April 3, 1928. 1,664,745

F. O. HOAGLAND

FLUID PUMP

Filed July 27, 1926 3 Sheets-Sheet 1

Fig. 1.

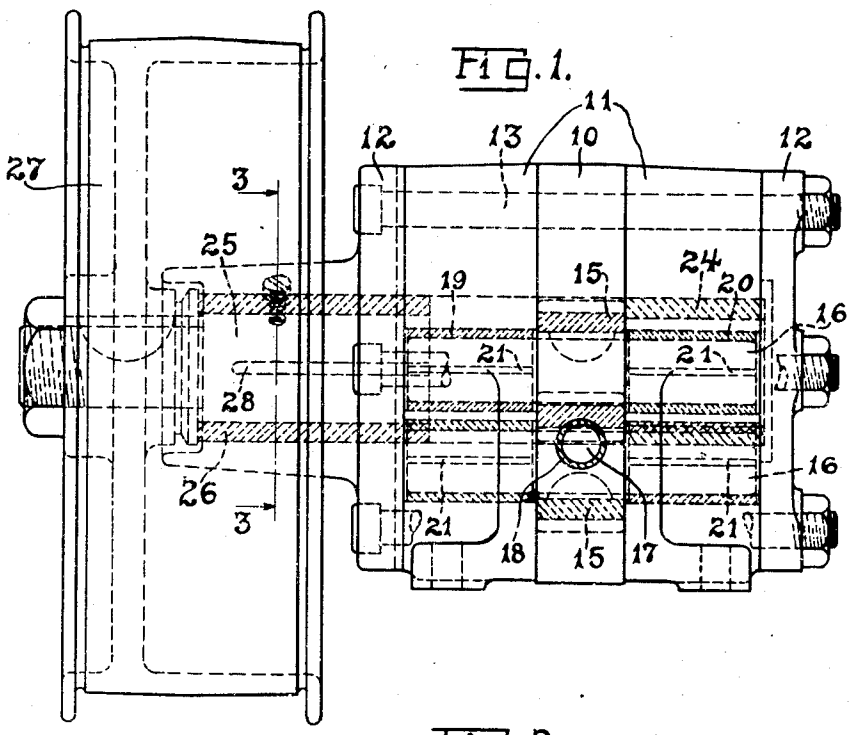
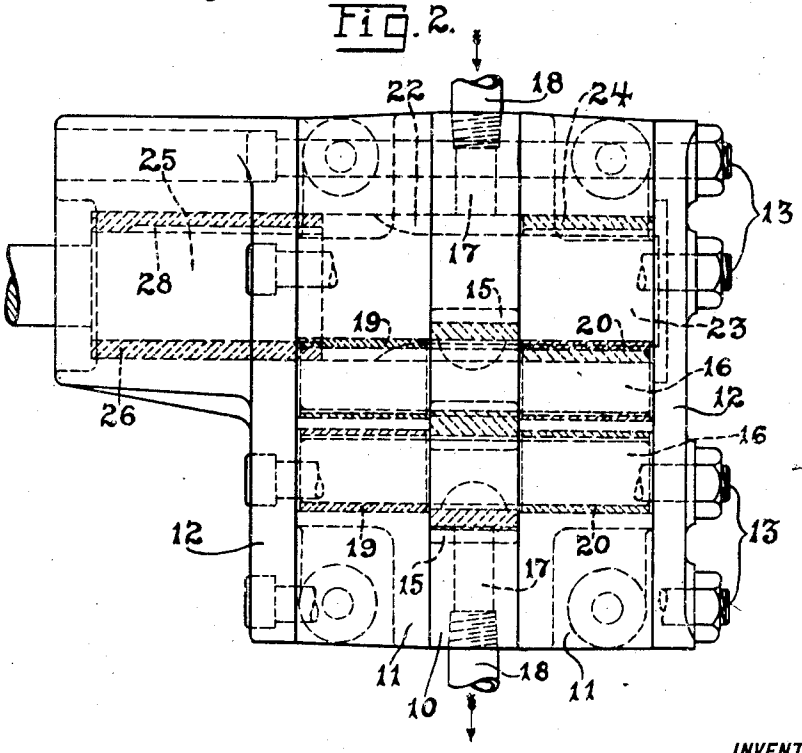


Fig. 2.



INVENTOR
F. O. Hoagland
BY
Joseph W. Schofield
ATTORNEY

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Fig. 3.

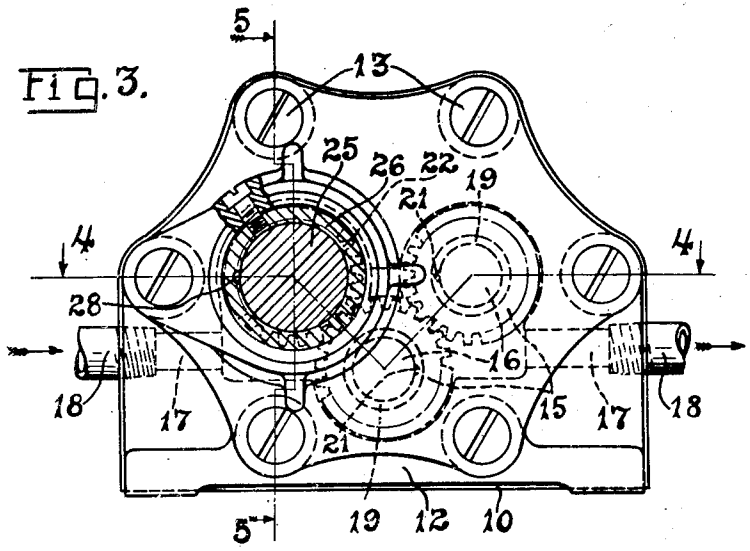
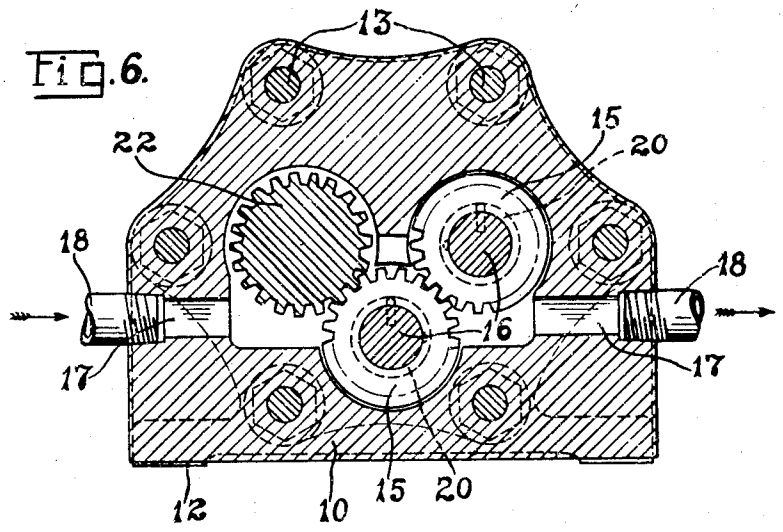


Fig. 6.



INVENTOR
F. O. Hoagland
BY
Joseph V. Schofield
ATTORNEY

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F. O. HOAGLAND

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Fig. 4.

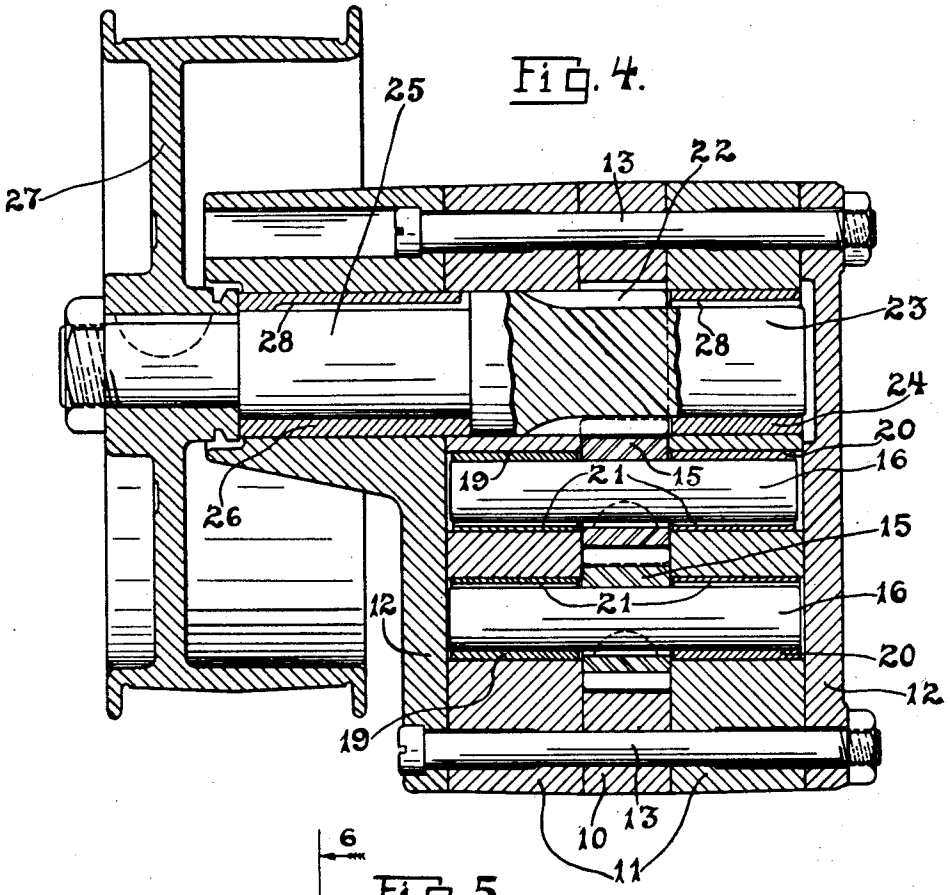
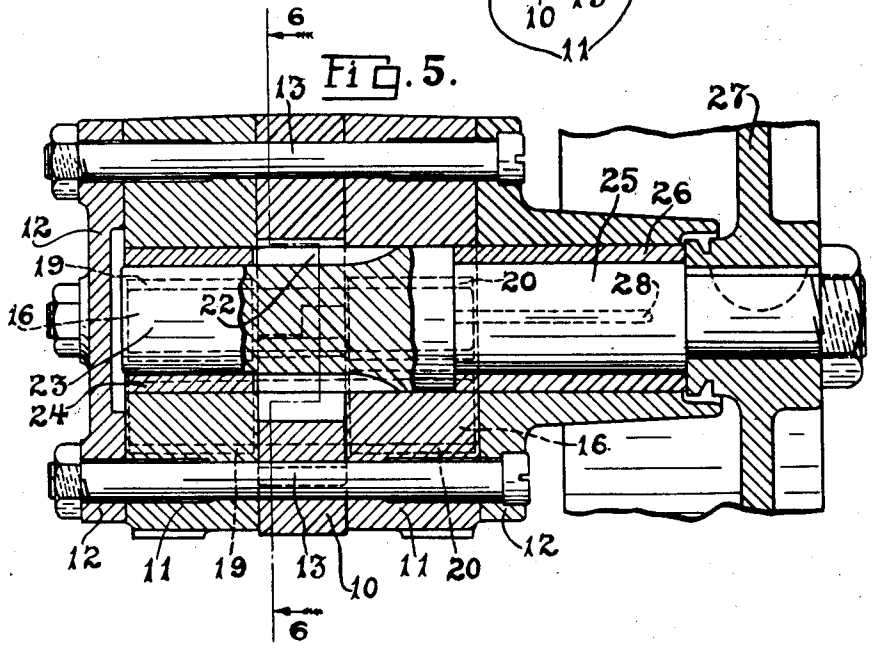


Fig. 5.



INVENTOR
F. O. Hoagland
BY
Joseph V. Schofield
ATTORNEY

Patented Apr. 3, 1928. 1,664,745

UNITED STATES PATENT OFFICE.

FRANK O. HOAGLAND, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO PRATT & WHITNEY COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

FLUID PUMP.

Application filed July 27, 1926. Serial No. 125,237.

This invention relate to pumps and in particular to a gear type pump adapted to force a liquid under high pressure.

An object of the present invention is to provide a gear type pump particularly designed and adapted for circulating a cutting or lubricating fluid in metal cutting machines.

One feature which is advantageous is that a separate driving gear on an independent driving shaft is provided, this driving gear meshing with one of the pair of intermeshing pumping gears.

Another feature of importance is that this driving gear and its driving shaft are disposed upon the intake side of the pump so that they will be subjected only to the lower pressures within that side of the pump.

Another feature which is advantageous, obtained by positioning the driving gear and its shaft within the intake side of the pump, is that no stuffing box is required for the driving shaft of the pump where it passes through the pump casing.

Another object of the invention is to form the pump casing of five separate principal members which may be manufactured economically and to a high precision in quantity production. Within one of these members forming the central part of the pump casing are disposed the pumping and driving gears operating within suitable recesses formed therein. Within two similar but oppositely disposed intermediate members adjacent this central member are formed the bearings for the pumping gears and a bearing for the driving shaft. Mounted on the outer sides of these intermediate members are the side cover plates or members having securing means therein for holding the pump casing members securely in position. Also within one of these side cover members is a bearing for the outer or free end of the driving shaft.

Another object of the invention is to provide bushings within the intermediate members and adapted to form the bearings for the journals of the pumping gears, these being provided with channels by means of which fluid may be supplied thereto to lubricate the rotating surfaces of these journals.

With the above and other objects in view my invention consists in the features of construction and operation set forth in the following specification and illustrated in the accompanying drawings.

In the accompanying drawings annexed hereto and forming a part of this specification, I have shown my invention embodied in a gear type oil circulating pump, but it will be understood that the invention can be otherwise embodied and that the drawings are not to be construed as defining or limiting the scope of the invention, the claims appended to this specification being relied upon for that purpose.

In the drawings:

Figure 1 is a side elevation of a complete pump made according to the present invention.

Fig. 2 is a plan view of the pump shown in Fig. 1, the driving pulley being removed.

Fig. 3 is a side view of the pump, partly in section, taken upon line 3—3 of Fig. 1 and looking in the direction of the arrows.

Fig. 4 is a sectional view taken upon the broken line 4—4 of Fig. 3.

Fig. 5 is a sectional view taken upon the line 5—5 of Fig. 3, and

Fig. 6 is a sectional view taken upon the line 6—6 of Fig. 5.

In the above mentioned drawings I have shown but one embodiment of the invention which is now deemed preferable, but it is to be understood that changes and modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

Briefly and in its broadest aspect, my invention comprises the following principal parts: First, a central member having transverse openings extending therethrough within which are adapted to operate a pair of pumping gears and also a driving gear, and having conduits formed therein through which the fluid being pumped is adapted to flow; second, intermediate side members adapted to be clamped adjacent opposite faces of the central member and having suitable bearings formed therein for the journals of the pumping and driving gears; third, side cover members adapted to be positioned against the opposite outside surfaces of the intermediate side members; fourth, means for securing the members forming the casing in proper fixed relative position; fifth, a pair of intermeshing pumping gears adapted to rotate within the opening within the

central member; sixth, a driving gear meshing with one of the pumping gears and mounted for rotation within a portion of the opening in the central member; seventh, bushings within the intermediate members forming bearings for the journals of the pumping gears and having oil channels therein; and eighth, a driving shaft preferably formed integral with the driving gear and extending through suitable bushings mounted in an intermediate member and in one of the side cover members.

Referring more in detail to the figures of the drawings, I show the pump casing of the present embodiment made up of five principal members and comprising: a central member 10, two intermediate side members 11 disposed in opposed relation to each other and on either side of the central member 10, and two side closing members 12, all of which are secured together by through bolts 13. The central member 10 is provided with an irregularly shaped opening 14 within which are adapted to be positioned the two intermeshing pumping gears 15 and also a driving gear 16 adapted to mesh with one of the pumping gears 15. Also provided within this central member are conduits 17 extending completely through the member and entering the opening 14, one of which conduits forms the intake of the circulating pump and the other conduit forms its discharge. By means of pipes 18 or other suitable connections adapted to be connected to the outer ends of these conduits 17 fluid may be admitted at one side of the pumping gears 15 and discharged from the opposite side of the gears 15 through the pump casing. As shown clearly in Fig. 4, the pumping gears 15 are keyed directly to short shafts 16 extending on opposite sides of the gears 15 and forming journals therefor. These journals are adapted to rotate within openings 19 provided within the intermediate side members 11. Preferably, and as shown in the figures, bushings 20 are mounted within the openings 19 in the intermediate members 11 which contact directly with the journal portions of the shafts 16. Each of these bushings 20 is provided with a small longitudinally extending channel 21 adapted to permit oil, or the other fluid being pumped, to be supplied to the journal portions of the shafts 16.

Also adapted to be supported within the intermediate side members 11 of the casing is the driving gear 22, the journal portion 23 of which on one side of the driving gear 22 directly engages a bearing 24 in the form of a bushing in one of the intermediate side housings 11 and the opposite extended end 25 engages a bearing 26 provided in one of the side closing members 12. The driving shaft 25 on this side of the gear 22 is extended through the side closing member 12 within which is a suitable bushing forming the bearing 26 therefor. On the outer end of this extended driving shaft 25 is mounted the driving pulley 27 for the pump. The side closing member 12 adjacent the journal end 23 of the driving gear 22 is recessed as shown clearly in Fig. 4 permitting fluid to be retained therein and forming a supply of fluid to lubricate the bearing surface of the bushing 24. Also the bushings 24 and 26 for the journal portions 23 and 25 of the driving gear 22 are provided with longitudinally extending channels 28.

In operation rotation of the driving gear 22 by its pulley 27 rotates the pumping gears 15 at a high speed and forces fluid being pumped in the direction indicated by the arrows in Fig. 6. It will be noted from an inspection of this figure that the driving gear 22 is placed upon the suction side of the pump and therefore this gear 22 will be subjected only to the intake pressure of the circulating fluid. Also the opening 14 in the central member 10 within which this driving gear 22 operates is provided with sufficient clearance beyond the ends of the teeth of this gear 22 so that this driving gear has no pumping action. The pumping gears 15, as shown, are adapted to closely fit the cylindrical surfaces of the separated portions of the opening 14 within the central member 10.

In order to suitably lubricate the rotating parts of the pump, advantage is taken of the fluid being pumped. It will be seen that fluid may extend from the side faces of the pumping gears 15 through the channels 21 provided within the bushings 20 within the intermediate members 11 and that these will therefore be completely filled at all times with means to lubricate the rotating and wearing surfaces. Similarly the bushing 26 for the extended portion of the driving shaft 25 within one of the side closing members 12 is maintained filled with fluid from the space surrounding the driving gear 22. Also, as this driving gear 22 is subjected only to the low pressure of the pump intake, there will be no tendency for fluid being pumped to be forced outwardly past the bushing 26 for this driving shaft.

What I claim is:

1. A fluid pump comprising in combination, a central member having an opening therein, intermediate side members having openings therein, side closing members, means securing said members together, pumping gears rotatably mounted within the opening within said central member, shafts supporting said gears in position, bearings for said shafts in said intermediate members, a driving gear for said first mentioned gears, a shaft integral with said latter gear and extending on opposite sides of said gear, a bearing for said shaft formed within one of the intermediate side members, a

bearing for said shaft on the opposite side of said gear formed in one of the side closing members, and conduits extending through one of said members for the fluid being pumped.

2. A fluid pump comprising in combination, a central member having an opening therein, intermediate side members having openings therein, side closing members, means securing said members together, pumping gears rotatably mounted within the opening within said central member, shafts supporting said gears in position, bearings for said shafts in said intermediate members, a driving gear for said first mentioned gears, a shaft integral with said latter gear and extending on opposite sides of said gear, a bearing for said shaft formed within one of the intermediate side members, a bearing for said shaft on the opposite side of said gear formed in one of the side closing members, each of said bearings being provided with longitudinally extending channels, and conduits extending through one of said members for the fluid being pumped.

In testimony whereof, I hereto affix my signature.

FRANK O. HOAGLAND.