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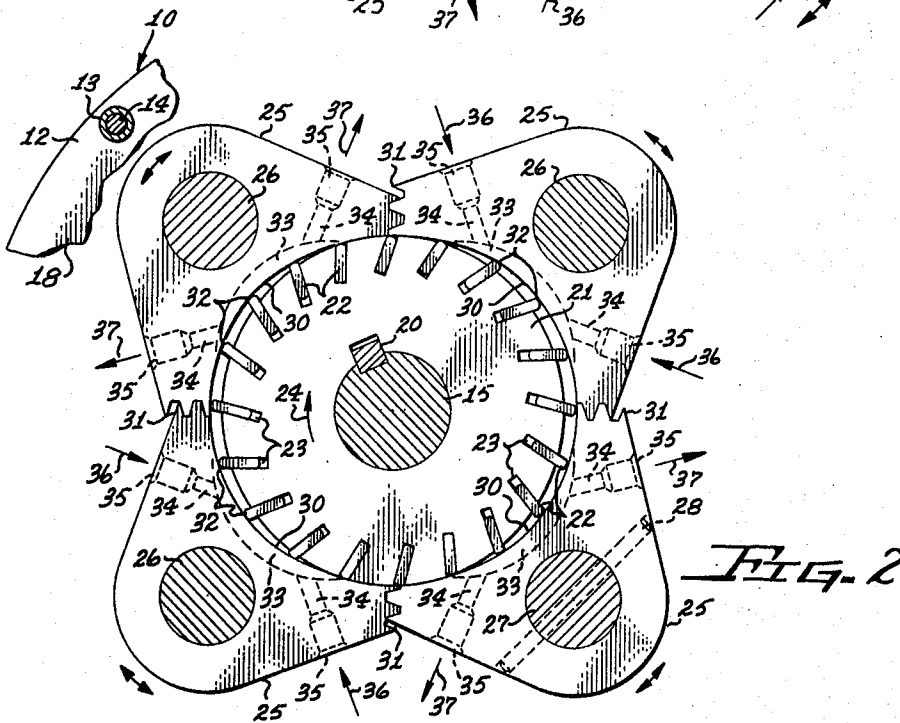
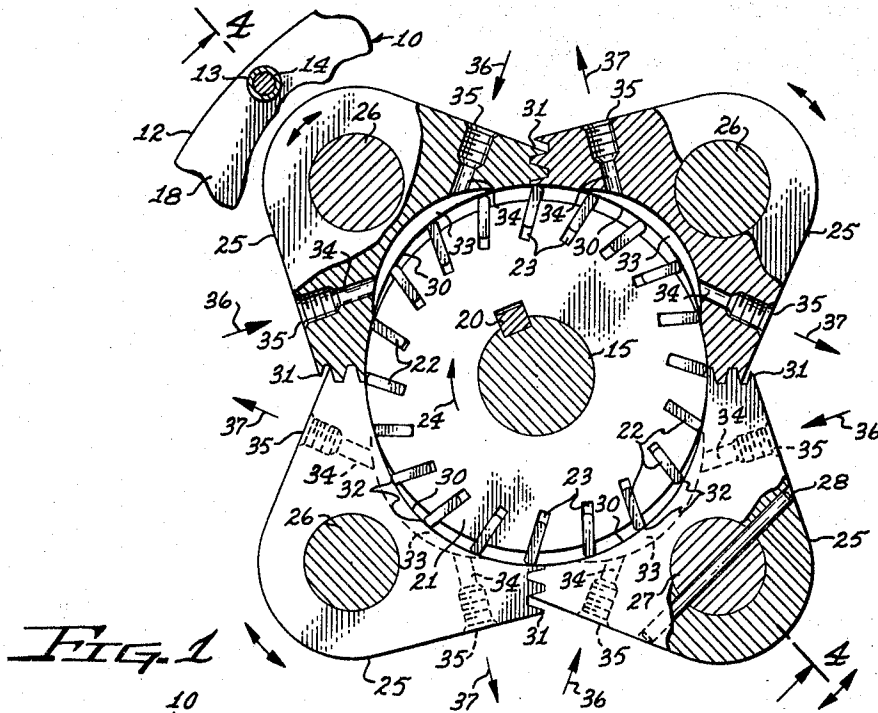
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3,266,429

FLUID PRESSURE PUMP OR MOTOR

Filed July 17, 1964

2 Sheets-Sheet 1



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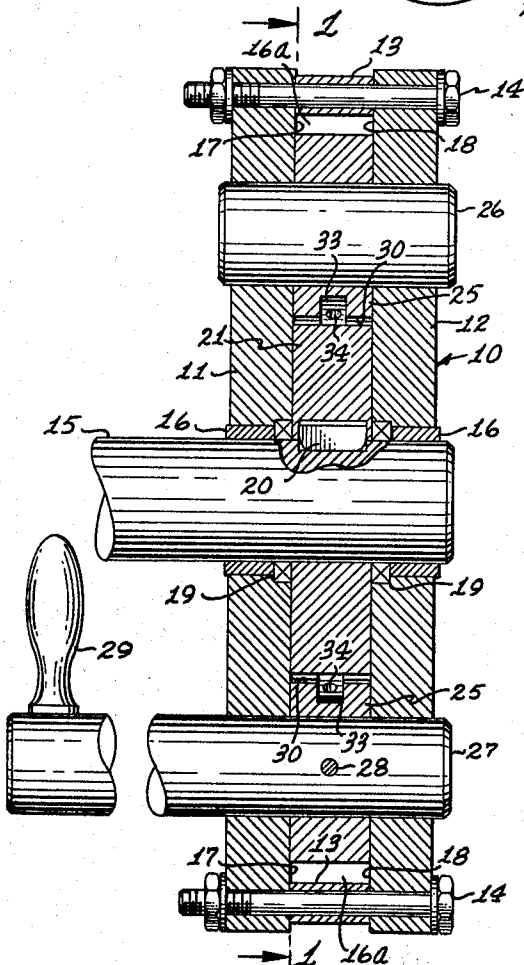
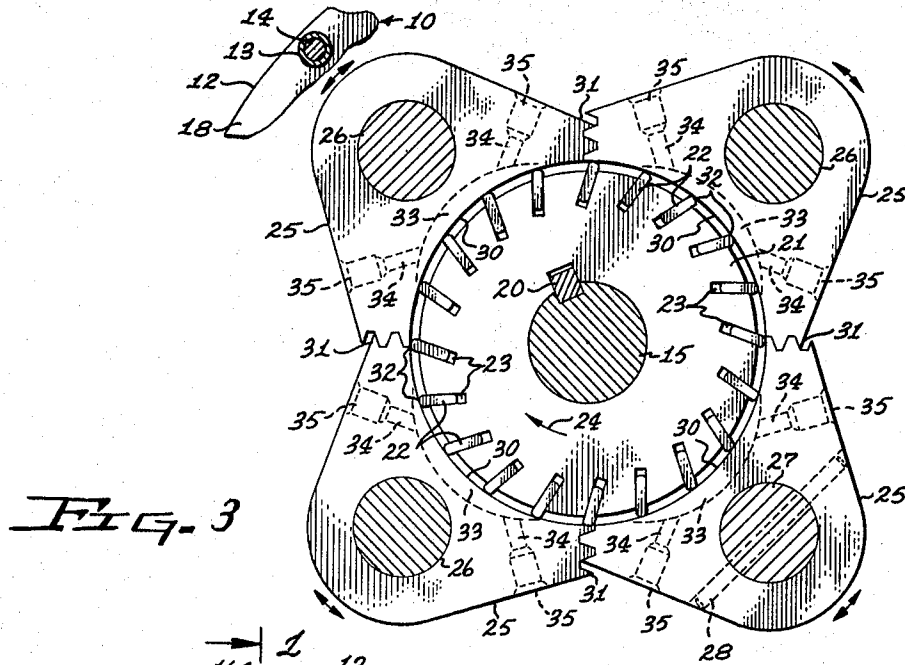
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FLUID PRESSURE PUMP OR MOTOR

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2 Sheets-Sheet 2



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FLUID PRESSURE PUMP OR MOTOR

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3 Claims. (Cl. 103—120)

This invention pertains to improvements in fluid pressure pumps and motors particularly to such devices capable of reversible variable delivery and volume control features in connection therewith.

One of the objects is to provide a variable delivery and reversible fluid pressure pump device of simple and rugged design.

Another object is to provide a fluid pressure pump device of the vane type in which a simple unique mechanism is provided to vary the shape, size and circumferential position of the pressure and suction chambers of the pump.

A still further object is to provide a vane pump with a plurality of geared together rockable segments for varying the characteristics of suction of flow produced by the pump.

Further features and advantages of this invention will appear from a detailed description of the drawings in which:

FIG. 1 is a sectional view of the device including the features of this invention on the line 1—1 of FIG. 4, with the parts shown in forward operative position.

FIG. 2 is a view similar to FIG. 1 but showing the device with the parts arranged for reverse operation.

FIG. 3 is a view similar to FIGS. 1 and 2 in which the parts are shown in neutral position.

FIG. 4 is an enlarged sectional view on the line 4—4 of FIG. 1.

As an example of one embodiment of this invention, there is shown a fluid pressure pump or motor having a frame indicated generally at 10 comprising a part of suitable side plates 11 and 12 secured together in spaced relationship by appropriate spaces 13 and bolts 14. An input drive shaft 15, if used as a pump or the output shaft if used as a motor, is journaled in suitable bearings 16 and carried in the side plates 11 and 12 and isolated from the space 16a between the inner faces 17 and 18 of the side plates by suitable seals 19 carried in the side plate 11 and 12 and surrounding the shaft 15. Fixed on the shaft 15 between the side plates 11 and 12 by the key 20 is the rotor 21 having the usual vanes 22 movable radially in the slots 23 as the motor and shaft turn in the direction indicated by the arrow 24.

Surrounding the motor 21 are a plurality of circumferentially disposed rocking segment elements 25 located between the faces 17 and 18 of the side plates which are pivotally mounted in the side plates 11 and 12 by suitable pins 26 and 27, the pin 27 being preferably fixed by a pin 28 to one of the segments 25 and extends outwardly from the side plate 11 and has an operating handle 29 for rocking the pin 27.

Each of the segments have arcuate vane contacting surfaces 30 at the ends of which are formed intermeshing gear teeth 31 so that upon rocking of the pin 27 as by manipulating handle 29 causes the segments to rock about their respective pins 26 with every other adjacent segment rocking in the opposite direction so as to vary the shape and configuration of the vane contacting surface formed by the arcuate surfaces 30 of the segments as the outer ends 32 of the vanes travel thereover.

Each of the segments 25 are provided with fluid cavities 33 in the arcuate vane contacting surfaces 30 of the segments which are connected to suitable fluid passageways 34 terminating at pipe tap openings 35 to which appropriate operating piping may be connected.

In FIG. 1 is shown the device operating as a pump

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for full delivery of fluid pressure in one direction wherein two of the diametrically opposite segments are sucking in fluid as indicated by the arrows 36 into the pipe tap opening 35 from suitable pipe lines connected to a reservoir, not shown, while the other two diametrically opposite segments 25 are discharging pressure fluid out through the pipe tap openings as indicated by their respective arrows 37.

By rocking the segments they may be moved to the opposite position shown in FIG. 2 to reverse the delivery and suction as shown by the arrows 36 and 37 or the segments may be rocked to an intermediate or neutral position as shown in FIG. 3 with a minimum or zero flow suction or discharge from the device.

While the apparatus herein disclosed and described constitutes a preferred form of the invention, it is also to be understood that the apparatus is capable of mechanical alteration without departing from the spirit of the invention and that such mechanical arrangement and commercial adaptation as fall within the scope of the appended claims are intended to be included herein.

Having thus fully set forth and described this invention what is claimed and desired to be obtained by United States Letters Patent is:

1. A fluid pressure pump comprising in combination:
 - A. a frame having,
 - B. a pair of spaced side plates having inner faces facing toward each other,
 - C. a drive shaft journaled in said side plates,
 - D. a rotor fixed to said drive shaft and located between said side plates,
 - E. rotor vanes radially reciprocable in slots formed in said rotor,
 - F. a plurality of rockable segments pivotally mounted between said inner faces of said side plates having arcuate vane contacting surfaces adapted to slidably engage the outer edges of said rotor vanes during rotation of said rotor,
 - G. pivotal connections between each of said rocking segment elements located adjacent to the ends of each of said arcuate vane contacting surfaces,
 - H. and means for rocking at least one of said rocking segment elements so that every other one of said rocking segments simultaneously rocks in the opposite direction from its adjacent segments to vary the volume and direction of fluid flow in said pump.
2. A fluid pressure pump comprising in combination:
 - A. a frame having,
 - B. a pair of spaced side plates having inner faces facing toward each other,
 - C. a drive shaft journaled in said side plates,
 - D. a rotor fixed to said drive shaft and located between said side plates,
 - E. rotor vanes radially reciprocable in slots formed in said rotor,
 - F. a plurality of rockable segments pivotally mounted between said inner faces of said side plates having arcuate vane contacting surfaces adapted to slidably engage the outer edges of said rotor vanes during the rotation of said rotor,
 - G. pivotal connections between each of said rocking segment elements located adjacent to the ends of each of said arcuate vane contacting surfaces,
 - H. means for rocking at least one of said rocking segment elements so that every other one of said rocking segments simultaneously rocks in the opposite direction from its adjacent segments to vary the volume and direction of fluid flow in said pump,
 - I. fluid cavities in each of said segments opening in said arcuate vane contacting surfaces,
 - J. and fluid passageways in each of said segments having means for connection to external piping for

conducting the supply and discharge of fluid from said pump.

3. A fluid pressure pump comprising in combination:

- A. a frame having,
- B. a pair of spaced side plates having inner faces facing 5 toward each other,
- C. a drive shaft journaled in said side plates,
- D. a rotor fixed to said drive shaft and located between said side plates,
- E. rotor vanes radially reciprocable in slots formed 10 in said rotor,
- F. a plurality of rockable segments pivotally mounted between said inner faces of said side plates having arcuate vane contacting surfaces adapted to slidingly engage the outer edges of said rotor vanes 15 during the rotation of said rotor,
- G. intermeshing gear tooth connections at the ends of each of said arcuate vane contacting surfaces of each of said segments to cause simultaneous rocking of each of said segments in the opposite direction 20 from its adjacent intermeshing segment when any one or more of said segments are actuated in rocking movement on said frame,

H. means for rocking at least one of said rocking segment elements so that every other one of said rocking segments simultaneously rocks in the opposite direction from its adjacent segments to vary the volume and direction of fluid flow in said pump.

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