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C. W. LAWSEK

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SPINNING PUMP

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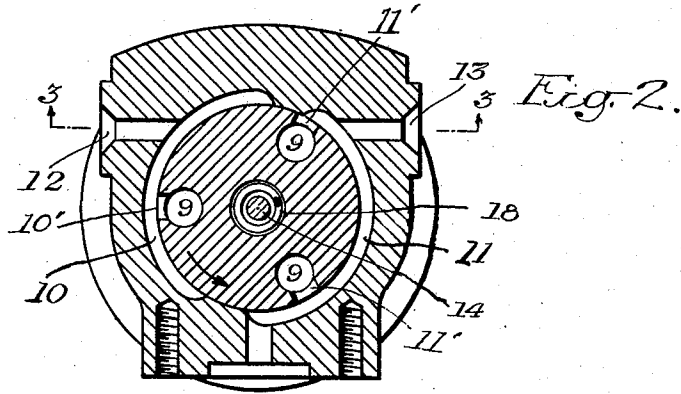


Fig. 1.

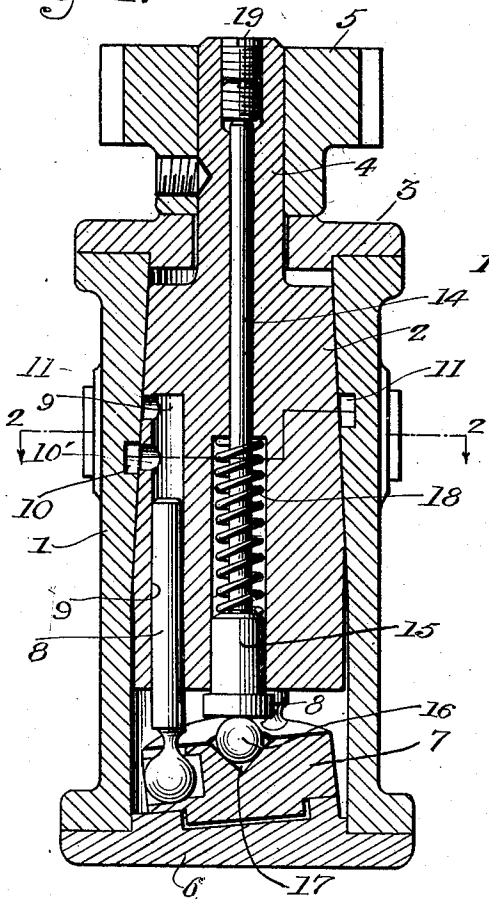
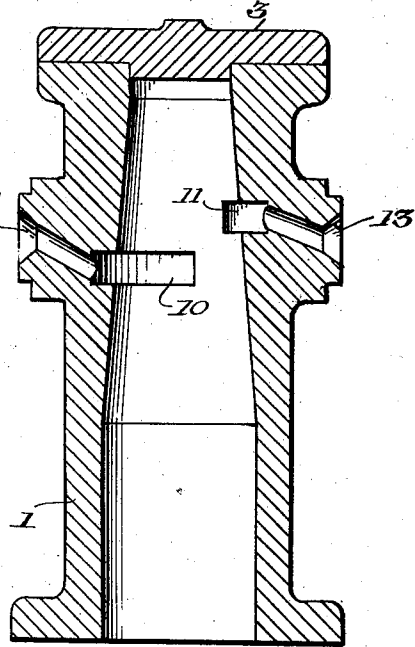


Fig. 3.



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SPINNING PUMP

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This invention relates primarily to improvements in spinning pumps of the type used in the manufacture of artificial silk and the like.

One of the objects of the invention is to provide a novel form of casing and rotor insuring long life without appreciable loss of operating efficiency.

Another object of the invention is to provide a novel arrangement of intake and discharge ports insuring against leakage from the one port to the other.

In the attached drawings:

Figure 1 is a longitudinal section through a spinning pump made in accordance with my invention;

Figure 2 is a transverse section on the line 2—2, Fig. 1, and

Fig. 3 is a section of the casing and its top head on the line 3—3, Fig. 2.

Referring to the drawings, the pump comprises in a preferred form the usual casing 1, the upper portion of the chamber of which is tapered. Within the said chamber is mounted for rotation a rotor 2 which is tapered from near its lower end to its upper end to correspond with the taper of the said chamber. The casing has at one end a head 3 through which a reduced extension 4 of the rotor 2 projects to receive on its outer end an operating pinion 5 by which the rotor is rotated in counter-clockwise direction, as indicated by the arrow in Fig. 2.

The casing 1 has at the other end a head 6 which in the present instance has formed on the inner face thereof a seat for an inclined cam 7. The cam 7 is operatively connected in well known manner with a plurality of plungers 8 which are adapted to slide longitudinally in cylindrical bores or openings 9 in the rotor 2, the cylindrical bores or openings 9 communicating at their inner ends with intake and discharge channels 10 and 11 in the inner wall of the casing 1 which are respectively connected with an intake port 12 and a discharge port 13 in the casing. Communication of the openings 9 with the channels 10 and 11 is effected through holes 10' and 11' provided in the rotor 2 in pairs, the openings of each pair being located one above

the other, as shown in Fig. 1 of the drawing. The general arrangement, which will be readily understood by those familiar with the art, is such that with rotation of the rotor 2 through the medium of the pinion 5, the connection between the cam 7 and the plungers 8 occupying the cylinders 9 in the rotor results in a corresponding rotation of the cam 7 and in a reciprocation of the plungers in their respective cylinders. The reciprocation of the plungers is so timed that in each instance the suction stroke occurs while the cylinder is in communication with the intake channel 10, while the compression stroke occurs while the cylinder is in communication with the discharge channel 11.

In the present instance, the cam 7 is held to its seat through the medium of a rod 14 extending through a central bore in the rotor 2 and having at its inner end a head 15 which contacts with a ball 16 occupying a central recess 17 in the inner face of the cam 7. A spring 18 confined behind the head 15 exerts a pressure resiliently holding the said head 15 in contact with the ball 16, and the rod is also positively held in the desired adjusted position by means of set screws 19 at the outer end.

It will be noted that in the present instance the rotor 2 is tapered towards the end which projects through the head 3, and that the internal chamber of the casing 1 is correspondingly tapered for reception of the rotor. In this manner, it will be apparent that any wear resulting either in the casing or in the rotor will be compensated by readjustment of the tapered rotor, and that the arrangement thereby provides for the maintenance of a close operating fit between the rotor and the casing which prevents leakage and loss of efficiency due to wear.

It will further be noted that the spring 18 functions not only to hold the cam 7 to its seat, but also creates a pressure on the rotor 2 tending to force it into its tapered seat within the casing, thereby maintaining the close operating fit between the casing and the rotor in spite of any wear developing between these parts. The construction insures long life for the pump without appreciable diminution in

the efficiency due to wear between the parts and resulting leakage.

A further novel and improving structural feature is found in the relative arrangement of the intake channel 10 and the discharge channel 11. It will be noted that these channels are offset from each other longitudinally of the casing, which results in a materially increased space between the adjacent ends of the channels. This space between the adjacent ends of the channels in a circumferential direction is necessarily small, and where, as heretofore, the channels have been arranged in the same circumferential plane there is a tendency for bypassing or leakage between the channels, particularly after wear has developed between the rotor and the casing. By offsetting the channels as described above, the effective space separating the adjacent ends of the channels is materially increased and the danger of leakage at this point correspondingly reduced. This arrangement of ports in conjunction with the aforescribed tapered formation of the rotor and casing results in practical elimination of leakage between the ports, and in a high operating efficiency which is maintained over extended periods of useful life.

I claim:

1. In a spinning pump, the combination with a casing having intake and discharge ports and a tapered chamber with which said ports communicate, of a correspondingly tapered rotor mounted in and seated upon the tapered wall of said chamber whereby the contacting tapered surfaces determine the position of the rotor axially in the casing, said rotor having cylindrical openings adapted to be brought into alternate and successive communication with the said ports as the rotor is rotated, plungers in said cylindrical openings, and means in the casing for reciprocating the plungers as the rotor is rotated.

2. In a spinning pump, the combination with a casing having intake and discharge ports and a tapered chamber with which said ports communicate, of an axially and correspondingly tapered rotor mounted in the chamber and having cylindrical openings adapted to be brought into alternate and successive communication with the said ports as the rotor is rotated, plungers in said cylindrical openings, means in the casing for reciprocating the plungers as the rotor is rotated, and a spring holding the rotor resiliently against the tapered wall of said chamber.

3. In a spinning pump, the combination with a casing having intake and discharge ports and a tapered chamber with which said ports communicate, of an axially and correspondingly tapered rotor rotatably mounted in and seated upon the tapered wall of said chamber whereby the contacting tapered surfaces determine the position of the

rotor axially in the casing, said rotor having cylindrical openings adapted to be brought into alternate and successive communication with the said ports as the rotor is rotated, plungers in said cylindrical openings, means in the casing for reciprocating the plungers as the rotor is rotated, positive means preventing retraction of the rotor from its tapered seat in the chamber, and a spring adapted to exert a pressure tending to force the rotor against said seat.

4. In a spinning pump, the combination with a casing having a tapering chamber and intake and discharge ports in said tapered section, of an axially and correspondingly tapered rotor rotatably seated in said tapered section of the chamber whereby the contacting tapered surfaces determine the position of the rotor axially in the casing, said rotor having cylindrical openings therein with ports in the tapered section adapted for alternate and successive communication with the said casing ports as the rotor rotates, plungers in said cylindrical openings, means in the casing for reciprocating the plunger in timed relation with the rotative movement of the rotor, and means for retaining the rotor firmly on its tapered seat in the casing.

5. In a spinning pump, the combination with a casing having an interior tapered chamber circular in cross section and having longitudinally spaced intake and discharge ports entering the side walls of said chamber at opposite points, of a rotor mounted in the chamber and having cylindrical openings adapted to be brought into alternate and successive communication with the said ports as the rotor is rotated, plungers in said cylindrical openings, and means in the casing for reciprocating the plungers as the rotor is rotated.

6. In a spinning pump, the combination with a casing having a cylindrical chamber tapered at one end and having intake and discharge ports in the tapering wall, of a rotor mounted in the chamber and being tapered axially at least in part to seat closely against the tapered wall of the chamber, said rotor having cylindrical openings therein with ports in the tapered section adapted to register with the said casing ports as the rotor rotates, plungers in said cylindrical openings, a cam seated in the end of the chamber and adapted for operative engagement with said plungers to reciprocate the latter as the rotor rotates, cooperating means between the rotor and cam to hold the rotor and cam to their respective seats, and means for rotating the rotor.

7. In a spinning pump, the combination with a casing having a cylindrical chamber tapered at one end and having intake and discharge ports in the tapering wall, of a rotor mounted in the chamber and being tapered axially at least in part to seat closely

against the tapered wall of the chamber, said
rotor having cylindrical openings therein
with ports in the tapered section adapted to
register with the said casing ports as the
rotor rotates, plungers in said cylindrical
openings, a cam seated in the end of the cham-
ber and adapted for operative engagement
with said plungers to reciprocate the latter
as the rotor rotates, an adjustable rod ex-
tending longitudinally through the rotor to
the exterior of the casing, a head slidably
mounted in a recess in the inner end of said
rotor and having a bearing with the inner
end of said rod, said head being also opera-
tively associated with the cam, a spring in
back of said head and acting through said
head to resiliently retain the cam on its seat,
means for adjusting the rod in the rotor
against the inner end of said head and for
locking said rod in the adjusted position, and
means for rotating the rotor.

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