July 2, 1946. E. W. DAVIS 2,403,058

LUBRICATING DEVICE

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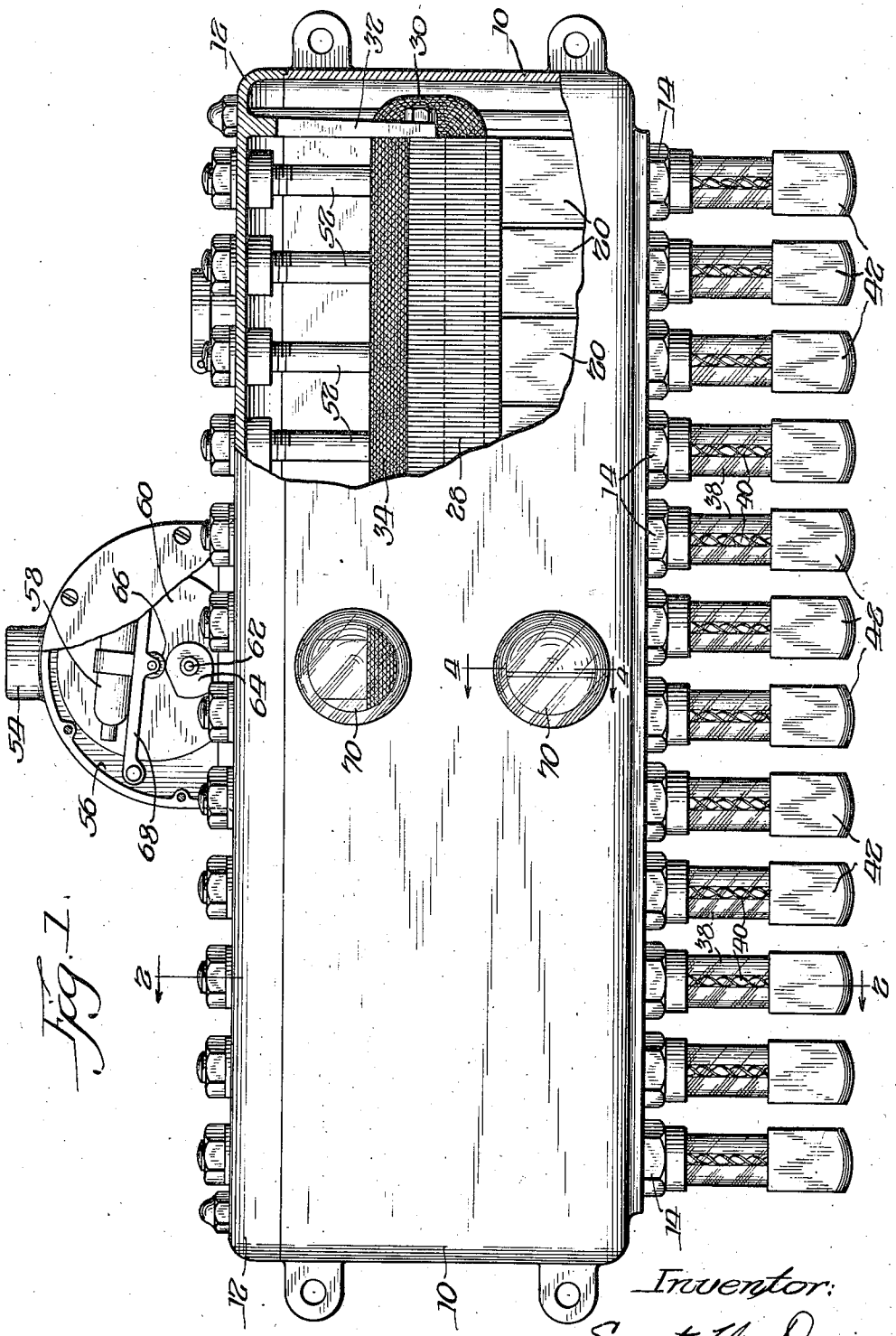

Fig. 1.

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Fig. 2.

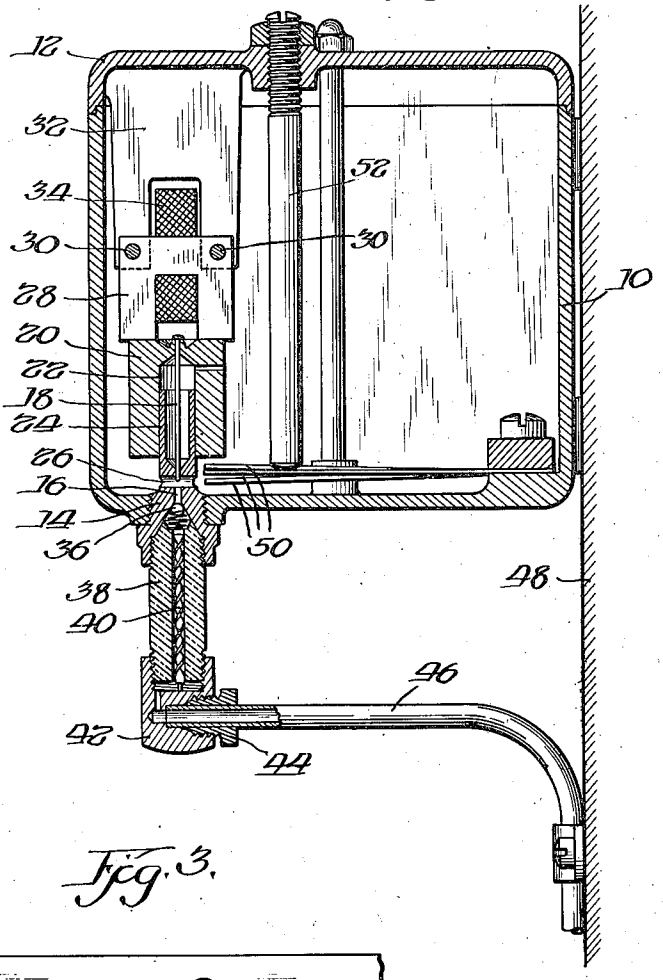

Fig. 4.

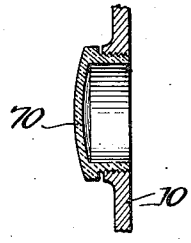

Fig. 3.

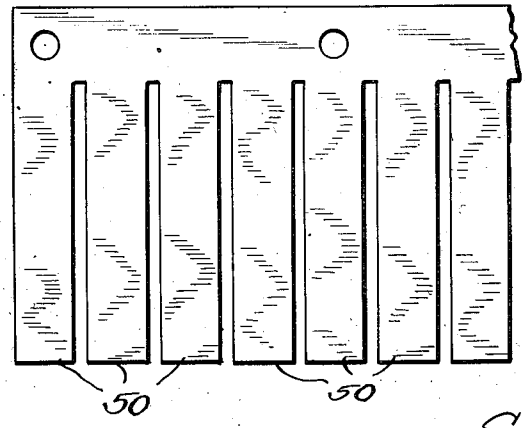

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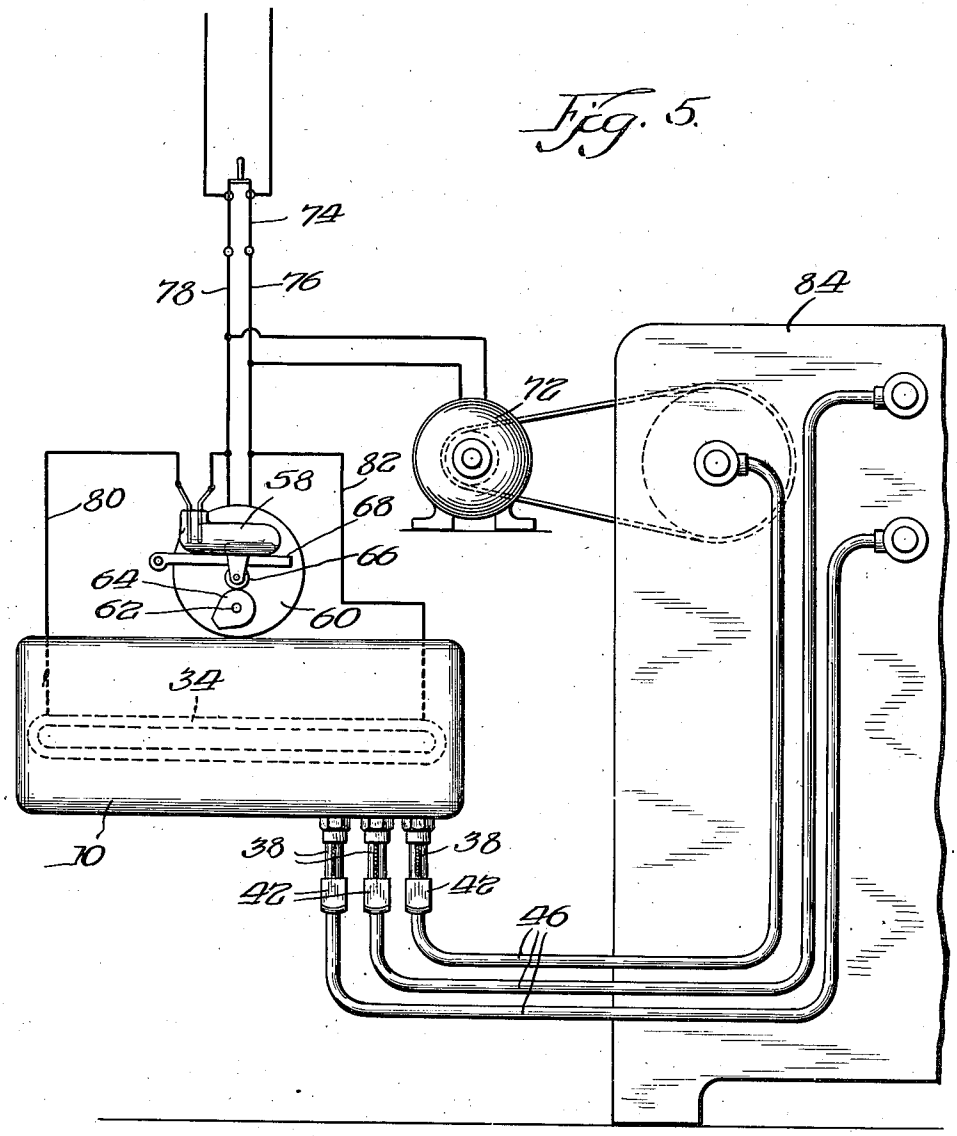
Fig. 5.



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2,403,058

LUBRICATING DEVICE

Ernest W. Davis, River Forest, Ill.

Application February 26, 1943, Serial No. 477,208

5 Claims. (Cl. 184—26)

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My invention relates primarily to lubricating devices wherein a plurality of pumps are arranged to deliver lubricant under pressure to a plurality of lubricant conduits, each leading to a bearing requiring lubrication.

The general object of my invention is to provide an efficient and dependable device of the class described which can be manufactured at low cost, and which can be installed in a convenient and practical manner.

A more specific object is to provide such a device which comprises relatively few parts.

Another object is to provide a device of the class described in which the individual rate of flow of each pump may be readily adjusted while the device is in operation.

A further object is to provide a lubricating device which is of compact design, and which is neat and attractive in appearance. These and other objects will appear as the description proceeds.

In the drawings:

Figure 1 is a front elevation of the complete device with portions broken away to show some of the interior mechanism;

Figure 2 is a transverse sectional elevation, the section being taken on the line 2, 2, in Figure 1;

Figure 3 is a plan view of the resilient stop shown in Figure 2; and

Figure 4 is a fragmentary section through the line 4, 4, in Figure 1.

Figure 5 is a wiring and installation diagram.

The lubricant reservoir 10 is constructed of a die casting and is provided with a cover 12 for excluding dirt. A plurality of pump cylinders 14, 14, are screwed into the reservoir 10, each such cylinder being provided with a bore 16 for receiving a plunger 18. Each plunger 18 is welded to a weight 20, constructed of square cold rolled steel, and provided with a bore 22, which receives the tubular guide portion 24, integral with the cylinder 14. The port 26 permits the flow of oil from the reservoir 10 to the bore 16.

An elongated, laminated magnet 28 is held together by tie rods 30 attached to depending supports 32 integral with the cover 12. The helix, or coil 34 is connected intermittently with a source of current by means which will be described hereinafter, so that the magnet 28 is alternately energized and de-energized. Each time the magnet 28 is energized it attracts all the weights 20, which act as armatures for the magnet 28, and which are all moved upwardly to the positions shown in Figures 1 and 2. Each time the magnet 28 is de-energized, all the weights

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20, 20 fall by the action of gravity, thereby projecting each plunger 18 into its respective bore 16 of the corresponding cylinder 14, and thereby ejecting oil past the corresponding check valve 36.

The transparent plastic tube 38 contains a helical rotor 40, which is rotated by the flow of lubricant through the tube 38, so as to furnish a visible indication of the approximate quantity of oil that is being pumped by each cylinder and plunger. The specific construction of this indicator is more fully described in my co-pending application, Serial Number 462,657, filed October 19, 1942, which issued as Patent No. 2,359,467, on October 3, 1944. Each elbow fitting 42 is provided with a bushing 44 which provides a lubricant tight connection with a tube 46 connected at its opposite end with a bearing on the machine 48, which is to be lubricated.

As each weight 20 falls by the action of gravity, it comes to rest upon striking the corresponding, resilient stop 50. These resilient stops are all integral with each other, as shown in Figure 3. The stops 50, 50 are constructed of spring steel with the free ends inclined upwardly a slight amount until they are urged downwardly by the adjusting pins 52, which are screwed into the cover 12. Each stop 50 is thus positioned by means of its corresponding adjusting pin 52, so as to permit the corresponding weight 20 to drop a selected distance for discharging the required amount of lubricant for lubricating the corresponding bearing.

The means for intermittently energizing the magnet 28 will now be described. The lubricating device of this invention is designed primarily for use on machines having individual electric drives. Such machines are ordinarily equipped with an electric motor 72 (Figure 5) and a starting switch 74 for controlling the motor. In applying the lubricating device of this invention to such a machine, it is contemplated to run a conduit containing conductors 76 and 78, from the starting switch of the machine to the conduit connection 54 on the junction box 56. Conductors 80 and 82 extend from the coil 34 to the starting switch 74 for the machine 84 to be lubricated. The mercury switch 58 is in series with the coil 34, so that when the switch 58 is open, the magnet 28 (Figure 2) will be de-energized. (The conductors and connections are omitted in Figures 1 and 2 in order to avoid confusion.) The Telechron motor 60, connected with said conductors 76 and 78, is provided with a slow speed shaft 62, to which is secured a cam

64, for engaging the roller 66, on the hinged bracket 68, whereby the mercury switch 58 is alternately opened and closed about ten times a minute, or oftener if necessary. With this arrangement the lubricating device operates whenever the machine is running and at no other time.

The transparent plastic windows 70 are threaded in the oil receptacle 10, as shown in Figure 4, and provide means for indicating the necessity of replenishing oil and also provide an indication of the oil level during the filling operation.

This lubricating device is suitable for use with oils of various consistencies, including the heaviest oils ordinarily used for lubricating machinery. It is also suitable for use with the type of lubricants known as fluid greases, but is not adaptable for use with heavy fibrous greases.

Owing to the small diameter of the plungers, considerable pressure may be produced with only moderately heavy weights. Thus a force of 5 ounces applied to a plunger $\frac{3}{64}$ of an inch in diameter develops a pressure of 180 pounds per square inch.

I claim:

1. In a lubricating device, a plurality of vertically movable weights; means for alternately raising and releasing said weights to produce vertical reciprocating movement thereof; a plurality of pumps, each said pump being actuated by said motion of one of said weights; means for supplying lubricant to said pumps; a resilient stop for each said weight to limit the downward movement thereof; each said stop being stressed to exert a force in an upward direction; and adjustable means for overcoming said force in each said stop, and for selectively positioning each said stop to provide a predetermined lowermost position for its corresponding weight, all of said stops being integral with each other.

2. In a lubricating device, a lubricant reservoir; a cover for said reservoir; a plurality of pump cylinders, each communicating with said reservoir; a plunger in each said cylinder; a weight connected with each said plunger; means for alternately raising and releasing said weights; a resilient stop for each said weight; and an adjusting means for each said resilient stop, each said adjusting means being movably attached to said cover and each said adjusting means engaging one of said resilient stops for the purpose set forth.

3. In a lubricating device, a plurality of cylinders; a plunger for each cylinder; a weight connected with each plunger for moving said plunger downwardly; a single, immovable, electrically energized member cooperating with said weights for moving said plungers in an upward direction; and adjustable means for limiting the downward movement of each said plunger.

4. In a lubricating device, a diminutive pump cylinder; a plunger for said cylinder; a weight for projecting said plunger downwardly into said cylinder, said weight being connected with said plunger, and said weight having a vertical bore therein; a guide tube within said bore for guiding the movement of said weight, said guide tube being integral with said cylinder; a plunger-guiding portion at the lower end of said guide tube, said plunger-guiding portion being integral with said cylinder; a lubricant reservoir; a port connecting said lubricant reservoir with the upper end of said cylinder, and means for alternately raising and releasing said weight.

5. In a lubricating device, a reservoir for holding oil, a cover for said reservoir, a plurality of reciprocatory plunger pumps receiving oil from the reservoir, each of said pumps being attached to the reservoir and having a paramagnetic weight associated therewith and operatively connected to the plunger of the pump, a plunger stroke limiting member associated with each pump and mounted in the reservoir, means carried by the cover cooperable with said stroke limiting members for individually adjusting the positions thereof, a single electromagnet carried by said cover and operable upon energization to move all of the paramagnetic weights against the force of gravity, and means for intermittently energizing said electromagnet.

ERNEST W. DAVIS.