 43 is threaded, and this threaded extremity receives a nut 45. By loosening the nut the crank or arm 41 can be adjusted at any angle with relation to a given point on the shaft which may determine the extreme travel of one or the other end of the plunger. The nut is then tightened so as to draw the curved edge portion 44 of the pin tightly against the shaft 18, and thereby firmly lock the arm or crank in its adjusted position.

The lower end of the arm or crank has projecting therefrom and fast thereto a circular lug 46, and mounted on this lug is an arm 47. This arm is intersected by an opening 48, in which is fitted a pin 49, said pin being provided with an enlargement, and a portion of the edge of the enlargement is curved, as indicated by the numeral 50. The outer end of pin 49 is threaded, and the threads receive a nut 51. The outer end of arm 47 has connected thereto a link 52, and this link leads to and is connected with any desirable movable mechanism which will effect, through the described connection, a rocking motion of the shaft 18. It is evident that the position of the arm 47 may be changed in a similar manner to the position of the arm 41 merely by loosening the nut 51 and then adjusting arm 47 to the desired extent and then tightening the nut inwardly, so as to draw the curved edge 50 tightly against the lug 46 in order to hold arm 47 tightly in its adjusted position. In providing for the adjustment of the rocking movement of the shaft 18—if, for instance, it is desired to provide for the maximum rocking movement of said shaft—the arm 47 is adjusted to such a position that it will be adjacent to and parallel with the crank or arm 41, this being accomplished, of course, by loosening the nut 51 and swinging the arm 47 to the position referred to and then tightening the nut 51. This adjustment will necessarily permit the shaft 18 to rock to the maximum extent. If now it is desired to diminish the rocking movement of the shaft 18, the nut is loosened. The arm 47 is then swung to the desired extent out of alinement with the arm 41 in order to obtain the required motion. The nut 45 is next loosened and the crank 41 turned to such a position as to secure the proper travel of the plunger. The two nuts are then tightened, so as to hold the respective arms fixedly at the positions to which they have been adjusted. This adjustment of the parts will cause a decrease in the extent of the rocking movement of the shaft 18, inasmuch as the said rocking movement is diminished as the distance of that end of the arm 47 to which the link 52 is connected increases from the center of the shaft 18.

From the lower end of each plunger-chamber a passage 53 extends and communicates with the lower end of each outlet-passage 22, whereby the oil forced out of each plunger-chamber is free to pass therefrom through the diagonal lower ports 32 and into the lower valve-casing of each pair of valve-casings.

In the operation of the invention the oil for lubricating purposes is fed by any desirable means through the inlet-pipe 8 and passes from said pipe into the passage 7. From the latter passage it flows through the branch passages 12, through the registering ports 11, and into the drip-nozzles 9. The oil so fed discharges from the drip-nozzles and flows through the sight-tubes, entering the oil-chambers 14, and from said chambers passes through the passages 21 into the lower ends of the plunger-chambers 15. The rocking movement imparted to the shaft 18 causes a vertical reciprocation of the plungers 16. On the downward movement of said plungers the passages 21 are closed by the same, and the oil which is in the lower ends of the plunger-chambers is forced through the passages 53, through the diagonal ports 32, thence past the lower ball-valves 33, thence through the diagonal ports 29, past the ball-valves 30, thence through the openings 28 in the top piece of the upper valve-casing, thence through the passages 22, and finally through the pipes 23 to the machinery to be lubricated.

While I have herein shown and described the two plunger-chambers, sight-tubes, oil-chambers, passages, &c., in conjunction therewith, yet I do not wish to be understood as restricting myself thereto, inasmuch as only one plunger-chamber, a plunger therein, and allied mechanism may be employed or more than a duplicate set of such mechanisms may be provided without departing from the spirit and scope of my invention.

From the fact that the shaft 18 passes through the oil-chambers 14 it will be evident that the gear members 17 are freely lubricated by the oil which is dripped into said chambers from the drip-nozzle. The said oil is also free to pass through the openings 20 into the plunger-chambers, so as to lubricate the upper ends of the plungers and the gear-teeth of said plungers.

Instead of providing a continuous gear member for operating the plungers I prefer to provide two separate gear members, as shown in the drawings. If a continuous gear member were employed, the oil would flow along the teeth thereof and drip into the oil-chamber 14 other than the particular chamber into which it should drip. It will be understood that the two gear members shown in the drawings are formed by cutting away the shaft between the two gear members. This cutting away of the shaft necessarily weakens said shaft, and particularly so where a number of feeds are employed, and consequently a long shaft is required. In order to compensate for this weakening, I mount on the shaft between the gear members a two-part bushing 54, which serves to prevent vibration or springing of the shaft.

What I claim as my invention is—

1. In an oil-pump, the combination of a frame provided with an oil-chamber and with a plunger-chamber having communication at a point removed from its outer end with the oil-chamber, and said frame also provided with a valve-controlled outlet-passage leading from the plunger-chamber, means for feeding oil into the oil-chamber, means for conducting the oil from the outlet-passage to the machinery

to be lubricated, a plunger in the plunger-chamber and provided with teeth forming a rack, a shaft extending across the frame and through the oil-chamber and provided with short gear-teeth therearound, said gear-teeth projecting through an opening in the wall between the oil-chamber and the plunger-chamber and engaging the rack-teeth of the plunger and the remainder of said teeth being located in the oil-chamber, the metal of the shaft on one side of said gear-teeth being cut away, and means for rocking the shaft.

2. In an oil-pump, the combination of a frame provided with an oil-chamber and with a plunger-chamber having communication at a point removed from its outer end with the oil-chamber, and said frame also provided with a valve-controlled outlet-passage leading from the plunger-chamber, means for feeding oil into the oil-chamber, means for conducting the oil from the outlet-passage to the machinery to be lubricated, a plunger in the plunger-chamber and provided with teeth forming a rack, a shaft extending across the frame and through the oil-chamber, and provided with short gear-teeth therearound forming a gear member which projects through an opening in the wall between the oil-chamber and the plunger-chamber, said gear member engaging the rack-teeth of the plunger, the remainder of said gear member being within the oil-chamber, and the metal of the shaft to one side of the gear member being cut away, a bushing mounted on the cut-away portion of the shaft, and means for rocking the shaft.

3. In an oil-pump, the combination of a frame provided with oil-chambers, and with plunger-chambers having communication at points removed from their outer ends with the oil-chambers, and said frame also provided with valve-controlled outlet-passages leading from the plunger-chambers, means for conducting the oil from the outlet-passages to the machinery to be lubricated, plungers in the plunger-chambers and provided with teeth forming racks, a shaft extending across the frame and through the oil-chambers and provided with separated gear members located in the oil-chambers and projecting through openings in the wall between the oil-chambers and the plunger-chambers, and engaging the rack-teeth of the plungers, the metal of the shaft between the gear members being cut away, the said cut-way portion being located between the oil-chambers, and means for rocking the shaft.

4. In an oil-pump, the combination of a frame provided with oil-chambers, and with plunger-chambers having communication at points removed from their outer ends with the oil-chambers, and said frame also provided with valve-controlled outlet-passages leading from the plunger-chambers, means for feeding oil into the oil-chambers, means for conducting the oil from the outlet-passages to the machinery to be lubricated, plungers in the plunger-chambers provided with teeth forming racks, a shaft extending across the frame and through the oil-chambers and provided with separated gear-teeth forming separate gear members located in the respective oil-chambers and projecting through openings in the wall between the oil-chambers and the plunger-chambers and engaging the rack-teeth of the plungers, the metal of the shaft between the gear members being cut away, the said cut-away portion being located between the oil-chambers, a bushing mounted on the cut-away portion of the shaft between the gear members and in the space between the oil-chambers, and means for rocking the shaft.

5. In an oil-pump, the combination of a frame provided with an oil-chamber, a plunger-chamber, and a valve-controlled outlet-passage, said oil-chamber, plunger-chamber, and outlet-passage being in communication, means for conducting the lubricating-oil from the oil-passage to the machinery to be lubricated, a plunger in the plunger-chamber and provided with teeth forming a rack, a transverse shaft provided with teeth forming a gear member meshing with the rack of the plunger, a crank connected to the shaft, means for adjusting the angle of the crank with respect to the shaft, an arm connected at one end to the crank, means for changing the angle of said arm with respect to the crank, and a connection extending from the other end of said arm and adapted to rock the arm and the crank.

6. In an oil-pump, the combination of a frame provided with an oil-chamber, a plunger-chamber, and a valve-controlled outlet-passage, said oil-chamber, plunger-chamber, and outlet-passage being in communication, means for conducting the lubricating-oil from the latter passage to the machinery to be lubricated, a plunger in the plunger-chamber, provided with teeth forming a rack, a transverse shaft provided with teeth forming a gear member meshing with the rack of the plunger, a crank fitted on the end of the shaft, a pin passing through an opening in the crank, said pin provided with a curved shoulder bearing against the shaft, a nut on a threaded end of said pin adapted to draw said shoulder against the shaft, an arm fitted to a lug projecting from the crank, a pin passing through the arm and provided with a curved shoulder bearing against the lug, a nut turning on said pin and adapted to draw the shoulder of the same against said lug, and a connection extending from the arm and adapted to rock the same, together with the crank.

7. In an oil-pump, the combination of a frame provided with an oil-outlet passage, and an oil-inlet passage, a drip-nozzle carried by the frame and in communication with the oil-inlet passage, a transparent sight-tube extending from the discharge end of the drip-nozzle,

forcing mechanism adapted to receive the oil dripped from the sight-tube, said forcing mechanism being constructed to force the oil from the outlet-passage to the machinery to be lubricated, and a reflecting medium movably fitted in grooveways back of the sight-tube, and a handle for moving said reflecting medium in and out in its guideways.

8. In an oil-pump, the combination of a frame provided with plunger-chambers, and with means for feeding oil to and conducting the same from said chambers, the plungers within the plunger-chambers provided with gear-teeth forming racks, a shaft mounted in bearings in the frame, said shaft having separated gear-teeth therearound forming separate gear members meshing with the racks, the metal of the shaft between the gear members being cut away, and a bushing mounted on the cut-away portion of the shaft between the gear members.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIS S. SHERMAN.

Witnesses:
C. T. BENEDICT,
ALMA KLUG.