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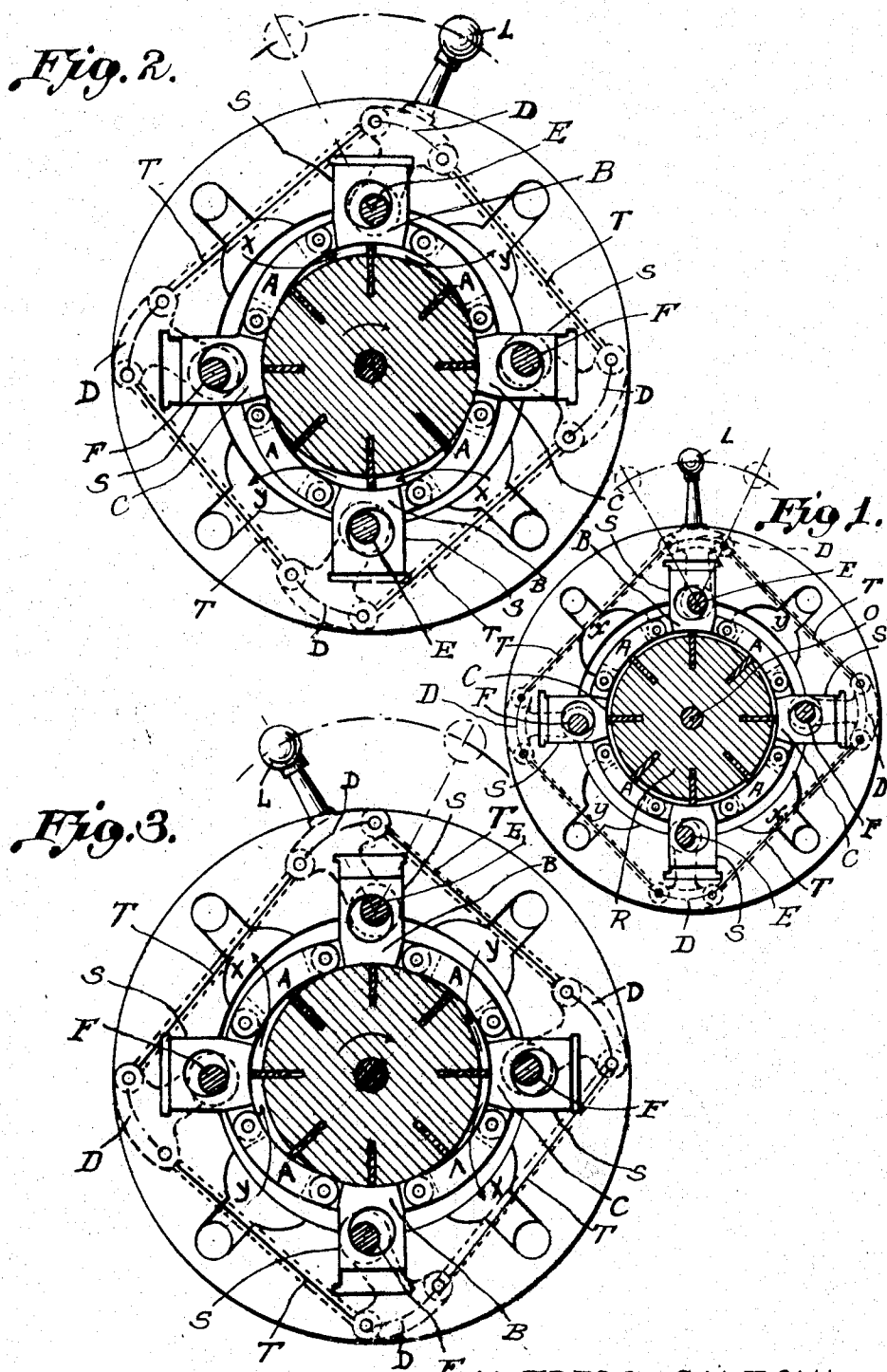
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REVOLVING PISTON MACHINE

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REVOLVING PISTON MACHINE

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1 Claim. (Cl. 103—120)

This invention relates to revolving piston machines wherein a displaceable stator is built up from a plurality of elements pivotally connected to each other with guide blocks interposed between them and arranged symmetrically relatively to the shaft of the machine, while being adapted to be radially shifted by suitable means so that each block is moved in an opposite direction to that of the adjacent blocks in order that a chamber having a variable volume results.

Machines having rotary pistons are, of course, already known to the art, wherein the fluid inlet and discharge ports are disposed in diametrically opposed couples in order to balance the thrusts on the rotors.

Such machines are also known which have rotary pistons of the mentioned balanced type, wherein the linings of the stator are of elliptical shape upon which the blades rest and are of yielding material, which may be deformed in such manner as to vary the differences in length between the axes of the ellipse and thereby vary the amount and the direction of the flow of liquid passing through the machine during each revolution of the same without varying the sense of rotation. The arrangement, according to the present invention, involves a stator lining consisting of linked elements interconnected by immediately disposed guide blocks and placed symmetrically with the shaft and arranged in such manner as to be capable of being radially displaced by means of a special device so that each block is displaced in an opposite direction to that of the adjacent blocks.

The accompanying drawings illustrate, by way of example, an execution form of the subject matter of the invention.

Figs. 1, 2, 3 are cross sections showing three different positions which the stator of a revolving-piston machine can take up.

Fig. 4 shows, to a larger scale, the development of one half of the stator.

Fig. 5 shows, likewise to a larger scale, the said half of the stator in elevation.

Fig. 6 is the development, to a smaller scale, of a half stator of modified construction, the modification being applicable in revolving-piston machines in which the suction and the delivery are made from the center of the rotor.

The stator of the machine shown in Figs. 1, 2, 3 comprises a series of elements A connected to one another to form a sort of chain, with guiding blocks B—C inserted between them, the blocks being adapted to be simultaneously displaced in the slides S by means, for instance, of the cams

E, F actuated by the lever L provided on the axis of the cam E and integral with the member or block D which in turn is connected by means of the couple of tie-rods T with the other similar members D in order to move simultaneously all the cams E, F.

Moreover the radial displacement of the blocks B in one direction and of the blocks C in the opposite direction may be obtained also without any external connection between the same.

Owing to the effect of the internal connection obtained by the elements A, it is sufficient to control only one block B or C by means of a cam or a screw or an hydraulic piston or other arrangement for causing the other blocks to be displaced in the same sense for the same amount.

In the elements A and blocks B, the surface nearer to the center of the machine is bent to the arc of a circle in order to obtain an accurately circular profile, concentric to the rotor R, when the machine is in the position shown in Fig. 1.

It is to be noted that the blocks B and C maintain, of course, their shape of a circular arc also when the blocks are displaced inwardly or outwardly, so that in the zone of passage between the inlet and the discharge openings of the fluid, the blades of the rotor are not to be radially displaced as the profile of the stator in these zones is a circular arc concentric with the rotor.

If the machine concerned is a variable output pump, Fig. 1, corresponds to the case of zero eccentricity, in which no delivery is supplied by the pump. If, however, by angularly displacing the lever L (and therewith also the eccentrics E and F) the blocks B are moved away from the center of the machine and the blocks C are simultaneously moved nearer to it, the internal profile of the stator will be gradually altered and will pass from the circular form (Fig. 1) to the pseudo-elliptical form (Fig. 2). In the latter case, if the machine be a pump, it will deliver an output corresponding to the volume of the eccentric chamber available between the stator and the rotor.

If Fig. 2 represents the position to which the maximum chamber-volume corresponds, by a suitable manipulation of the lever L or the like as described, the machine can be made to gradually pass through all the possible intermediate chamber-volumes.

The circulation of the liquid may be, for instance, as shown in Fig. 2, viz. the liquid is sucked-in through the diametrically opposed suction apertures X and is delivered through the other pair of apertures Y. The stator is traversed

by the liquid according to the apertures X and Y which lie between the elements A, as may be seen from Fig. 4. This figure is a development of a half-stator comprising three sets of elements 5 A, these elements being spaced apart by the extensions G of the guiding blocks B and C pivotally connected by the spindles P (Fig. 5).

The deformation of the stator may be effected also in the opposite way by so operating the lever 10 L that the blocks B are moved nearer to the rotation shaft and the blocks C are moved away therefrom (Fig. 3). The stator will then assume a pseudo-elliptical shape in which the major axis of the ellipse is at right angles with the position 15 the same axis has in Fig. 2.

With the arrangement above described the direction of flow of the liquid can be reversed without reversing the rotation of the machine because, for instance in the case of a pump, the 20 formerly suction apertures X become delivery apertures and the formerly delivery apertures Y become suction apertures.

In this manner a backward running of motors fed from the pump can be obtained, with 25 all revolving velocities from nought to maximum.

The same displaceable stator is applicable also in revolving-piston machines in which the suction and delivery action takes place from the rotation shaft of the rotor. In this case the apertures X and Y are no longer required and the 30 element A can be made in a single piece as indicated in Fig. 6. This figure is the development of a displaceable half-stator which, as in the previous construction, comprises the guiding 35 blocks B and C with the extensions G and the connecting spindles P.

According to the size and application for which the revolving-piston machines fitted with the displaceable stator above described are intended, the stator can achieve the compensation of the stresses also with three or even more sets of elements and guiding blocks, the sets being staggered 120° relatively to each other, provided that the element chain and the arrangement of the suction and delivery apertures be so symmetrically arranged that the stresses provoked in the 10 rotation shaft by the internal pressures are compensated.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:— 15

A revolving-piston machine having a stator which is displaceable and deformable in order to obtain a variable chamber-volume, said stator comprising a plurality of elements pivotally connected with one another and guiding blocks interposed between said elements and pivoted thereto, said stator having fluid inlet and discharge ports disposed therein between adjacent guide blocks, a rotary pumping element and 25 drive shaft therefor mounted within said stator, said guide blocks being symmetrically arranged relatively to said drive shaft and being mounted for movement radially inwardly and outwardly in such a manner that each block receives a movement in a direction opposite to that of the adjacent blocks, and a suitable device for moving said stator blocks, whereby the stator is deformable to vary the volume of fluid displaced or reverse the direction of flow of fluid through said ports. 35

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