

Feb. 7, 1939.

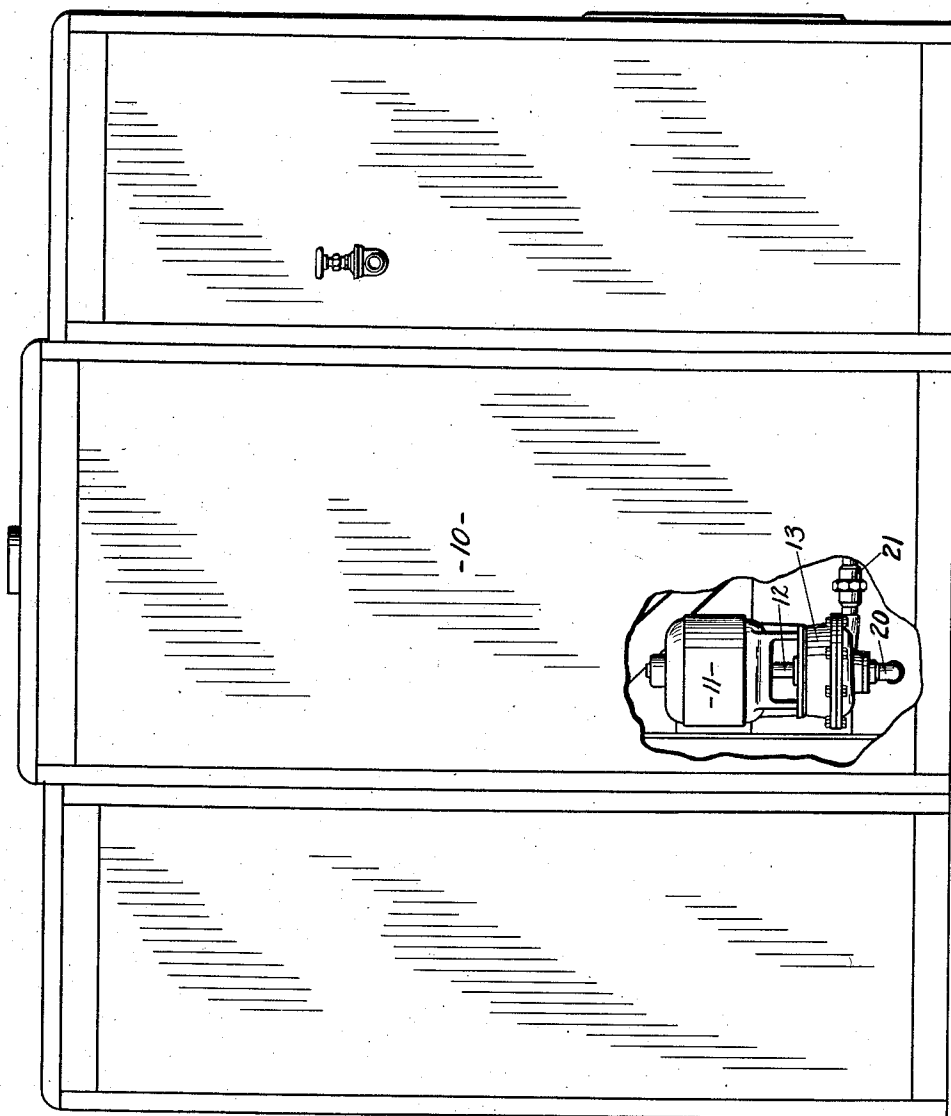
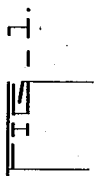
L. E. SODERQUIST

2,146,161

LUBRICATION OF SOLVENT PUMPS

Filed June 14, 1937

3 Sheets-Sheet 1



INVENTOR.
Leslie E. Soderquist
BY *Tefft & Tefft*
ATTORNEY.

Feb. 7, 1939.

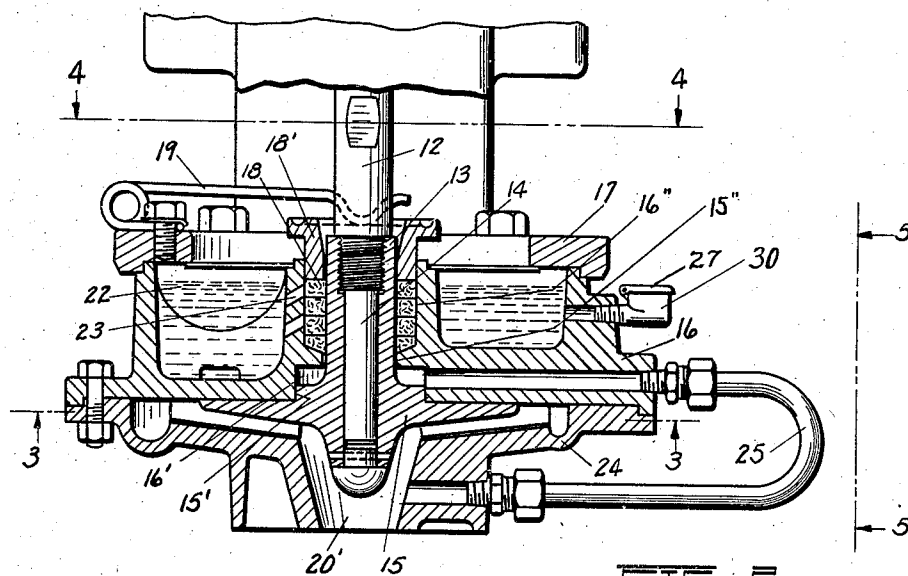
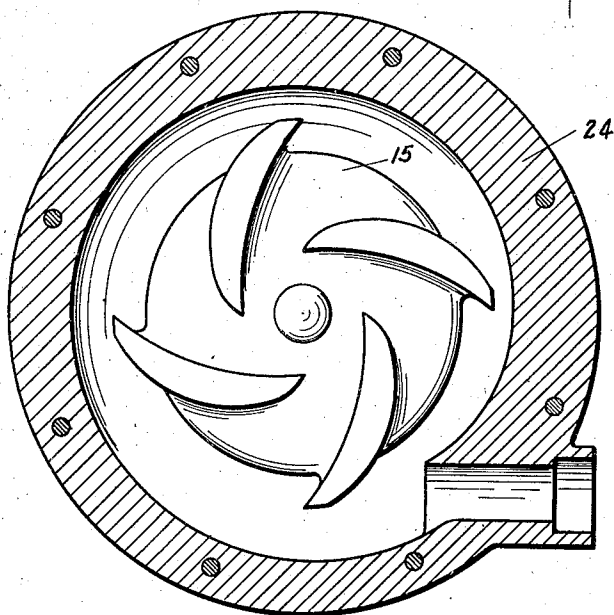
L. E. SODERQUIST

2,146,161

LUBRICATION OF SOLVENT PUMPS

Filed June 14, 1937

3 Sheets-Sheet 2



INVENTOR.

INVENTOR.
Leslie E. Soderquist

BY

Teffe - Tefft

ATTORNEY.

Feb. 7, 1939.

L. E. SODERQUIST

2,146,161

LUBRICATION OF SOLVENT PUMPS

Filed June 14, 1937

3 Sheets-Sheet 3

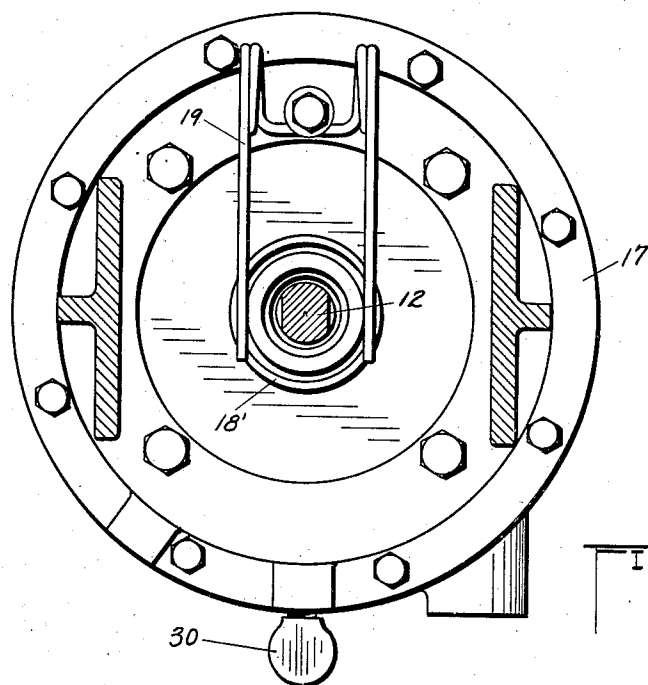


FIG. 4.

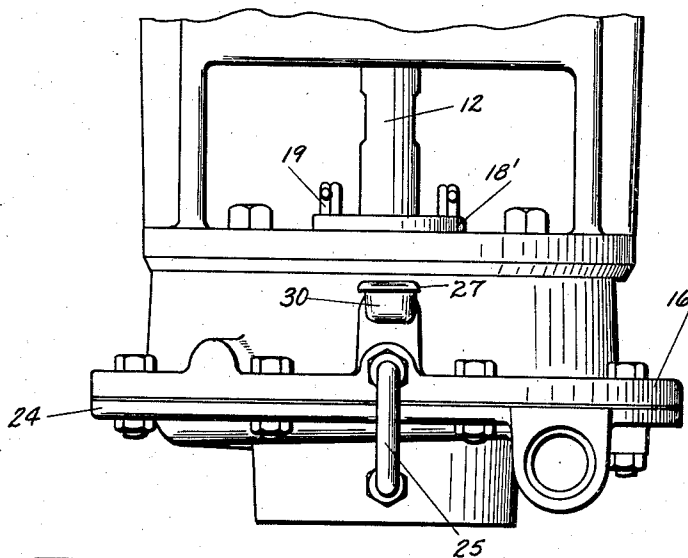


FIG. 5.

INVENTOR.
Leslie E. Soderquist
BY *Tefft and Tefft*
ATTORNEY.

UNITED STATES PATENT OFFICE

2,146,161

LUBRICATION OF SOLVENT PUMPS

Leslie E. Soderquist, Akron, Ohio, assignor to
National Rubber Machinery Company, Akron,
Ohio, a corporation of Ohio

Application June 14, 1937, Serial No. 148,007

5 Claims. (Cl. 308—36.1)

This invention relates to a special type of centrifugal pump used in commercial dry cleaning machines for pumping cleaning solvent, such as carbon tetrachloride but obviously may be of much broader application and use.

Dry cleaning solvents as used in dry cleaning machines readily absorb oils and pumps for handling these liquids often develop bearing trouble, due to the lubricating oils being rapidly absorbed in the solvent. Further, these solvents are particularly difficult to seal, which further complicates the bearing problem. As a result of these conditions, pumps of this class are a continual source of trouble and expense, requiring frequent service and replacement.

The particular object of this invention is to provide a centrifugal pump for dry cleaning solvents and the like, that will require only minor and infrequent service, and yet be long lived.

Another object is to provide, in a pump for this purpose, a reservoir for a large supply of bearing lubricant, which will be fed automatically, in proper quantity, to the pump bearings. In this connection it should be noted that the lubricant may be fed to the pump shaft bearings at a rate substantially proportional to the load or suction effect of the pump itself and that, by introducing a suitable regulating means such as a valve in the suction line leading from the suction side of the pump to the bearing, the quantity of lubricant supplied per unit of time may be controlled.

And a still further object is to provide a design that is relatively simple and sturdy, so that it may be quickly and properly serviced by inexpert operators.

Other objects and benefits will be disclosed by the following description and drawings, in which:

Fig. 1 is a broken rear elevation view of a dry cleaning machine, showing the pump and pump motor mounted in the machine, with pipe connections for the solvent;

Fig. 2 is a sectional elevation view of the pump showing the arrangement of the parts later to be described;

Fig. 3 is a plan sectional view of the pump on section lines 3—3 Fig. 2;

Fig. 4 is a plan sectional view on the section lines 4—4 Fig. 2; and

Fig. 5 is a side elevation view as seen from the lines 5—5 of Fig. 2.

Now, referring to Fig. 1. I designate the dry cleaner cabinet by the numeral 10; the pump motor by 11; the motor drive shaft 12; the pump

generally 13; the inlet pipe 20; and the outlet pipe 21.

In Figs. 2 and 3 it will be noted that the motor drive shaft 12 supports and drives the impeller 15 by the shoulder screw connection 13, and the smaller extension 14. It will readily be appreciated that this makes an accurate but sturdy and simple structure, with almost positive alignment with the upper pump housing 16, and motor flange 17, which are mounted concentric. Integral with the impeller 15 is a flange bearing 15', fitting in the recess 16', and extending upward is the bearing spindle 15'' in the gland opening 16''.

A porous bearing and packing material 18 in rings is inserted in the gland opening 16'', and is continuously held in proper compressed relation to the spindle 15'' by the male gland member 18', and the spring 19. An oil reservoir 22 of substantial capacity communicates with the porous packing material 18 by openings 23, keeping the packing saturated with oil. The reservoir may be filled through a fill pipe 30 normally closed by a cover 27.

The lower pump housing 24 is bolted to the upper housing in concentric relationship as shown. The opening 16' in the upper housing is connected with the pump inlet passageway by a tubing connection 25, the purpose of which, in conjunction with the other structure, will now be explained.

It will be appreciated that rapid rotation of the impeller 15 will cause suction in the inlet passage-way 20', and this suction communicates to the opening 16' and gland 16'', causing oil to be drawn from the reservoir 22 through openings 23, and the packing ring 18, and this lubricates the impeller spindle 15'' and 15'. The amount of lubrication can readily be adjusted by providing any conventional adjustment for the tension of the spring 19 or by otherwise varying the tightness or the porosity of the packing in the gland 16'', to provide ample lubrication, and the large oil reservoir is adequate for a considerable length of time. Also a needle valve or the like of any conventional type (not shown) may be placed in line 25 in order to regulate the suction effect or amount on the packing gland or stuffing box, in turn to regulate the amount of oil flowing to and from the same.

The spring 19 maintains uniform regulated pressure on the packing ring, and at the same time provides quick easy access to the gland in the oil reservoir. When the pump is running, lubricant is drawn into the gland 16'' by suction

and a sufficient amount passes into the annular recess 16' to provide lubrication for the surfaces 15'. Any excess of lubricant is drawn off by the pipe 25 as is any solvent which may leak past the surfaces 15'.

5 While I have illustrated and described a preferred embodiment of the invention it will be appreciated and understood that it is of broader application and susceptible of other embodiments
10 and of various changes without departing from the invention spirit and the scope of the appended claims.

I claim:

1. In a pump, a motor, a motor rotor shaft extension mounting the impeller of the pump, means
15 providing a bearing for said shaft extension, a pump housing mounted substantially concentric with the impeller, a lubricating oil reservoir carried by the pump housing, means providing a
20 passage from said reservoir to said bearing means for supplying lubricant to said extension, and connections from the suction side of the pump to said bearing means whereby lubricating oil is
supplied to the impeller spindle by suction.

25 2. In a pump, an impeller, an impeller spindle, a bearing gland having porous packing therein about said spindle, an oil reservoir connected by a passageway to said porous packing, and connections from the packing gland to the suction

side of the pump whereby lubricating oil is drawn from the oil reservoir to lubricate the impeller spindle.

3. In a pump, an impeller, an impeller spindle, a bearing gland having porous packing about said
5 spindle, a male gland member in said gland and against said packing, means for urging said gland member against said packing, an oil reservoir communicating with said porous packing, and
10 connections from the packing gland to the suction side of the pump whereby lubricating oil is drawn from the oil reservoir to lubricate the
impeller spindle.

4. In a pump for a dry cleaning machine, a motor, a pump shaft, a pump mounted on said
15 shaft, bearing means for said shaft, an oil reservoir, and connections between said reservoir and the suction side of the pump including said bearing means, whereby oil is drawn from said reservoir to provide lubrication for the pump bearings.
20

5. A lubricating system for a pump shaft comprising, means providing a shaft bearing, said bearing having a bearing surface about said shaft, a lubricant reservoir having communication with
25 one portion of said bearing surface, and means providing a closed passageway between another portion of said bearing surface and the low pressure side of the pump.

LESLIE E. SODERQUIST.