No. 775,067. PATENTED NOV. 15, 1904.

J. F. McCANNA & J. R. MARKLE.

LUBRICATING PUMP.

APPLICATION FILED JUNE 20, 1900.

NO MODEL. 3 SHEETS—SHEET 1.

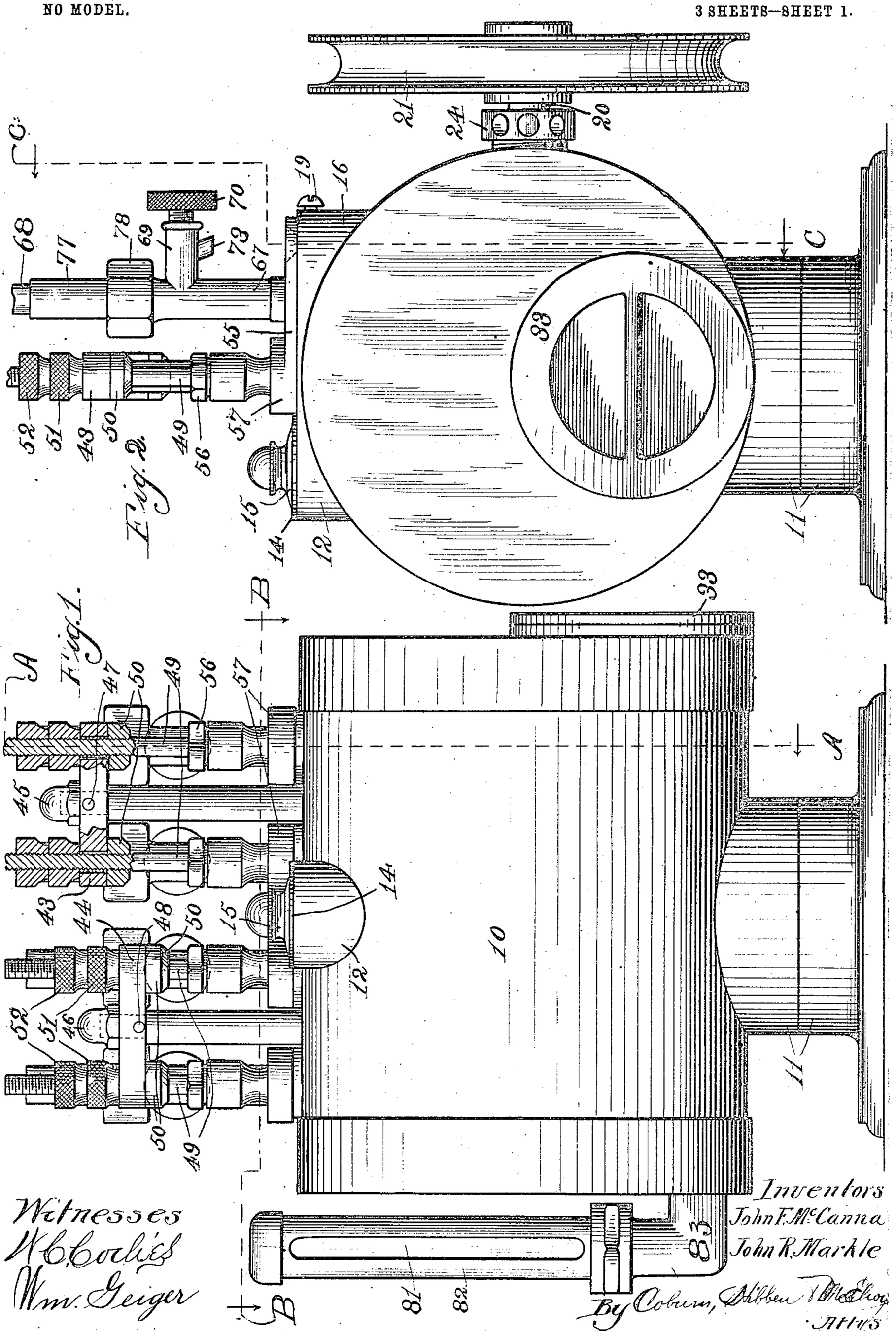

Fig. 1.

Fig. 2.

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 4.

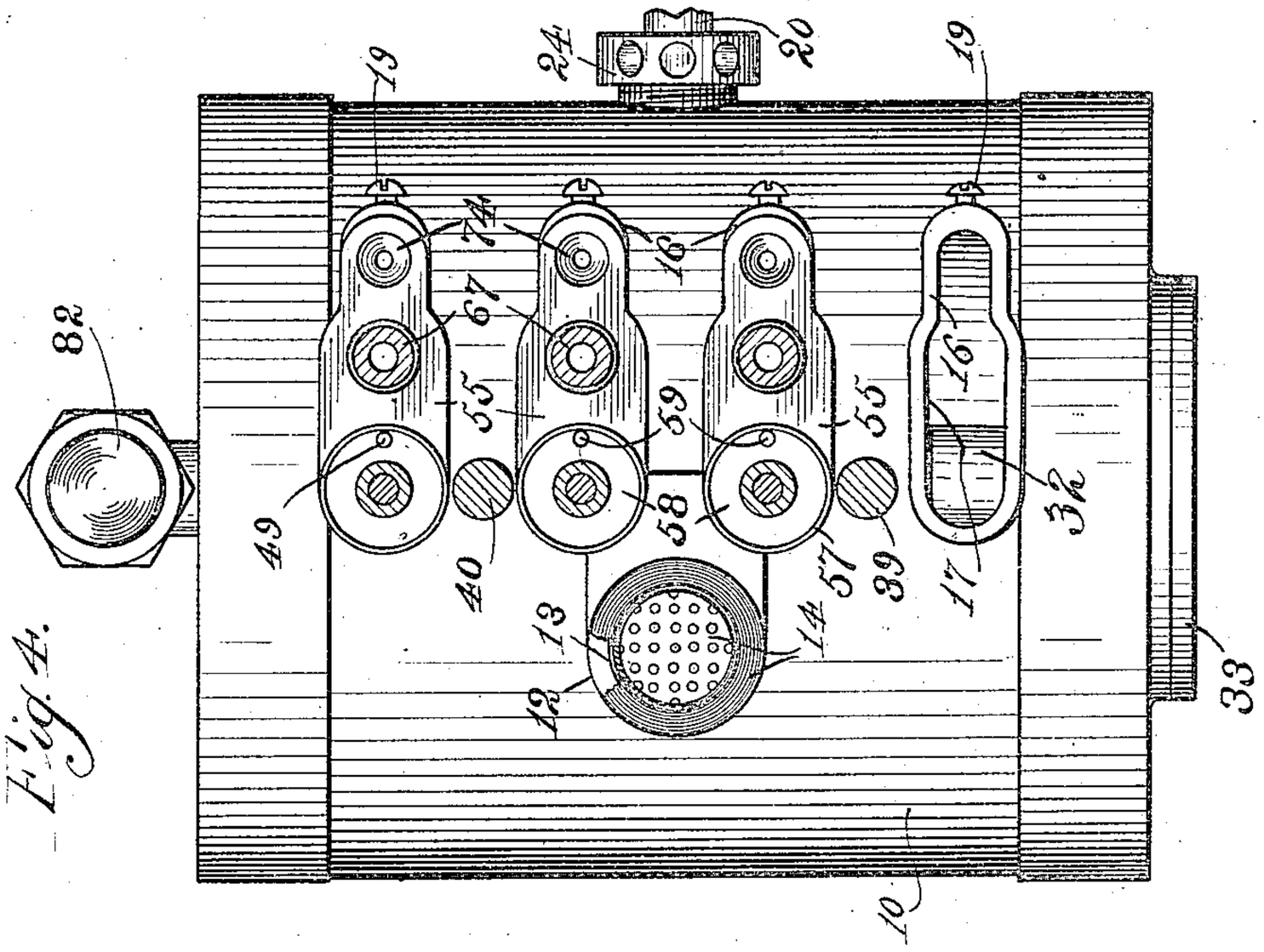
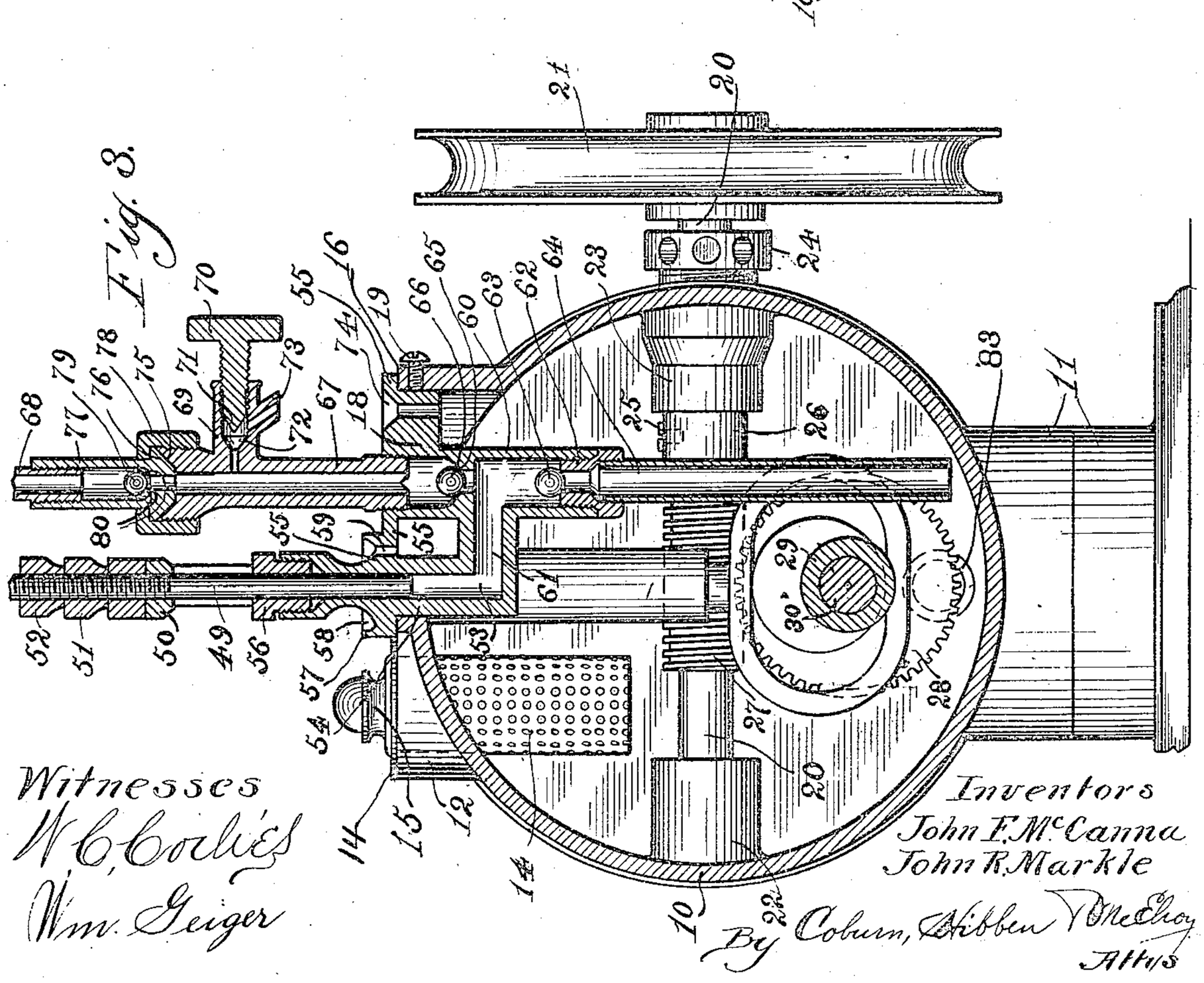


Fig. 3.



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 7.

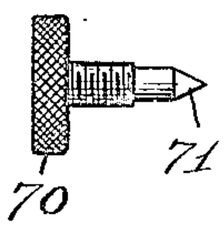
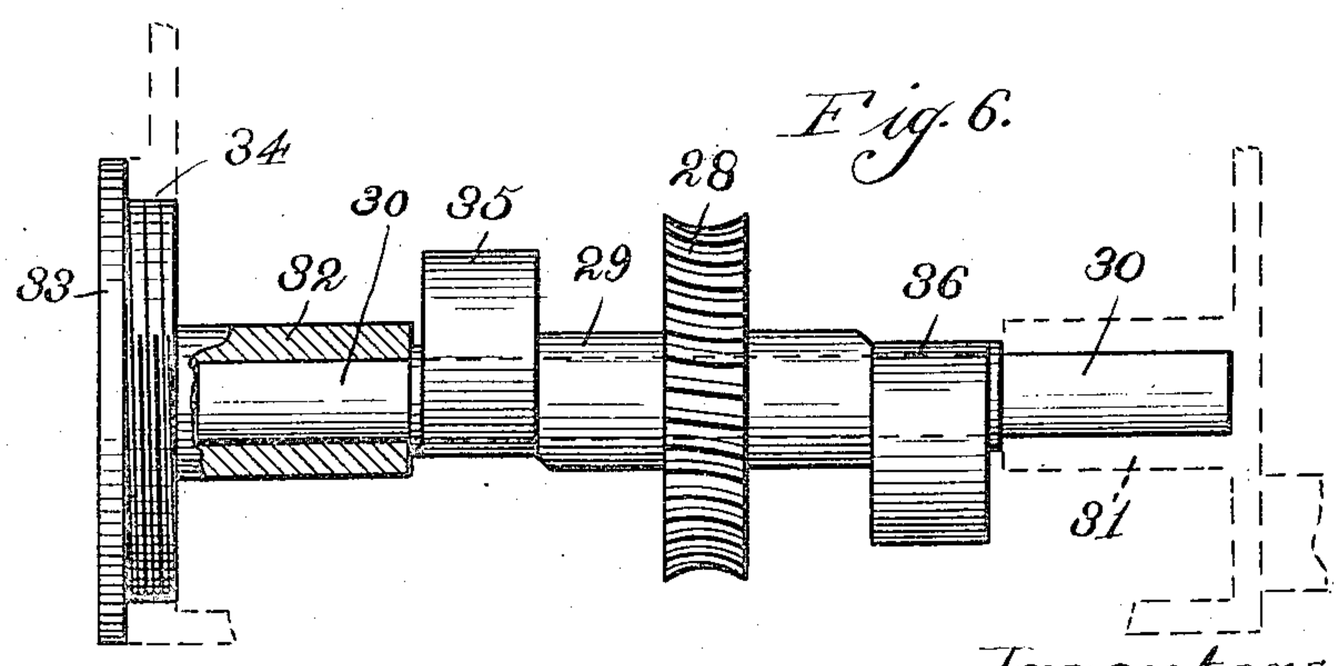


Fig. 5.

Fig. 6.



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No. 775,067. Patented November 15, 1904.

UNITED STATES PATENT OFFICE.

JOHN F. McCANNA AND JOHN R. MARKLE, OF CHICAGO, ILLINOIS, ASSIGNORS TO THE JOHN F. McCANNA COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

LUBRICATING-PUMP.

SPECIFICATION forming part of Letters Patent No. 775,067, dated November 15, 1904.

Application filed June 20, 1900. Serial No. 20,959. (No model.)

To all whom it may concern:

Be it known that we, JOHN F. McCANNA and JOHN R. MARKLE, residents of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Lubricating-Pumps, of which the following is a specification.

Our invention relates to certain new and useful improvements in lubricating-pumps which are designed to force oil or any other lubricant in regular quantities to any moving mechanism at a rate varying with its speed, and is designed to produce a pump or a system of pumps that shall be simple in construction, accurate in operation, capable of adjustment to any desired rate of feed, and operating with the least possible degree of friction in the moving parts, thus securing extreme durability. Where a system of pumps is employed, they are constructed so that any or all of them can be thrown out of operation without disturbing the action of the remaining pumps in the system.

In carrying out the purposes of our invention we have devised a novel construction in which all the mechanism for transforming the rotary movement of the main driving-shaft to the reciprocating movement desired for operating the pump-pistons is mounted in the cup, so as to be immersed in the oil or other lubricant, where it will necessarily operate with little friction and practically no wear. We have further devised not only a novel transforming mechanism for the purpose above set out, but one that is especially adapted for high-speed engines and other machinery. We have, furthermore, devised a novel design for a cup and the aforesaid transforming mechanism, so that the number of pumps to be operated in a system can be indefinitely increased without necessitating any alteration in the general design or materially increasing the number of parts, except, of course, the actual pumping mechanism added.

Our invention further resides in certain details of construction, all of which will be fully and at length set out in the claims annexed hereto.

Referring now to the three sheets of drawings, in which the same reference characters are used to designate identical parts in all the figures, Figure 1 is a side elevation of our invention as arranged for four pumps. Fig. 2 is an end elevation of the same. Fig. 3 is a sectional view on the line A A of Fig. 1. Fig. 4 is a plan view in section on the line B B of Fig. 1. Fig. 5 is a side elevation in section on the line C C of Fig. 2. Fig. 6 is a detail view showing the eccentric-shaft and its mountings, and Fig. 7 is a detail of one of the screw-valves.

As is best shown from Figs. 1 and 2, the cup 10 has its body of a substantially cylindrical shape and has secured thereto the base 11, which may be of any desired shape or construction to properly support the cup in any desired position. The generally cylindrical contour of the cup is broken by the short cylindrical offset 12, centrally located at one side near the top of the main cylinder, which offset has the circular aperture 13 therein, through which passes the strainer 14, which is of the customary construction and which is securely held in place and covered by the cap 15, fitting into the aperture in the strainer. Formed mainly upon the other side of the central line of the top of the main cylinder 10 are the elongated offsets 16, which correspond in number to the number of pumps to be employed in connection with the cup and which in plan view are of the general shape best shown in Fig. 4 and each of which has the aperture 17 formed therein of the proper shape to receive the pump-body 18, which is seated therein and secured by the set-screw 19, passing through the side of the offset 16, at the outer end thereof.

For actuating the pump or system of pumps for the high-speed engines with which the present system is especially adapted to operate we employ the shaft 20, which has secured upon its outer end the pulley-wheel 21, which is connected by a belt to some rotating part of the engine or other machinery to be lubricated. This shaft has its inner end journaled in the hollow bearing-stud 22, which is formed or secured upon the inner side of the

cylinder-shell. The other end of the shaft passes out through the side of the shell through the oppositely-disposed apertured bearing-stud 23, the outer aperture of which is closed by the packing-gland 24, which is screwed into it in the customary manner. The shaft 20 has rigidly secured thereto, as by the screw 25, the sleeve 26, which has the worm 27 formed upon its inner end, so as to be centrally disposed upon the portion of the shaft 20 which is inside the cup. This worm 27 meshes with a gear-pinion 28, (see Fig. 5,) which is rigidly secured upon or formed integral with the sleeve 29, which is mounted upon the shaft or bearing-rod 30, which has one end mounted in the hollow bearing-stud 31, preferably formed integral with the end of the casing, while the other end is mounted in the similar stud 32, which, however, is formed integral with the screw-threaded cap 33, which closes the aperture 34, formed in the end of the cylindrical cup. This aperture 34 is of a sufficient size to admit the gear-pinion 28, and by the construction thus employed we are enabled to readily assemble the parts in a manner that will be subsequently described. The sleeve 29, except for convenience in assembling the parts, might be formed integral with or rigidly secured upon the shaft or bearing-rod 30, although we have shown the sleeve as loosely mounted on the rod, it being immaterial whether the shaft 30 rotates in its bearings 31 and 32 or whether the sleeve rotates on the shaft. The sleeve has secured upon it, preferably near its outer ends, the eccentric-disks and 36, which coöperate with the yokes 37 and 38, respectively, which are secured upon the lower ends of the vertically-reciprocating rods 39 and 40, which have their bearings in the elongated tubular projections 41 and 42, formed in and projecting downwardly from the top of the cylinder. For convenience of assembling the parts the rods 39 and 40 are screw-threaded into their yokes 37 and 38, as is clearly shown in Fig. 5. These rods 39 and 40 carry the cross-heads 43 and 44, which are conveniently formed of bars having three apertures therein, through the central one of which extends the screw-threaded upper end of the rod 39 or 40, as the case may be, the rod being cut away to form a shoulder upon which the cross-head rests and which is secured in position by the nuts 45 and 46, as well as by the pins 47 and 48, which may be passed through the cross-head and rod. Passing through the outermost holes in the cross-heads 43 and 44 are the piston-rods 49 of the pumps, and the amount of stroke of these piston-heads is regulated by the coöperation of the fixed abutments 50 thereon and the adjustable abutments 51, consisting of nuts above the cross-head, which can be set at any desired position on the screw-threaded upper ends of the pistons and secured by the lock-nuts 52. By this construction it will be seen that the amount of stroke that is given to each piston and the consequent rate at which the pump operates can be regulated by means of the lost motion between it and the rods 39 and 40, as the case may be. It will be readily apparent that with this construction, in which a single rod 39, with a cross-head, is employed to move two or more piston-rods different distances, it becomes vitally important that the cross-head be rigidly secured upon the rod 39. Otherwise the possible movement of the cross-head relative to the rod 39 would, especially when one piston-rod was adjusted for a shorter throw than the other, cause the apertures in the cross-head, through which the piston-rods pass, to cramp upon said piston-rods and cause them to move before the desired lost motion of the rod 39 had been used up. If the cross-head is rigidly secured instead of pivotally secured thereto, as has been proposed in prior constructions, it is impossible for the cross-head to swing about the rod 39, and thus cramp the piston-rods, which, however, is entirely possible if the cross-head is pivoted on the rod 39.

The construction of the pump is best shown in Figs. 3 and 4, where it will be seen that the piston-barrel 53 is located in the vertical tube 54, that extends through the top plate 55 of the pump, the upper end of the tube 54 being provided with the packing-gland 56, through which the piston 49 reciprocates. An annular flange 57 is formed about this tube 54 in a position such that its under side is flush with the under side of the top plate 55, so that the edges of this flange 57 and of the top plate 55 rest upon the upper surface of the offset 16. This flange 57 has the annular channel 58 therein, which is adapted to receive any drippings that might work through the packing-gland 56 and by means of the channel 59 permit the oil to flow back into the cup. Parallel with the tube 54 is another tube, 60, which is connected with the tube 54 by the top plate 55 as well as by the cross-tube 61. The tube 60 has screwed into its lower end the nut 62, the top of the aperture through which furnishes a seat for the check-valve 63, which is preferably of the customary ball construction. This nut 62 may have screwed into the lower end thereof or formed integral therewith the tube 64, which extends down substantially to the bottom of the cup, so that the pump can practically exhaust the contents of the reservoir. A valve-seat 65 is formed in the tube 60 by contracting its bore just above the place where it is entered by the cross-tube 61, and the preferably spherical check-valve 66 coöperates with this valve-seat. The operation of this pumping mechanism will be readily apparent, as while the piston ascends the valve 63 is raised to permit the pump to be filled, while the pressure of the oil above holds the valve 66 closed. As the piston descends the valve 63 is closed

and the valve 66 is opened, so that the oil forced out of the pump by the piston will ascend into the connecting-tube 67, which is screwed into the upper end of the tube 60 and leads to the discharge-pipe 68. This connection 67 has opening into it the drain-pipe 69, at right angles thereto, which is closed by the screw-valve 70, which has its preferably conical-shaped end 71 coöperating with the seat 72 in the passage leading to the passage through the connection 67. The drain-pipe 69 has the spout 73 leading therefrom and located directly over the flaring aperture 74 in the top plate 55, through which the oil being drained off will return to the cup or reservoir. The connection 67 has its enlarged upper end screw-threaded on the outside, and the interior of its upper end is of a hollow cone shape, as seen at 75, to coöperate with the conical end 76 of the joint 77, by which the connection 67 is joined to the discharge-pipe 68. The nut 78 serves to hold the joint 77 securely upon the connection 67, and to prevent any backward flow of oil through the drain-pipe when it is opened the check-valve 79 is provided and seats itself upon the shoulder formed at 80 by contracting the diameter of the aperture through the joint 77. The lower end of the drain-pipe 68, fitting into the joint 77, serves to prevent the valve 79 from being forced away from its proper position. When it is desired to ascertain the rate of feed of any of the pumps, all that is necessary to do is to open the screw-valve 70, when the weight of the oil above the check-valve 79 will hold it closed and the oil forced out by the pump will be discharged in drops through the spout 73, where they can be readily counted, and thence through the aperture 74 back into the pump. The customary glass gage-pipe 81, which shows the height of the oil in the reservoir, may be provided and placed in the inclosing tube 82, which is secured upon the elbow-joint 83, which is let into the end of the cup, as clearly shown in Fig. 1.

From a consideration of the structure which we have described it will be apparent that it is capable of any adjustment that may be necessary to regulate the quantity of the lubricant which any pump shall discharge and also that the actuating mechanism being extremely simple and operating in the oil in the reservoir will act certainly and with the least possible wear. It will also be apparent that the system is capable of indefinite expansion without materially changing the structure or design, as it is only necessary to increase the length of the cylindrical cup and of the shaft extending longitudinally therethrough and to add as many additional eccentrics and pumps as may be necessary to supply the different parts to be lubricated.

While we have shown our invention as embodied in the form which we at present consider best adapted to carry out its purposes, it will be understood that it is capable of some modifications and that we do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the art.

What we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a device of the class described, the combination with an oil-cup, of an actuating-shaft passing into said cup and having suitable bearings therein, a reciprocating rod passing into said cup, connections within said cup for transforming the rotary movement of said shaft into a positive reciprocating movement of the rod in both directions, a valved pump in connection with said cup, a reciprocating piston therefor, a stuffing-box in said pump through which said piston passes, and adjustable connections outside of said cup between said rod and piston for varying the amount of movement given to the piston by said rod.

2. In a device of the class described, the combination with an oil-cup, of an actuating-shaft passing into said cup and having suitable bearings therein, a reciprocating rod passing into said cup, connections within said cup for transforming the rotary movement of said shaft into a positive reciprocating movement of the rod in both directions, said connections consisting of a worm on said shaft, an eccentric-shaft mounted to rotate in bearings inside said cup, a gear mounted on said shaft and meshing with the worm, operating connections between said eccentric-shaft and the reciprocating rod, a valved pump in connection with said cup, a reciprocating piston therefor, a stuffing-box in said pump through which said piston passes, and adjustable connections between said rod and piston outside of the cup for varying the amount of movement given to the piston by the reciprocating rod.

3. In a device of the class described, the combination with an oil-cup, of an actuating-shaft passing into said cup and having suitable bearings therein and provided with a worm on its inner portion, reciprocating rods passing into said cup, a shaft journaled in said cup and provided with a plurality of eccentrics thereon corresponding in number to said rods, a worm-gear on said shaft meshing with the worm, yokes on said rods coöperating with the eccentrics and moved positively thereby in both directions, valved pumps in connection with said cup, a reciprocating piston for each of said pumps, a stuffing-box in each of said pumps through which its piston passes, and adjustable connections outside of said cup between said rods and pistons for varying the amount of movement given to the pistons by the rods.

4. In a device of the class described, the combination with an oil-cup, of an actuating-shaft passing into said cup and having suitable bearings therein and provided with a worm on its inner portion, reciprocating rods passing into

said cup, a shaft journaled in said cup and provided with a plurality of eccentrics thereon corresponding in number to said rods, a worm-gear on said shaft meshing with the worm, yokes on said rods coöperating with the eccentrics, pumps in connection with said cup, a reciprocating piston for each of said pumps, and adjustable connections between said rods and pistons for varying the amount of movement given to the pistons by the rods, said connections comprising cross-heads rigidly secured on each of said rods having apertures therein through which the pistons pass, and adjustable abutments on the pistons coöperating with said cross-heads.

5. In a device of the class described, the combination of a shaft having a pulley-wheel thereon and a worm secured thereto, with a shaft having a worm-gear thereon meshing with said worm and an eccentric secured thereto, a pump having a reciprocating piston, and connections between said eccentric and piston for reciprocating the piston positively in both directions, comprising a rod reciprocated by said eccentric and a cross-head rigidly secured on said rod having an aperture therein through which the piston passes, and abutments on said piston, one of them being adjustable, coöperating with said cross-head.

6. In a device of the class described, the combination of a shaft having a pulley-wheel thereon and a worm secured thereto, with a shaft having a worm-gear thereon meshing with said worm and a plurality of eccentrics secured thereto, a plurality of pumps each having a reciprocating piston, and connections between each of said eccentrics and its coöperating pistons for reciprocating the latter positively in both directions, said connections comprising rods reciprocated by said eccentrics, each rod having a cross-head rigidly secured thereon and connected with a plurality of the pump-pistons.

7. In a device of the class described, the combination with a cup, of a shaft passing into and journaled in said cup and provided with a pulley-wheel secured thereto outside of said cup and a worm-gear secured thereto inside of the cup, a shaft journaled in bearings formed in the inner walls of said cup and having the worm-gear thereon meshing with the worm and also an eccentric secured thereto, a pump having a reciprocating piston, and connections between said eccentric and piston for moving the piston positively in both directions at each rotation of the eccentric-shaft comprising a yoke embracing said eccentric, a rod connected to said yoke, and a cross-head on said rod connected with the piston outside of the cup by means of adjustable abutments on said piston coöperating with the cross-head through which it passes.

8. In a device of the class described, the combination of the cup having a bearing 31 formed in the interior thereof, with the rotary operating-shaft journaled at one end in said bearing, a removable cap-piece oppositely disposed to said bearing 31 and provided with the bearing 32 for the other end of said shaft, the gear-wheel 28 on said shaft, eccentrics 35 and 36 also mounted thereon, the rods 39 and 40 reciprocating in the cup, and the yokes 37 and 38 connected to said rods and embracing the eccentrics, the rod 39 being screwed into yoke 37, substantially as and for the purpose described.

9. In a device of the class described, the combination with a cup, of the reciprocating rod 39 having the bearing 41 therein and having the cross-head 43 with the apertures therein rigidly secured thereto, the piston-rods 49 passing through said apertures and into pumps mounted in said cup, the fixed and adjustable abutments on the piston-rods coöperating with said cross-heads, and means for reciprocating said rod in a straight line.

10. In a device of the class described, the combination with the cup, of the reciprocating rods 39 and 40 having the bearings 41 and 42 therein and carrying the cross-heads 43 and 44 with the apertures therein rigidly secured thereto, the piston-rods 49 passing through said apertures and into pumps mounted in said cup, the fixed and adjustable abutments on the piston-rods coöperating with the cross-heads, and means for reciprocating said rods comprising the shaft 30 having the eccentrics 35 and 36 secured thereto and the yokes 37 and 38 secured to the lower ends of the rods 39 and 40 and embracing said eccentrics.

11. In a device of the class described, the combination with the cup having the shape of a cylinder with a horizontal axis, of the operating-shaft extending lengthwise thereof on the inside of said cup, the pumps mounted in the top thereof in a row parallel to said shaft, each comprising the piston, piston-chamber, valve-seats, check-valves, and discharge-pipe, all constructed and combined so that the pumps can be individually and separately placed in the top of the cup, connections from said shaft to said pumps for operating the same, and means for rotating the shaft.

12. In a device of the class described, the combination with the cup, of the operating-shaft extending lengthwise on the inside thereof, the pumps mounted in the top thereof in a row parallel to said shaft, each comprising the piston, piston-chamber, valve-seats, check-valves, and discharge-pipe, all constructed and combined so that the pumps can be individually and separately placed in the top of the cup, connections from said shaft to said pumps for operating the same, said connections comprising yokes embracing eccentrics on said shaft and secured to rods reciprocated thereby and passing up through the top of the casing and connected to the pistons of said pumps, and means for rotating the shaft.

13. In a device of the class described, the

combination with a cup having a bearing formed on the inner side thereof at one end and a removable cap-piece oppositely disposed at the other end and provided with a bearing on its inner side, of the operating-shaft extending lengthwise thereof journaled in said bearings, the pumps mounted in the top thereof in a row parallel to said shaft, each comprising the piston, piston-chamber, valve-seats, check-valves, and discharge-pipe, all constructed and combined so that the pumps can be individually and separately placed in the top of the cup, connections from said shaft to said pumps for operating the same, and means for rotating the shaft.

14. In a device of the class described, the combination with the cup having an aperture 17 in the top thereof, of a pump adapted to be seated in said aperture and having the pump-body 18 formed with the drip-flange 58 and channel 59 surrounding the piston-cylinder and the drip-aperture 74 therein, said pump-body being adapted to be secured in place in said aperture by the set-screw 19, a discharge-pipe leading from said pump, and sight-feed devices for discharging oil drop by drop from said discharge-pipe into the aperture 74, substantially as and for the purpose described.

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