Feb. 16, 1926.

1,573,525

H. SANDOZ

MULTICYLINDER PUMP

Filed Sept. 29, 1925

FIG. 1.

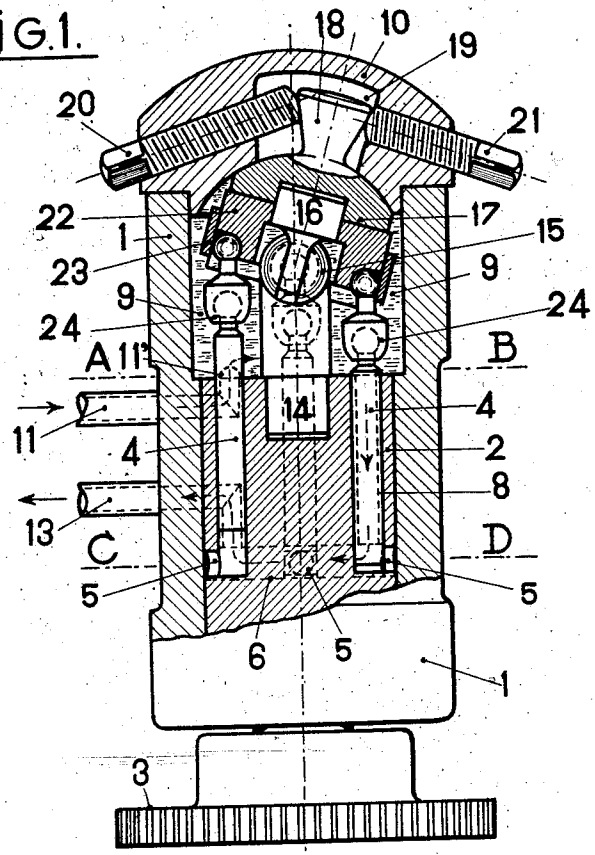
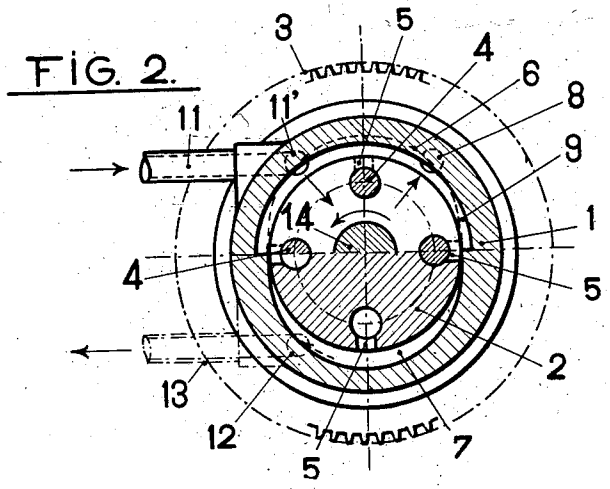


FIG. 2.



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Patented Feb. 16, 1926. 1,573,525

UNITED STATES PATENT OFFICE.

HENRI SANDOZ, OF TAVANNES, SWITZERLAND, ASSIGNOR TO TAVANNES WATCH CO., S. A., OF TAVANNES, SWITZERLAND, A CORPORATION OF SWITZERLAND.

MULTICYLINDER PUMP.

Application filed September 29, 1925. Serial No. 59,262.

To all whom it may concern:

Be it known that I, HENRI SANDOZ, a citizen of the Republic of Switzerland, residing at Tavannes, in the Canton of Berne, Switzerland, have invented new and useful Improvements in Multicylinder Pumps, of which the following is a specification.

This invention relates to multi-cylinder pumps intended mainly for the suction and forcing of liquids of sirupy constituency, such as viscose used in the manufacture of artificial silk.

Among the best-known multi-cylinder pumps serving to force viscose through dies or plates there are some of which the cylinders are formed by recesses, provided in a rotatable cylindrical body, disposed parallel to the axis of rotation of this body and at equal distances from the axis, the cylindrical body rotating in a cylindrical casing in which it fits, except over a part corresponding to the bottoms of the recesses where it is not in contact with the internal wall of the casing at this non-circular part, except on the diametrically opposed generatrices, in such manner as to form with this part of the internal wall of the casing two chambers, an inlet chamber and a delivery chamber, with which each recess or cylinder communicates alternately in the course of each rotation of the cylindrical body, the cylinders having reciprocating pistons connected to a rotating member controlled by the cylindrical body and the axis of which cuts at an angle that of the cylindrical body.

The pump in accordance with the invention is of the type above referred to and is characterized by the fact that the liquid drawn in and forced by the piston plungers is led towards the above-mentioned inlet chamber by way of a chamber enclosing the piston connecting members, in such manner that the liquid is subjected in the pump itself to an energetic agitation under the action of the connecting members and that it also continuously lubricates the movable parts of the pump.

This arrangement gives to the pump forming the subject of the present invention important advantages over known pumps of this kind, because the viscose is given a preliminary agitation and passes in a homogeneous condition and in a state of perfect purity to the draw dies or plates. Moreover, it serves at the same time as a lubricant, avoiding the need for oil or grease, which by infiltration would mix and eventually combine with the viscose, altering the chemical and physical properties required of the latter.

The annexed drawing shows by way of example one embodiment of the invention,

Fig. 1 being a part longitudinal section and part elevation, while

Fig. 2 is a section one half on the line A—B and one half on the line C—D of Fig. 1.

The pump illustrated is intended for pumping and discharging viscose and comprises a casing 1 in which is rotatable a cylindrical body 2. The latter is driven by a pinion 3 and is formed with four holes or recesses disposed parallel to its axis of rotation and at equal distances from such axis. These recesses constitute the cylinders or pump bodies of the pump and each have a plunger 4. At the bottom of each recess is provided a lateral port 5, which communicates during each rotation of the body 2 alternately with a suction chamber 6 and a delivery chamber 7. These chambers provided in the casing 1 opposite the bottoms of the holes symmetrically on opposite sides of the body 2 have a transverse section of crescent form. The suction chamber 6 communicates by a passage 8 formed in the casing 1 with a chamber 9 formed in the casing 1 between the cover 10 of the latter and the body 2. To the chamber 9 there is connected at 11′ a pipe 11 by which the viscose is introduced. The delivery chamber 7 communicates by the opening 12 with a pipe 13 by which the viscose is discharged to the dies or the like.

In the cylindrical body 2 is secured a spindle 14 connected through a universal joint 15 with a pivot 16, provided on a spherical segment 17 having a head 18 entering a cavity 19 in the cover 10 of the case 1. The spherical portion of the segment 17 bears on a corresponding spherical surface on the cover 10, so that the segment may slide over the said surface and may be more or less inclined in relation to the axis of rotation of the body 2, the centre of the spherical segment coinciding with the centre of rotation of the universal joint 15. The segment is held by two screws 20, 21, in the cover 10, permitting of the segment being given any desired inclination.

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On the pivot 16 is fastened a plate 21 bearing with its rear face on the plane surface of the segment 17. On the front face of the plate 22 are movably held, by means of a ring 23, four small ball-like members 24, each of which is connected by a ball joint to one of the four pistons 4.

The plate 22 being fixed to the pivot 21 necessarily takes the inclined position which will be given to the segment 17 and, moreover, participates in the movement of rotation of the body 2. As a result the plate 22 imparts to the pistons 4 a reciprocating movement and determines the length of stroke, the latter being the greater the more inclined the plate 22 to the axis of rotation of the cylindrical body 2.

The operation of the pump is as follows. Viscose enters by the pipe 11 under a pressure of about two atmospheres and passes into the chamber 9 which it fills completely. By the action of the members connecting the pistons, which are set in rapid rotation, the viscose is subjected to energetic agitation in the chamber 9, which renders it perfectly homogeneous. At the same time the viscose lubricates the body 2, the pistons and all the internal movable parts of the pump. From the chamber 9 the viscose is partly forced and partly drawn into the suction chamber 6 through the passage 8. From there it is drawn by the plungers 4 of the body 2 through the ports 5 and is at once forced through the latter into the delivery chamber 7 and through the opening 12 into the pipe 15 connected to the dies or the like.

The viscose is thus constantly in circulation within the pump while it is in operation. Nevertheless the pump may be completely emptied by expelling the viscose so as to prevent the latter from penetrating into the factory cavities and causing deterioration of the pump when the latter is not in use. For this purpose the pipe 11 may be closed by means of a cock (not shown in the drawing) while the pump is in operation.

What I claim—

A multi-cylinder pump including a casing, a cylindrical body rotatable within said casing, said cylindrical body formed with passages disposed parallel to its axis of rotation and equi-distant from said axis, such passages constituting the cylinders of said multi-cylinder pump, said casing formed with diametrically opposed suction and delivery chambers with which the cylinders on the rotatable body are brought into communication in turn, plungers arranged in said cylinders, a compartment in said casing above said plungers, a plunger connecting member located in said compartment and rotatable by the cylindrical body to actuate said plungers, an inlet pipe connected with said compartment and a connection between said compartment and said suction chamber whereby the liquid to be drawn in will pass through said compartment and will be subjected to energetic agitation by said plunger connecting member and will lubricate the movable parts of the pump.

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

HENRI SANDOZ.