

Oct. 15, 1957

C. E. ADAMS ET AL
PUMP CASING CONSTRUCTION

2,809,595

Filed Jan. 26, 1954

2 Sheets-Sheet 1

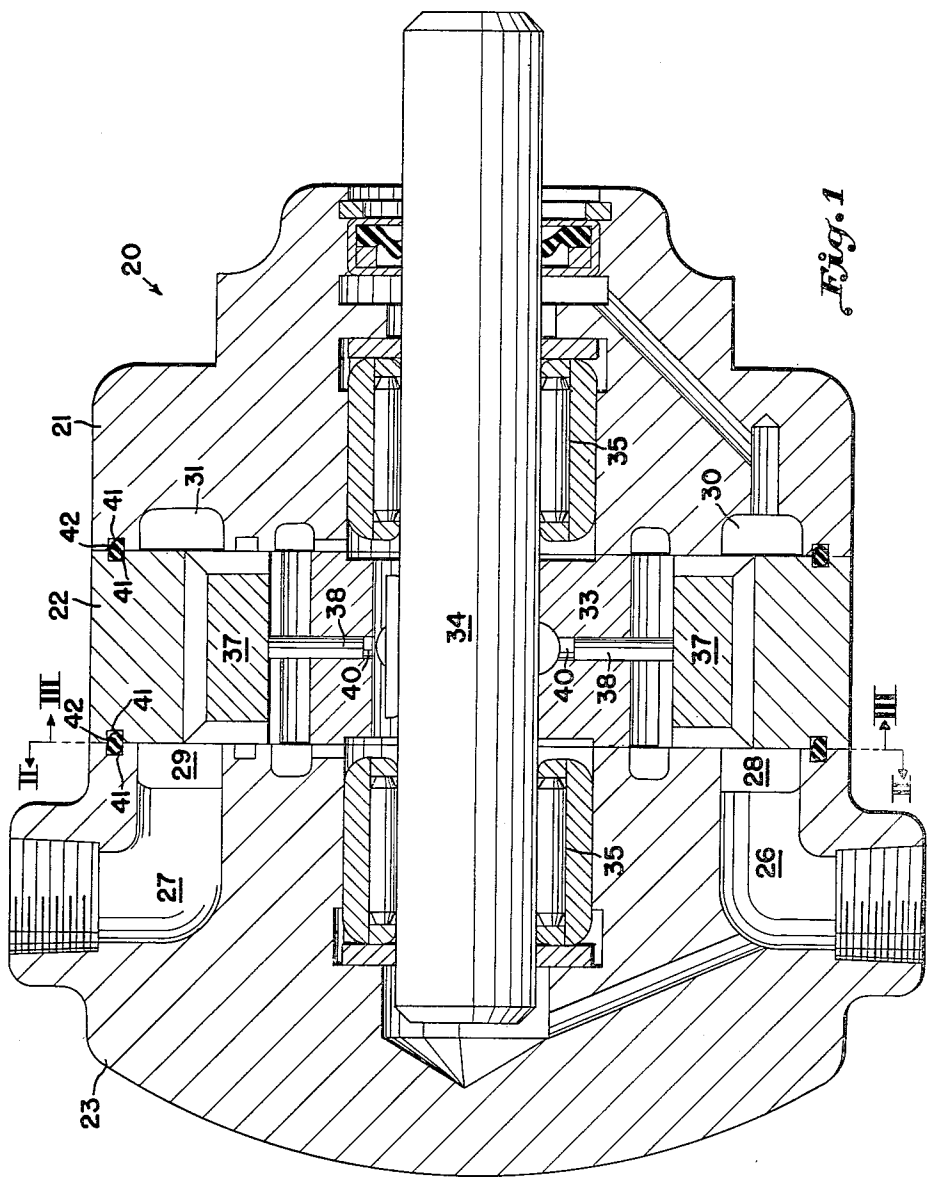


Fig. 1

INVENTORS
CECIL E. ADAMS
YUNG HO SUN
BY
Herschel C. Amohundro
attorneys

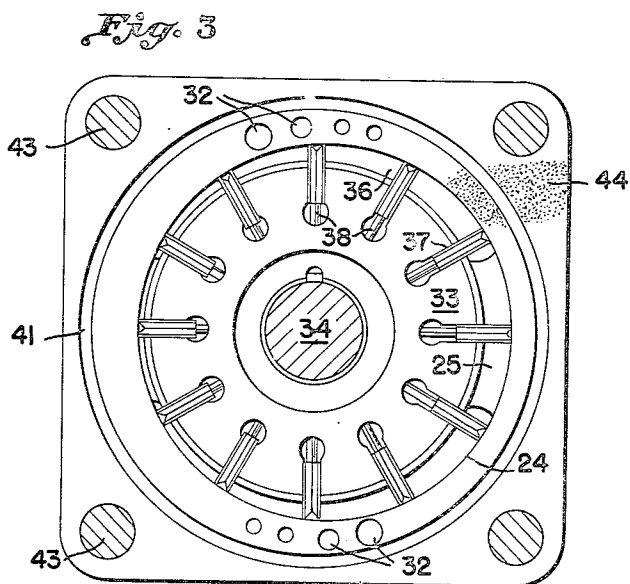
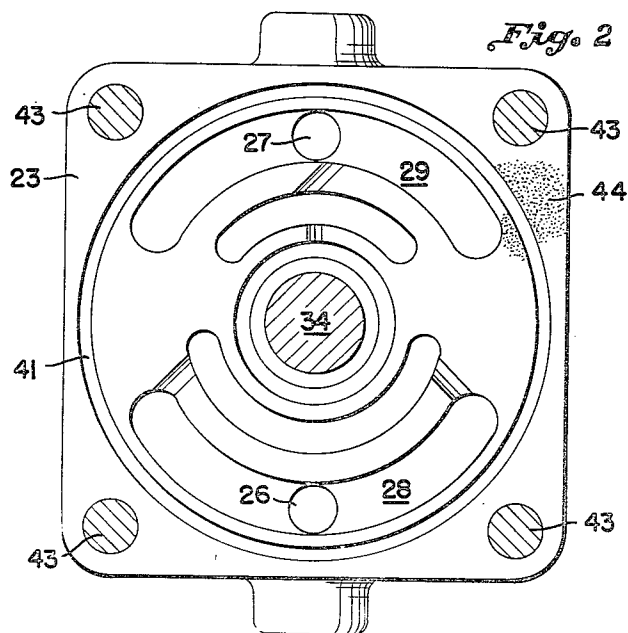
Oct. 15, 1957

C. E. ADAMS ET AL
PUMP CASING CONSTRUCTION

2,809,595

Filed Jan. 26, 1954

2 Sheets-Sheet 2



INVENTORS
CECIL E. ADAMS
YUNG HO SUN

BY
Herschel C. Omohundro
attorney

1

2,809,595

PUMP CASING CONSTRUCTION

Cecil E. Adams and Yung Ho Sun, Columbus, Ohio, assignors, by mesne assignments, to American Brake Shoe Company, New York, N. Y., a corporation of Delaware

Application January 26, 1954, Serial No. 406,128

2 Claims. (Cl. 103—217)

This invention relates generally to hydraulic apparatus and is more particularly directed to fluid pressure energy translating devices commonly known as pumps and motors.

An object of this invention is to provide an improved casing construction for pumps, motors or other devices having cooperating parts with recesses or openings requiring precise alignment.

Another object of this invention is to provide a casing composed of a plurality of sections with means for performing the dual purposes of sealing the joint between sections and precisely aligning the sections or openings formed therein.

Still another object of the invention is to provide a casing having a plurality of cooperating sections each of which is provided with matching grooves and positioning a resilient sealing gasket or similar element in the grooves, the sections then being clamped together to compress the gasket in the grooves.

A further object of the invention is to provide a casing composed of cooperating sections having chamber forming recesses and surrounding such recesses with endless grooves, the grooves in the cooperating sections matching one another and receiving a ring-like gasket formed of rubber-like composition, the gasket being compressed in the grooves and serving to seal the joints as well as align the sections or openings formed therein.

Another object of the invention is to provide the mating surfaces of the sections mentioned in the preceding paragraph with lightly roughened portions, such as, by sand blasting, to introduce sufficient friction to prevent the sections from slipping relative to one another in the event the clamping devices should be partially loosened by strain or otherwise.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred form of embodiment of the invention is clearly shown.

In the drawings:

Fig. 1 is an axial section taken through a pump having a casing embodying the present invention;

Figs. 2 and 3 are vertical transverse sectional views taken through the pump on the planes indicated by the lines II—II and III—III of Fig. 1.

Referring more particularly to the drawings, the numeral 20 designates generally the pump shown in Fig. 1. This pump is substantially identical with the one shown in our co-pending application Serial No. 406,127 filed on even date herewith for a vane pump but has been selected for illustration only since the invention relates to casing construction and may apply to the casing of a pump or any other device in which recesses or openings formed in separable sections must be precisely aligned.

The pump 20 has a casing formed of three sections 21, 22, and 23. Sections 21 and 23 are end sections while section 22 is a combination spacer and cam section having an opening 24 which, when the casings are assembled, forms a rotor chamber 25. Section 23 has

2

inlet and outlet passages 26 and 27, respectively, formed therein to connect corresponding ports 28 and 29 with a hydraulic system. The sections 21, 22, and 23 have mating surfaces which are engaged when the sections are assembled to form a casing, the ports 28 and 29 being on one side of and communicating with the chamber 25 while recesses 30 and 31 are in registration with the inlet and outlet ports but on the opposite side of the chamber and communicate therewith; the ports and recesses are connected also by holes 32 formed in the section 22.

Chamber 25 receives a rotor body 33 which is supported by a shaft 34 journaled in bearings 35 carried by the sections 21 and 23. The opening 24 is so located in the section 22 that it will be eccentric to the axis of the shaft 34. This eccentricity will place the surface of the rotor in closer proximity to the peripheral wall of the rotor chamber on one side than on the other and will cause fluid transfer pockets 36 formed by spaced radially extending vanes 37 and adjacent wall surfaces to alternately increase and decrease in size as the rotor revolves. The inlet and outlet ports are so located that, as the pockets increase in size, they will be communicating with the inlet port and receive fluid therefrom and, as the pockets decrease in size, they will be communicating with the outlet port and expel fluid thereinto. This is conventional operation of a pump and further explanation of such operation is believed to be unnecessary at this time.

Piston pins 38 are disposed in piston chambers 40 in the rotor beneath the vanes and fluid from the pressure port is supplied to the inner ends, as in the co-pending application mentioned above, to urge the vanes into controlled engagement with the peripheral wall of the rotor chamber. Also as in the co-pending application, ports are provided in registration with the inlet and outlet ports and the inner ends of the vane slots to equalize the pressure at the inner and outer ends of the vanes when they register with the inlet and outlet ports.

Each vane has its outer and side edges grooved as in the co-pending application to provide chambers at the outer ends and passages to connect the chambers and the inner ends of the vane slots. Pressures and forces at the inner and outer ends of the vanes will thus be substantially balanced and only the force exerted by the piston pins 38 and centrifugal force will urge the vanes outwardly.

This invention resides more particularly in the casing construction. As shown in the drawings, each of the sections 22, 23, and 24 has its mating surface provided with an endless groove 41 extending around the inlet and outlet ports and the opening 24. The grooves 41 in adjoining surfaces match one another and, when the sections are assembled, form a complete groove to receive a sealing gasket 42. These gaskets may be formed of any suitable material, neoprene or rubber-like O-rings having been found satisfactory. By locating the gaskets or sealing rings partially in each of adjoining sections, the sections are caused to be properly aligned. Suitable screws or bolts 43 are employed to clamp the sections together, this action compressing the gasket in the groove. Due to the compression of the gasket, the joints between the sections are made fluid tight in addition to being properly aligned.

It is within the concept of the invention to treat the matching surfaces of the sections to minutely roughen them and thus prevent relative sliding movement therebetween in the event the fastening devices should be slightly loosened. One form of treatment is to sand blast the matching surfaces as indicated by numeral 44. The minute recesses will be insufficiently deep to permit fluid seepage but will introduce additional friction.

While the form of embodiment of the present invention as herein disclosed constitutes a preferred form, it is to be

3

understood that other forms might be adopted, all coming within the scope of the claims which follow:

We claim:

1. A pump casing comprising a plurality of sections with recesses formed for precise alignment, said sections having planar surfaces treated to increase the resistance to slippage therebetween; means for locating said sections relative to one another and sealing the joint between them having registering annular grooves in said sections at the planar surfaces; and an endless resilient gasket composed of a material other than metal partially disposed in the groove in each section.

2. A pump casing comprising a plurality of sections with recesses formed for precise alignment, said sections having abutting planar surfaces with portions sand blasted to increase the resistance to slippage therebetween; means for locating said sections relative to one another and sealing the joint between them having registering annular

4

grooves in said sections at the planar surfaces; and an endless rubber gasket compressed in said grooves when the planar surfaces are in abutting relationship.

References Cited in the file of this patent

UNITED STATES PATENTS

2,556,313	Adams et al.	June 12, 1951
2,599,767	Long	June 10, 1952
2,649,737	Hoen et al.	Aug. 25, 1953
2,653,550	Gardiner et al.	Sept. 29, 1953
2,713,828	Huber	July 26, 1955
2,720,171	Harrington et al.	Oct. 11, 1955

OTHER REFERENCES

Machine Design Magazine for Sept. 1944 (pages 120 and 123).

American Machinist Magazine for Aug. 2, 1945 (pages 122 and 123).