May 25, 1926.

1,586,307

R. HILDEBRAND

PUMP

Filed August 16, 1924

FIG. I

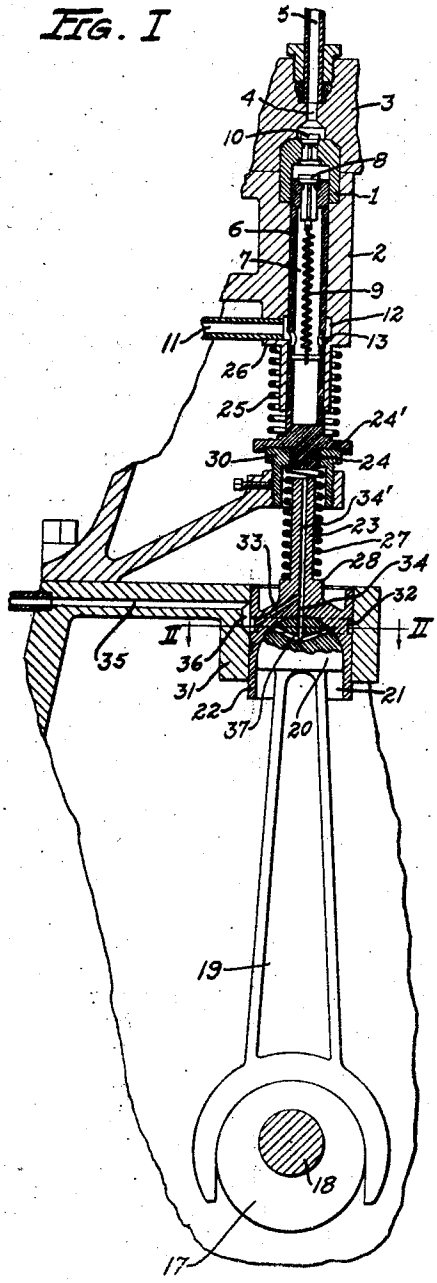
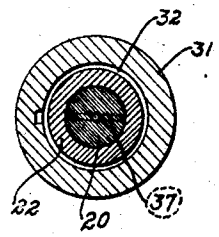


FIG. II



INVENTOR
R. HILDEBRAND

BY Cook & McCauley

ATTORNEYS

Patented May 25, 1926. 1,586,307

UNITED STATES PATENT OFFICE.

REINHARD HILDEBRAND, OF WEBSTER GROVES, MISSOURI, ASSIGNOR TO FULTON IRON WORKS COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF DELAWARE.

PUMP.

Application filed August 16, 1924. Serial No. 732,491.

This invention relates to improvements in pumps, and the novel features may be used in a pump adapted to deliver fuel to an internal combustion engine. To illustrate the invention, I have shown a fuel-feeding pump adapted to supply liquid fuel to an engine of the Diesel type, but it is to be understood that the invention may be used for various other purposes.

One of the objects of the invention is to produce a strong, simple, inexpensive and durable pump-operating means. Another object is to effectively lubricate the operating means. A further object is to prevent undue noise in the operating means and especially at certain points where the operating elements contact with each other.

With the foregoing and other objects in view, the invention comprises the novel construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the accompanying drawings, wherein is shown the preferred embodiment of the invention. However, it is to be understood that the invention comprehends changes, variations and modifications which come within the scope of the claims hereunto appended.

The preferred form of the invention comprises a socket joint through which motion is transmitted in one direction from an oscillatory thrust member to a slidable member, and a spring whereby the slidable member is returned, the spring being adapted to maintain the contacting faces of the joint in firm engagement with each other. The slidable member herein shown is provided with a striking face adapted to strike an abutment through which motion is transmitted to the pump plunger, and an additional spring is shown to return said plunger. As an illustration of a suitable lubricating system I have shown a groove formed in the periphery of said slidable member and passageways leading from said groove to said striking face and also to the contacting faces of the socket joint. The slidable member is mounted in a guide provided with an oil passageway leading to said groove. The socket joint is lubricated to avoid undue friction and the striking face is supplied with oil to provide a cushion which reduces the noise at this point.

Fig. I is a vertical section illustrating a portion of an engine provided with a pump embodying the features of this invention.

Fig. II is a horizontal section on the line II—II in Fig. I.

The pump herein shown comprises a cylindrical pump chamber 1 confined between a guide 2 and a cover 3, the latter having a discharge port 4 leading to a discharge pipe 5.

The pump plunger 6 is in the form of a tube provided with a longitudinal passage 7 for the admission of liquid fuel to the pump chamber 1 and having an inlet valve 8 at its upper end to prevent return flow of the liquid. 9 designates a spring tending to retain the inlet valve on its seat. A discharge valve 10 is located in the discharge passage 4 to prevent return of the liquid to the pump chamber. The liquid to be pumped is supplied through a pipe 11 leading to an annular recess 12 formed around the tubular plunger 6, the latter having ports 13 communicating with said recess to admit the liquid to the inlet passage 7 in the plunger.

To illustrate a suitable means for reciprocating the pump plunger, I have shown an eccentric 17 on a rotary shaft 18, an oscillatory thrust rod 19 with a forked lower end straddling and contacting with the periphery of said eccentric and having a curved upper end 20 seated in a socket 21 formed in a crosshead 22, the latter having a striking finger 23 adapted to engage an abutment member 24 extending from a collar 24′ at the lower end of the plunger 5. A spring 25 is interposed between the abutment collar 24′ and a shoulder 26 to serve as means for restoring the plunger. To restore the crosshead, a spring 27 is interposed between a shoulder 28 on the crosshead and a threaded tube 30 which serves as a stop to limit the downward motion of the plunger. The threaded tube 30 is adjustable vertically to vary the stroke of the plunger, thereby varying the quantity of liquid to be discharged from the pump.

The socket 21 in the crosshead 22 has an arcuate face contacting with and conforming to the curved face at the upper end of thrust rod 19, and the restoring spring 27 retains these faces in contact with each other. This spring also retains the forked lower end of the rod 19 in contact with the

eccentric 17, so it is not necessary to attach said rod 19 to the crosshead nor to the eccentric.

At the beginning of each upward stroke of the eccentric, the crosshead 22 slides upwardly in a guide 31 and the striking finger 23 moves toward the abutment 24. During the middle portion of this stroke, the top face of finger 23 strikes said abutment to actuate the pump plunger and force the liquid through the discharge port 4. Thereafter, the crosshead 22 and thrust rod 19 are restored by the spring 27, while the spring 25 moves the plunger downwardly until the collar 24′ engages the adjustable tube 30.

During each upward stroke of the plunger, the inlet valve 8 is closed and liquid is drawn from the pipe 11 to the interior of the plunger, and during each downward stroke the discharge valve 10 is closed while the inlet valve 8 is open to admit the liquid to the pump chamber 1.

Lubricating oil is supplied to the periphery of the crosshead 22 and also to the arcuate faces of the socket joint, as well as to the top face of the striking finger 23 where it serves as a cushion or silencer. The crosshead is provided with a peripheral groove 32 and an internal passageway 33 having a branch 34 extending downwardly to the arcuate faces of the socket joint, and a branch 34′ extending upwardly to the top face of the striking finger 23. The oil is supplied through a passageway 35 formed in the guide 31 and having an enlarged discharge end 36 at the groove 32 in the periphery of the crosshead. Oil is thus supplied to the outer face of the slidable crosshead which contacts with the guide, and at the same time a stream of the oil passes through the passageway 33 to lubricate the socket joint and the striking face at the top of finger 23. The upper end of the thrust member 19 is provided with three passageways as shown at 37 in Figs. I and II diverging from each other and leading to the contacting faces of the socket joint, so as to distribute the oil, said passageways being adapted to communicate with the passageway 34, as shown in Fig. I.

I claim:

1. A pump provided with operating means including a slidable member, a guide in which said slidable member is mounted, an oscillatory thrust member, said slidable member being provided with a socket having an arcuate face, one end of said thrust member being provided with a convex face contacting with and conforming to said arcuate face, said slidable member having a groove in its peripheral face and an internal passageway leading from said groove to said contacting faces, said thrust member having diverging pasageways leading to said contacting faces and adapted to communicate with said internal passageway, and said guide being provided with a lubricant passageway leading to said groove.

2. A pump provided with operating means including a driven member, a driving member adapted to strike said driven member to transmit motion thereto, said driving member being movable toward and away from said driven member, and means whereby lubricant is supplied to the striking face of said driving member.

3. A pump provided with a plunger having an abutment, a slidable member having a striking face adapted to strike said abutment to actuate said plunger, and a guide in which said slidable member is mounted, said slidable member having a passageway leading from said guide to said striking face, and said guide being provided with a lubricant passageway leading to the first mentioned passageway.

4. A pump provided with a plunger having an abutment, a spring adapted to move said plunger in one direction, a crosshead adapted to move said plunger in the opposite direction, a guide in which said crosshead is slidably mounted, said crosshead having an extended striking member movable toward and away from said abutment and provided with a striking face adapted to strike said abutment to acuate the plunger, said crosshead having an internal passageway leading from said guide to said striking face, and said guide being provided with a lubricant passageway leading to said internal passageway.

5. A pump provided with a plunger having an abutment, a slidable member having a striking face adapted to strike said abutment to actuate said plunger, a guide in which said slidable member is mounted, and an oscillatory thrust member adapted to actuate said slidable member, said thrust member and slidable member having concentric faces contacting with each other, said slidable member being provided with a peripheral groove and internal passageways leading from said groove to concentric faces and also to said striking face, and said guide being provided with a lubricant passageway leading to said groove.

In testimony that I claim the foregoing I hereunto affix my signature.

REINHARD HILDEBRAND.