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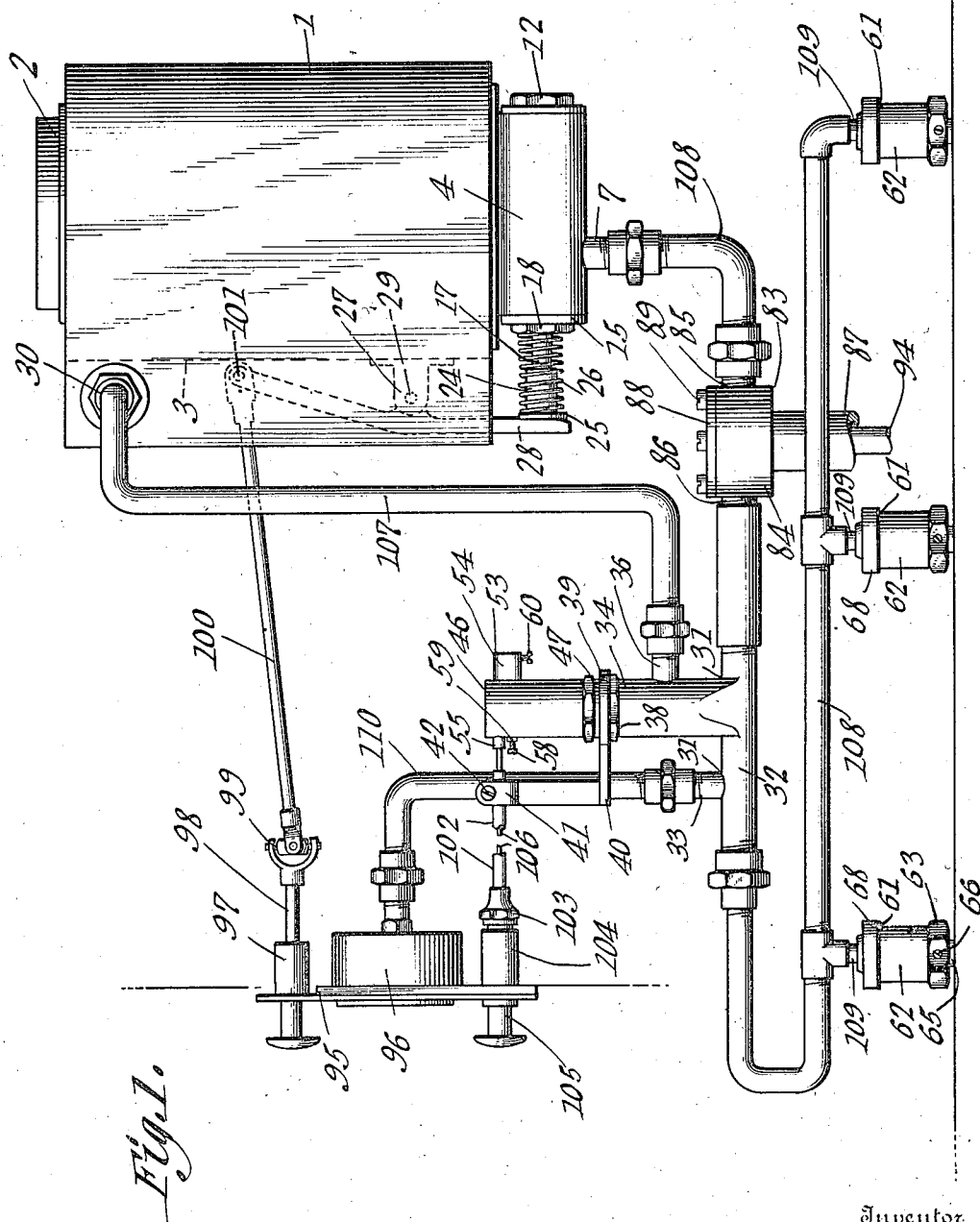
1,496,947

J. K. ROBINSON

OILING SYSTEM

Filed March 15, 1923

4 Sheets-Sheet 1



Inventor

J. K. Robinson

By

Chas. H. Co.

Attorneys

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4 Sheets-Sheet 2

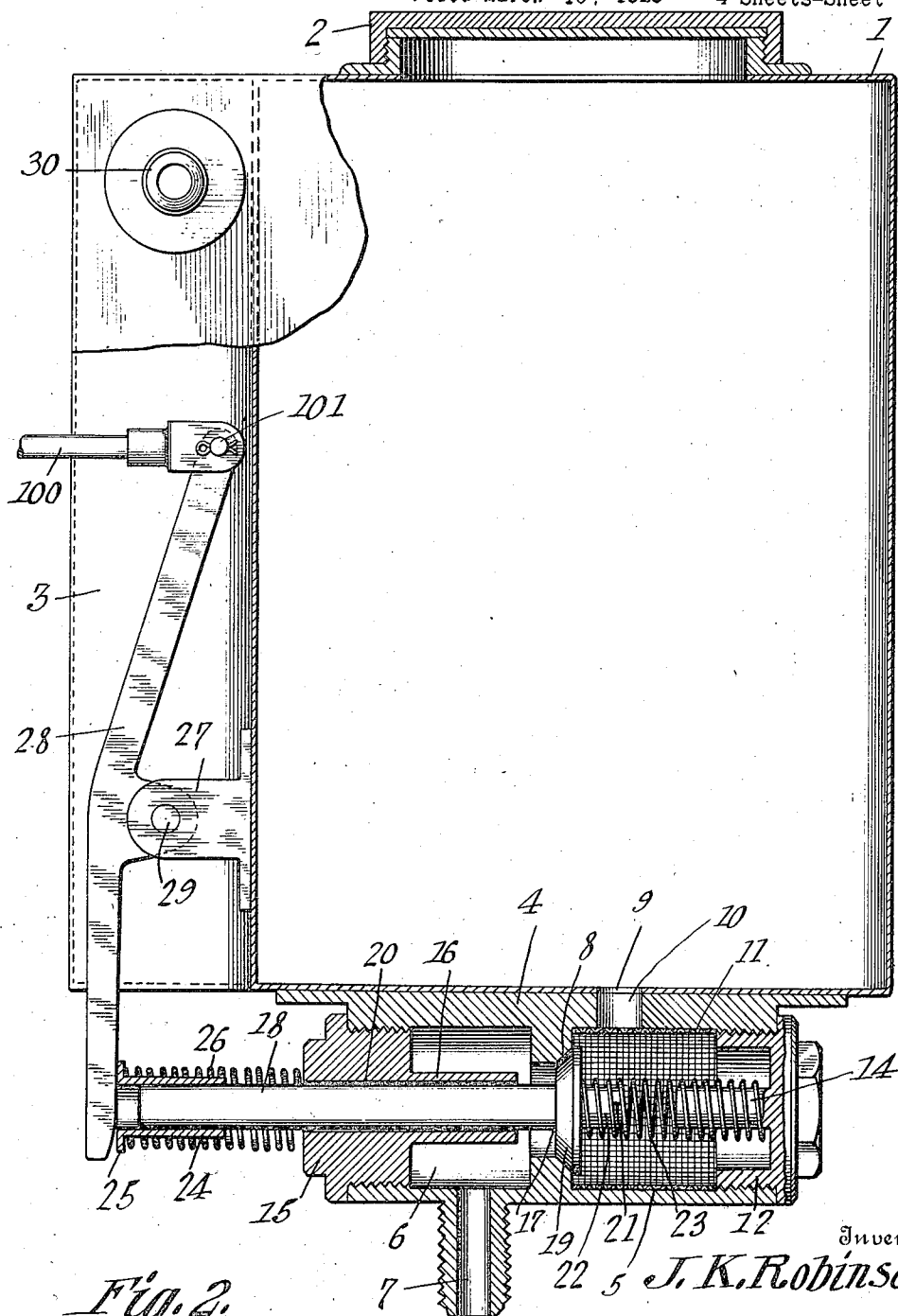


Fig. 2.

Inventor

J. K. Robinson

By

C. A. Snow & Co.

Attorneys

June 10, 1924.

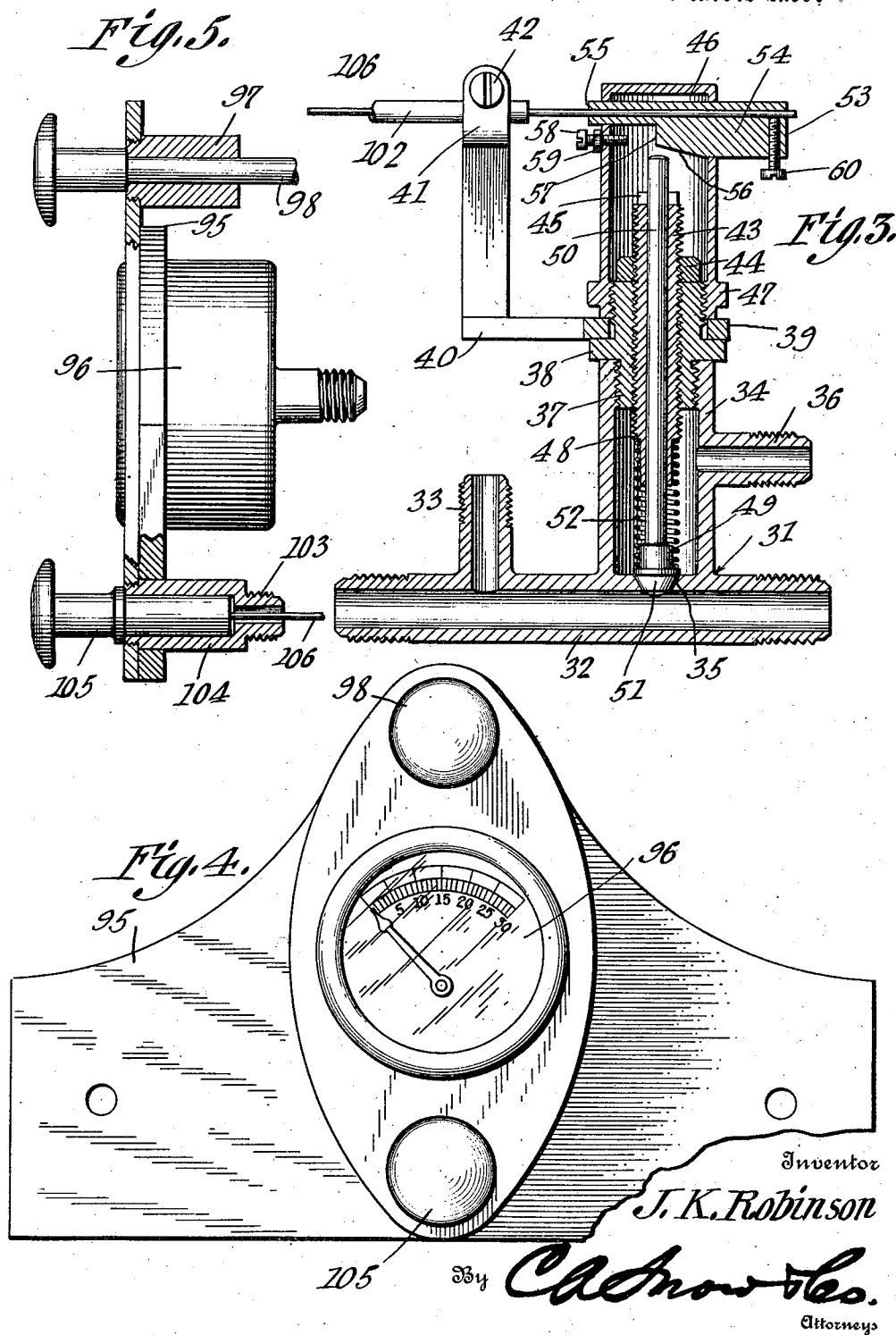
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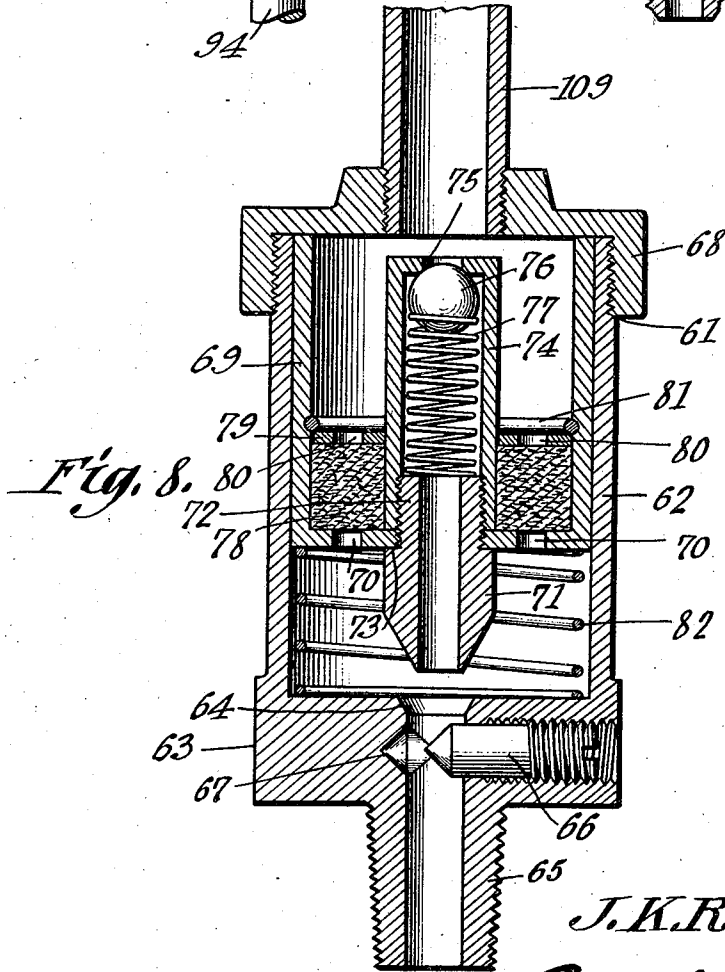
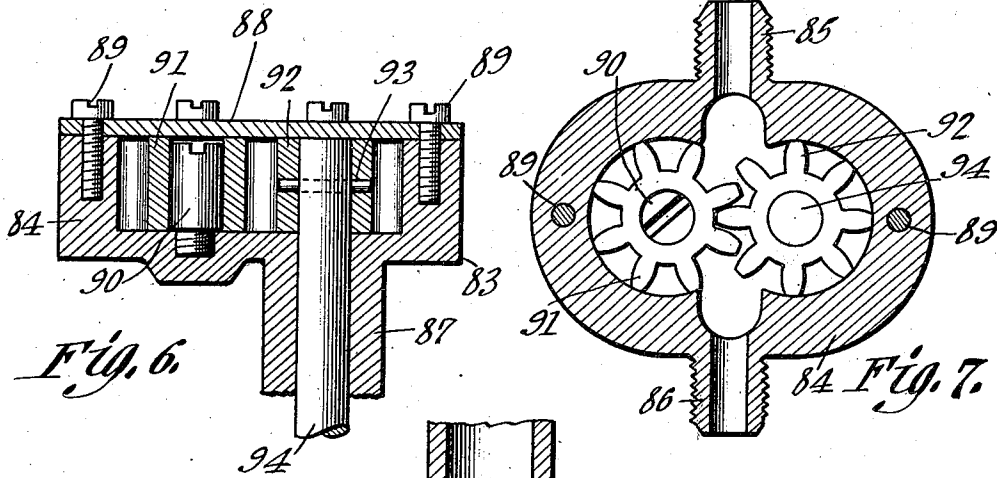
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J. K. ROBINSON

OILING SYSTEM

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4 Sheets-Sheet 4



Inventor

J. K. Robinson

By

CAHILL & CO.

Attorneys

UNITED STATES PATENT OFFICE.

JAMES K. ROBINSON, OF JACKSONVILLE, FLORIDA, ASSIGNOR OF ONE-FOURTH TO S. S. RICKETT AND ONE-FOURTH TO C. C. ROBERTSON, BOTH OF JACKSONVILLE, FLORIDA.

OILING SYSTEM.

Application filed March 15, 1923. Serial No. 625,320.

To all whom it may concern:

Be it known that I, JAMES K. ROBINSON, a citizen of the United States, residing at Jacksonville, in the county of Duval and State of Florida, have invented a new and useful Oiling System, of which the following is a specification.

This invention aims to provide an improved means whereby oil may be supplied under pressure, slowly, to the parts to be lubricated on an automobile or a machine of any other kind, novel means being provided whereby, at the will of an operator, the oil pressure may be permitted to build up to an abnormal point, and then be released, so as to dislodge an obstruction which may exist.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that, within the scope of what is claimed, changes in the precise embodiment of the invention shown can be made without departing from the spirit of the invention.

In the accompanying drawings:—

Figure 1 shows diagrammatically, and in elevation, an oiling system constructed in accordance with the invention. Figure 2 is a vertical section taken through the tank, parts appearing in elevation; Figure 3 is a sectional view showing one of the valve mechanisms; Figure 4 is an elevation showing the dial and attendant parts; Figure 5 is a sectional view of the structure shown in Figure 4, parts being broken away and parts appearing in section; Figure 6 is a vertical sectional view showing the pump; Figure 7 is a horizontal sectional view showing the pump; and Figure 8 is a longitudinal section taken through one of the oil cups.

The device forming the subject matter of this application comprises six coacting mechanisms, including a tank, shown in detail in Figure 2; a valve which appears in Figure

3; an oil cup depicted in Figure 8; a pump delineated in Figures 6 and 7; a support and gage detailed in Figures 4 and 5; and sundry operating connections and piping appearing most clearly in Figures 1, 5 and 6. Of these in their order, consider, first:

The tank.

A tank 1 is provided and has a filling cap 2, there being a longitudinal recess 3 in the tank. A valve casing 4 is secured to the lower end of the tank 1 and is provided with chambers 5 and 6, the casing having an outlet 7, communicating with the chamber 6, and there being a valve seat 8 in the casing, between the chambers 6 and 5. The tank 1 is supplied in its bottom with an opening 9, communicating with an inlet port 10 in the casing 4, the port discharging into the chamber 5. A tubular screen 11 is located in the chamber 5 and extends across the port 10. Into one end of the casing 4, a cup-shaped closure 12 is threaded, the closure having an inwardly projecting stem 14. A closure 15 is threaded into the opposite end of the casing 4 and has a reduced tubular guide 16 which projects into the chamber 6.

The numeral 17 denotes, generally, a valve including a stem 18 and a head 19 carried thereby, the head being adapted to cooperate with the seat 8 and the stem being mounted for right line reciprocation in the closure 15 and in the guide 16. For a purpose which will be made manifest hereinafter, the stem 18 of the valve 19 is mounted somewhat loosely as at 20 in the closure 15 and the extension 16, so that air may enter the chamber 6, under some circumstances, slowly. The stem 18 of the valve may embody a projecting end 22 provided with a kerf 21, intended to receive a screw driver, or like tool, adapted to secure a rotation of the valve 19 and to secure a grinding of the valve on the seat 8 when it becomes necessary to grind the valve. A compression spring 23 is located in the chamber 5, one end of the spring abutting against the closure 12, and the other end of the spring abutting against the valve 19 to hold the valve yieldably seated, the ends of the spring being disposed about the project-

ing portion 22 of the valve stem 18, and about the stem 14 of the closure 12. A tubular slide 24 is mounted for reciprocation on the outer end of the valve stem 18 and has an outstanding flange 25, a compression spring 26 being disposed about the slide and about the stem and abutting at its ends against the flange 25 and against the closure 15 of the casing 4. A bracket 27 is located in the recess 3 of the tank 1, a lever 28 being fulcrumed intermediate its ends upon the bracket, as shown at 29, one end of the lever 28 being adapted to cooperate with the outer end of the slide 24. Reverting to the tank 1, it may be observed that the same is provided adjacent to its upper end with an inlet 30.

Attention is directed to the fact that the tank above described is claimed specifically in my co-pending application Serial No. 625,906, filed on the 17th day of March 1923.

The valve mechanism.

In Figure 3 there appears a valve mechanism which is denoted generally by the numeral 31, the valve mechanism comprising a body including a tubular base 32 having an outlet 33, the base carrying a receptacle 34. A valve seat 35 is fashioned in the base 32 at the point of juncture between the receptacle 34 and the base. The receptacle 34 has a lateral outlet 36. The lower end of a bushing 37 is threaded into the receptacle 34, the bushing having a wrench head 38, facilitating the rotation of the bushing. About the upper end of the bushing 37 extends the eye 39 of an angular bracket 40 provided with compressible jaws 41 connected by a tightening device 42. A tubular guide 43 is threaded for adjustment into the bushing 37 and is supplied at its inner or lower end with an external shoulder 48, the guide being equipped at its upper end with a kerf 45, intended to receive a screw driver or like tool, adapted to secure a rotation and an adjustment of the guide. The guide 43 is held in place by a lock nut 44 threaded upon the guide and bearing upon the end of the bushing 37.

A cap 46 is threaded on the upper end of the bushing 37 and serves to bind the eye 39 of the bracket 40 against the flange 38 of the bushing 37, the cap being supplied with a wrench head 47. A reciprocating valve is provided, the same being denoted generally by the numeral 49, the valve comprising a stem 50 mounted slidably in the guide 43, the stem carrying a head 51 which is adapted to coact with the seat 35. A compression spring 52 surrounds a portion of the stem 50, one end of the spring abutting against the shoulder 48 on the guide 43, and the other end of the spring abutting against the valve head 51 to hold the head yieldably upon the seat 35.

A valve controlling device 53, preferably

in the form of a slide, is mounted for reciprocation in the upper end of the cap 46 for movement transversely thereof. The slide 53 comprises a body 54 and a reduced stem 55, the body 54 having an inclined edge 56, and there being a shoulder 57 at one end of the body. Movement of the slide or valve controlling device 53 in one direction is limited by an adjustable stop 58 such as a screw, threaded into the cap 46 and adapted to cooperate with the shoulder 57, the screw being held in place by a lock nut 59, threaded thereon and adapted to engage the cap 46. A holding device 60, such as a screw, is threaded into the body 54 of the slide 53.

The valve mechanism above described forms the subject matter of a separate application; Serial No. 625,905 filed on the 17th day of March 1923.

The oil cup.

Figure 8 is a detail view wherein appears an oil cup denoted generally by the numeral 61. This cup 61 may be constructed in various ways, and some of the elements thereof may be omitted, if desired. As shown, the oil cup 61 comprises a body 62 having a base 63 wherein a seat 64 is fashioned, the base carrying a nipple 65. A valve plug 66 is threaded into the base 63 and controls the flow through the nipple or outlet 65, a seat 67 being formed in the base 63 for the reception of the inner end of the valve plug. A cap 68 is threaded on the body 62 of the oil cup.

Within the body 62 of the oil cup 61, an inverted cup-shaped plunger 69 is slidably mounted. In the bottom of the plunger 69 there are outlets 70. The numeral 71 designates a hollow valve which is so shaped at its lower end as to conform to the seat 64, the valve 71 comprising a neck 72 defining a shoulder 73, the neck being threaded into the bottom of the plunger 69 and the shoulder 73 engaging the bottom of the plunger. A tubular guide 74 is threaded on the inner end of the neck 72 and, cooperating with the bottom of the plunger 69, holds the valve 71 in place. The guide 74 is equipped in its upper end with a reduced opening 75. A valve 76 is disposed within the guide 74 and constitutes a movable closure for the opening 75, the valve being held in closed position with respect to the opening 75 by a compression spring 77 disposed within the guide 74. A retarder or pad 78 is located in the plunger 69 and rests on the bottom thereof, the retarder being constructed of such material that oil will pass through it slowly, when the oil is under pressure. A cover plate 79 rests on the retarder 78 and is located about the guide 74, the cover plate being held in place by a spring retainer 81 engaged with the side wall of the plunger 69. There are openings 80 in the plate 79.

A compression spring 82 is disposed in the body 62 of the oil cup 61 and exerts an upward pressure on the plunger 69.

The oil cup is covered specifically in my co-pending application Serial No. 625,904, filed on the 17th day of March, 1923.

The pump.

A pump 83 of any desired sort is supplied, the pump, if desired, including a casing 84 having an inlet 85 and an outlet 86, the casing being provided with a projecting bearing 87 of any desired length. Upon the casing 84, a lid 88 is secured as indicated at 89. A stub shaft 90 is mounted in the bottom portion of the casing 84 and upon the stub shaft, a gear wheel 91 is mounted, the gear wheel meshing into a gear wheel 92 secured at 93 to a shaft 94 journaled in the bearing 87, the shaft being power-driven. If the oiling system forming the subject matter of this application is applied to an automobile, the shaft 94 will be driven in any appropriate way from the propelling engine of the vehicle.

The support and gage.

Note in Figures 4 and 5, a support 95, carrying a pressure gage 96. A bearing 97 is carried by the support 95, a slide 98 under the control of an operator being mounted to reciprocate in the bearing. The support 95, carries, also, a bearing 104, wherein a slide 105 is movable.

Connections, piping and miscellaneous parts.

A universal joint 99 connects the slide 98 with a rod 100 which is pivoted at 101 to the lever 28 as shown in Figure 2. One end of a sleeve 102 (which may be flexible) is connected at 103 to the bearing 104, the other end of the sleeve being gripped between the jaws 41 of the bracket 40 shown in Figure 3. Through the sleeve 102 passes an operating member 106, which may be a wire, one end of the operating member being attached to the slide 105. Figure 3 shows that the other end of the operating member 106 is received in the valve controlling slide 53 and is held therein by the screw 60. Reverting to Figure 1, a by-pass conduit 107 extends between the outlet 36 of the receptacle 34 and the inlet 30 of the tank 1. A delivery conduit 108 is connected at one end to the outlet 7 of the valve casing 4. The delivery conduit 108 has branches 109 which are assembled with the caps 68 of the oil cups 61. A pressure conduit 110 extends between the outlet 33 of the body of the valve mechanism 31 and the gage 96.

Sundry observations may properly be made at this point concerning the strength of certain springs in the device. In order to shorten the description, let it be supposed

that the spring 52 of Figure 3 will yield under a pressure of ten pounds; that the spring 82 of Figure 8 will yield under a pressure of ten pounds; and that the spring 77 of Figure 8 will yield under a pressure of thirty pounds; these figures being purely arbitrary, saving in so far as they may indicate a difference in the strength of the springs, relatively but not in degree. Let it be supposed, further, by way of illustration, that the propelling force of the pump 83 is about sixty pounds. The pump 83 and the base 32 of the valve mechanism 31 are interposed in the delivery conduit 108. The delivery conduit 108 may be of any length and shape, the particular form given to this element in Figure 1 being selected merely with a view to economizing space.

Operation.

In practical operation the valve 19 at the bottom of the tank 1 (Figure 2) is moved to open position by a train of elements comprising the slide 98, the connection 100 and the lever 28. The lost motion afforded by the member 24 prevents the valve 19 from being opened if the slide 98 is touched or struck accidentally. When the valve 19 is opened, the oil passes from the tank 1 through the opening 9—10 the screen 11, the chamber 5, the chamber 6, the outlet 7 and the conduit 108, into the pump 83. The pump 83 passes the oil onward through the conduit 108 into the base 32 of the valve mechanism 31 (Figure 3), pressure being transmitted to the gage 96 through the conduit 110. The oil flows under pressure through the conduit 108 to the cups 61 by way of the branches 109. The pressure of oil in the cup 61 forces the plunger 69 downwardly until the valve 71 closes upon the seat 64, the spring 82 being compressed. The valve 76 does not open at this time because the spring 77 is stronger than the spring 82. The pressure builds up in the conduit 108 and in the cup 61 until the gage 96 indicates the known pressure at which the spring 82 of the cup 61 and the spring 52 of the valve mechanism 61 yield. Then, the operator manipulates the slide 98 to cause the lever 28 of the tank 1 to permit the valve 19 to close under the action of the spring 23. If the operator does not close the valve 19 promptly, the spring 52 of the valve mechanism 31 (Figure 3) is compressed, and the oil which is fed through the conduit 108 by the pump 83 after the cup 61 has been filled, returns to the tank 1 through the by-pass 107. When the valve 19 at the bottom of the tank 1 closes, the valve 51 shown in Figure 3 closes responsive to the action of the spring 52, because no more oil is supplied to the pump 83 to be forced through the conduit 108. When the pressure of oil in the cup 61 is reduced by

the operation last above described, the spring 82 (Figure 8) returns the cup-shaped plunger 69 to the position shown in Figure 8, the plunger being full of oil, and the valve 71 being carried to open position with respect to the seat 64. Air enters the chamber 6 slowly, through the small space 20 (Figure 2) between the valve stem 18 and the closure 15, and the pump 83 passes a slight air pressure through the conduit 108 to the cup 61 (Figure 8). The oil in the cup-shaped plunger 69 is forced slowly through the openings 80 of the plate 79, through the retarder 78 and through the openings 70 of the plunger, the oil passing through the nipple 65 to the part which is to be lubricated. The plug valve 66, if used, affords a fine adjustment of the oil supply.

Suppose that the operator suspects that, due to an obstruction, some part which is to be lubricated by one of the cups 61 is not receiving a proper amount of oil. Then, both the slide 98 and the slide 105 are operated, the slide 98 securing an opening of the valve 19 (Figure 2), and the slide 105 acting through the member 106 to move the valve controlling device 53 until the inclined edge 56 thereof lies more or less in the path of the valve stem 50, the position of the valve-controlling device being regulated by means of the screw 58 which engages the shoulder 57. Oil flows into the cup 61, the plunger 69 moves downwardly, the valve 71 (Figure 8) closes on the seat 64, and the plunger 69 fills with oil as hereinbefore described. The pressure is retained in the oil cup 61, under such circumstances, because the valve 71 is closed upon the seat 64. The valve 51 (Figure 3) opens under the increasing pressure of oil, but does not open fully, because the edge 56 of the valve-controlling member 53 is disposed in the path of the stem 50 of the valve 51. Some of the oil passes by the valve 51 and enters the tank 1 through the by-pass 107. The pressure is increased in the oil cup 61, but is not increased to full pump pressure, because the valve 51 is opened slightly. Through the instrumentality of the stop screw 58, the position of the valve controlling member 53 may be regulated, the movement of the valve stem 50 being adjusted, the valve 51 being opened more or less, the amount of oil escaping through the by-pass 107 being varied, and the pressure of oil in the oil cup 61 being regulated accordingly. The pressure in the oil cup 61 builds up until it is high enough to compress the spring 77, whereupon the valve 76 moves suddenly to open position with respect to the aperture 75. The oil shoots, then, with great force, and almost explosively, from the cup-shaped plunger 69 and the body 62 of the cup 61, through the opening 75, through the guide 74, through the hollow valve 71 and through

the nipple 65, the obstruction being dislodged. When the obstruction is dislodged, this fact is made manifest by a diminution of pressure indicated on the gauge 96 and the operator then may move the slide 98 to close the valve 19 and may move the slide 105 to restore the valve-controlling device 53 to its normal position.

Should it be found that oil from the chamber 6 leaks out through the space 20, an internal annular groove may be formed in the tubular guide 16, and an oil hole, for returning oil, may be drilled from the chamber into the aforesaid groove.

What is claimed is:—

1. In an oiling system, an oil cup having an outlet, a plunger mounted in the cup for advancement and retraction and having means for closing the outlet when the plunger is advanced, an oil conduit communicating with the cup, means for forcing oil through the conduit under pressure, a retarder carried by the cup and constituting means for securing an advancement of the plunger, and a closing of the outlet, responsive to pressure in the conduit, means for reducing the pressure in the conduit, and means for retracting the plunger and opening the outlet when the pressure in the cup is reduced, the retarder being permeable to permit oil to pass slowly therethrough under reduced pressure.

2. An oiling system, constructed as set forth in claim 1 and further characterized by the provision of a valve under the governance of an operator and controlling the flow through the outlet of the oil cup.

3. In an oiling system, an oil cup having an outlet, a plunger mounted in the cup for advancement and retraction and having means for closing the outlet when the plunger is advanced, an oil conduit communicating with the cup, a tank discharging into the conduit, a valve under the governance of an operator and controlling the flow from the tank to the conduit, means for forcing oil through the conduit under pressure, a retarder carried by the plunger and constituting means for securing an advancement of the plunger, and a closing of the outlet, responsive to pressure in the conduit, the valve constituting means for securing a reduction of pressure in the conduit, and means for retracting the plunger to open the outlet, the retarder being permeable, to permit oil to pass slowly therethrough, under reduced pressure, when the plunger is retracted and the outlet opened.

4. An oiling system, constructed as set forth in claim 3, and further characterized by the provision of a by-pass conduit, leading from the oil conduit to the tank, and a valve in the by-pass conduit, the said valve being so constructed as to open at a predetermined pressure.

5. A device of the class described, constructed as set forth in claim 1 and further characterized by the provision of a pressure gauge, and means for establishing communication between the gauge and the oil conduit.

6. In an oiling system, an oil cup having an outlet, a plunger mounted in the cup for advancement under pressure and for retraction, a retarder on the plunger, means carried by the plunger for closing the outlet when the plunger is advanced, to prevent oil from passing through the outlet responsive to pressure on the retarder, the plunger having a passage discharging into the outlet independently of the retarder, a valve controlling the passage, an oil conduit discharging into the cup, means for creating pressure in the conduit, means for controlling the pressure in the conduit, a first spring means for retracting the plunger when pressure in the cup is decreased, and a second spring means for closing the valve, the second spring means being stronger than the first spring means, to permit pressure to build up in the cup whilst the outlet of the cup is closed.

7. A device of the class described, constructed as set forth in claim 6, and further characterized by the fact that the conduit has an outlet, and a valve controlling the outlet, the last specified valve being constructed to open at a predetermined pressure, means being provided for governing the movement of the last specified valve, to regulate the pressure at which the second spring means yields to permit an opening of the valve which controls the passage in the plunger.

8. A device of the class described, constructed as set forth in claim 6 and further characterized by the provision of a tank discharging into the conduit, a by-pass connecting the conduit with the tank, a valve controlling the by-pass and constructed to open

when a pre-determined pressure has been attained in the conduit, and means for regulating the movement of the last specified valve, thereby to regulate the pressure at which the second spring means yields to permit an opening of the valve which controls the passage in the plunger.

9. In an oiling system, a cup having an outlet, an oil conduit communicating with the cup, means for creating pressure in the conduit, means for regulating pressure in the conduit, a member movably mounted in the cup for closing the outlet responsive to pressure in the conduit, means for moving said member to open the outlet responsive to a reduction of pressure in the conduit, and an oil retarder carried by said member.

10. In an oiling system, a cup having an outlet, first and second valve members, the first valve member being movable in the cup and controlling the outlet, the second valve member being movable upon the first valve member, and controlling the passage of oil therethrough, a first spring means for moving the first valve member to open position, a second spring means for closing the second valve member, the second spring means being stronger than the first spring means, an oil conduit discharging into the cup, mechanism for creating pressure in the conduit thereby to close the first valve member, and to open the second valve member after pressure has built up in the cup; and means under the governance of an operator for regulating the pressure in the conduit to vary the point at which the second spring means yields when the second valve member opens.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JAMES K. ROBINSON.

Witnesses:

HENRIK J. SCHMIDT,
C. U. SMITH.