United States Patent

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[54] **PRESSURIZED ROLLER MEANS IN A FLUID PRESSURE DEVICE**
17 Claims, 6 Drawing Figs.

[52] U.S. Cl. 418/61
[51] Int. Cl. F01c 3/00
[50] Field of Search ..... 91/56, 68; 103/130, 126 A, 121, 123; 230/145, 141 A; 123/860 K, 12 A

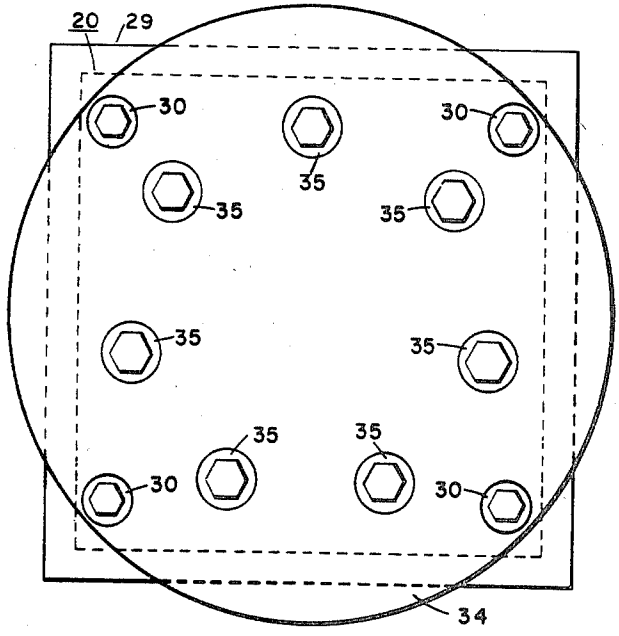
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ABSTRACT: The pressurized roller means is featured in a stator-rotor mechanism having stator and rotor means, the latter of which having a rotational movement about its own axis and an orbital movement about the axis of the stator means. The stator means includes a plurality of cylindrical roller means journaled respectively in a plurality of open journal pockets. A minor cylindrical portion of the respective roller means is exposed through the open pockets. The exposed, minor cylindrical portions constitute internal teeth for the stator means. Upon relative movement between the stator means and the rotor means, the rotor means is disposed to contact the exposed, minor cylindrical portions, whereby they may rotate and thus convert what would otherwise be a sliding contact into a roller contact. A major cylindrical portion of the roller means is held in the respective pockets by a confronting wall which circumferentially embraces a major portion of the pockets. A substantially fluidtight clearance space is provided between the confronting wall and a major portion of the roller means. Pressurized fluid is conducted to this clearance space for fluidically supporting the roller means in the pockets.



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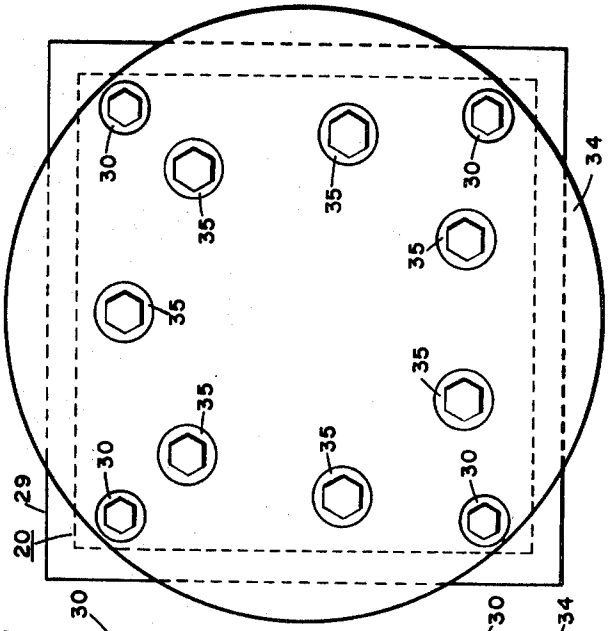


FIG. 2

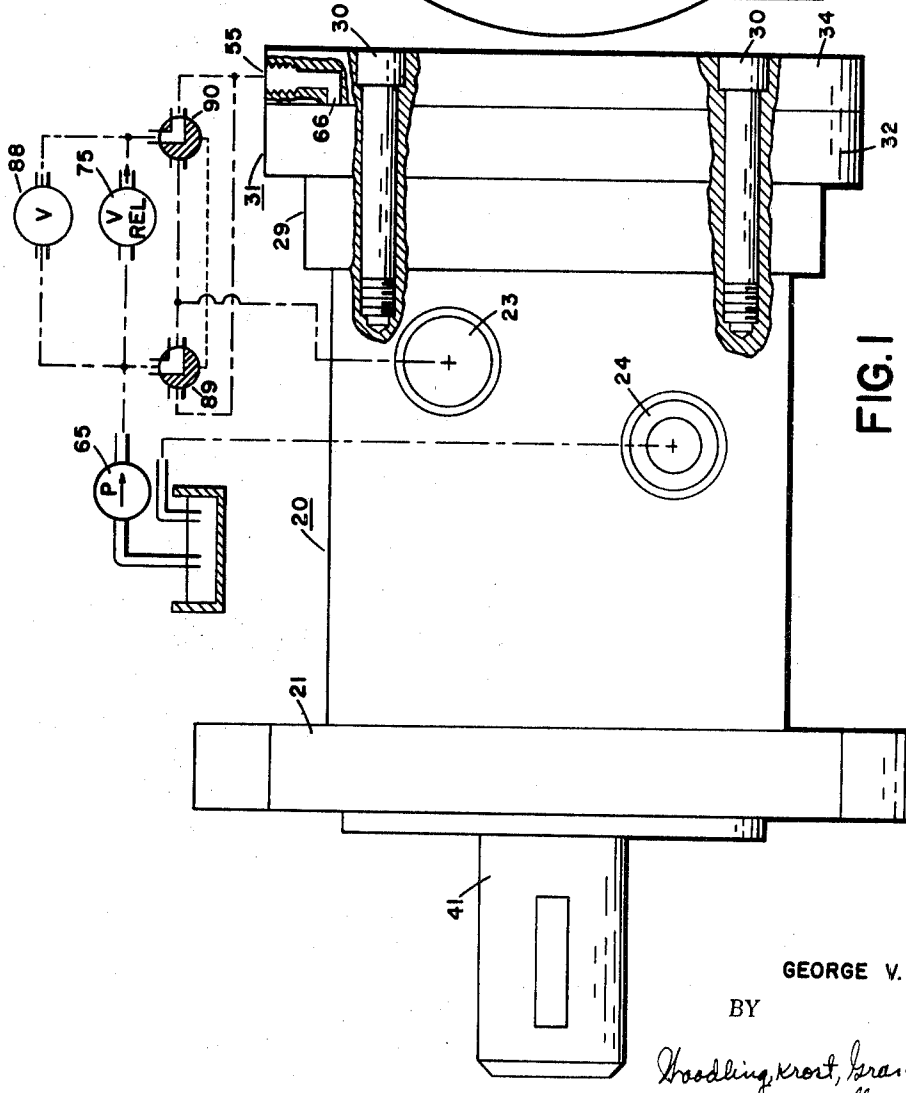


FIG. 1

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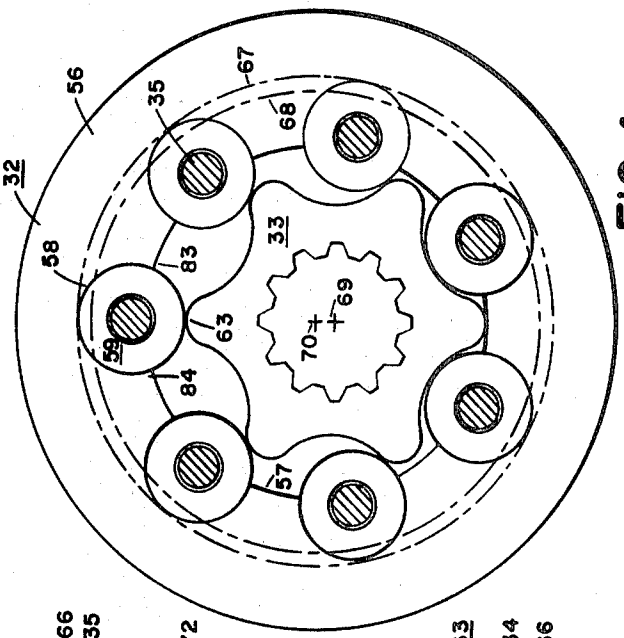


FIG. 4

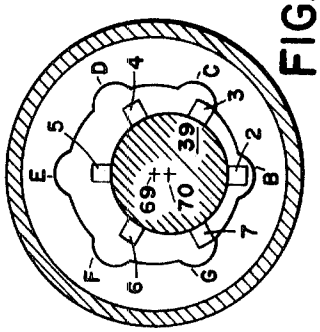


FIG. 6

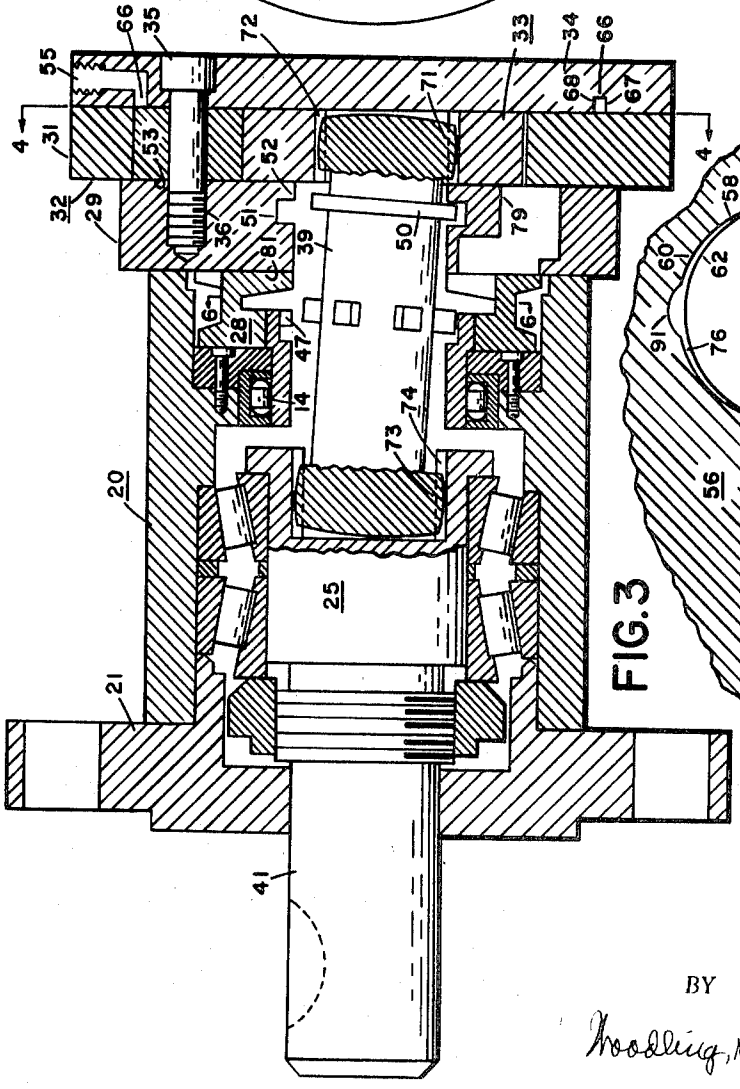


FIG. 3

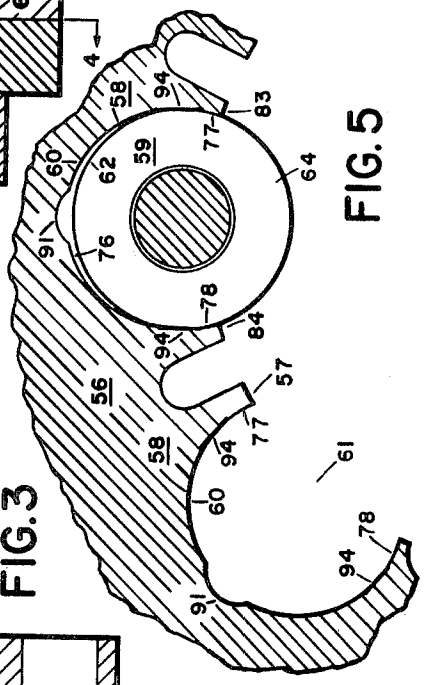


FIG. 5

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PRESSURIZED ROLLER MEANS IN A FLUID PRESSURE DEVICE

BACKGROUND OF THE INVENTION

In a stator-rotor mechanism having stator and rotor means, it has been found that the tips of the rotor teeth tend to wear away where they slidably engage the contour of the stator teeth. This is particularly true under conditions of high fluid pressures. Where rollers are provided in an apparent attempt to convert the slidable engagement into a rolling engagement, the wearing of the tips may be reduced but other problems arise. One difficulty with the rollers, is that they are apparently designed to fit loosely in the pockets, whereby they may shift under influence of pressurized fluid in the stator-rotor mechanism to seek contact with the rotor teeth. However, with a loose fit, the rollers are pressed askew to one side of the pockets rather than in a direct radial, inward direction against the rotor teeth. This sidewise (askew) movement of the rollers tends to destroy the true geometry of the system.

Accordingly, it is an object of my invention to eliminate the sidewise movement of the rollers.

Another object is to apply pressurized fluid on the top of the rollers.

Another object is to press the rollers in substantially a direct radial, inward direction against the rotor teeth.

Another object is the provision of fluid duct means through which pressurized fluid may flow to the clearance space around the rollers.

Another object is the provision of duct means leading respectively from a remote pressure area to the clearance spaces around the rollers.

Another object of the present invention is to pressurize the rollers for fluidically supporting the rollers in the pockets.

SUMMARY OF THE INVENTION

The invention constitutes pressurized roller means in a fluid pressure device having first and second pressure containing means, said first containing means surrounding said second containing means and defining therewith fluid chamber means for containing pressurized fluid therein, said containing means being mounted for relative movement, one of said containing means having at least an open pocket and the other of said containing means having at least a contactable portion, said open pocket having a major closed side and a minor open side in communication with said fluid chamber means, said major closed side having a dimension in generally a circumferential direction greater than that of said minor open side, substantially cylindrical roller means in said pocket, said roller means having a minor portion extending through said minor open side and disposed for contact with said contactable portion, said major closed side of said pocket having opposed terminal wall means and intermediate wall means therebetween, said intermediate wall means and said roller means defining a fluid clearance space therebetween, said fluid pressure device having pressure confining wall means remote from said clearance space, duct means through which pressurized fluid may flow into said clearance space, said duct means leading from said pressure confining wall means to said clearance space and communicating therewith at a place intermediate said opposed terminal wall means, said pressurized fluid in said clearance space urging said roller means to seek contact with said contactable portion, and fluid passage means communicating with said fluid chamber means for flow of fluid into and out of said fluid chamber means.

Other objects and a fuller understanding of this invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a top plan view of a fluid pressure device embodying my invention;

FIG. 2 is an end view of the right-hand end of the fluid pressure device in FIG. 1;

FIG. 3 is a vertical cross-sectional view of the fluid motor;

FIG. 4 is a view of the stator-rotor mechanism, taken along the line 4–4 under the end cap;

FIG. 5 is an enlarged view, showing a representation of a roller journaled in an open pocket and illustrating an exaggerated clearance space therebetween; and

FIG. 6 is a view looking at the right-hand side of the drive means between the orbital shaft and the rotary valve in FIG. 3, taken along the line 6–6 thereof, showing six regional drive locations.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The figures of the drawing show a preferred embodiment of the invention but this is only by way of illustration; it is not to be taken as limiting, the invention being limited only by the hereinafter appended claims. For clarity of the invention, the usual shaft and static seals are not shown.

The general construction of the fluid pressure device, separate from the stator-rotor mechanism, may be substantially the same as that shown and described in my pending application, Ser. No. 797,223, filed Feb. 6, 1969.

With reference to the drawings, the construction of my orbital fluid pressure device comprises generally a main housing **20** having substantially a square cross section. A mounting flange **21** is secured to the left-hand end of the housing. The housing **20** is hollow from end-to-end. Rotatively mounted in the left-hand end portion of the housing is a main shaft **25** having an axis substantially coinciding with the fixed axis. As illustrated, the main shaft **25** is rotatively mounted in tapered roller bearings. An external shaft **41** comprises an integral part of the main shaft **25**. A rotary valve **28**, rotatively mounted on bearings **14**, is mounted in the right-hand end portion of the main housing **20** and sealingly engages a stationary face **81** of a stationary valve member **29** connected to the right-hand end face of the main housing by screws **30**. Attached to the right-hand face **53** of the stationary valve member **29**, is a stator-rotor mechanism **31** comprising stator means **32** and rotor means **33**. An end cap **34** encloses the stator-rotor mechanism. As illustrated, screws **35** secure the stator-rotor mechanism and the end cap **34** to the stationary valve member **29**. The screws **35** threadably engage threaded holes **36** in the stationary valve member and hold the end cap **34**, the stator-rotor mechanism **31**, and the stationary valve member **29** together as a bolted assembly. The screws **30** extend all the way through the bolted assembly and hold the stationary valve member **29** against the right-hand end of the main housing **20**. Although not limited thereto, the stator has seven internal teeth and the rotor has six external teeth intermeshing with the stator internal teeth. The stator may be described as having (n) number of internal teeth and the rotor may be described as having (n—1) number of external teeth. The intermeshing teeth upon relative movement therebetween define operating fluid chambers. The rotor has an axis **70** which orbits about the fixed axis **69** of the stator. The rotor **33** also rotates about its own axis. The stator internal teeth constitute outer wall means of the operating fluid chambers. The rotor external teeth constitute inner wall means of the operating fluid chambers. The rotation of the rotary valve **28** relative to the stationary valve **29** controls the entrance of fluid to and the exit of fluid from the operating fluid chambers through fluid passages **79** in the stationary valve member **29**. The rotary valve **28** is driven by a wobble or orbital shaft **39** which also interconnects the main shaft **25** and the rotor **33**. As shown in FIG. **1**, the right-hand end portion of the wobble shaft **39** extends through a shaft hole **52** in the stationary valve member **29** and has an operative connection with the rotor **33**. The shaft hole **52** as a reference axis substantially in axial alignment with the fixed axis of the stator. Thus, the axis of the wobble shaft **39** orbits around the reference axis, the same as the rotor axis orbits around the stator axis. The operative connection comprises male spline teeth **71** on the wobble shaft which interfittingly engage female spline teeth **72** in the rotor. Thus, the right-hand end portion of the wobble shaft **39** is disposed for rotational movement about its own axis and for

orbital movement about the fixed axis of the stator. The connection means between the left-hand end portion of the wobble shaft and the main shaft **25** comprises male spline teeth **73** on the wobble shaft which interfittingly engage female spline teeth **74** in the central core of the main shaft. Thus, the left-hand end portion of the wobble shaft is disposed for rotational movement only about the fixed axis of the stator.

The wobble shaft **39** is connected to drive the rotary valve **28** through one rotation for each rotation of the wobble shaft. The drive is shown in FIG. **6** and may be substantially the same as that shown and described in FIGS. **16–18** of my pending application, Ser. No. 797,223, filed Feb. 6, 1969. The drive means comprises a plurality of drive follower means B to G disposed at circumferentially spaced regional locations internally of the rotary valve and a plurality of drive actuating means **2** to **7** circumferentially disposed about the orbital shaft **39**. The drive follower means B to G are circumferentially disposed with reference to the fixed (first) axis about which the rotary valve rotates and the drive actuating means **2** to **7** are circumferentially disposed with reference to the shaft (second) axis. The drive follower means B to G comprise female wall means in the form of substantially a semicircle provided in an internal rim **47** within the rotary valve. The drive actuating means **2** to **7** comprise male wall means in the form of lugs provided on the outside of the actuating shaft. The diameter of the top of the lugs may be substantially the same as the diameter of the male gear teeth **71** and **73**, whereby the lugs as well as the male gear teeth may pass through the central opening in the stationary valve and in the rotary valve. The female wall means and the male wall means are preferably six in number, being the same in number as the external teeth of the rotor **33** and may be designated as (**n**–**1**) in number. The female wall means are circumferentially spaced apart from each other at substantially equal intervals (60°) about the first axis and the male wall means are circumferentially spaced apart from each other at substantially equal intervals (60°) about the shaft (second) axis. The drive actuating means **2** to **7** (male wall means) and the drive follower means B to G (female wall means) respectively engage each other in successive order at the regional locations with the respective drive means at each regional location constituting a pair of regional drive means for transmitting a torque therebetween in response to the combined movement of the orbital shaft **39**.

The drive means thus described constitutes universal drive means and provides for rotating the rotary valve means relative to the stationary valve means once for each rotation of the wobble shaft **39**. The operation of the rotary valve means is independent of the load and thrust on the main shaft. The fluid may flow through the drive means as open spaces are needed to accommodate for the flow of fluid therethrough.

Relative axial movement may occur between the male and female spline teeth connections, and in this application, confinement or axial limit means are provided to limit such relative axial movement. As illustrated, the confinement means comprises abutment means in the form of an annular shoulder **50** on the wobble shaft **39** which is disposed to orbitally fit within an annular recess **51** provided inside of a centrally disposed shaft hole **52** in the stationary valve member **29**, see FIG. **3**. The interengagement between the sidewalls of the shoulder **50** and the sidewalls of the recess **51** limits the relative axial movement between the male and female spline teeth.

The orbital shaft **39** may be inserted in the hole **52** of the stationary valve **29** in the normal manner without any obstruction from the annular shoulder **50**, since its outside diameter is less than the diameter of the hole **52**. It is the orbital position of the rotor means **33** which holds the annular shoulder **50** within the recess **51**. There is always at least some portion of the annular shoulder **50** engaging a sidewall of the recess **51**. This interengagement of the sidewalls limits the extent that the orbital shaft may move in an axial direction and makes it possible to interchange stator-rotor mechanism of variable width. Thus, if it were not for my axial limit means, it would be possible, where a wider stator-rotor mechanism is used than that shown in FIG. **3**, for the orbital shaft **39** to work its way to the right until it hit the end cap **34**, thereby causing the male and female spline teeth **73** and **74** to lose their full engagement width for transmitting full torque to the main shaft **25**.

As shown in FIG. **4**, my invention is incorporated in the stator means **32**, and comprises a stator ring **56** having an internal wall portion means **57** defining an internal opening. The stationary ring **56** shows seven (although not limited thereto) journal pockets **58** disposed around the internal opening and are spaced-apart at substantially equal circumferential intervals from each other. Journaled in the pockets **58** for rotational movement, are a plurality of substantially cylindrical rollers **59**. Each of the pockets circumferentially have a closed major portion of substantially a cylindrical wall **60** and an open minor portion **61** communicating with the internal opening. The closed major portion (cylindrical wall **60**) constitutes a confronting wall enclosing a major cylindrical portion **62** of a roller journaled therein, whereby a minor cylindrical portion **64** of the roller extends into the internal opening through the open minor portion **61** of the pocket. The stator ring **56** and the rollers **59** journaled in the pockets **58** constitute the stator means **32** with the minor cylindrical portions **64** of adjacently disposed roller means define seven or (*n*) number of stator internal teeth.

The stator means **32** and the rotor means **33** are mounted between opposed side member means, namely, the stationary valve member **29** on the left-hand side, and the end cap **34** on the right-hand side. The rollers **59** have end wall means abuttably confined between the stationary valve member **29** and the end cap **34**. The outer ends of the external teeth of the rotor means **33** define round tips **63** which are disposed to sealingly engage the rollers (minor cylindrical portion **64**) upon relative movement between the stator and rotor means. The rollers **59** are disposed to rotate in the pockets **58** as the tips **63** move relative thereto, whereby a rolling movement is provided therebetween instead of the usual sliding movement. The aim of the rollers **59** is to prevent undue wearing of the tips **63**, but, as pointed out before, the rollers present a problem of producing an undesirable sidewise movement to the rollers.

With my invention, pressurized fluid is conducted between the rollers **59** and the pockets **58** into which the rollers are mounted. Any suitable means may be employed to conduct pressure fluid to the rollers, and as illustrated in FIGS. **1** and **4**, the pressurized fluid is first conducted from a pump **65** through a relief valve **75** to a port **55** and then to an annular groove **66** provided in the face of the end cap **34**. The pump **65** may also supply pressurized fluid to a port **23** of the fluid pressure device. Exhaust fluid may flow from a port **24** to a sump of the pump. The annular groove **66** is defined by opposed edges **67** and **68**, and when the end cap **34** is mounted against the side of the stator ring **56**, the two opposed edges **67** and **68** of the groove will register thereagainst, as indicated by the two concentric dash-dot circles in FIG. **4**, being representative of the place where the opposed edges **67** and **68** of the annular groove **66** register against the stator ring **56**. As represented, the annular groove **66** intercepts the ends of the pockets **58** and registers with arcuate recesses **91**, see FIG. **5**, whereupon pressurized fluid is conducted to flow into a clearance space **76** between the pockets and the rollers, see exaggerated clearance space in FIG. **5**. In my invention, the clearance space **76** may have a wider tolerance than normally, whereby the rollers may be urged inwardly against the tips **63** by the pressurized fluid. The arcuate recess **91** is sufficient to permit the pressurized fluid to flow from the annular groove **66** at one end of the rollers **58** to the other end. Pressurized fluid forces the rollers against the tips **63** of the rotor teeth and thereby provide a good fluid sealing engagement therebetween. In manufacturing, there is no need to maintain extraordinarily fine machining tolerances, because a little freedom between the rollers and the pockets is helpful to

better operation. The pressurized fluid acts as a cushion and functions to accommodate for unavoidable irregularities in machine tolerances. The pressurized fluid continually forces the rollers 59 against the tips 63, so that a good fluid seal is maintained therebetween even though there may be some wear on the tips. Accordingly, a good fluid sealing fit is always maintained. As shown, the screws 35 extend through central holes in the rollers with ample clearance therebetween.

The clearance space 76 is substantially fluidtight, since the fluid pressure forces the rollers toward the open side of the pockets. As best illustrated in FIG. 5, the confronting wall of the pockets (closed major portion of substantially a cylindrical wall 60) has first and second terminal end wall portions 77 and 78 circumferentially spaced-apart at least substantially 180° from each other. The first terminal end wall portion 77 meets with the internal wall portion means 57 of the stator ring 56 and defines a first apex body portion 83 therebetween. The second terminal end wall portion 78 meets with the internal wall portion means 57 of the stator ring 56 and defines a second apex body portion 84 therebetween. As illustrated, the roller 59, for example, in FIG. 5, under pressurized fluid is forced to seek engagement against both of the opposed terminal wall means 77 and 78 and provide a fluid seal therebetween. The rollers 59 are thus forced in substantially a direct radial, inward direction, against the rotor teeth. The pressurized port 55 comprises pressure confining wall means and constitutes a pressure area remote from the pockets. The annular groove 66 (fluid duct means) communicates with the clearance spaces 76 at the top of the rollers, being a place intermediate the opposed terminal wall means 77 and 78. A clearance space 76 is defined by a roller mounted in a pocket and an intermediate wall of the pocket which extends between the opposed terminal wall means 77 and 78. The pressure of the rollers against the first and second terminal end wall portions 77 and 78 provides for making the clearance space 76 substantially fluidtight. As shown in FIG. 4, the annular groove 66 communicates with the clearance space 76 at a location substantially midway between the first and second terminal end portions 77 and 78.

An adjustable relief valve 75 may be employed as a means to adjustably vary the pressure of the pressurized fluid, whereby the entire roller system functions as a relief valve in forcing the roller 58 inwardly against the rotor teeth. Accordingly, the internal leakage at the tips 63 may be adjustably controlled to vary the torque. In case the fluid pressure device is used as a fluid drag brake, then the amount of the drag may be adjustably controlled by adjusting the relief valve 75.

In the flow diagram of FIG. 1, the pressurized fluid delivered to the port 55 is less than the pressurized pressure delivered to the inlet port 23 and being also less than the pressure developed in the operating fluid chamber means in the stator-rotor mechanism. In parallel with the pressure relief valve 75 is a valve 88, and by opening the valve 88 and bypassing the relief valve 75, the pressurized fluid delivered to the port 55 is substantially the same as that delivered to the inlet port 23 and that developed in the fluid chamber means in the stator-rotor mechanism. As illustrated, reversing valves 89 and 90 are provided whereby the pressurized fluid delivered to the port 55 and to the inlet port 23 may be reversed. The reversing valves 89 and 90 may be ganged, or operated together, as illustrated by the dotted connecting line. In the flow diagram of FIG. 1, the reversing valves 89 and 90 may be operated to a position opposite to that shown, whereby the pressurized fluid delivered to the port 55 is higher than that delivered to the port 23 and that developed in the fluid chambers in the stator-rotor mechanism. Accordingly, in the illustrated flow diagram, the pressurized fluid delivered to the port 55 may be lower, or higher than, or the same as, that delivered to the port 23 and that developed in the stator-rotor mechanism. In this application, the pressurized fluid delivered to the port 55 and to the clearance space 76 (acting inwardly against the rollers 59) may be characterized as being separate from the pressurized fluid delivered to the inlet port 23 and to the fluid chamber means in the stator-rotor mechanism, where the pressure acts outwardly against the rollers 59.

In FIG. 4, the pockets respectively comprise fragmental cylindrical wall means. The rollers 59 preferably fit loosely in the pockets, whereby they may move and seek contact with the rotor teeth under the influence of pressurized fluid. Due to the fact that the rollers are pressurized from the top, they do not tend to move askew, but tend to seek contact with both of the opposed terminal wall means 77 and 78. FIG. 5 shows a modification, in that the pockets comprise fragmental noncylindrical wall means. The noncylindrical wall means may first be machined (including drilling, reaming, grining, etc.) to a round (cylindrical) surface, whereby a fragmental cylindrical wall means is provided as shown and described in in FIG. 4. As a second operation, the cutting tool (reamer, grinder, etc.) is moved in an inward, radial direction relative to the stator ring 56, whereby the fragmental cylindrical pocket is converted into a fragmental noncylindrical or oblong pocket as viewed in profile. The inward, radial movement need be but a short distance. In FIG. 5, the opposed walls defined by the short distance (being exaggerated) are indicated by the reference character 94. The opposed walls 94 are thus parallel with respect to each other.

As a further modification in FIG. 5, the inwardly directed stator portions or fingers between adjacent rollers are bifurcated, thereby providing bifurcated body portions respectively comprising yieldable branches, whereby the opposed terminal wall means 77 and 78 are yieldable (spreadable) relative to each other in generally a circumferential direction under force of a roller therebetween. In FIG. 5, the rollers may fit relative close (without looseness) between the parallel walls 94 but are free to move in a radial direction. The arrangement prevents the rollers from moving sidewise (askew), which if allowed to occur, would destroy the true geometry of the system. Since the opposed terminal wall means 77 and 78 are yieldable, the rollers may move in a radial direction therebetween the freedom even though the rollers may have a relatively close fit or be slightly oversized. The necessity for close machine tolerances is greatly relieved due to the yieldable characteristics of the opposed terminal wall means 77 and 78 which will accommodate a slightly oversized roller.

Although this invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and the scope of the invention as hereinafter claimed.

I claim:

1. Pressurized roller means in a fluid pressure device having first and second pressure containing means, said first containing means surrounding said second containing means and defining therewith fluid chamber means for containing pressurized fluid therein, said containing means being mounted for relative movement, one of said containing means having at least an open pocket and the other of said containing means having at least a contactable portion, said open pocket having a major closed side and a minor open side in communication with said fluid chamber means, said major closed side having a dimension in generally a circumferential direction greater than that of said minor open side, substantially cylindrical roller means in said pocket, said roller means having a minor portion extending through said minor open side and disposed for contact with said contactable portion, said major closed side of said pocket having opposed terminal wall means and intermediate wall means therebetween, said intermediate wall means and said roller means defining a fluid clearance space therebetween, said roller means in said pocket having opposed confronting wall means respectively confronting said opposed terminal wall means and being respectively contactable therewith, duct means through which pressurized fluid may flow into said clearance space, said duct means leading to said clearance space and defining a fluid entrance therewith at a

place circumferentially intermediate said opposed terminal wall means, said roller means under influence of pressurized fluid being urged to seek contact with both said opposed terminal wall means, said pressurized fluid in said clearance space urging said roller means to seek contact with said contactable portion, and fluid passage means communicating with said fluid chamber means for flow of fluid into and out of said fluid chamber means.

2. The structure of claim 1, wherein said containing means are mounted for relative rotational movement and wherein one of said containing means is also mounted for orbital movement relative to the other of said containing means.

3. The structure of claim 1, wherein said opposed terminal wall means are spreadable relative to each other in generally a circumferential direction upon being engaged by said roller means under influence of said pressurized fluid in said clearance space.

4. The structure of claim 1, wherein said pocket comprises fragmental cylindrical wall means.

5. The structure of claim 1, wherein said pocket comprises fragmental noncylindrical wall means.

6. Pressurized roller means in a fluid pressure device including a stator-rotor mechanism having stator means and rotor means, said stator means surrounding said rotor means and defining therewith fluid chamber means for containing pressurized fluid therein, said stator and rotor means being mounted for relative rotational movement, one of said stator and rotor means being mounted for orbital movement relative to the other, said stator means having (n) number of open pockets, said rotor means having ($n-1$) number of contactable portions, said open pockets respectively having a major closed side and a minor open side in communication with said fluid chamber means, said major closed side having a dimension in generally a circumferential direction greater than that of said minor open side, substantially cylindrical roller means in each of said pockets, said roller means respectively having a minor portion extending through said minor open side and disposed for contact with said contactable portions upon relative movement between said stator and rotor means, said major closed sides of said pockets respectively having opposed terminal wall means and intermediate wall means therebetween, said intermediate wall means of each pocket and a roller means mounted therein defining a fluid clearance space therebetween, said roller means in each said pockets having opposed confronting wall means respectively confronting said opposed terminal wall means in each said pockets and being respectively contactable therewith, duct means through which pressurized fluid may flow into said clearance spaces, said duct means leading respectively to said clearance spaces and respectively defining a fluid entrance therewith at a place circumferentially intermediate said opposed terminal wall means, said roller means in each said pockets under influence of pressurized fluid being urged to seek contact with both said opposed terminal wall means in each said pockets, said pressurized fluid in said clearance spaces urging said roller means to seek contact with said contactable portions, and fluid passage means communicating with said fluid chamber means for flow of fluid into and out of said fluid chamber means.

7. The structure of claim 6, wherein said opposed terminal wall means are yieldable relative to each other in generally a circumferential direction under force of roller means therebetween.

8, . The structure of claim 6, having first and second opposed side member means between which said stator and rotor means are mounted, one of said stator and rotor means and one of said opposed side member means jointly defining said fluid duct means.

9. The structure of claim 6, having first and second opposed side member means between which said stator and rotor means are mounted, said stator means having an annular sidewall, one of said opposed side member means having an annular groove with opposed edges registering against said annular sidewall, said annular groove and said annular sidewall jointly defining said fluid duct means.

10. The structure of claim 1, having means to vary the pressure of said pressurized fluid in said clearance space.

11. The structure of claim 6, having means to vary the pressure of said pressurized fluid in said clearance spaces.

12. The structure of claim 6, having means whereby pressurized fluid delivered to said clearance space has a pressure substantially the same as that in said fluid chamber means.

13. The structure of claim 6, having means whereby pressurized fluid delivered to said clearance space has a pressure higher than that in said fluid chamber means.

14. The structure of claim 6, having means whereby pressurized fluid delivered to said clearance space has a pressure lower than that in said fluid chamber means.

15. The structure of claim 6, wherein said pockets respectively comprise fragmental cylindrical wall means.

16. The structure of claim 6, wherein said pockets respectively comprise fragmental noncylindrical wall means.

17. The structure of claim 6, wherein said stator means has (n) number of bifurcated body portions disposed respectively between adjacent roller means, said bifurcated body portions respectively comprising yieldable branches, whereby said opposed terminal wall means are yieldable relative to each other in generally a circumferential direction under force of roller means therebetween.