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[54] **ROTARY DISTRIBUTOR**
 3 Claims, 3 Drawing Figs.

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137/580
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F16l 27/00
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625.15, 625.21, 625.46, 580; 251/172, 175, 192,
160, 180; 285/100, 101, 102, 226, 227, 228, 229;
73/49.6, 49.8, 41

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ABSTRACT: A rotary distributor for sequentially distributing a fluid to different regions comprising two coaxial, ported ring members, one of the members having a coaxial ported plate attached thereto and arranged in face-sealing relation with the other member, each member having fluid ports arranged so that fluid flows through the ports in one member and through the ports of the ported plate to the ports of the other member, the direction of fluid flow being parallel to the axis of the coaxial members, the ported plate controls communication between the ports in one member and those in the other member, and means whereby fluid delivered to the distributor for passage through the ported members and the ported plate also serves to apply pressure on one side of the ring members to maintain the members in face-sealing relation.

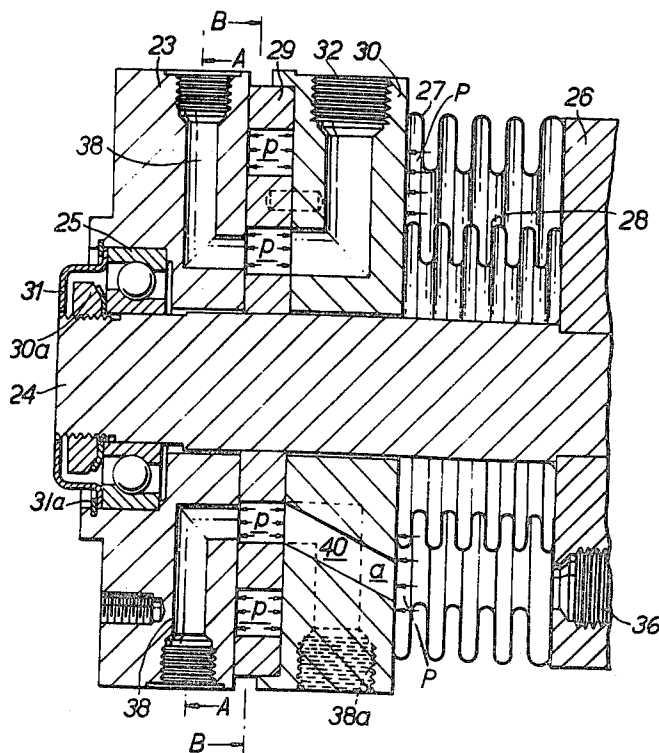
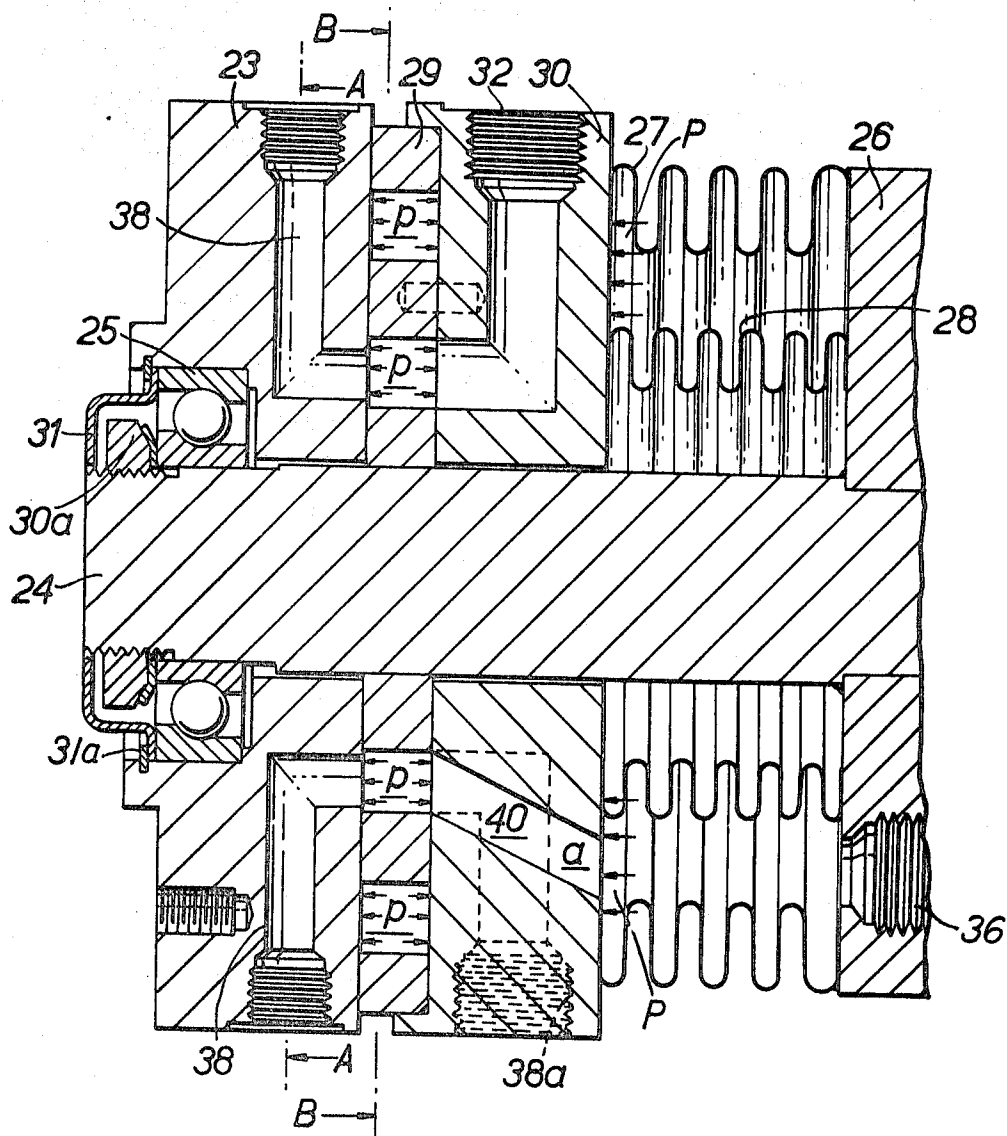
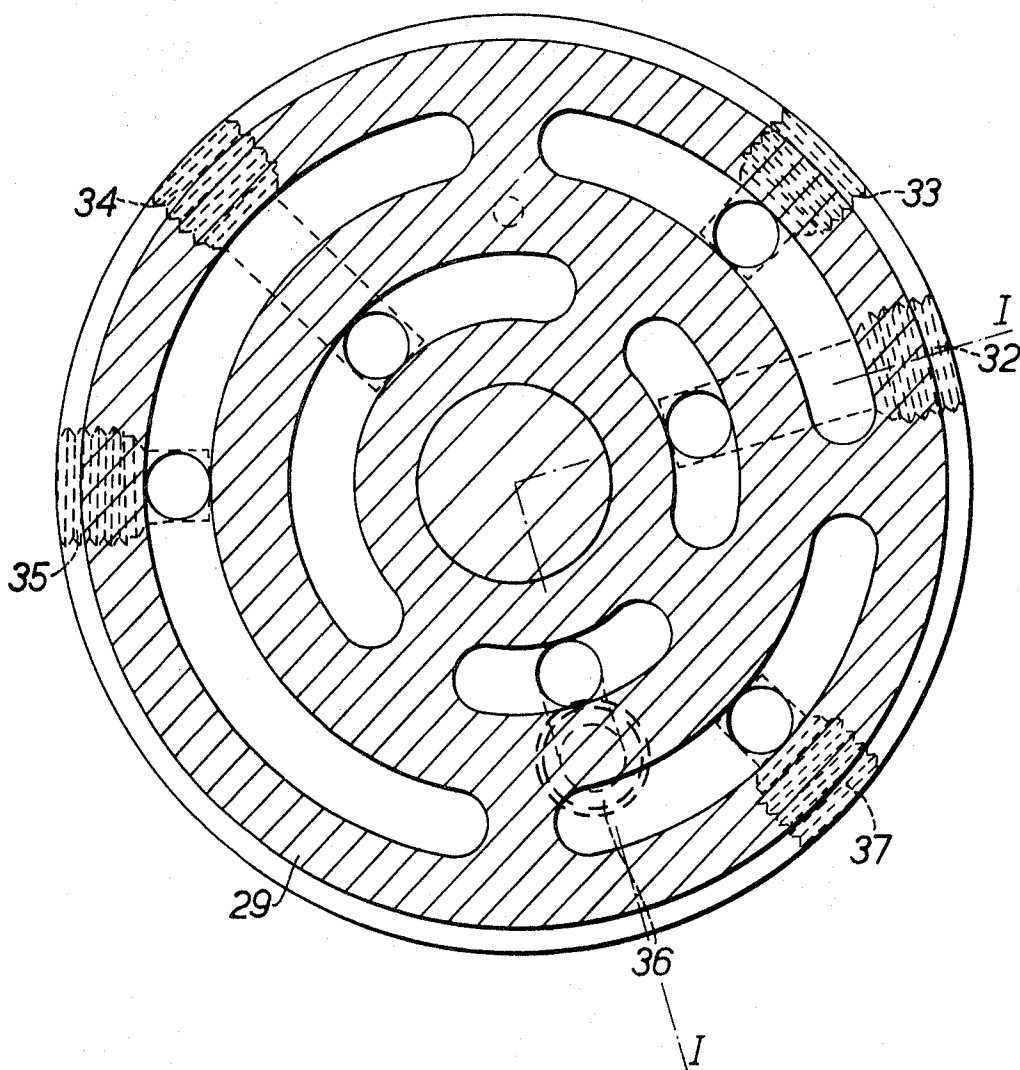


FIG. 1.



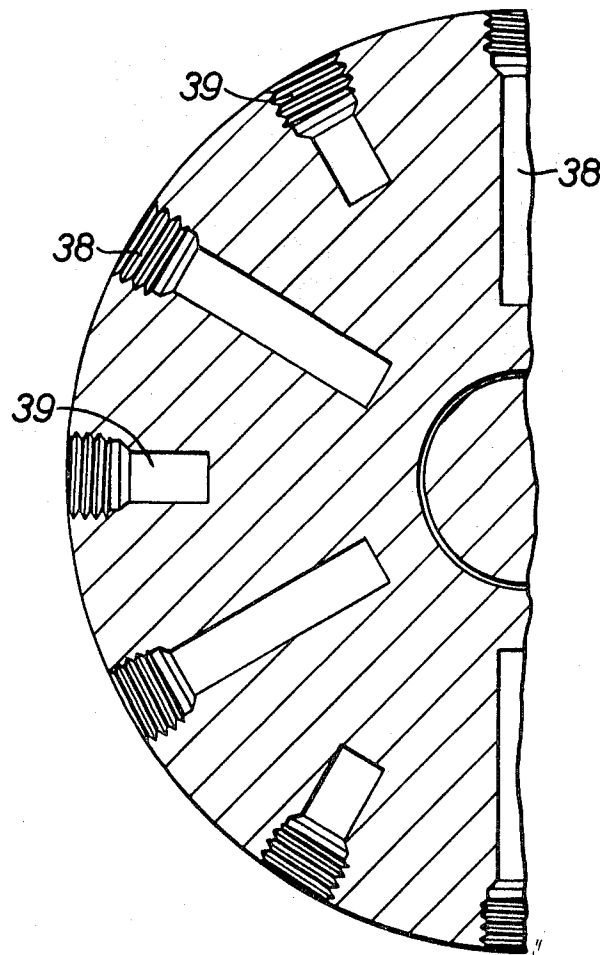
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FIG. 2.



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FIG. 3.



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ROTARY DISTRIBUTOR

This application discloses an improvement over the applicants' copending application Ser. No. 638,334, filed May 15, 1967.

The present invention relates to a rotary distributor in or for a system for permitting fluid to be sequentially distributed to different regions.

In application Ser. No. 638,334 a rotary distributor is described comprising two coaxial relatively rotatable ported ring members, one of which is faced with a coaxial ported valve plate arranged in face-sealing relation with the other member. In one embodiment disclosed in application Ser. No. 638,334 each ported ring member has fluid ports opening into its periphery. The ported ring members and the valve plate are constructed and arranged so that the direction of flow of fluid through the valve plate ports from one ported ring member to the other is parallel to the common axis. The valve plate controls communication between the ports in one ported ring member and those in the other ported ring member. In application Ser. No. 638,334 there is also described means to maintain a face-sealing relation between the ported ring members and the valve plate during the period when fluid, under pressure, is passing through the ports of the ported ring members.

An object of the present invention is to improve the face-sealing relation by utilizing fluid pressure and to this end means are provided whereby fluid pressure is applied to maintain the ported ring members and the valve plate in face-sealing relation during the period when fluid, under pressure, is passing through the ports of the plate valve and ported ring members.

The method and means, described more fully hereinafter, has been found to counter the tendency of the operating fluid or fluids to separate the seat faces.

The fluid pressure used in the present invention to maintain the face-sealing relation may be derived from an operative fluid, i.e., a fluid which flows through the ported ring members, or from a fluid which is independent of that flowing through the ported ring members.

One of the ported ring members may be a nonrotatable member. Both ported ring members and the valve plate have at least one and possibly several sets of fluid supply and return ports. These sets of ports can be used for distributing hot and cold water or other fluids to one or more desired processing areas. For example, a series of molds can be attached to the rotatable member with each mold connected to a hot and cold water supply and return port situated around the periphery of the rotatable ported ring member. As the rotating ported ring member rotates, the ports contained therein are sequentially registerable with supply and return port in the valve plate and each of the mold pieces can thus be subjected to the same heating and cooling cycle during rotation.

The ports in the valve plate member can be arcuate in shape and a plurality of such ports can be arranged in concentric series which are suitably connected to ports in the nonrotatable member. By providing circular ports in the rotatable member which move along the arcuate slot ports of the valve plate member and by apportioning the circumferential extent of the arcuate slot ports of the valve plate member, the duration of the heating and cooling stages for each mold or the duration of fluid supply to a specific operation can be chosen as desired. The supply and return of hot and cold water to molds is given only by way of example as the fluid may be dispatched to and returned from ports for hydraulic or pneumatic operation or for supplying specific fluids to a specific area for various purposes.

The improved sealing contact between the face of the valve disc member and the cooperating face of the rotatable ported ring member of the present invention prevents leakage and promotes accuracy of flow control.

In order that the invention may be the more readily understood, reference is hereinafter made to the accompanying drawing and example which illustrate one form of rotary distributor according to the present invention.

FIG. 1 is a sectional view of a distributor embodying improvements or modifications according to the present invention, being a section on the line 1—1 of FIG. 2.

FIG. 2 is a cross section of the distributor of FIG. 1 taken on the line B—B of FIG. 1.

FIG. 3 is a cross section of the distributor of FIG. 1 taken on the line A—A of FIG. 1.

Referring to the drawings, a ported ring 23 with angled ports opening into the periphery of the ring is rotatably mounted on a fixed shaft 24, being rotatably supported on the shaft by way of a ball thrust or angular contact bearing 25. The shaft carries a collar 26 to which two radially spaced bellows 27 and 28 are fixed by welding, brazing, glueing or otherwise. A disc valve 29 is secured to an angularly ported nonrotatable ring 30 to which the two bellows are likewise fixed and sealed. The contacting faces of the rotary ported ring 23 and the disc valve 29 are kept in sealing contact by the axial thrust of the pressurized fluid contained in the bellows. The ball bearing 25 is retained axially by the screw or keyed ring 30a. The cup-shaped member 31 is held by a spring clip 31a.

The ring 30 is provided with hot (or warm) supply and return ports 32, 33. Ring 30 is also provided with chilled ports 34, 35 and cold water supply and return ports 36, 37. The rotatable ring 23 is provided with inlet and outlet ports 38, 39 respectively communicating with molds (not shown) which rotate with the said ring as is described in our aforesaid copending application. The disc valve 29 contains arcuate ports which control the flow to the successive molds as the ports in member 23 register with the ports in disc valve 29. It has been found that when the fluid flow through the ports in disc valve 29 is under a certain pressure there is a tendency for the cooperating seal faces of the members 23 and 29 to separate axially and result in leakage which interferes with the control of the fluid flow by the disc valve 29. To overcome this disadvantage, one of the pressurized fluids (in this example the cold water is used) is introduced through port 36 into the space between the two sealed bellows 27, 28. This fluid then flows through the oblique passage 40 in the nonrotatable ported member 30 to the disc valve member. It thus applies fluid force P to the relatively large annulus of the member 30 between the bellows 27, 28 which counteracts the aforesaid separating tendency.

It is not necessary to use a working fluid as the said pressure-applying fluid, but as is indicated by the dotted lines, pressurized working fluid may be introduced by way of a normal radial port like 38a and an independent source of fluid under pressure may be delivered into the chamber between the bellows to maintain the requisite pressure to avoid said separation, the oblique port 40 being then omitted.

Moreover other yielding means than concentric bellows may be used to contain and seal the separation-preventing fluid pressure, e.g., concentric C or U rings, piston devices or other appropriate sealed-chamber-forming means.

What is claimed is:

1. A rotary distributor for permitting fluid to be sequentially distributed to different regions, comprising two coaxial relatively rotatable ported ring members and a ported valve plate coaxial therewith one of said members being faced with said coaxial plate and said plate being arranged in face-sealing relation with the other member, and each member having fluid ports opening into its periphery and said valve plate having cooperating ports, the ports in said members and said valve plate being arranged so that the direction of fluid through a valve plate port from a port of one member to a port of another will be parallel to the common axis of said members and said valve plate, said valve plate controlling communication between the ports in one member and those in the other, and means whereby fluid delivered to the distributor for passage through the ported members and the valve plate also serves to apply pressure on one side of one of said members to maintain the said members in said face-sealing relation when fluid under pressure is passing through the ports of the said members, said means including a sealed annular chamber for

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the pressure fluid which maintains the face-sealing contact, said chamber having inner and outer walls formed by coaxial bellows each of which is sealed at each end.

2. A rotary distributor for distributing fluid sequentially to different regions comprising, a first and second coaxial ported ring member, said second ported ring member being rotatable with respect to said first ported ring member; a ported valve plate, said ported valve plate being coaxial to said first and second ported ring members, one face of said ported valve plate being fixed to the face of the first ported ring member so that ports in the ported valve plate register with ports in the first ported ring member, the other face of said ported valve plate being arranged in face-sealing relation with the second ported disc member such that on rotation of said second ported disc member, the ports in said ported valve plate and ports in said second ported disc member register sequentially, the ports of said first and second ported disc members and said

ported valve plate being arranged so that the direction of fluid flow through the first ported disc member, ported valve plate and second ported disc member is parallel to the common axis of said first and second ported disc members and means for applying a fluid under pressure to at least one of the sides of the first and second ported disc members which is not in contact with said ported valve plate to maintain the first and second ported disc members in face-sealing relation with the ported valve plate, said means including a sealed annular chamber for the pressure fluid which maintains the face-sealing contact, the said chamber having inner and outer walls formed by coaxial bellows each of which is sealed at each end.

3. A distributor according to claim 2, wherein the fluid which is applied under pressure to at least one of the sides of the first and second ported disc members is one of the fluids flowing through the distributor.

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