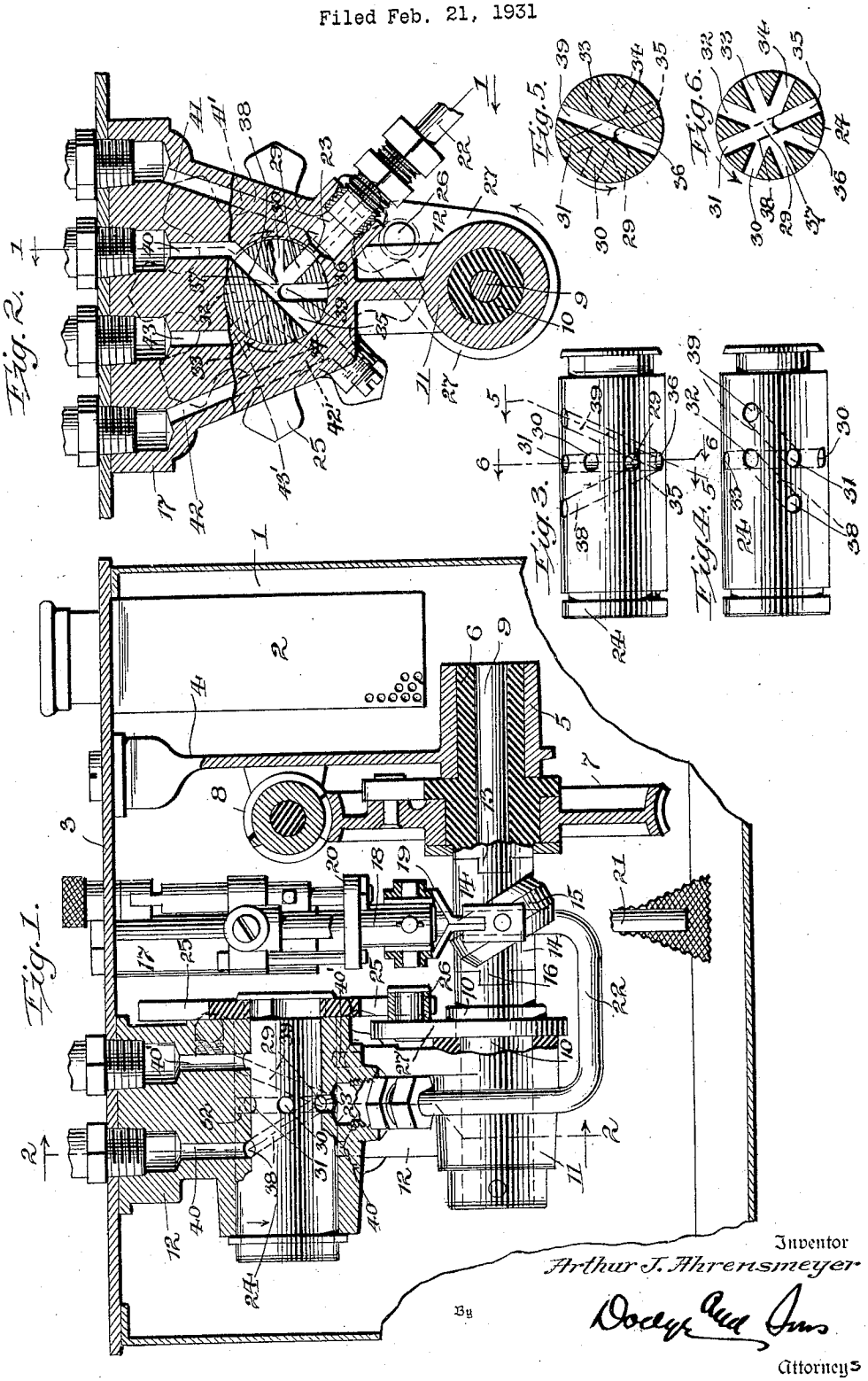
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LUBRICATOR

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LUBRICATOR

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This invention relates to lubricators, and particularly to that type in which a regulated quantity of lubricant is forced periodically to a point or points to be lubricated.

As is well known, automobiles particularly require adequate, but regulated, lubrication at various points, and it is imperative that each part lubricated receive the proper amount of oil. The present invention has for its object the provision of a simple device adapted to effect such regulated lubrication in a positive and efficient manner. Particular attention has been given to the arrangement and functioning of the lubricant ports and passages, so as to provide for more direct and definite delivery of the oil to the desired points.

In a sense, the present invention is an improvement upon the devices set forth and claimed in Letters Patent No. 1,532,620, granted April 7, 1925; and No. 1,610,847, granted December 14, 1926, to Thomas E. Coleman, to which reference is hereby made.

The accompanying drawing discloses a practical form of the device, wherein,—

Fig. 1 is a vertical section of the improved lubricator taken on line 1—1 of Fig. 2, certain of the parts being shown in side elevation;

Fig. 2, a vertical section on line 2—2 of Fig. 1;

Fig. 3, a side elevation of the novel rotary distributor element removed from the lubricator;

Fig. 4, a plan of the distributor element as it appears in Fig. 3;

Fig. 5, a section taken on line 5—5 of Fig. 3; and

Fig. 6, a similar section taken on line 6—6 of Fig. 3.

In the drawing, 1 designates a suitable oil container or reservoir. A filler strainer 2 extends downwardly into the reservoir from a removable cover 3. Also projecting downwardly into the reservoir from the underface of the cover, to which latter it is attached, is a bracket 4. A bearing 5, formed in the lower end of the bracket, supports for rotation a hub or sleeve 6 upon which is fixed a worm-gear 7. A worm 8 serves to drive worm-gear 7, the worm itself being actuated by some moving part of the structure to be lubricated.

A drive shaft 9 is supported at one end in sleeve 6. The opposite end of the shaft is supported by a second sleeve or hub member 10 mounted in a bearing sleeve 11, preferably formed integrally with a distributor casting or body 12 depending from the reservoir cover. The inner end of sleeve 6 is provided with a projection 13 adapted to enter a slot formed in a hub 14, comprising part of a wobbling eccentric 15. Hub 14 has a projection 16, whereby it is slidably connected also to sleeve 10.

Eccentric 15 serves to operate the pump unit for the oil. The pump casting 17 is suspended from reservoir cover 3 and the piston 18 thereof is operatively connected by yoke 19 with the wobbling eccentric 15. Preferably the capacity of the pump is controlled by an adjustable sleeve 20 in the manner set forth and claimed in Letters Patent 1,262,979, dated April 16, 1918.

The pump may be of any approved type and, in so far as the present invention is concerned, a plurality of pumps may be employed, as shown in Letters Patent 1,532,620, supra. The construction of the pump member is such that the piston thereof is oscillated so as to bring spill-ports into registry when the piston has caused the discharge of a predetermined quantity of oil, as set forth in Letters Patent 1,262,979, above mentioned.

A pipe 21, opening into the lower part of the reservoir, connects at its inner end to the intake of pump 17. A pipe 22 extends from the outlet of the pump and is connected to an inlet port 23 located in a longitudinal, cylindrical opening or bore formed in the distributor body 12. (See Figs. 1 and 2.) This bore provides a seat for a rotating distributor element 24. Said element is designed to be rotated step-by-step, and to that end has a star-wheel 25 secured to one end thereof, with which coacts a roller 26 carried at the outer end of a crank 27 mounted on and rotatable with sleeve 10.

Distributor element 24 is provided intermediate its ends with a series of eight radial

inlet ducts 29, 30, 31, 32, 33, 34, 35 and 36. Attention is called to the fact that all of these inlet ducts are located in a single plane disposed perpendicularly to the longitudinal axis of distributor 24; also that the outer ends of these ducts, which open onto the periphery of element 24, are alined with inlet opening 23 of the distributor body, so that the inlet port and these ducts may register successively upon rotation of element 24.

In Figs. 1 and 2, inlet port 23 of the distributor and inlet duct 29 of element 24, are shown in registry. Star-wheel 25 is provided with eight points, so that, as a result of the step-by-step, rotary movement imparted to distributor 24, (this movement being in a clock-wise direction, as shown in Fig. 2), inlet ducts 29 to 36 will be brought successively into registry with inlet port 23.

It will be noted, particularly from Fig. 6, that the inner ends of inlet ducts 29 to 36 in the distributor element all open into a central chamber 37; also that all of these inlet ducts are spaced the same distance from each other about the circumference of element 24, the angle between each of the ducts in the construction shown being 45°. As a result, the opposing ducts are alined with each other and, in fact, thus provide in effect a series of four, diametrically-arranged through passages in the distributor element. This is important in obtaining a full understanding of the manner in which these ducts function to receive and distribute the lubricant directly to the desired points, as explained shortly.

In order that the lubricant entering through port 23 into any one of the inlet ducts 29 to 36 of element 24 may be distributed, the element is provided with a pair of inclined outlet ducts 38, 39. As will be best seen upon reference to Figs. 3, 4, 5 and 6, distributor ducts 38, 39 are similarly arranged and extend diametrically through distributor element 24. Said outlet ducts incline to each side of the plane in which the series of inlet ducts 29 to 36 are located, so that the discharge ends of ducts 38, 39 are spaced apart both longitudinally and circumferentially of the rotatable element 24.

As shown most clearly in Fig. 4, the inlet end of distributor duct 38 opens into inlet duct 35 of the distributor element, while the inlet end of distributor duct 39 opens into inlet duct 36 of the element. Inlet duct 32 of the distributor element 24 and the outlet end of distributor duct 39 are longitudinally alined, as shown in Fig. 4. The outlet end of distributor duct 38 is longitudinally alined with inlet duct 31, as shown in the same figure. Thus, the outlets of distributor ducts 38, 39 are spaced 45° apart on the circumference of distributor element 24.

Distributor casting 12 is provided with eight passages (corresponding to the eight inlet ducts 29 to 36 of element 24) into which are threaded pipes that extend to the points to be lubricated. These passages communicate at their lower ends with outlet ports arranged in banks of four across the casting (see Figs. 1 and 2), and are designated, respectively, by 40, 41, 42, 43; and 40′, 41′, 42′, 43′. The individual ports are alined longitudinally of the distributor casting 12, as appears from Fig. 2.

As will be seen from reference to Fig. 1, the discharge end of distributor duct 38 stands in alinement with the several outlet ports 40 to 43, inclusive. The discharge opening of distributor duct 39 stands in alinement with outlet ports 40′ to 43′, inclusive. Thus, during the step-by-step, rotative movement of element 24, the discharge mouth of outlet duct 38 is brought successively into registry with the outlet ports of the series or bank which it serves. Likewise, the discharge mouth of distributor port 39 is brought successively into registry with the outlet ports of its series.

However, since the outlet ports of the two series 40 to 43 and 40′ to 43′ are spaced 90° apart (as shown in Fig. 2) and the discharge ends of distributor ducts 38, 39 are offset circumferentially 45°, rotation of element 24 first brings the discharge end of duct 38 into registry with one of the outlet ports of the series 40 to 43. Concurrently with this registration, inlet port 23 registers directly with one of the inlet ducts 29 to 36, thereby providing a direct passage for flow of oil to the point to be lubricated. The next movement of element 24 cuts off outlet duct 38 and brings outlet duct 39 into registry with the corresponding outlet port of its series 40′ to 43′. Simultaneously, inlet port 23 registers with the next succeeding inlet duct of series 29 to 36. The operation of pump 17 is timed so that it functions to discharge a quantity of oil upon each succeeding registration of inlet port 23 with the several inlet ducts 29 to 36 of the distributor element. Thus, the oil is distributed to the desired points through the interconnecting ducts and ports as above described.

Now, it will be seen that as a result of registration of inlet port 23 successively with the inlet ducts 29 to 36, oil will be fed first to one of the outlet ports 40 to 43 by duct 38, and then to one of the outlet ports 40′ to 43′ by duct 39. Continued rotation of element 24 then brings duct 38 into registry with the next succeeding outlet duct 41 of its series, following which duct 39 registers with its corresponding outlet port 41′. In this manner, the distribution of the charges of oil are continued alternately to the two series of outlet ports and in succession to the individual ports of each series.

The construction and operation of the mechanism described, it is to be noted, is conducive to positive and efficient feeding of lu-

bricant to the desired points, paricularly because of the direct registry or connection of ducts 29 to 36 with distributor inlet 23. The oil on entering any one of the inlet ducts 29 to 36 from inlet 23, will fill these various ducts and also distributor ducts 38 and 39, the oil being released for distribution to which ever one of the outlet ports 40 to 43 or 40′ to 43′, as is then in registry with distributor duct 38 or 39.

It is conceivable, of course, that only one of the inclined distributor ducts 38, 39, may be used, in which case the actuating mechanism, including the star-wheel 25, would be changed, so that the step-by-step rotation of distributor element 24 would effect registration of the distributor duct and the outlet ports which it supplies. It is also manifest that by employing a greater or less number of pockets in the periphery of the star-wheel 25, and forming a correspondingly greater or less number of inlet ducts in the distributor element, and the requisite number of outlet ports leading therefrom, a greater or less number of parts may be lubricated.

What is claimed is:

1. In a force-feed lubricator, the combination of an actuating shaft; a pump operated thereby; a distributor casting provided with a transverse series of ports adapted to be connected to points to be lubricated and with an inlet port communicating with the discharge opening of said pump; a distributor element mounted in said casting, said element having a plurality of interconnected radial inlet ducts extending therethrough in a single plane in alinement and for direct registry with said inlet port and an inclined outlet duct also extending therethrough, said outlet duct communicating at one end with said inlet ducts and opening at its opposite end in alinement with the ports through which the oil is to be forced; and means operable in timed relation with the pump for moving said distributor element step-by-step to cause said outlet duct to register successively with the outlet ports and, concurrently with such registrations, to connect said inlet port successively with the inlet ducts when the pump is discharging.

2. In a force-feed lubricator, the combination of a distributor body having a longitudinal bore formed therein, said body also being provided with a lubricant inlet port opening into said bore and a transverse series of lubricant outlet ports leading from said bore and spaced longitudinally relatively to said inlet port; and a distributor element rotatively mounted in said bore, said element being formed with a plurality of inlet ducts the outer ends of which open onto the surface of said element in alinement with said inlet port and with an outlet duct communicating with said inlet ducts and opening onto the surface of said element in alinement with said outlet ports, the arrangement being such that said inlet port and one of said inlet ducts and said outlet duct and one of said outlet ports are adapted for simultaneous direct registry, the inlet duct last mentioned and said outlet duct comprising the sole passage for lubricant through the distributor element at the time said registry takes place.

3. The combination in a force-feed lubricator, of a distributor body having a longitudinal bore formed therein, said body also being provided in said bore with a pair of transverse series of outlet ports and an intermediate inlet port; and a rotary distributor element mounted in said bore, said element being provided with an annular series of radial inlet ducts the outer ends of which open onto the periphery of said element in line with said inlet port and with a pair of outlet ducts communicating with said inlet ducts and opening onto the periphery of said element one in line with one of said series of outlet ports and the other in line with the other series, the arrangement being such that the inlet ducts are adapted to register successively with the inlet port and, concurrently with such registrations, to place the inlet port alternately in communication with said pair of series of outlet ports and successively with the outlet ports of each series.

4. In a force-feed lubricator, the combination of a distributor body provided with an annular series of outlet ports and an inlet port; and a movable distributor element mounted in said body, said distributor element being provided with an annular series of inlet ducts opening onto the surface thereof and adapted for successive direct registry with said inlet port and with a distributor duct communicating with said inlet ducts and opening at its outer end onto the surface of the element in alignment with said series of outlet ports, the arrangement being such that the inlet ducts are adapted, upon movement of said distributor element, to place the inlet port successively in communication with the outlet ports, through said distributor duct.

In testimony whereof I have signed my name to this specification.

ARTHUR J. AHRENSMEYER.