Dec. 18, 1928.

1,695,650

E. GODILLOT

PUMP AND THE LIKE

Filed Feb. 14, 1927 3 Sheets-Sheet 1

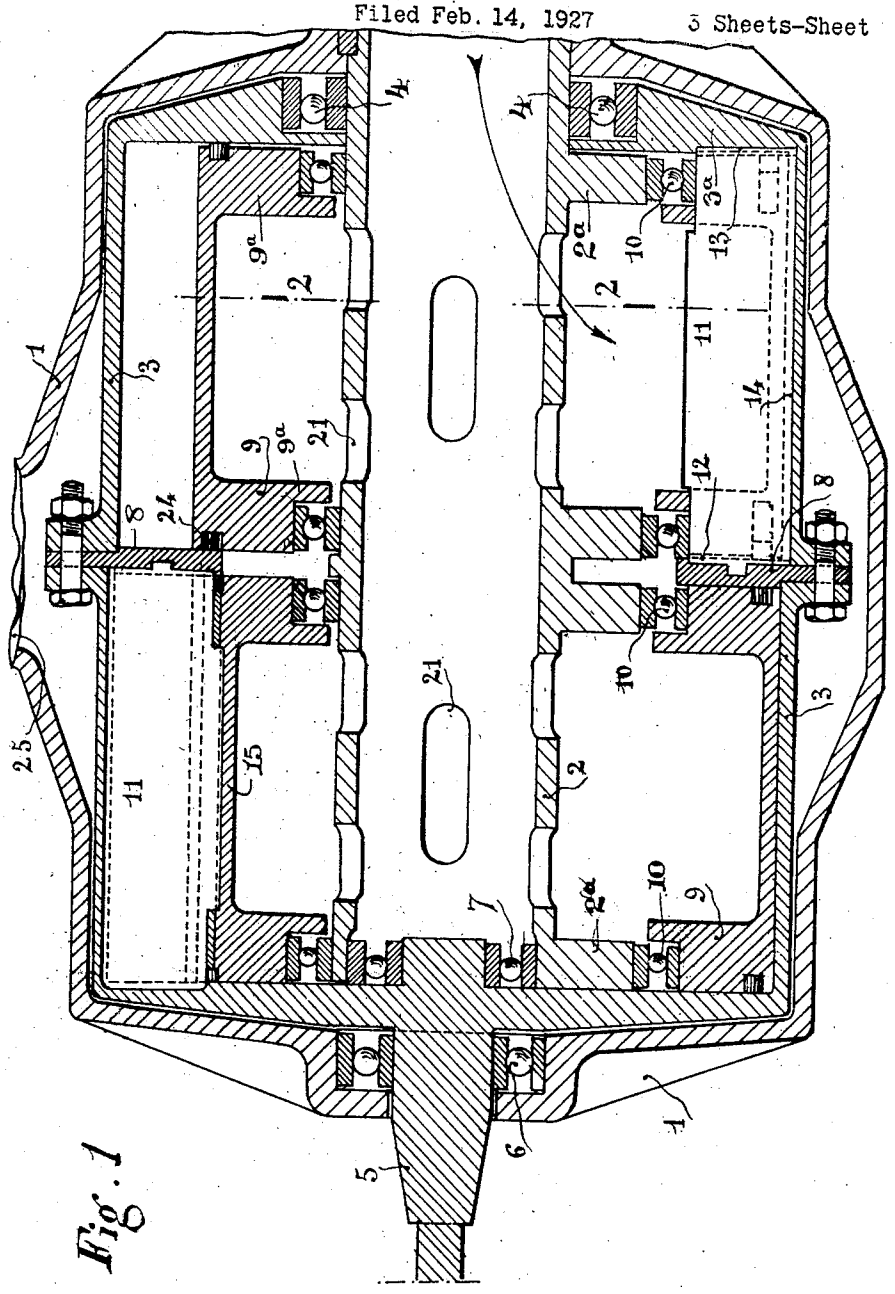

Fig. 1

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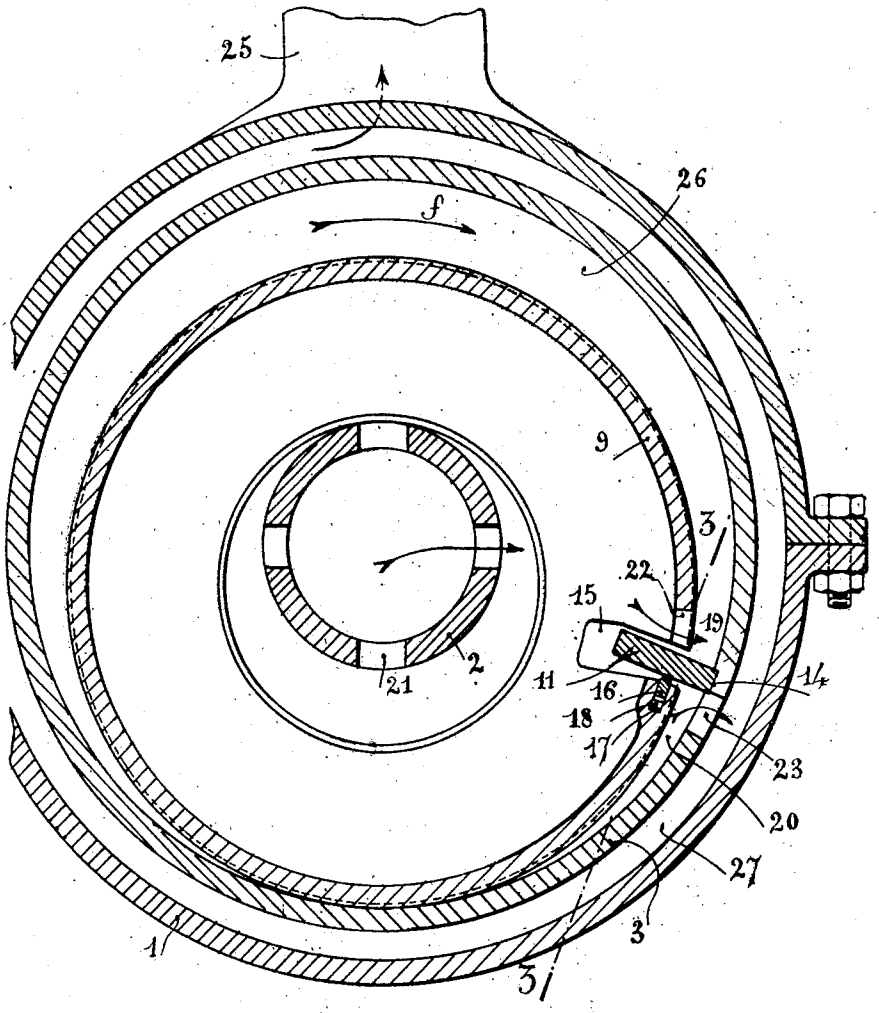

Fig. 2

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Filed Feb. 14, 1927 3 Sheets-Sheet 3

Fig. 3

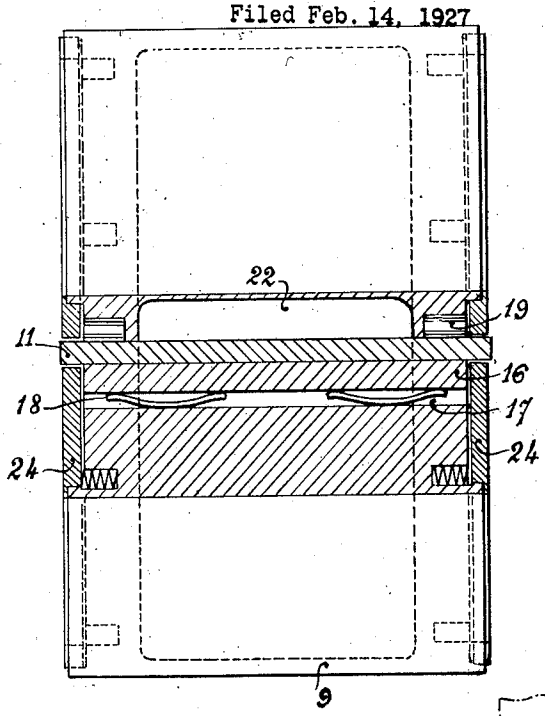


Fig. 4

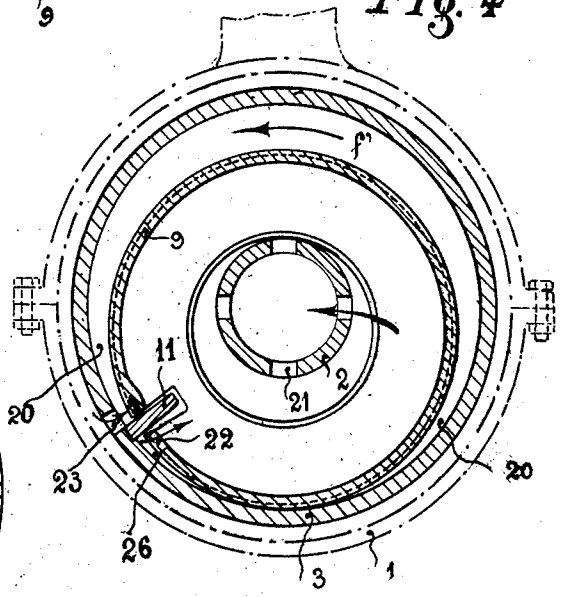
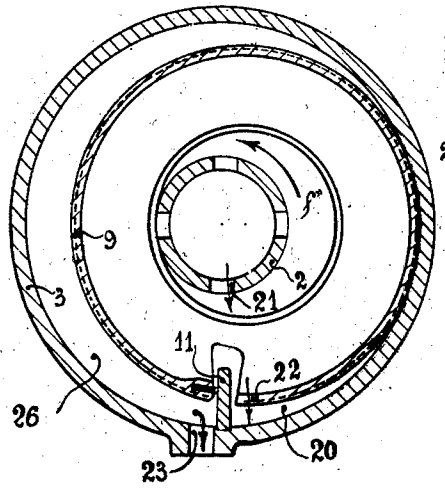


Fig. 5



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UNITED STATES PATENT OFFICE.

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PUMP AND THE LIKE.

Application filed February 14, 1927, Serial No. 168,147, and in France February 18, 1926.

This invention relates to improvements in pumps, compressors, ventilators and the like of that class in which the elements in motion have continuous rotary movement the object of the invention being to provide improvements which avoid alternative displacement and the effects of inertia resulting therefrom; to dispense with objectionable valves and the like, and also to reduce to a minimum the surfaces, engendering friction.

With the above and other objects in view, the invention consists in the construction, combination and arrangement of devices hereinafter described and claimed.

In the accompanying drawings

Figure 1 is a vertical, longitudinal, central, sectional view of a rotary pump constructed and arranged in accordance with my invention.

Figure 2 is a transverse sectional view on the plane indicated by the line 2—2 of Figure 1.

Figure 3 is a detail sectional view on the plane indicated by the line 3—3 of Figure 2.

Figure 4 is a transverse sectional view of a modified form of the invention.

Figure 5 is a similar view of another modified form of the invention.

The pump comprises a fixed casing 1 formed by two shells connected by a horizontal joint and carrying a hollow fixed sleeve 2, forming the suction inlet.

Coaxially with the casing 1 is disposed a drum 3 which is revoluble on the sleeve 2, a ball bearing 4 being interposed between drum and sleeve.

This drum is integral with a shaft 5 fitted on one side in a ball bearing 6 provided in the casing 1, and, on the other side, in a ball bearing 7 arranged at the extremity of the sleeve 2.

The pump comprises two bodies separated by a partition 8 of the drum 3.

In each of these bodies is disposed a hollow cylinder 9 provided with heads and rotating in ball-bearings 10; the latter are carried by the sleeve 2 and mounted on eccentric bosses 2^a of the sleeves. Each of the cylinders is moved by the drum 3, through the medium of a vane 11 sliding in the walls of the cylinder 9.

Each vane is maintained at one part in radial recesses 12 provided in the partition 8 and, at the other part, in a recess 13, provided in the bottom head 3^a of the drum 3. It is also arranged in a horizontal groove 14 in the inner periphery of the drum.

In the heads 9^a of each cylinder 9 are vertical recesses 15 permitting the displacement of the vane 11 and widened, as shown in Figure 2, in order to allow the vane to assume various positions in the cylinder during its rotation, such changes in position being caused by the eccentricity of the cylinder with regard to the drum 3. The vane 11 is guided in the wall of the cylinder 9 in the front direction, in the direction of rotation, by a blade 16 sliding in a recess 17 and pushed by springs 18, and, at the rear, by rollers 19 placed in recesses provided at the extremities of the cylinder. The blade 16 extends along the whole cylinder 9 and ensures the tightness of the chamber 20 which is formed between the cylinders 3 and 9 in the front of the vane.

In the sleeve 2 are provided apertures or passages 21 disposed to the right of the cylinders 9. These cylinders are provided medially of their circumference with an aperture 22 near the vane and in rear thereof.

The drum 3 is provided with two ports 23 in the front of the vanes.

In order to ensure the equilibration, the two vanes are disposed at 180° in the drum 3.

In case of juxtaposition of several elements the vanes would be disposed for the same purpose at equal angles with regard to the different elements.

Tight joints between the cylinders 9, the bottom parts of the drum 3 and the partition 8 are ensured by segments 24 pushed by springs.

The casing 1 is provided with an outlet conduit 25 placed for example at its upper part.

It will be remarked that the vane 11 separates the chamber 20 from an opposite chamber 26 which is also formed between the cylinder 9 and the drum 3.

While rotating the shaft 5 in the direction indicated by the arrow *f* in Figure 2, the transported fluid will be sucked through the sleeve 2 and the passages 21 and 22 into a chamber 26, the capacity of which increases; at the same time the fluid contained in the chamber 20, the capacity of which is gradually diminished, will be discharged through

the passage 23 into the space 27 between the casing 1 and the drum 3 and escapes through the conduit 25.

If the vane 11 passes to the left of Figure 2, the suction will be effected anew at the rear of the vane and the forcing in the front of it, hence a continuous current of the sucked and forced fluid will be established.

The foregoing description applies to the form of the invention shown in Fig. 1, in which the outer drum 3 is movable and the sleeve 2 remains fixed, the drum being moved in the direction of the arrow *f*.

Figure 4 shows a modified form of the invention, according to which the drum 3 is moved in the contrary direction *f'*, the direction of the circulation of the transported fluid being simply reversed, the apparatus continuing to operate as a pump.

The fluid is sucked through the passage 23 into the chamber 20, the capacity of which increases, and at the same time the fluid contained in the chamber 26, the capacity of which diminishes, is discharged through the passages 22 and 21 across the sleeve 2, through which it escapes.

The same result will be obtained by turning the apparatus in the direction indicated by the arrow *f* (Fig. 2), by modifying the position of the orifices 22 and 23 with regard to the vane, that is to say the orifice 22 would have to be placed in the front of the vane in the direction of rotation and the orifice 23 at the rear of the same.

In some instances it would be possible to dispense with the casing 1 which is practically without utility if the fluid is air sucked directly from the exterior.

Inversely, when rotating the apparatus in the direction of *f'*, the orifice 22 being placed in front of the vane in the direction of rotation and the orifice 23 at the rear of the pallet, it will be obvious that the direction of the circulation of the fluid would be from the center toward the periphery.

In the event that the drum 3 is fixed and the sleeve 2 rotated, the inner cylinder 9 would be moved, that is to say oscillated circumferentially, analogously to the movement of the eccentric collars, owing to its fitting on the eccentric bosses 10 of the movable sleeve and the line of tangency of the two cylinders 3, 9 would describe the inner circumference of the drum 3, whereas the vane 11 would remain immovable, being preferably disposed in the vertical diametrical plane at the upper or at the lower point.

This form of the invention is shown in Figure 5.

The casing 1 is dispensed with since the outer drum is fixed.

According to the direction of rotation of the sleeve the fluid will circulate from the center toward the periphery or inversely, and the orifices 23 will be the orifices of discharge or intake. If the direction of rotation is the one represented in Figure 5 by the arrow *f''*, it will be obvious that the working of the appartus will be the same as described with regard to the form shown in Figures 1 to 3, since the relative motion is the same.

If the direction of rotation is the contrary one, the discharge will be effected across the shaft 2. Such an arrangement is preferable in case of employment of apparatus as overfeeder for explosion motors in order to blow the carburetted gases and to avoid the disadvantages resulting from the separation of the gaseous mixtures resulting from their different densities, the mixture being in this case and also in other analogous cases, sucked from the exterior toward the interior.

In the device represented in Figure 5, the rotation can be also effected in either direction by suitably disposing the orifices of intake and discharge on both sides of the vane.

Hence, the apparatus is reversible with regard to the direction of rotation as well as with regard to the role of the fixed and the movable elements.

The pump may comprise one single body, or a higher number of similar bodies.

The invention permits, without departing from the scope of the same, different modifications of the details. For example, for pumps of large dimensions, the guiding elements 16, 18 and 19 could be advantageously replaced by another appropriate guiding system, for example a cylindrical piece rotating or pivoted in lodgings provided in projections of the inner cylinder and comprising a longitudinal slit into which passes the vane with slight friction.

What I claim, is:—

1. Apparatus of the class described comprising an outer cylinder having a port in its periphery, an inner cylinder arranged eccentrically in the outer cylinder and having a peripheral port, one of said cylinders being arranged for rotary movement with respect to the other and each of said cylinders having heads, a tubular element extending through the inner cylinder concentrically with the outer cylinder and having eccentrics on which said inner cylinder turns, said tubular element having ports, and a substantially radial vane bearing against the inner periphery of the outer cylinder and arranged in substantially radial recesses in the heads of the inner cylinder which recesses are of greater width than said vane to permit lateral play of said vane and packing means for said piston.

2. Apparatus as claimed in claim 1 including rollers in said inner cylinder bearing against one side of said vane, and a spring projecting element also mounted in

said inner cylinder and bearing against the opposite side of said vane and on which said vane is free to pivot.

3. Apparatus as claimed in claim 1 in which the packing means includes spring projected packing elements at the ends of said vane.

4. Apparatus of the class described comprising an outer cylinder having a peripheral port, an inner cylinder eccentrically arranged in the outer cylinder and having a peripheral port, one of said cylinders being revoluble with respect to the other, a tubular element extending through said cylinders, arranged concentrically with respect to the outer cylinder and having a peripheral port, eccentrics on said tubular element on which said inner cylinder turns, and a substantially radially arranged vane bearing against the inner periphery of the outer cylinder, extending through the periphery of the inner cylinder and arranged for free lateral movement as well as for radial movement and packing means for said vane.

In witness whereof I affix my signature.

EDOUARD GODILLOT.