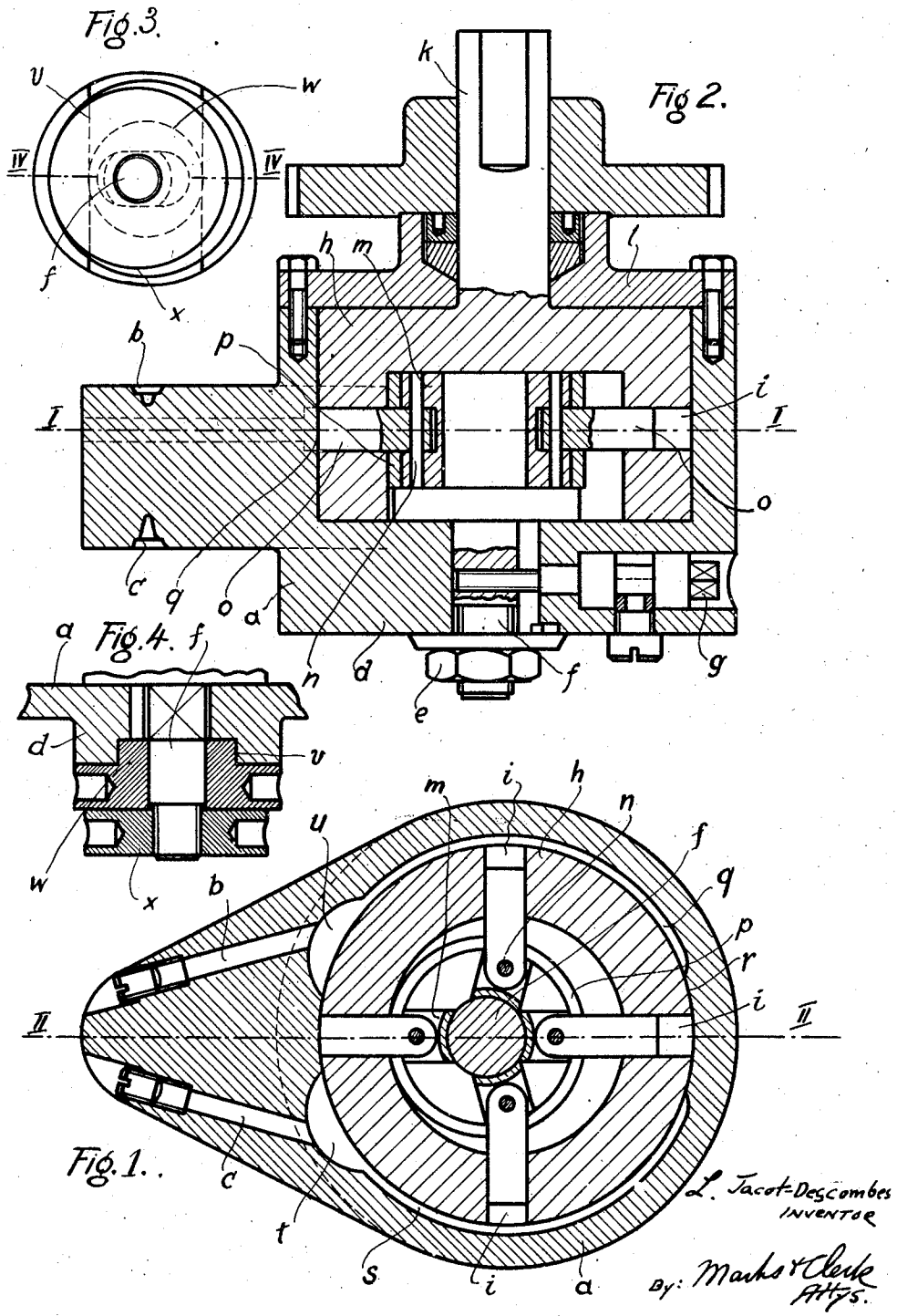
Nov. 19, 1929. L. JACOT-DESCOMBES 1,736,497

ROTATABLE PISTON PUMP AVAILABLE FOR VISCOSE

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Fig. 5.

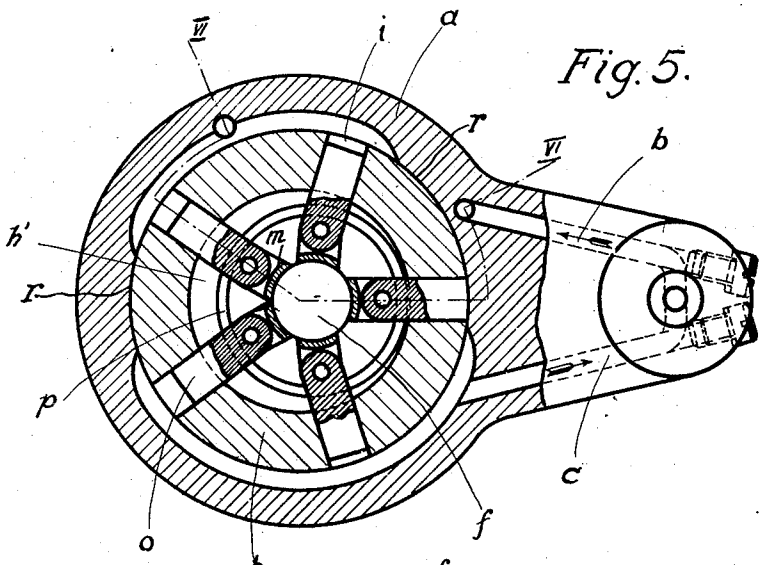
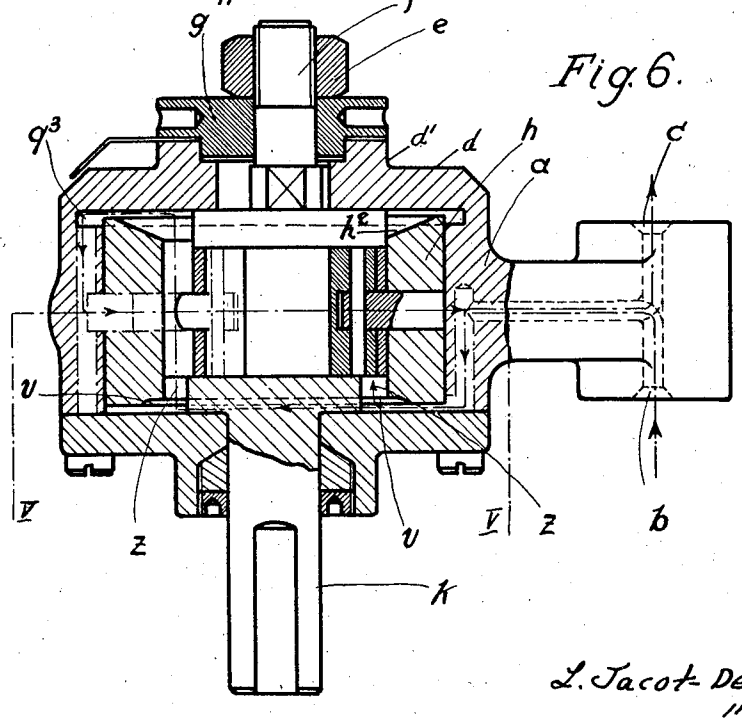


Fig. 6.



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Fig. 8.

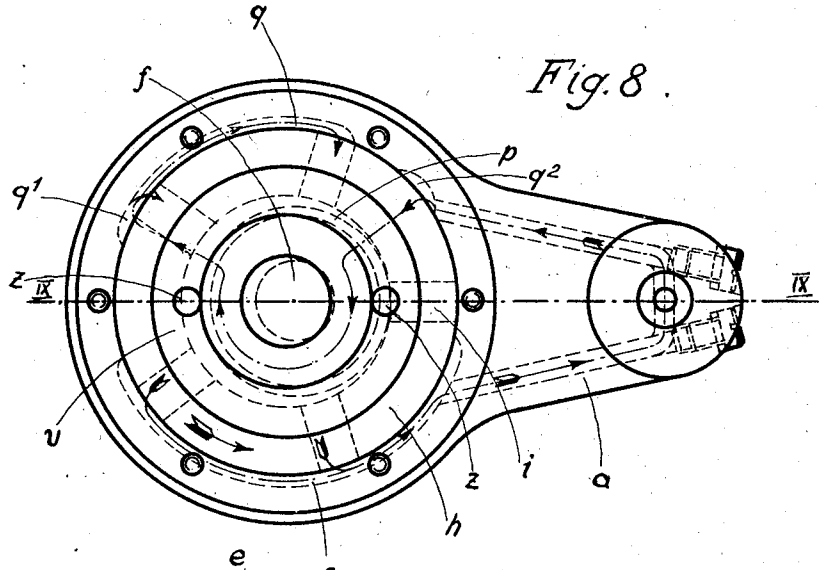
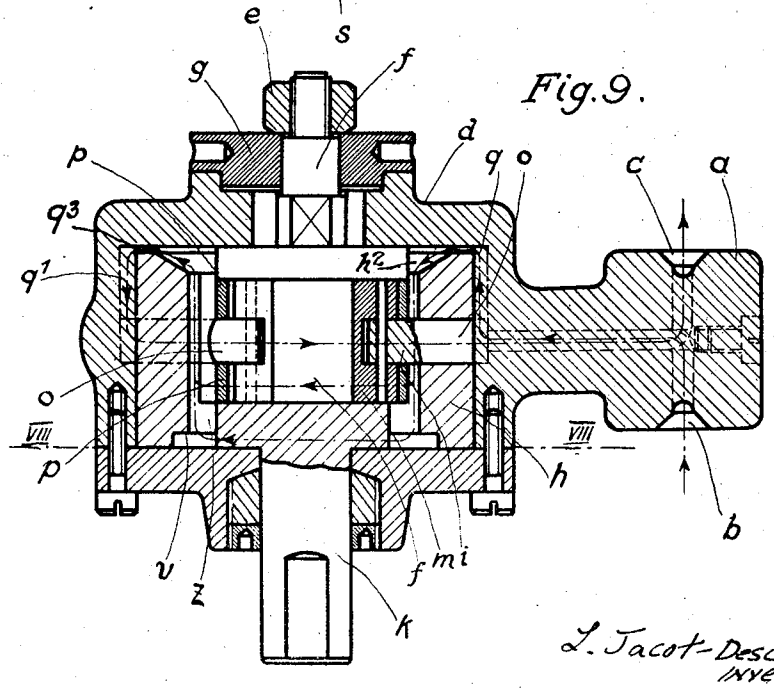


Fig. 9.



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Fig. 10.

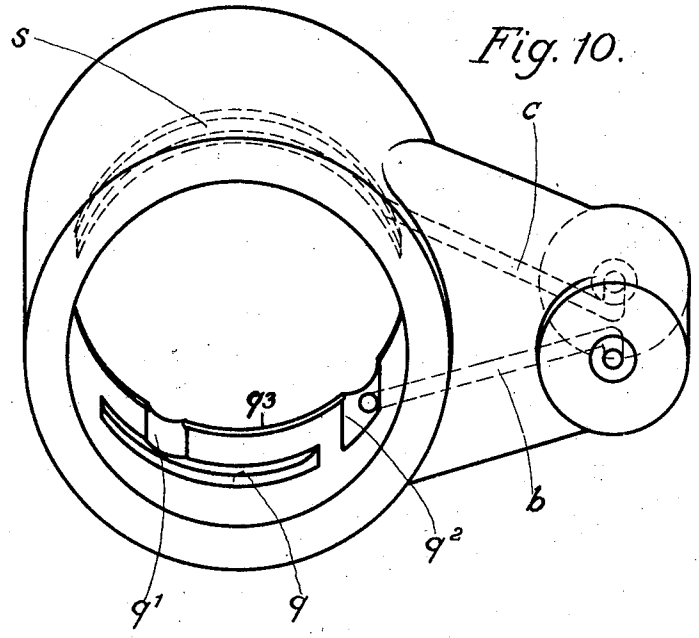
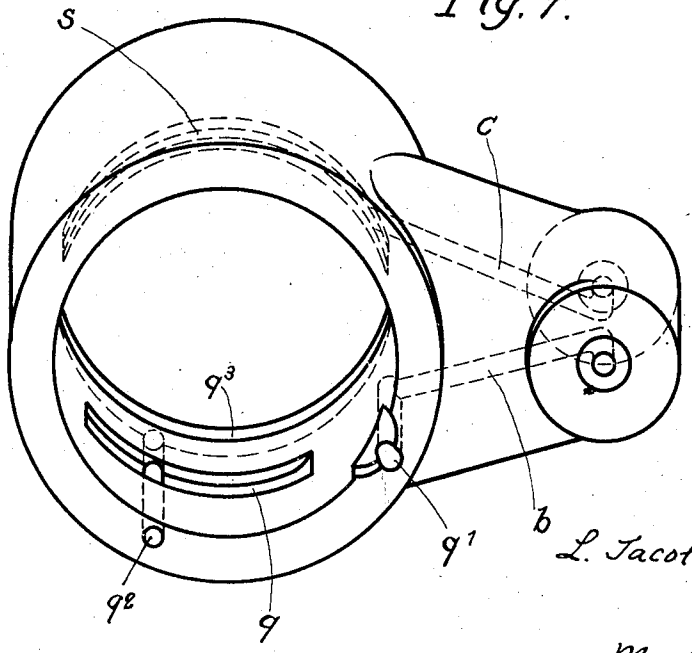


Fig. 7.



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Patented Nov. 19, 1929 1,736,497

UNITED STATES PATENT OFFICE

LÉON JACOT-DESCOMBES, OF TAVANNES, SWITZERLAND

ROTATABLE PISTON PUMP AVAILABLE FOR VISCOSE

Application filed February 24, 1928, Serial No. 256,749, and in Switzerland February 28, 1927.

The present invention relates to piston pumps available for viscose in the manufacture of artificial silk.

Rotatable piston pumps are alreadys known where the pump body is a rotor having two holes of the same diameter and pistons pressed by springs against a casing arranged eccentrically to the axis of the rotor. In this kind of pumps the liquid is drawn in and discharged into a chamber having the cross section of a segment. The pistons are pressed against the casing by means of springs which separate the same in a radial sense. In other pumps having pistons in the inside of a rotor these pistons are worked by eccentric disks inside of the pistons which is a costly arrangement requiring a complicated machining.

One object of the present invention is a piston pump having an adjustable output and being available especially for the manufacture of artificial silk and in which the body of the pump rotatively mounted is hollowed out and encloses a stationary eccentrically arranged pivot pin. The pistons are hinged to this pin so that their attaching points will oscillate around the stationary pivot axis and that the pistons will slide within the pump body while the latter is rotated.

Another object of the invention is means for lubricating automatically and abundantly the inner parts of the pump body and the pump body itself which heretofore has not been made to a sufficient extent. According to the present invention it is also rendered possible to counterbalance the pressures inside of the pump and to reduce thereby the motive power required.

To this end the admitted liquid passes across a counterbalancing chamber where it is constantly replaced and by progressing it will touch the mentioned ever moving parts so that they will be thoroughly lubricated.

In the annexed drawings four working forms are represented as examples.

Figs. 1 and 2 are sectional views of a first form;

Fig. 1 a section on line I—I in Fig. 2, and

Fig. 2 a section on line II—II of Fig. 1.

Figs. 3 and 4 are an end view and a cross section and relate to a modification of the adjusting device of the eccentricity between the axis of the pump body and that of the trunnion for the pistons.

Figs. 5, 6 and 7 relate to a third form.

Fig. 5 is a side view with the cover removed;

Fig. 6 is a cross section on line VI—VI of Fig. 5, and

Fig. 7 is a perspective view of the casing.

Figs. 8 to 10 relate to a fourth form;

Fig. 8 is a side view of the pump having the cover removed;

Fig. 9 is a cross section on line IX—IX of Fig. 8, and

Fig. 10 is a perspective view of the casing.

According to Figures 1 and 2 the orifices of the inlet and the discharge canals b and c of the pump are provided on the two opposite side faces of a latteral protuberance of the cylindrical casing a on one side face d of which is an oval hole forming a slide wherein is held fixed a trunnion f by means of a nut e. The relative position of the trunnion f within the said slide is made adjustable in a radial sense by a screw g which is held stationary by means of a set screw arranged transversally to the same.

The cylindrical pump body h is provided with a number of radial holes i all in the same plane. It is rotatably lodged in the cover plate l with an axis k forming a lengthening extended to the outside of the casing. In the hollow inside of the pump body h and fitted to the cylindrical surface of the eccentrically arranged trunnion f are provided slide shoes m hinged by means of pins n to pistons o fitted into the said holes i. These slide shoes are held in position around the trunnion f by means of the hoops p located on both sides of the said pistons.

The working of the pump is as follows:

While the pump body h turns it moves the pistons o. The slide shoes are guided by the pistons and are slidingly on the outside of the trunnion f. The eccentrical position of the trunnion with regard to the axis k determines the stroke of the pistons. The liquid is admitted to the pistons through the canal b and a circumferential groove q inside of the casing and between the two circumferential

spaces r where the casing a fits close to the pump body h and which separates the admission side from the discharge side. A similar groove s on the discharge side communicates with the discharge canal c. At the meeting of the canals b and c with the grooves q, s expansion chambers u, t are provided as regulating means for the flow of the liquid.

The working form shown in Figs. 3 and 4 differs from that in the foregoing figures by the method of adjusting the eccentricity of the axis f. The outer wall of the pump body h presents a groove v in which turns an eccentric disk w keyed on to the axis of the trunnion f and graduations are provided on a disk x which is rigidly fast to said trunnion and to said eccentric disk which graduations serve to determine the eccentricity to which the stroke of the pistons may be limited. Thus it will be possible to fix the exact output of the pump.

According to Figures 5 to 7 the cylindrical casing a has a lateral extension containing the orifices of admission and discharge canals b and c. In the eye d on the side face of the casing is lodged slidably in an oval hole the stationary trunnion f and maintained in its respective position by means of a nut e and an adjusting screw g. Inside of the casing is the hollow pump body h provided with radial perforations i wherein are slidably held the pistons o by means of slide shoes m arranged around said stationary trunnion f. These shoes are fitted to the surface of the trunnion and held in position by means of hoops p on each side of the pistons.

Inside of the casing separated by the two extents r where the pump body fits close to the casing are the grooves q and s into which discharge the radial pump cylinders of the body. The groove q is on the admission side where the pistons move towards the center and are filling. The groove s is on the discharge side and communicates with the discharge canal c. The inlet canal b communicates through a transversal canal q^1 in the casing with a circular groove v of the pump body next to the cover of the casing. From this groove v which is a counterbalancing chamber ports z in the pump body admit the liquid to the hollow inside h^1 of the pump body and from there with the aid of a conical hollow h^2 in said body into a circular groove q^3 provided in the casing. This groove communicates with the groove q of the admission side through a transverse canal q^2.

The working of the pump is as follows:

When the hollow pump body turns under the influence of a power acting on the axis k the pistons owing to the eccentrical position of the stationary trunnion f will be reciprocated within the radial cylinders. These movements suck up the liquid from the groove q into the cylinders i which after having passed the extent of contact between pump body and casing which separates the two grooves q and s will discharge their content into the grooves s. The sucking effect will be transmitted from the groove q through groove q^3 and the inside of the pump body and the ports z to the counterbalancing chamber v. From here the sucking effect will be transmitted through the canal q^1 to the admission canal b. Thus the liquid will be always renewed and circulated through the whole pump and will touch all the movable parts so as to assure a perfect and complete lubricating. The full part of the pump body making contact with the cover will also get lubricated. Besides the two face sides of the pump body are making contact with a liquid of the same pressure and these parts will therefore be counterbalanced.

In the working form according to the Figures 8, 9 and 10 corresponding parts are designated with the same letters of reference. The canal q^1 and the groove q^3 are provided on the inside of the casing. These conduits are directed in an inverse direction so that the circulating liquid takes another path. The sucking effect will be transmitted from the groove q through the canal q^1 into the hollow inside of the pump body and from there through the cavity q^2 to the admission canal b of the pump. The sucked-in liquid fills the hollow inside of the body h completely and lubricates all the movable parts there. Liquid will also come through the ports z into the counterbalancing chamber v and will be renewed there owing to the moving parts inside of the pump body.

Here therefore the two chambers instead of getting crossed one after the other by the total liquid supply, as was the case in the preceding working form, are crossed on a certain part of their path by two separate branches of liquid. The lubricating of all the parts will therefore be effected by a liquid which is constantly renewed and which has not time enough to change and to lose its lubricating qualities as is generally the case with the viscose. Also in this working example the same pressure will exist on both side faces of the pump body.

It is evident that where the liquid circulates through one of the chambers and then through the other the direction of the flow of the liquid through the pump could be inverse of that indicated in the preceding case that is the liquid from the admission canal could be directed into the chamber of the mechanism and from here into the admission groove.

Attention must be called to the fact that with the arrangement according to the present invention a lateral adjustment of the piston shoes is rendered possible, a fact which is not present in known pumps of this kind. This adjusting possibility of the shoes is the necessary condition for the regular and exact working of such pumps and ever needed be-

cause it is practically not possible to drill the radial holes in the pump body with such an exactness that the axes of all the cylinders coincide with one and the same plane.

What I claim as new is:

In a rotatable piston pump available for viscose and having an adjustable out-put, the combination, a cylindrical casing possessing a lateral extension and a cover plate constituting its one side face, a stationary trunnion projecting into the inside of said casing and held adjustably in a radial sense in the other side face of the casing, a cylindrical hollow pump body in contact with the inside of the casing only at two limited and diametrically opposed extents and having at least one set of radial perforations and an axis integral with it mounted rotatably in said cover, pistons fitted slidably into said perforations of the pump body and hinged to slide shoes capable of some lateral adjustment and fitted close to the surface of said trunnion, hoops adapted to mantain the contact between said shoes and the trunnion, two circumferential segmental grooves provided in the casing and separated by said contact extents between the casing and the pump body, a circular groove between this body and the bottom face of the casing and a counterbalancing chamber on the opposite side between the pump body and the cover plate, admission and discharge canals with orifices in said lateral extension of the casing and communicating canals between the admission canal and the counterbalancing chamber and between the discharge canal and the said circular groove and circumferential discharge groove, the whole with a view of lubricating all movable parts of the pump with a constantly renewed liquid.

In testimony whereof I affix my signature.

LÉON JACOT-DESCOMBES.