May 30, 1933. H. M. LA BRIE 1,912,284

PUMP

Filed June 14, 1932

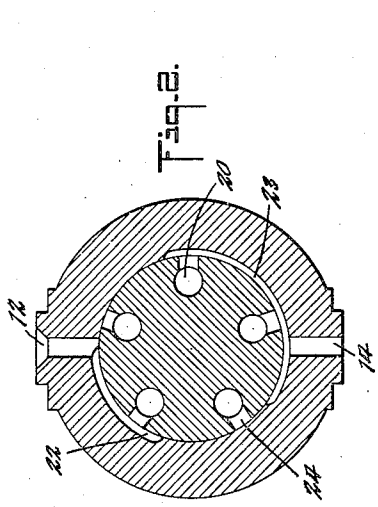


Fig. 2.

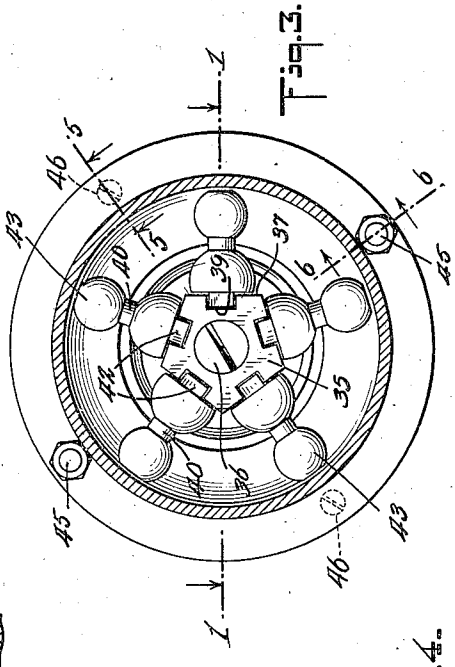


Fig. 3.

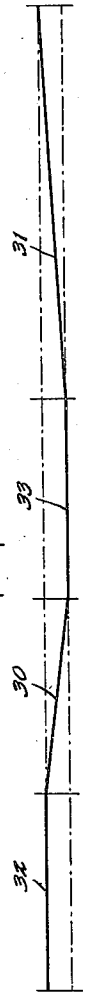


Fig. 4.

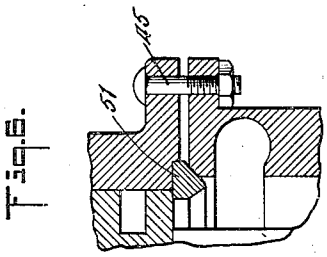


Fig. 6.

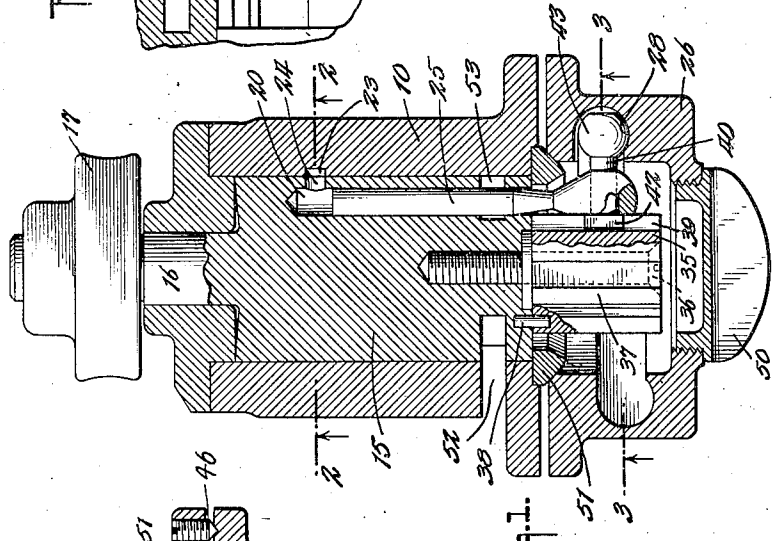


Fig. 1.

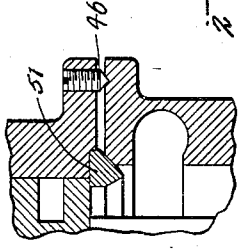


Fig. 5.

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BY HIS ATTORNEYS

Howson and Howson

Patented May 30, 1933 1,912,284

UNITED STATES PATENT OFFICE

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PUMP

Application filed June 14, 1932. Serial No. 617,189.

This invention relates to pumps, and more particularly to devices of this character adapted for pumping viscous liquids, such as the type of pumps used in the manufacture of artificial silk, for forcing the spinning solution through the spinneret.

The main object of the invention is to avoid movement of the pump piston when the cylinder is not in communication with the inlet or outlet ports.

Other objects are to improve the construction and operation of pumps of this character, to render them economical to manufacture, reliable in use, and otherwise well adapted for the purposes set forth, as will be apparent from the following description in conjunction with the accompanying drawing, in which—

Figure 1 is a vertical longitudinal section through a pump according to the preferred embodiment of the present invention;

Figure 2 is a cross-section taken along the line 2—2 of Figure 1;

Figure 3 is a cross-section taken along the line 3—3 of Figure 1;

Figure 4 is a development of the profile of the novel cam race;

Figure 5 is a partial section taken along the line 5—5 of Figure 3; and

Figure 6 is a partial section taken along the line 6—6 of Figure 3.

The pump comprises a cylindrical pump casing 10 having an inlet 12 through which the spinning solution is supplied, and an outlet 14 through which the spinning solution is forced to the spinneret. A rotor 15 is mounted in the casing 10 and has a shaft 16 extending through the top of the casing and provided with a gear 17 by means of which the rotor is driven. The rotor 15 is longitudinally bored to form a plurality of cylinders 20, five being shown in the present instance, equi-distant from and parallel to the axis of the rotor.

As shown in Figure 2, a loading port 22 is formed inside the casing 10 in communication with the inlet 12, and an unloading port 23 is provided, which communicates with the outlet 14. Each cylinder 20 has a passage 24 extending outwardly therefrom in the annular plane of the ports 22 and 23. A plunger 25 is snugly fitted in each of the cylinders 20, and extends downwardly below the bottom of the rotor 15.

A hollow cam 26 is secured to the bottom of the casing, and is provided with a cam race 28, which as shown in Figure 4 has an inclined portion 30 corresponding to the loading port, and an oppositely inclined portion 31 corresponding to the unloading port. The cam race 28 also comprises non-inclined portions 32 and 33, corresponding to the bridges between the ports. The portions 32 and 33, which are not inclined, appear as straight, parallel lines in the development shown in Figure 4.

A guide post 35 is secured to the bottom of the rotor 15 as by means of a screw 36, and has a face 37 for each of the pistons of the rotor. A pin 38 prevents relative rotation of the guide post and rotor. In the form shown each face 37 has a slot 39 cut therein, parallel to the axis of the rotor. Radial plunger guide pins 40 are carried by the lower end of each plunger 25. The inner end of each pin 40 has a shoe 42 slidable in the groove 38 and the outer end carries a follower 43 received in the cam race 28. In the form shown, the cam race is circular in radial section and the follower 43 is therefore spherical.

The cam 26 is secured to the casing 10 by bolts 45, in such a manner that it may be tilted about an axis through the bolts 45 by means of adjusting screws 46. This adjustment will vary the inclination of the cam race portions 30 and 31 and thus adjust the stroke of the plungers.

The cam 26 has a cap 50 threaded in the lower portion thereof and the hollow interior of the cam is preferably filled with a suitable lubricant. In order to seal the joint between the casing 10 and the cam 26, and permit the tilting adjustment without breaking the seal, a ball face sealing ring 51 is interposed between the casing 10 and the cam 26.

Means are provided for discharging any of the material being pumped which may have leaked past the plunger 25, and thus preventing this material from fouling the

lubricant contained inside the cam. For this purpose a slot 52 is cut through the casing 10 into the bore thereof, and a slot 53 is cut in the rotor 15 so as to communicate with the cylinder 20 associated with each of the plungers 25.

In operation, the rotor 15 being driven by the gear 17 in the direction of the arrow shown in Figure 2, the followers 43 will be driven along the cam race 28. As the passage 24 for each cylinder passes the bridge and communicates with the loading port 22, the follower 43 passes down the inclined portion 30 of the cam race and thus draws the material to be pumped into the cylinder 20. As the passage 24 leaves the loading port 22 and travels around the bridge, the follower 43 rides along the straight cam race portion 33 and thus is given no longitudinal movement. As the passage 24 comes into communication with the unloading port 23, the cam follower 43 passes up the inclined cam race portion 31 thus driving the plunger upward, and forcing the material out through the outlet 14. During the remaining angle of rotation, the follower 43 rides along the cam race portion 32 which is not inclined, and hence gives no longitudinal movement to the plunger.

While the preferred embodiment of the invention has been disclosed in detail, the invention is not limited to the details disclosed, but instead includes such embodiments thereof as fall within the scope of the appended claims.

I claim:

1. In a spinning pump, a casing having inlet and outlet ports with bridges therebetween, a rotor in said casing having cylinders communicating successively with said ports and bridges, plungers slidable in said cylinders, a hollow cam having a flange bolted to said casing, said cam having a race of substantially circular cross section comprising inclined portions corresponding to said ports, and non-inclined portions corresponding to said bridges cut into the inner wall thereof and having a greater major diameter than said rotor, a guide post secured to said rotor having slots parallel to said plungers, and radial members carried by said plungers comprising substantially spherical cam followers received in said race and guide shoes engaging said slots and means for preventing the material being pumped from passing inside said cam.

2. In a spinning pump, a casing having inlet and outlet ports with bridges therebetween, a rotor in said casing having cylinders communicating successively with said ports and bridges, plungers slidable in said cylinders and having cam followers, a hollow cam having a race receiving said followers and comprising inclined portions corresponding to said ports and non-inclined portions corresponding to said bridges and containing lubricant, a ball faced sealing ring engaging said cam and having a rear surface seated on said casing and retaining said rotor, and adjustment screws for tilting said cam with respect to said casing on the ball face of said sealing ring about an axis in an axial plane through said inclined portions and through said ports.

3. In a spinning pump, a casing having inlet and outlet ports with bridges therebetween, a rotor in said casing having cylinders communicating successively with said ports and bridges, plungers slidable in said cylinders and having cam followers, a hollow lubricant containing cam secured to said casing and having a race receiving said followers, said race having inclined portions corresponding to said ports and non-inclined portions corresponding to said bridges, a ball faced sealing ring on said casing, means for tilting said cam on said ball face of said sealing ring, said casing having an open slot between said ports and sealing ring, and said rotor having a registering slot communicating with each cylinder, whereby leakage of material being pumped is prevented from fouling said lubricant.

4. In a spinning pump, a casing having inlet and outlet ports with bridges therebetween, a rotor in said casing having cylinders communicating successively with said ports and bridges, plungers slidable in said cylinders and having cam followers, a hollow cam associated with said casing having a race receiving said followers and comprising inclined portions corresponding to said ports and non-inclined portions corresponding to said bridges and containing lubricant, means for securing said cam to said casing, means for tilting said cam about said securing means whereby the inclination of the port portions of said race may be varied, sealing means between said cam and casing permitting said adjustment and preventing escape of lubricant, said casing having an open slot between said ports and said sealing means, and said rotor having a registering slot communicating with each cylinder, whereby leakage of material being pumped is prevented from interfering with the tilting of said cam on said sealing means, and from fouling said lubricant.

5. In a spinning pump, a casing having inlet and outlet ports with bridges therebetween, a rotor in said casing having cylinders communicating successively with said ports and bridges, plungers slidable in said cylinders, a hollow cam having a race comprising inclined portions corresponding to said ports and non-inclined portions corresponding to said bridges and containing lubricant, adjustable means for securing said cam to said casing whereby the inclination of the port portions of said race may be varied, and sealing

means between said cam and casing permitting said adjustment and preventing escape of lubricant, said sealing means engaging said rotor and retaining said rotor in said casing.

In testimony whereof I have signed my name to this specification.

HOWARD M. LA BRIE.