F. W. KNOTT.

DISTRIBUTING PUMP.

APPLICATION FILED AUG. 18, 1906.

995,877.

Patented June 20, 1911.

2 SHEETS—SHEET 1.

Fig. 1

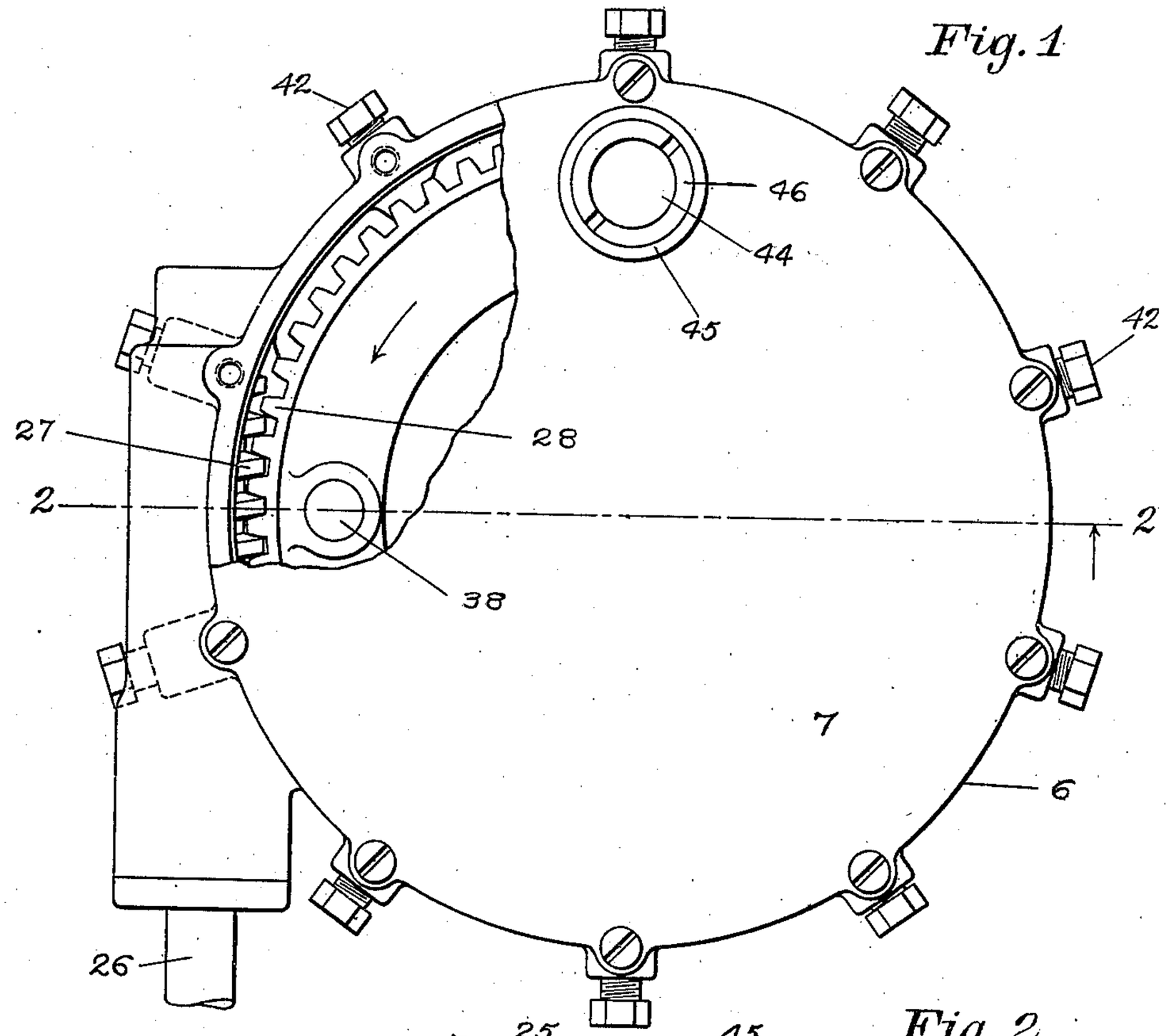

Fig. 2

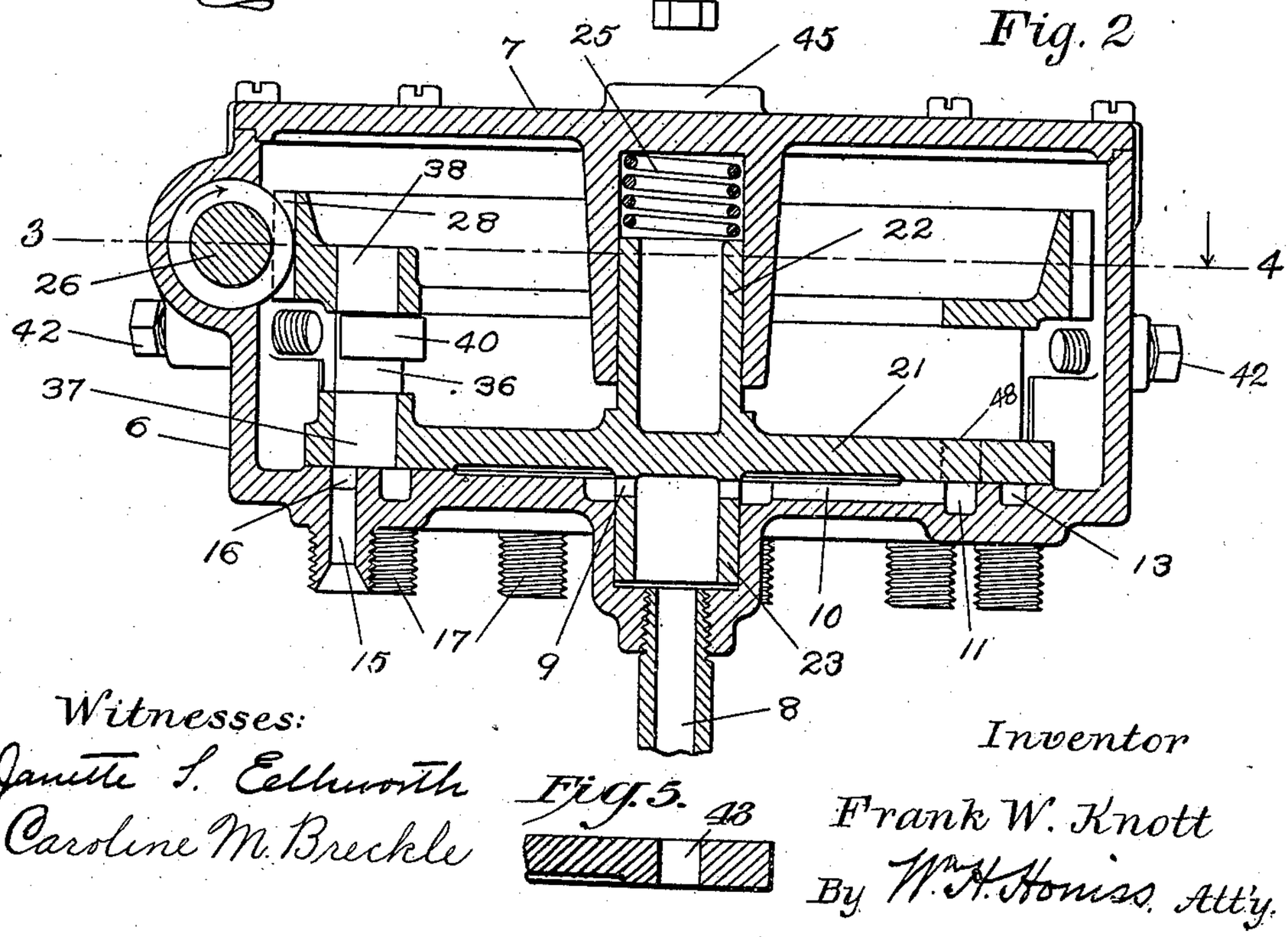

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Fig. 5.

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2 SHEETS—SHEET 2.

Fig. 3

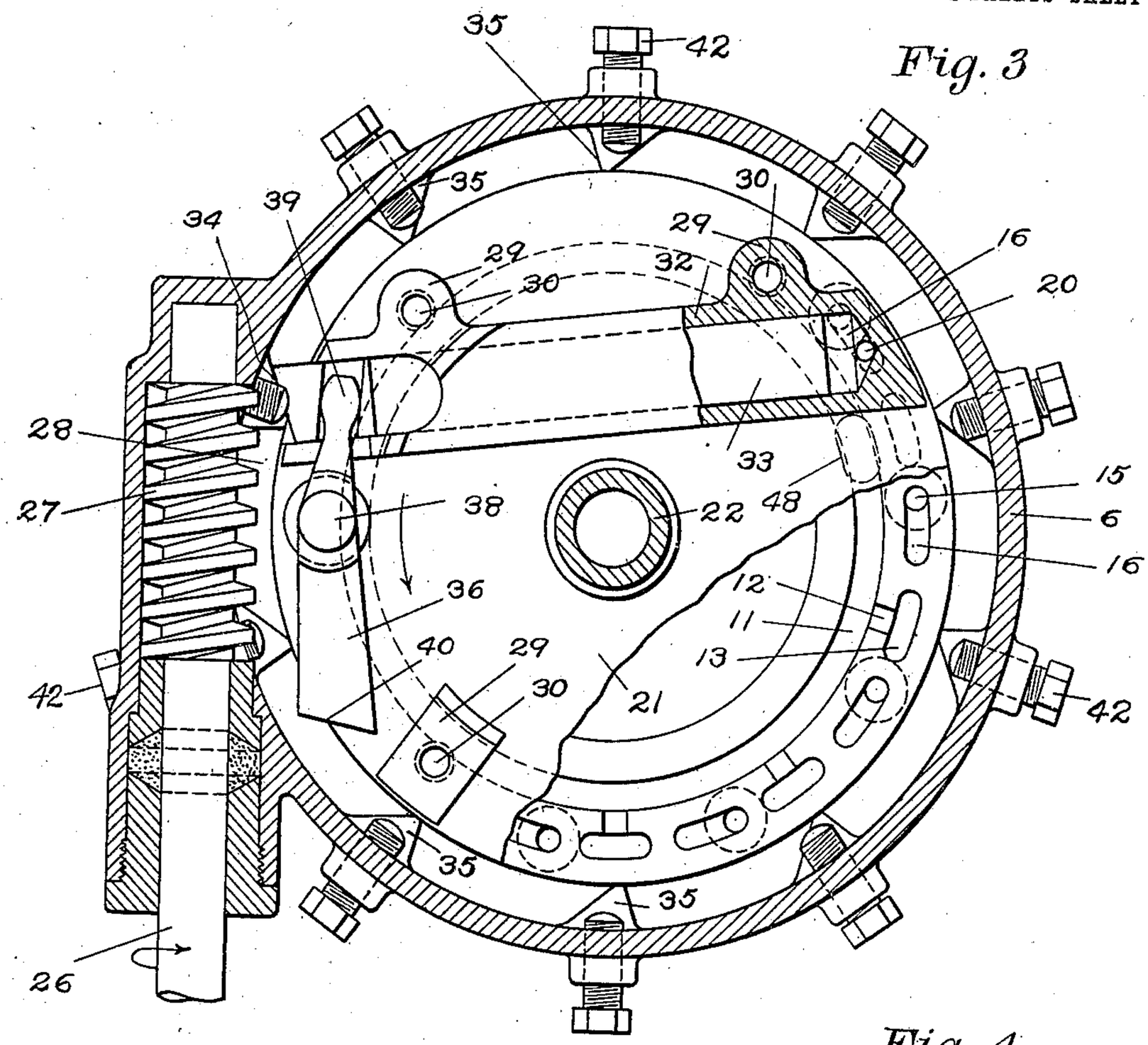
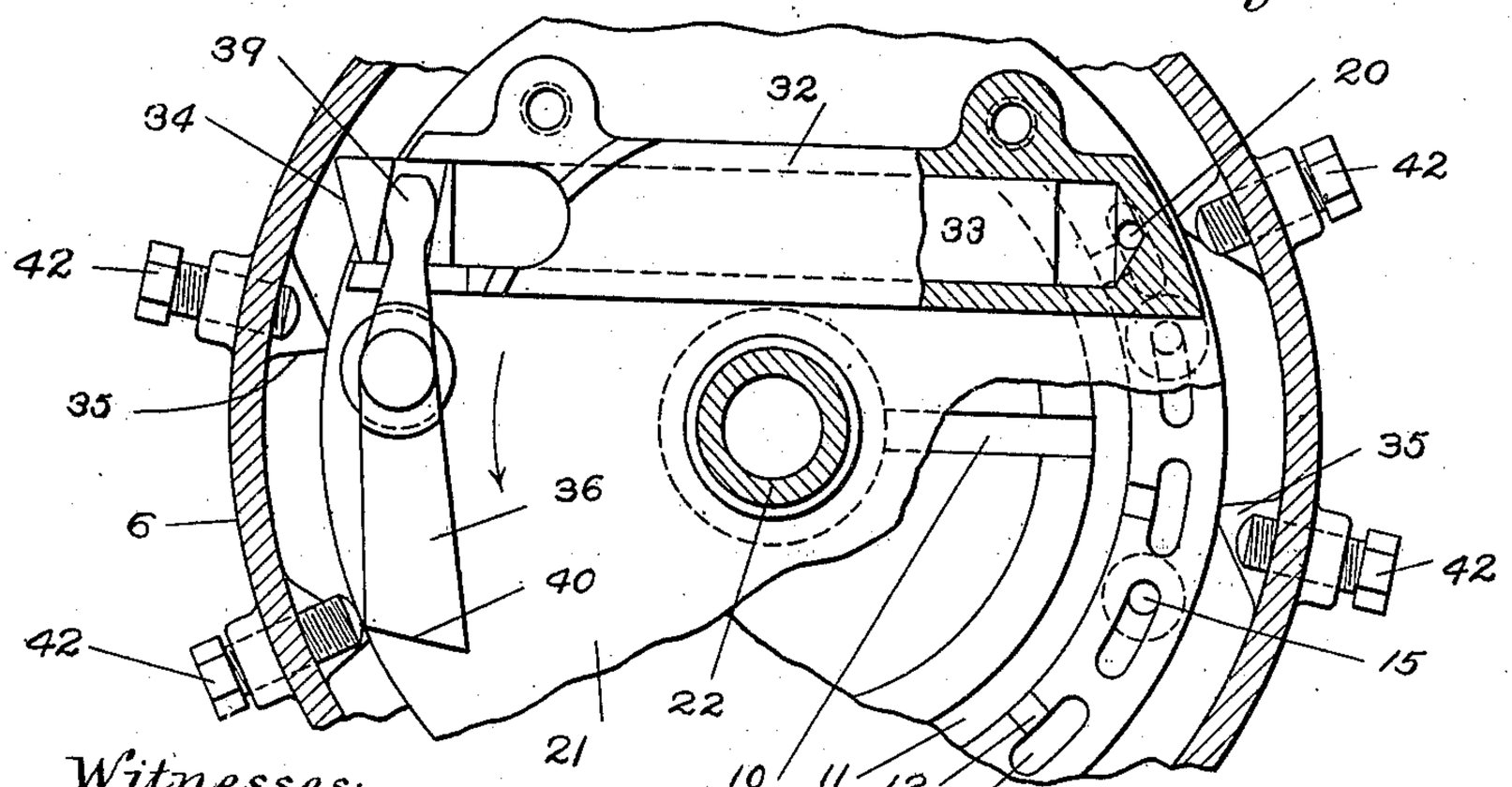


Fig. 4



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UNITED STATES PATENT OFFICE.

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DISTRIBUTING-PUMP.

995,877. Specification of Letters Patent. Patented June 20, 1911.

Application filed August 18, 1906. Serial No. 331,132.

To all whom it may concern:

Be it known that I, FRANK W. KNOTT, a citizen of the United States, and resident of Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Distributing-Pumps, of which the following is a full, clear, and exact specification.

This invention relates to improved pump devices, in which pumping mechanism is combined with means for distributing the pumped material independently and in varying quantities to a plurality of outlets.

This invention may be adapted to various uses.

The embodiment of the invention herein shown and described is especially adapted for pumping and distributing oil to the different bearings of an automobile. In this and in many other machines, it is important to provide for the certain delivery of a definite and determinable amount of oil to each of several bearings of the machine. Some of these bearings require much more oil than is required by other bearings. Moreover, since in most cases the amount of oil required for each bearing varies at different times, and must be determined by observation and experiment, means are provided for varying the delivery at each outlet, during the operation of the machine.

Figure 1 of the drawings is a plan view, and Fig. 2 is a side view on section taken on the line 2—2 of Fig. 1, showing my invention as adapted for automatic service. Figs. 3 and 4 are plan views in section taken on the line 3—4 of Fig. 2, showing the pumping mechanism in two different positions. Fig. 3 shows the parts during the discharge stroke, while Fig. 4 shows the parts just after the intake or suction stroke. Fig. 5 is a fragmentary side view in section showing a modification applicable to the pump carriage 21.

The operating parts are preferably inclosed in a casing 6, provided with a tight cover 7, the casing being provided with means for attaching it to the automobile or other machine upon which it is to be used. The oil or other material to be pumped is conveyed to the interior of the casing through a pipe 8, thence flowing through openings 9 and one or more passages 10 to the annular channel 11, from which the oil flows through the passages 12 to the several ports 13, from which the oil is taken in succession by the pumping mechanism, as will be hereinafter explained. The casing is also supplied with a plurality of outlet passages 15, communicating with outlet ports 16, through which the oil is independently discharged to the respective bearings, by means of pipes leading from and secured to the casing in any convenient way, as by the screw-threaded nipples 17. The inlet ports 13 and the outlet ports 16 are arranged in proper situation and sequence to communicate with the intake and discharge openings of the pump mechanism. In the present instance, in which the intake and discharge to and from the pump mechanism is made through a single passage 20, the inlet ports 13 and the outlet ports 16 are arranged in alternate succession, in a single path, in or adjacent to the pathway of the opening 20. In the present instance also these ports are arranged in a circle, because of the fact that the pumping mechanism, including the opening 20, revolves around a fixed center.

The ports 13 and 16 may as herein shown be elongated in the general direction of travel of the pump opening 20, in order that that pump opening may remain in register with those openings throughout the respective working movements of the pump plunger. This is especially true where the rotary movement of the pump carriage 21 is continuous.

The pump mechanism, best shown in Figs. 3 and 4, is mounted for revolving movement upon a pump carriage 21, which is mounted for rotative movement in the casing 6, and its cover 7, by means of the gudgeons 22 and 23, respectively. The main portion of the pump carriage is in the form of a circular disk which overlies the various channels and passages for oil made in the upper side of the lower wall of the casing 6, the disk making an approximately close joint with that lower wall, so as to practically confine the flow of oil to the passages and ports, the disk being preferably also pressed downwardly into close contact with the lower wall of the casing by means of the spring 25.

The pump carriage may be driven in various ways, according to the character and position of the mechanism from which it is driven. In the present instance, the rotating movement of the carriage is imparted through the rotating worm shaft 26, pro-

vided with the worm thread 27 which meshes with the peripheral teeth of a worm gear 28, which is concentric with and fixed to the pump carriage 21, and may be integral therewith or be separately attached thereto by means of the bosses 29, provided with the screw holes 30. In order to prevent the escape of oil through the bearing for the worm shaft 26, the latter extends into the casing through a stuffing box, as shown in Figs. 1 and 3.

The pump mechanism shown herein is mounted for revolving movement upon and with the pump carriage 21, and consists of a pump barrel 32, which may be integral with, or removably attached to the pump carriage 21.

The pump barrel is provided with a piston or plunger 33 mounted for lengthwise movement in the pump barrel. The combined intake and discharge opening 20 of the pump is located at the bottom end of the pump barrel, as shown in Figs. 3 and 4, communicating alternately with the inlets 13 and the outlets 16, as the pump mechanism revolves with the rotating pump carriage 21.

The pump mechanism is operated by the rotation of the pump carriage, to move the plunger 33 back and forth in proper relation, as the pump opening 20 registers with the ports 13 and 16, the plunger being drawn back, as shown in Fig. 4, when the opening 20 is in register with one of the ports 13, and being pushed inwardly, as shown in Fig. 3, when the opening 20 is in register with one of the ports 16, thus serving to take in oil from each of the ports 13 and discharge oil through the succeeding ports 16. As the carriage rotates the left hand end 34 of the plunger 33 is carried against the faces of the lugs 35, extending inwardly from the side wall of the case, as shown in Fig. 3, one or both of the coacting faces of the plunger and of the lug being inclined relative to the direction of movement. A lever 36 is pivotally mounted upon the carriage in any convenient way, as by the bearings 37 and 38. One end 39 of the lever engages with the pump plunger 33, while the other end 40 of the lever projects forwardly into engaging relation with the points of adjustable screws 42, which project inwardly through the side wall of the casing 6 above the lugs 35, the plane of the lever end 40 being above the plane of the end 34 of the piston and above the plane of the lugs 35, so as to pass clear of them.

The degree of inclination of the end 40 of the lever 37 may be varied to correspondingly vary the time or speed of the lever movement. By adjusting the several screws 42, the drawing back movement of the pump plunger 30 may be varied from full stroke down to nothing, thus serving to vary the distribution of oil to each outlet or bearing, independently of any other outlet or bearing, and all by the operation of a single pump.

It is obviously immaterial whether the adjusting devices are applied to the intake or the discharge stroke of the pump. In the present instance illustrated herein, the pump plunger is pushed inwardly to uniform position by the fixed lugs 35, the variation being applied to the backward or intake stroke of the plunger, by means of the adjustable screws 42. Obviously however, adjustable screws similar to the screws 42 may be substituted for the fixed lugs 35; or the lugs be substituted for the screws.

It is not an essential feature of this invention that the mechanism be entirely inclosed as herein shown; but for most purposes, and particularly for use upon automobiles, it is desirable thus to entirely inclose the moving parts. The shaft 26 or any equivalent operating medium such as a connecting rod may also be inclosed in a pipe. When the parts are thus inclosed, it is desirable to have some of the moving parts at least exposed to view, in order to enable the operator to readily observe at any time, whether the mechanism is in operation and working properly. To this end, I provide a sight opening 44 preferably surrounded by a raised hub 45, and containing a glass sight piece held therein in any convenient way, as by means of the ring nut 46.

The operation of this device is as follows:—A flow of oil being provided through the pipe 8, it passes through the passages 9 and 10 to the annular channel 11, distributing thence through the passages 12 to the successive inlet ports 13. The rotations of the pump carriage carry the inclined end 40 of the lever 36 against the abutment screws 42, so as to push the lever 36 inwardly and draw the pump plunger 33 backwardly, thus making its intake stroke, while the pump opening 20 is in register with the inlet port 13, the elongation of that port enabling the inflow of oil to the pump to continue to any desired extent during the backward or suction stroke of the plunger. This position of the parts is shown in Fig. 4. As the pump carriage continues to rotate, the end 34 of the plunger is carried against the lugs 35, as shown in Fig. 3, thereby moving the plunger through its discharging stroke, during which time the opening 20, which then serves as the discharge opening, is in register with the outlet 16 and thereby forcing oil to the bearing, which is connected to that particular port, the elongation of the port 16 being made sufficient to register with the opening 20, preferably through the entire discharging stroke of the pump. Having thus completed its intake and discharge movements with relation to one of the

inlet ports 13 and its succeeding outlet port 16, the continued rotation of the pump carriage carries the pump mechanism against the succeeding screw 42, and abutment 35, thus repeating the operations of the pump mechanism for each of the outlets, and thereby forcing the required amount of oil in regular succession to each of the bearings connected with the said outlets. By thus arranging the inlets and outlets in alternate succession in the same circular path, I am enabled to utilize the single pump opening 20 for both the intake and the discharge functions of the pump.

The method of driving the rotating carriage will depend very largely upon its environment, the character of the mechanism with which it is to be used, and upon its position with relation to that mechanism. When located at one side of that mechanism, it will generally be found convenient to employ a worm and worm wheel as herein shown.

In instances where it may be found practicable to predetermine the required flow of oil to each of the bearings without providing for variation of the flow, the adjustable screws 42 may be dispensed with, and fixed abutments similar to the abutments 35 may be employed for moving the lever 36 to draw back the pump on the intake strokes. Even in that case, however, a larger amount of oil may regularly be delivered to some bearings than to the other bearings, by varying the heights of the respective abutments for the intake strokes, thereby imparting longer intake strokes just prior to reaching those outlets through which a larger flow is desired. The casing 6 may also be utilized as a reservoir for the supply of oil, instead of, or in addition to the pipe connection 8, using the sight opening 44 as a filling opening. In that case an aperture may as shown in Fig. 5 be made through the disk portion of the pump carriage 21 to permit the oil to flow from the reservoir to the distributing channel 11.

It will be understood that the present invention, although herein specifically shown and described in a form suitable for use in connection with automobiles, is capable of adaptation for use with engines and other machines in which it is desirable to supply lubricating or other fluid independently to each of several bearings, or other places.

It will be understood that the parts herein shown may be modified in many ways, in form and relative position and time or sequence of operation to adapt them to different environments or different conditions of service.

I claim as my invention:—

1. A pump device, having in combination a plurality of outlet ports, a reciprocating pump having abutment engaging members for its opposite strokes disposed in two different pathways, means for moving the pump to carry its discharge opening successively into register with the said outlet ports, and two series of driving abutments for the pump respectively disposed in the said pathways.

2. A pump device, having in combination a plurality of outlet ports, a reciprocating pump having abutment engaging members for its opposite strokes disposed in different pathways, a carriage on which the pump is mounted, means for rotating the carriage, and two sets of abutments against which the said abutment engaging members of the pump are carried by the rotations of the carriage, the abutments for discharging the pump contents being disposed so as to effect the discharge movement of the pump at each of the said outlet ports in succession.

3. A pump device, having in combination a plurality of outlet ports, a reciprocating pump having abutment engaging members for its opposite strokes disposed in different pathways, a carriage on which the pump is mounted, means for rotating the carriage, and two sets of abutments against which the said abutment engaging members of the pump are carried by the rotations of the carriage, the abutments for discharging the pump contents being disposed so as to effect the discharge movement of the pump at each of the said outlet ports in succession, and means for independently adjusting the abutments of one of the said sets for varying the discharging capacity of the pump for the respective outlet ports.

4. A pump device, having in combination a rotating pump carriage, pump mechanism appurtenant to the carriage and having a combined intake and discharge opening arranged eccentrically to the center of rotation, to travel in a pathway around that center, a plurality of inlets and outlets arranged in alternate succession in the pathway of the said opening, means operable by the rotation of the carriage to draw and discharge through the inlets and outlets respectively, fixed abutments for imparting positive discharging movements to the pump mechanism, and adjustable screws for varying the working stroke of the pump mechanism independently with relation to the different outlets.

5. A pump device, having in combination a rotating pump carriage, pump mechanism appurtenant to the carriage with its discharge opening revolving around the center of rotation of the carriage, a plurality of inlets and outlets arranged in alternate succession adjacent to the circular pathway of the discharge opening, means operable by the rotation of the pump carriage for working the pump, fixed abutments for imparting discharging movements to the pump

mechanism, and adjustable screws for varying the stroke of the pump mechanism to independently vary its discharge with relation to each of the said outlets.

6. A pump device, having in combination a rotating pump carriage, pump mechanism appurtenant to the carriage, having a discharge opening eccentric to the center of rotation, a plurality of inlet and outlet ports situated in alternate succession adjacent to the pathway of the discharge opening, and means operable by the rotation of the pump carriage for working the pump mechanism including fixed abutments for imparting positive discharging movements to the pump mechanism, and adjustable screws for varying the suction movement of the pump independently for each inlet port to vary the capacity of the pump independently with relation to the respective outlet ports.

7. A pump device, having in combination a rotating pump carriage, pump mechanism appurtenant to the carriage, including a pump chamber, a piston therein, abutments for moving the piston in one direction, a lever appurtenant to the carriage and engaging with the piston, and abutments engaging with the lever to move the piston in the opposite direction.

8. A pump device, having in combination a rotating pump carriage, pump mechanism appurtenant to the carriage, including a pump chamber, a piston therein, abutments for moving the piston in one direction, a lever appurtenant to the carriage and engaging with the piston, abutments engaging with the lever to move the piston in the opposite direction, and a plurality of outlets arranged in succession adjacent to the path of the opening of the pump, to register therewith at the successive discharging movements of the piston.

9. A pump device, having in combination a rotating pump carriage, a pump mechanism appurtenant to the carriage, including a pump chamber, a piston therein, abutments for moving the piston in one direction, a lever appurtenant to the carriage and engaging with the piston, abutments engaging with the lever to move the piston in the opposite direction, and a plurality of inlets disposed adjacent to the path of the intake opening of the pump to register therewith during the successive intake movements of the piston.

10. A pump device, having in combination a rotating pump carriage, pump mechanism appurtenant to the carriage, including a pump chamber, a piston therein, abutments for moving the piston in one direction, a lever appurtenant to the carriage and engaging with the piston, abutments engaging with the lever to move the piston in the opposite direction, a plurality of inlets disposed adjacent to the pathway of the intake opening of the pump, and registering therewith during the intake movements of the piston, and a plurality of outlets disposed adjacent to the path of the discharge opening of the pump and registering therewith during the successive discharging movements of the piston.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses this 13th day of August, 1906.

FRANK W. KNOTT.

Witnesses:
J. P. FEELY, Jr.,
ANNA H. HEINRICH.