Sept. 4, 1928. 1,683,010

J. M. ANDERSON

ROTARY LIQUID PUMP

Filed Aug. 17, 1927

Fig. 1.

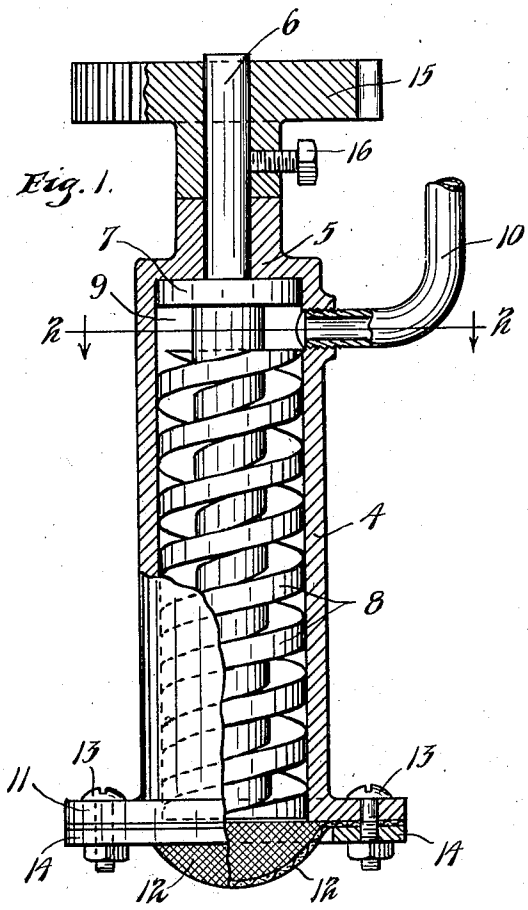


Fig. 3.

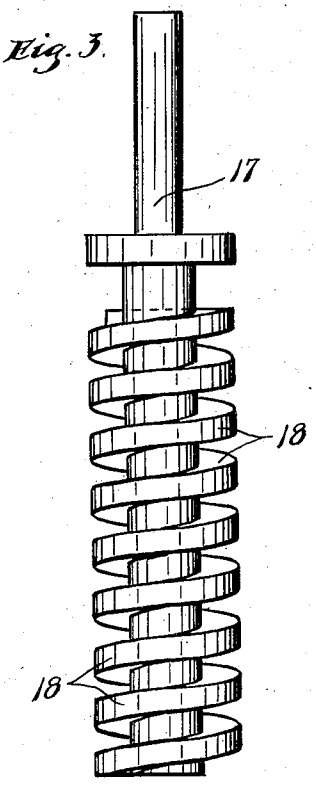
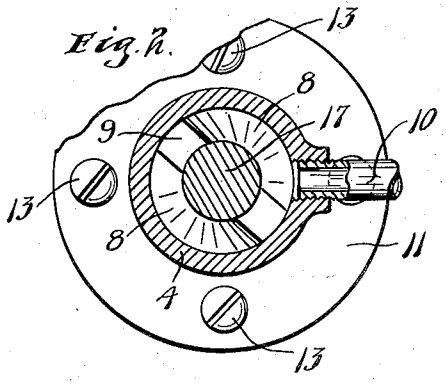


Fig. 2.



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ROTARY LIQUID PUMP.

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This invention relates to rotary liquid pumps and particularly to such pumps as can be used in connection with internal combustion engines for pumping the oil or water therein. The invention relates more particularly to certain improvements on that class of pumps disclosed in the U. S. patent of Alexander T. Brown, No. 1,359,472, dated November 16, 1920. In the Brown pump a casing for a rotatable screw is provided, having a chamber adjacent the top thereof of greater diameter than the diameter of the screw and the shaft carrying the screw has a portion extending through the said chamber of approximately the same diameter as the diameter of the screw. With such a structure the liquid forced into the said chamber must be turned from its natural direction of flowage, sidewardly into the chamber, thereby creating a considerable back pressure and lessening the efficiency of the pump.

It is the main object of this invention to provide a rotary liquid pump including a hollow casing, a screw working within the opening in the casing, having comparatively wide edges closely abutting the side walls of the opening, a chamber at the top of the casing of equal diameter with the diameter of the screw and into which the liquid discharged from the upper end of the screw is adapted to be led so that no back pressure will be created to interfere with the efficient action of the screw.

A further object of the invention is to provide in such a structure a double action screw whereby liquid can be discharged from the pump in great volume at high constant pressure.

These and other objects and advantages of the present invention will more fully appear from the following description made in connection with the accompanying drawings, wherein like reference characters refer to the same or similar parts throughout the various views, and in which:—

Fig. 1 is a view in side elevation of the device, with certain of the parts broken away and shown in section;

Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1, as indicated by the arrows; and

Fig. 3 is a view in side elevation showing a modified type of screw.

Referring to the drawings, a cylindrical casing 4 is provided, having a closed top 5 with a central upwardly extending projection thereon. The casing 4 has a longitudinal bore extending centrally therein, the said bore being of the same diameter throughout, and the casing is open at its lower end to said bore. A shaft 6 extends downwardly through the top 5 of the casing wherein it is journaled, and through the bore in the casing. Immediately below the top 5 the shaft 6 is provided with a flange 7 which closely abuts the top to seal the bearing therein. Below the flange 7 the shaft 6 is of greater diameter than half the diameter of the bore of the casing, and is provided with two sets of screw threads 8 which extend from the lower end of the casing to adjacent the upper end of the bore, but which terminate short of the upper end of the bore to form a chamber 9 between the flange 7 and the upper ends of the screw threads. The screw threads 8 are quite wide at their edges and the diameter of the screw threads are such that the wide edges closely abut the side walls of the bore in the casing. A discharge conduit 10 is threaded in a bossed opening at the upper portion of the casing so that the conduit will communicate directly with the chamber 9. An outwardly extending flange 11 is provided at the lower end of the casing 4 and a strainer 12 fitting over the lower open end of the casing is secured to the flange 11 by means of bolts 13 passing through the flange and through a ring 14 placed beneath the strainer 12. The strainer 12 preferably has a bellied portion extending downwardly below the opening at the lower end of the casing 4. The shaft 6 extends upwardly from the top 5 of the casing some little distance and a gear 15 or other operating means may be secured to the upper end of the shaft as by means of the set screw 16. Preferably the shaft 6, flange 7 and screw threads 8 will be turned from a single piece of material.

In Fig. 3 of the drawings, a screw member 17 is illustrated, which may be substituted for the screw member formed by the shaft 6, flange 7 and screw threads 8 in Fig. 1. The screw member 17 is similar to the said member illustrated in Fig. 1, with the exception that instead of having double screw threads thereon, the member 17 is provided with the single screw threads 18.

In operation the pump will be so situated that the lower end of the casing 4 will be submerged in the liquid to be pumped. As the gear 15 is operated through any source of

power, the shaft 6 will be turned, thereby causing the screws 8 to rapidly rotate to carry up the liquid from the lower end of the casing to the chamber 9 from whence the liquid will be discharged through the pipe 10. Inasmuch as the screw threads 8 terminate short of the upper end of the bore of the casing, liquid will be continuously supplied to the chamber 9, thereby causing a steady and continuous discharge of liquid through the conduit 10. Inasmuch as the screws 8 have comparatively wide edges which tightly abut the side walls of the bore, the pump will be very efficient in its action and will force up the liquid into the chamber 9 at considerable pressure, there being no back leakage of liquid between the sides of the screw threads and the side walls of the casing. The liquid will be forced directly into the chamber 9 without changing the direction of flow of the same, so that practically no back pressure will be caused by whatever liquid there may be in chamber 9. The portion of shaft 6 extending through the bore in the casing 4 being of at least half the diameter of the diameter of the bore, will act to cause the liquid to follow the circuitous path formed by the screw threads 8 to prevent the liquid from being forced upwardly in the casing 4 at too steep an angle. The flange 7 will prevent any leakage of liquid through the upper end of the casing, and as the flange forms the top walls of chamber 9 and rotates with the shaft 6, it will assist in causing a continuous circulation of liquid from the chamber 9 to conduit 10.

By provision of the double screw threads 8, a pump is provided which will be quicker in action and will discharge more liquid at a higher pressure than is the case where a single thread screw 18 is used. Also, by provision of the double thread screw liquid will be discharged in the chamber 9 at diametrically opposite points therein, so that the direction of the circulation of liquid in chamber 9 to conduit 10 will always remain the same and the discharge of liquid into the chamber 9 will be balanced at diametrically opposite points therein, so that a more constant pressure will be obtained in the discharging liquid. When the single screw 18 is substituted for the double screws 8, the action of the two devices will be the same except for the differences above noted. It will be understood that the pitch of the screws and the spacing between convolutions thereof can be varied as desired. The particular type of strainer construction at the bottom of the casing 4 may be varied as desired. It will also be understood that other changes may be made in the form, details, arrangements and proportions of the various parts without departing from the scope of the present invention, which, generally stated, consists in the matter shown and described and set forth in the appended claims.

What is claimed is:—

1. A rotary liquid pump comprising a cylindrical casing having a closed upper end and an open lower end adapted to be submerged in liquid, a screw journaled in said upper end and extending through said casing, said screw having screw threads closely engaging the walls of said casing, said screw threads extending from the lower end of said casing to adjacent the top thereof but terminating some distance from the top to form a small chamber at the upper end of said casing, said casing having a discharge outlet extending laterally from said chamber, means for rotating said screw and a flange carried by said screw, rotating therewith, abutting the upper end of said casing and being of substantially the same diameter as the interior diameter of said casing, said flange sealing the bearing for said screw, having a close running fit with the top and internal wall of said casing and forming a rotatable top wall for said chamber in one continuous plane whereby friction of the liquid against the top of said casing is prevented.

2. A rotary liquid pump comprising a cylindrical casing having a closed upper end and an open lower end adapted to be submerged in liquid, a rotatable shaft journaled in the closed end of said casing and extending through the hollow portion thereof, a double thread screw carried by said shaft and engaging the inner wall of said casing, said screw extending from the lower end of said casing to adjacent the upper portion thereof and having wide screw threads terminating in a horizontal plane adjacent the top of said casing, forming a chamber adjacent the top of said casing, a conduit extending laterally from said chamber and casing, and means carried by said shaft rotating therewith, having a lower flat annular surface, having a close running fit with said casing and forming the top of said chamber, whereby said chamber and conduit are disposed between rotating portions of said screw, and friction of the liquid against a stationary end of said casing is prevented.

In testimony whereof I affix my signature.

JOSEPH M. ANDERSON.