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auto water-chill

Aug. 25, 1925.

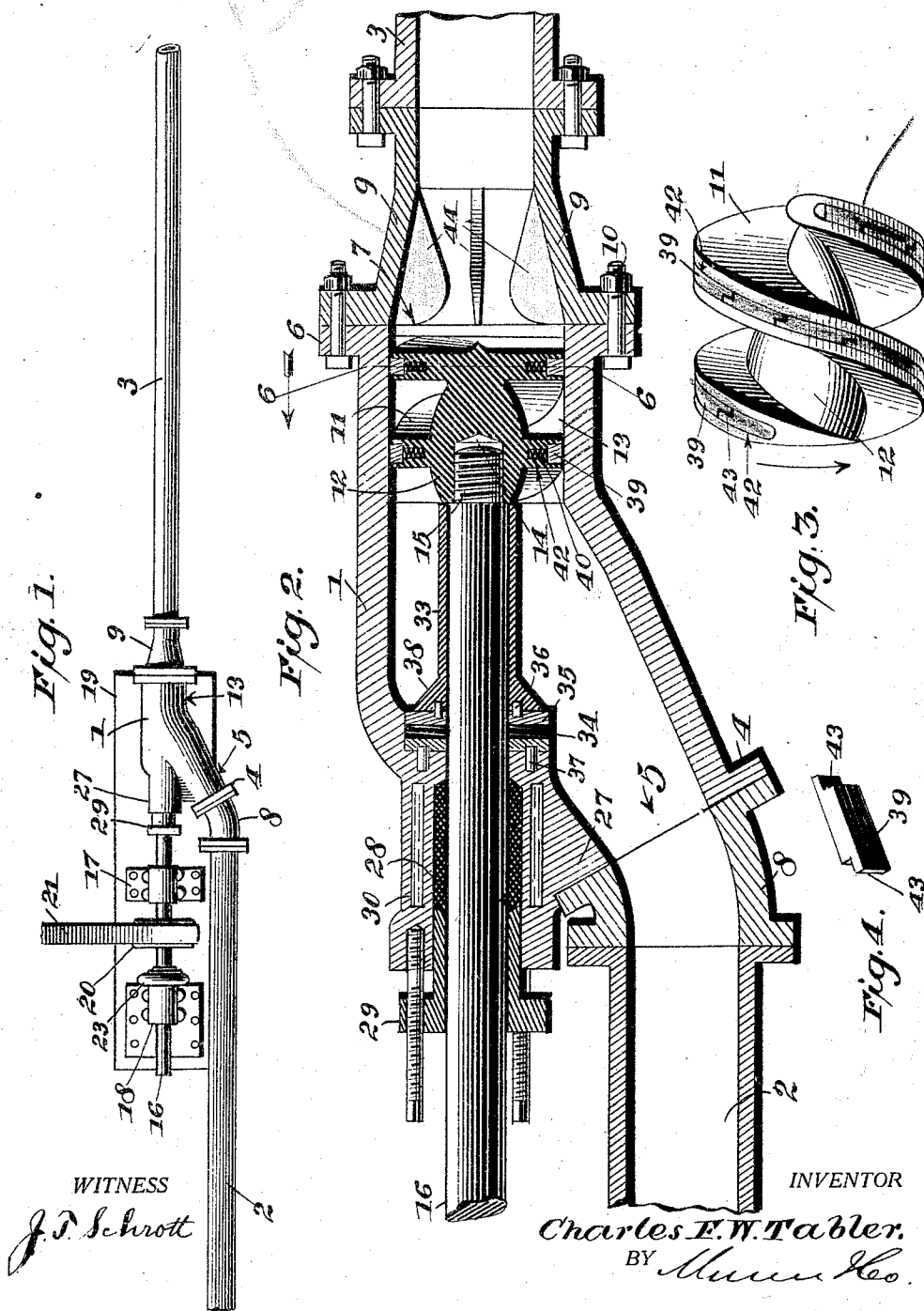
1,550,931

C. F. W. TABLER

PUMP

Filed March 25, 1924

2 Sheets-Sheet 1



WITNESS
J. D. Schrott

INVENTOR
Charles E. W. Tabler.
BY *Mum Co.*

ATTORNEYS

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2 Sheets-Sheet 2

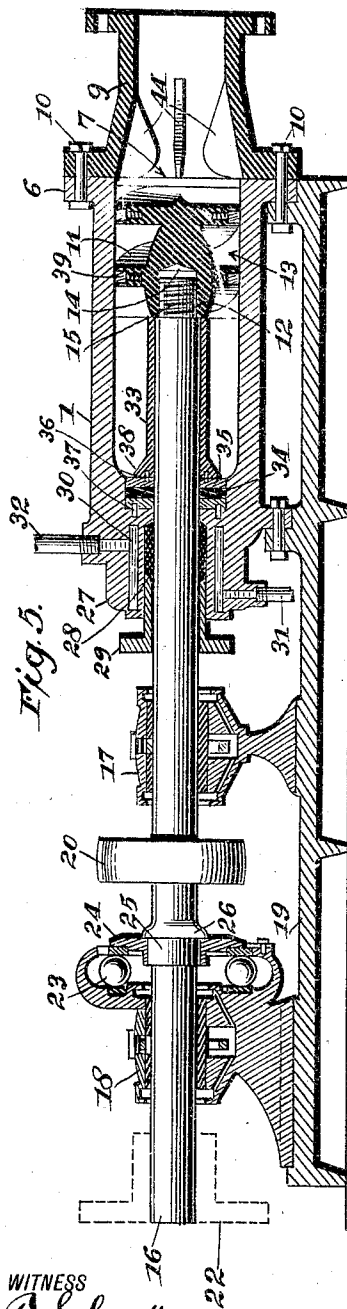


Fig. 5.

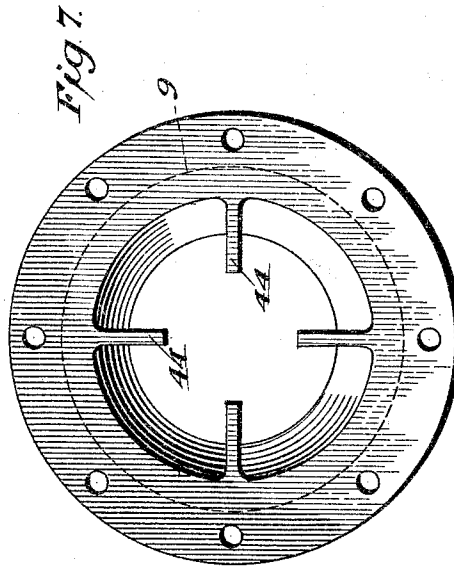


Fig. 7.

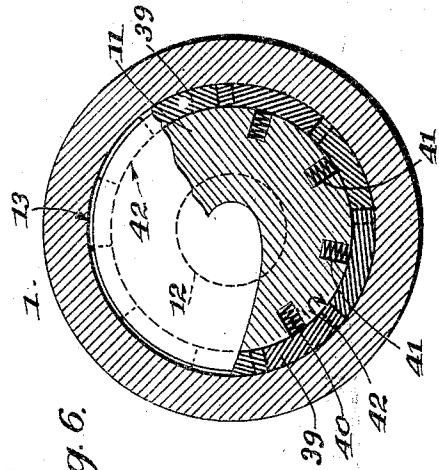


Fig. 6.

WITNESS
J. P. Schrott

INVENTOR
Charles F. W. Tabler
BY *Mum & Co.*
ATTORNEYS

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UNITED STATES PATENT OFFICE.

CHARLES F. W. TABLER, OF TAMPICO, MEXICO.

PUMP.

Application filed March 25, 1924. Serial No. 701,847.

To all whom it may concern:

Be it known that I, CHARLES F. W. TABLER, a citizen of the United States, and a resident of Tampico, Mexico, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

My invention relates to improvements in pumps, and it consists of the constructions, combinations and arrangements herein described and claimed.

An object of the invention is to provide a pump for the specific purpose of keeping pressure on the oil in an oil line so that the flow can be kept up to a necessary rate.

Another object is to provide a pump in which simplicity of structure and design are important factors, making it economically possible to install them quite freely in a long oil pipe line.

A further object of the invention is to provide a pump of the character disclosed below, having a screw piston with a particular form of packing by which high pressure at a low speed can be attained.

A further object of the invention resides in the manner of incorporating the pump in an oil line, one of the features of the pump being the absence of valves of any kind thereby avoiding the pronounced and recurring jars or knocks to which oil lines having valve type pumps are subjected.

Other objects and advantages appear in the specification, reference being had to the accompanying drawings, in which:

Figure 1 is a detail plan view of a portion of an oil line, showing how a pump is incorporated,

Figure 2 is a horizontal section of the pump,

Figure 3 is a detail perspective view of the screw piston,

Figure 4 is a detail perspective view of one of the packing elements,

Figure 5 is a vertical longitudinal section of the pump,

Figure 6 is a cross section on the line 6—6 of Figure 2,

Figure 7 is an end view of the pump and pipe coupling which is removable to permit access to the screw piston.

Reference is first made to Figure 1 in that the manner of installation of the pump 1 is here shown to advantage. It is situated between the pipes 2 and 3 of an oil pipe line. The purpose of the pump is to impose pres-

sure upon the oil column and thus compensate for the unavoidable reduction in the rate of flow caused by the resistance of the walls of the pipe, viscosity of the oil, etc. The pumps are installed where needed.

For the foregoing purpose of installation the pump has a flange 4 at the suction inlet 5 and a similar flange 6 at the fluid outlet 7. The former provides the place of fastening of an elbow 8 which makes connection with the pipe 2, the latter providing the place of fastening of the coupling 9 which connects the continuation 3 of the pipe line. The coupling 9 is removable by taking out the bolts 10, this for the purpose of gaining access to the screw piston 11.

In order to prevent the fluid from spiraling as it enters the coupling 9 a plurality of fins 44 are made to project inwardly as shown in Figure 7. These tend to guide the fluid in a straight stream.

This piston is so termed because of its screw or spiral formation and because of its function as a means of forcing the fluid from the pipe 2 to the pipe 3. The spiral blade of the piston is carried by a hub 12 which is a generally oval shape. This shape is adopted because it meets the requirements of strength and adequate support for the blade.

The piston turns in the axial cylinder 13 of the pump 1. It has a threaded bore 14 to receive the stub 15 of the shaft 16, this arrangement permitting removal and renewal of the piston. This shaft is journaled in bearings 17 and 18. These are mounted upon a bed plate 19 which is securely anchored in a manner commonly known. The shaft is driven either by a pulley 20 and belt 21 as shown in full lines, or by means of a mover attached to the coupling 22 in dotted lines.

A ball bearing 23 (Figure 5) is so situated as to take any thrust of the pump shaft. The thrust is delivered by a plate 24 which is seated upon an enlargement 25 on the shaft, there being a flange 26 on the shaft to back the plate. The foregoing bearing structure is on a more or less conventional order, the idea in showing the bearings in detail at all merely being to disclose a type of shaft support.

Situated in the heavy or thickened base 27 of the pump 1 is a packing 28 which is compressible around the pump shaft by means of a gland 29. The packing gland is water

cooled by a jacket 30 in which a circulation is maintained by pipes 31 and 32, (Figure 5). This cooling measure is necessary inasmuch as considerable heating occurs at this particular bearing place.

A sleeve 33 provides a spacer between the hub 12 of the piston and a series of washers abutting the base 27. These washers are of fiber 34 and metal 35, dowel pins 36 and 37 being used to keep the metal washers from turning in respect to the sleeve and base respectively. The sleeve has a conical base 38 providing both a bearing on the nearest washer and an adequate mounting for the dowels 36.

Much importance is attached to the packing 39 in the periphery of the spiral blade of the piston 11. This packing is absolutely essential to make such contact with the wall of the cylinder 13 as will hold the pressure at the right of the piston and create a suction at the left. Any looseness of the piston in the cylinder would defeat its purpose.

It is therefore necessary to provide springs 40 (Figure 6) to press the packing outward. These springs occupy pockets 41 of which there are enough to accommodate a sufficient number of springs to uniformly press out all of the packing. The packing is either made in units as in the drawings, in the case of a relatively large piston, or of a continuous strip as in smaller pistons.

In either case the packing groove 42 and the springs 40 are employed. The packing units 39 have overlapping joints 43 to insure a continuous packing surface. The springs cause the packing to stand out beyond the periphery of the piston blade so that only the packing contacts the cylinder wall.

The operation may be readily understood from the following additional description. The oil pipe line is separated wherever it is desired to insert a pump for the purpose of keeping the flow continuous. Oil, particularly crude oil, being heavy must be assisted frequently when conducted through a long pipe line.

In making the foregoing separation the separated sections of piping (2 and 3, Figure 1) for example, are displaced laterally a space sufficient to make proper connections with the suction inlet 5 and the fluid outlet 7. This displacement is negligible in a long pipe line.

Having installed the pump it is only necessary to provide power for driving it. The spiral blade of the piston 11 forces the

column of oil forward under great pressure and at slow speed. An efficient packing such as disclosed is essential to make a tight and uniform joint between the cylinder 13 and piston blade. The pump is totally valveless, and thereby eliminates a mechanism which causes no small amount of trouble. The opening and closing of valves in present pumping systems, causes a pounding which is noticeable for miles along the pipe line. The oil stream in the present pump is practically continuous.

It is to be observed that the interior of the pump 1 as well as the cylinder 13 are quite large in diameter as compared with that of the pipes 2 and 3. The purpose of this is to insure an adequate volume of oil to the piston and to compensate for the displacement of the rather heavy hub 12 on which the spiral is formed.

Upon desiring to make repairs the coupling 9 is unloosened and taken sidewise out of the pipe line. This provides an opening through which access to the piston 11 may be had. The piston can be unscrewed from the end of the pump shaft 16, and then by removing the various bearings the entire shaft can be withdrawn.

In conclusion it is desired to state that the apparatus can be used as a high pressure hydraulic prime mover. In such event the fluid under pressure will be directed against the head of the spiral piston from the pressure end. The impact of the fluid against the spiral piston causes the piston to turn, power being then transmitted through the shaft. The ribs 44 prevent the fluid column itself from whirling.

While the construction and arrangement of the improved pump as herein described is that of a generally preferred form, obviously modifications and changes may be made without departing from the spirit of the invention or scope of the claim.

I claim:—

A pump comprising a casing, a cylinder portion, a heavy portion forming part of the casing, confronting said cylinder portion and constituting a base, a shaft projecting through the base toward the cylinder, a piston carried by the shaft comprising a hub, a spiral blade upon the hub, a spacing sleeve on the shaft between the hub and base, a conical base upon the sleeve, and thrust means including a plurality of metallic and fibre washers interposed between said bases.

CHARLES F. W. TABLER.