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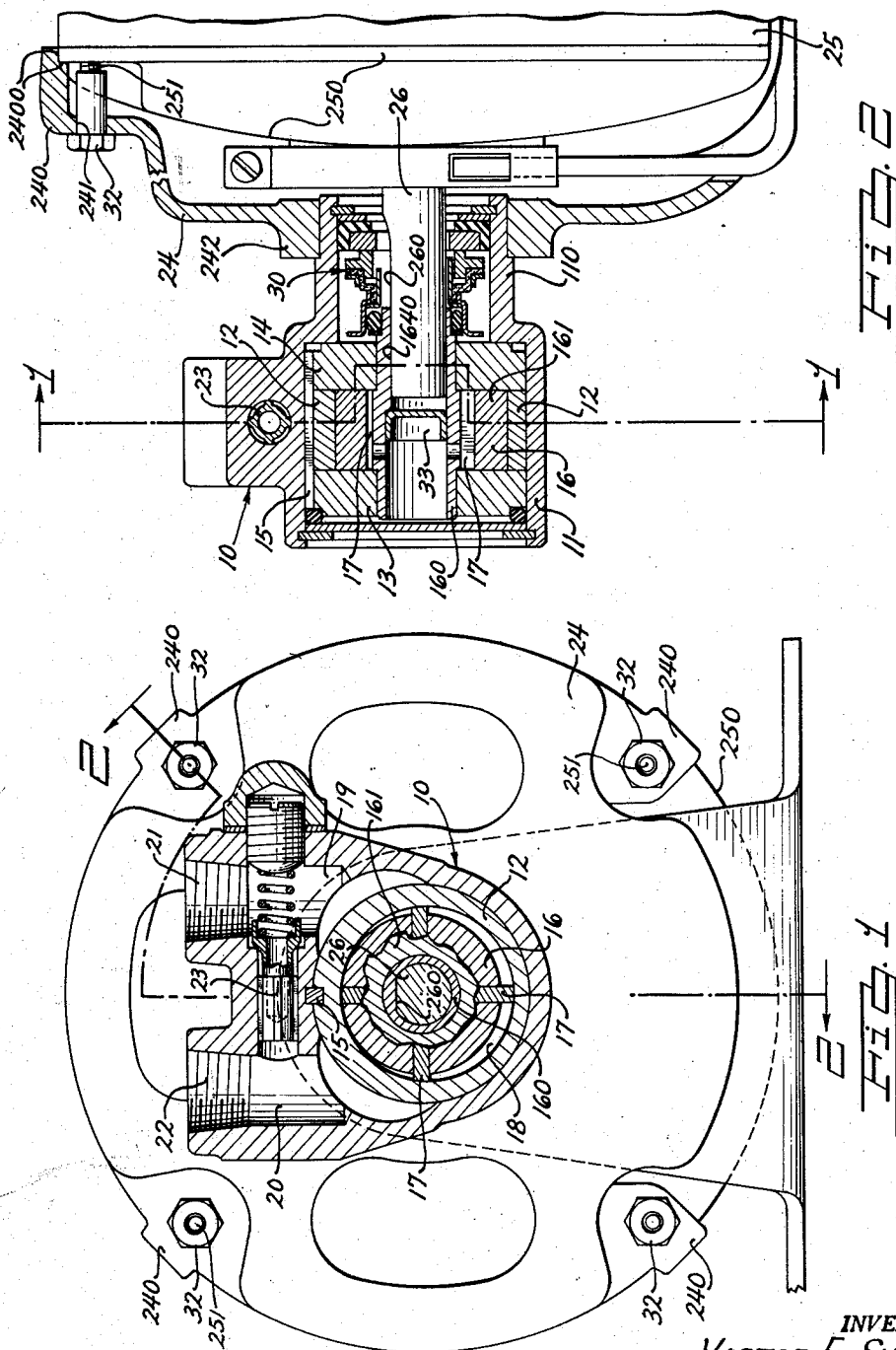
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PUMP AND MOTOR CONSTRUCTION

Filed Jan. 18, 1962

2 Sheets-Sheet 1



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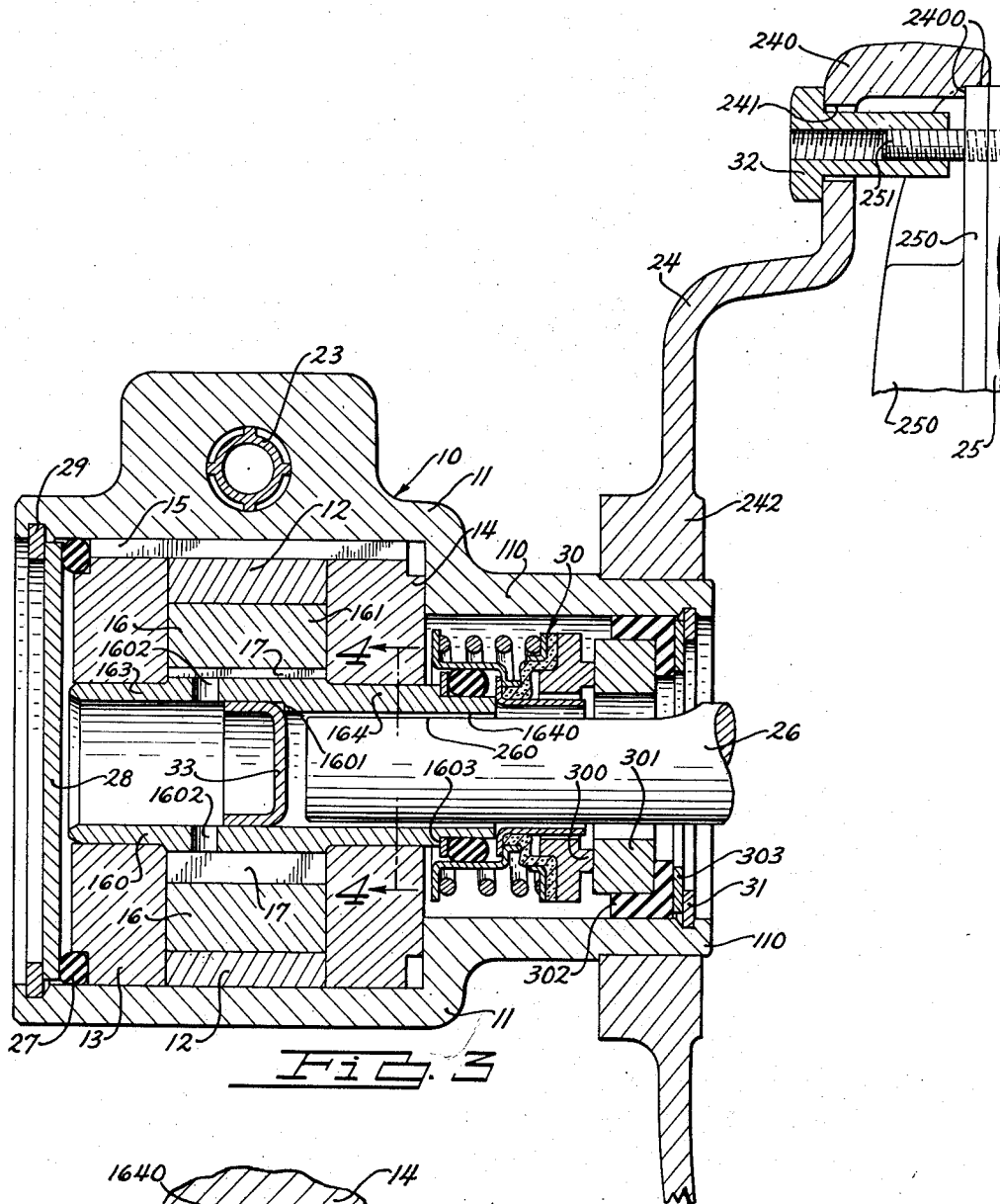
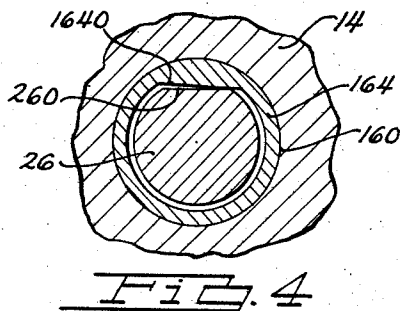
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1

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PUMP AND MOTOR CONSTRUCTION

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1 Claim. (Cl. 103—118)

This invention relates to pump and motor construction, and in particular to improvements in combined pump and motor units.

The primary object of the invention is to provide in a combined pump and motor unit improved and economical means for readily mounting the pump in driven relationship on the motor frame without the use of a conventional elongated mounting cage, an inboard bearing, and a universal joint, which improvement not only is extremely economical but is compact and assures a vibration free operation of the pump and motor unit.

Other objects of the invention will become apparent by reference to the following detailed description taken in connection with the accompanying drawings, in which:

FIG. 1 is a sectional elevational view of pump and motor construction embodying the invention taken on the line 1—1 of FIG. 2.

FIG. 2 is a vertical sectional view taken on the line 2—2 of FIG. 1.

FIG. 3 is an enlarged fragmentary sectional view similar to FIG. 2 showing the preferred construction in detail.

FIG. 4 is a fragmentary sectional view taken on the line 4—4 of FIG. 3.

For the purposes of disclosing the instant invention, the pump illustrated is similar to that of U.S. Patent No. 2,925,786 to Edward J. Hill; however, it is to be understood that the pump unit per se may be of other constructions adapted to utilize the improved combined motor and pump construction of the instant invention.

Referring now to the drawings wherein like reference numerals refer to like and corresponding parts throughout the several views, the particular embodiment of the invention disclosed for illustrative purposes comprises a vane type pump 10 including a pump housing 11 into which are fixed an eccentric liner 12 and end bearings 13 and 14, all keyed in proper aligned inter-relationship by an alignment key 15 disposed in suitable key slots. The said vane type pump 10 also includes a pump rotor 16 having a rotor shaft 160 rotatable within the said end bearings 13 and 14, the said pump rotor 16 being radially slotted to accommodate pump vanes 17. The pump chamber 18 located between the eccentric liner 12, the end bearings 13 and 14 and the pump rotor 16 is suitably ported by porting (not shown) to the pump inlet and outlet passages 19 and 20 communicating with pump inlet and outlet connections 21 and 22 respectively. The said pump 10 is preferably provided with a suitable spring loaded pressure relief by-pass 23 between the said inlet and outlet passages 21 and 22.

The pump housing 11 is concentrically mounted by a suitable mounting spider 24 concentrically fixed on the end cap 250 of an electric motor 25 in a manner that assures that the motor shaft 26 is in accurate axial alignment with the rotor shaft 160 of the pump rotor 16. As shown throughout the drawings and best in FIG. 3, the mounting spider 24 is preferably provided with a plurality of ears or lugs 240 which fit on and over the circular end cap 250 of the motor 25. Suitable means such as interiorly threaded studs 32 extending through apertures 241 in the spider lugs 240 threaded on studs 251 extending from the motor 25 secure the mounting spider 24 firmly and accurately on the shaft end of the motor 25. The said spider lugs 240 are preferably arcuately

2

formed at 2400 to seat accurately on the circular end cap 250 of the motor 25 as best indicated in FIGS. 2 and 3. The pump rotor 16 is driven directly by the motor 25 as later described in detail. A suitable fluid seal assembly 30 is provided between the pump rotor shaft 160 and the pump housing 11 arranged to seal the pump between the driven end of the pump rotor shaft 160 and the inner end of the pump housing 11 at central collar 242 of the mounting spider 24.

The pump 10 has its rotor 16 keyed or otherwise fixed on a central boss 161 of the rotor shaft 160 while end portions 163 and 164 of the said rotor shaft rotate in the end pump bearings 13 and 14. The said rotor shaft 160 is formed hollow, the larger or outer end portion 163 thereof having a cup type seal 33 pressed thereinto against a shoulder 1601. Suitable radially disposed bleed apertures 1602 in the said pump rotor shaft 160 prevent hydraulic pressure from building up behind or inwardly of the pump vanes 17. The several pump elements are assembled as best shown in FIG. 3, and are sealed within the outer end of the pump housing 11 by means of an O-ring 27, an end cap 28, and an expanding anchor ring 29.

The said rotor shaft 160 of the pump 10 is shouldered near its inner end at 1603 to accommodate the fluid seal assembly 30 which has an annular bearing 300 which rotates with the pump shaft 160 against a thrust ring 301 non-rotatively mounted in a cup shaped gasket 302 backed up by an annular mounting ring 303 which is anchored in the small end 110 of the pump housing 11 by an expanding anchor ring 31, all as best shown in FIG. 3. The said fluid seal 30 is generally conventional, and need not be further described in detail inasmuch as it is obvious that other types of rotating fluid seals may be employed if desired.

The inner hollow end portion 164 of pump rotor shaft 160 is provided with a flat keyway 1640 therein which is formed complementary to the flat key 260 formed on the extended end of the motor shaft 26. Thus, when the extended keyed end of the motor shaft 26 is telescoped within the hollow complementarily formed keyway in the inner end of the pump rotor shaft 160, the said pump rotor 16 is driven by the motor 25. A slight clearance, greatly exaggerated in FIG. 4, between the hollow inner end portion 164 of the pump rotor shaft 160 and the motor shaft 26 compensates for any slight misalignment of the pump rotor shaft 160 and the motor shaft 26 that might possibly occur, and eliminates any necessity for a flexible coupling between the said motor shaft 26 and the pump rotor shaft 160.

Although but a single embodiment of the invention has been disclosed and described in detail, it is obvious that many changes may be made in the size, shape, arrangement and detail of the various elements of the invention, all without departing from the spirit and scope thereof as defined by the appended claim.

I claim:

In a pump and motor construction wherein the motor includes a circular end cap having threaded studs extending therefrom adjacent the periphery thereof, and a motor shaft extending from said motor having a flat key formed on one side of said shaft,

a centrally apertured mounting spider formed for disposition centrally on said motor end cap,

a vane type pump including a housing and a pump rotor rotatably mounted in fluid sealed relationship therein,

said rotor having radially disposed vane slots therein and vanes reciprocatingly mounted in said vane slots,

said rotor including a hollow rotor shaft with a flat keyway formed therein at one end thereof,

3

said pump housing including a tubular sleeve concentric with respect to said rotor shaft extending therefrom axially of said rotor shaft and fixedly mounted centrally on said mounting spider, said motor shaft extending centrally through said spider and into said one end of said hollow pump rotor shaft in key mated drive relationship thereto, the mating flat face of the key of said motor shaft and flat face of the keyway of said pump rotor being slightly spaced, a fixed seal in said other end of said hollow rotor shaft spaced from the end of said motor shaft forming a fluid reservoir therein, said rotor shaft having suitable radially disposed apertures therein communicating with said pump vanes

5

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whereby to prevent a build-up of hydraulic pressure behind said pump vanes, and means securing said mounting spider concentrically on said motor end cap.

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