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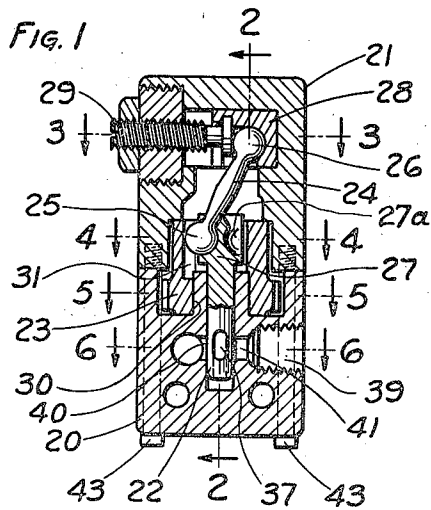
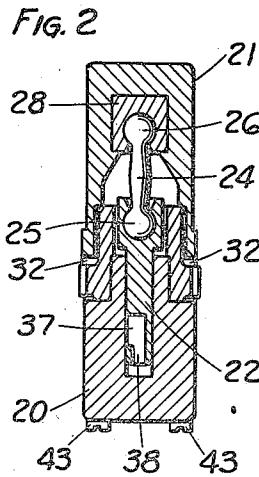
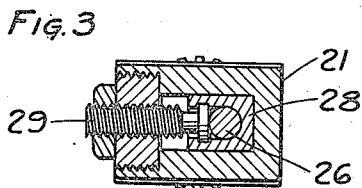
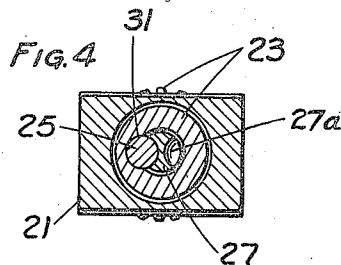
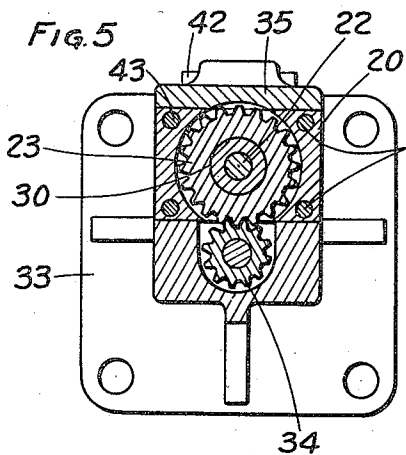
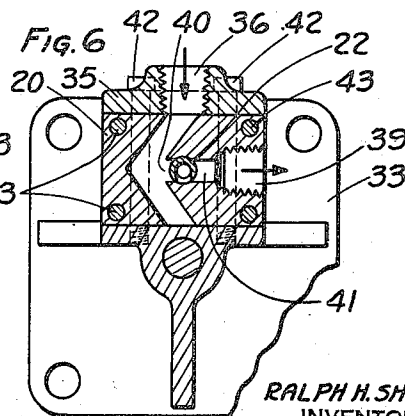
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2,436,492

PUMPING UNITS FOR MECHANICAL LUBRICATORS

Filed June 6, 1946

3 Sheets-Sheet 1



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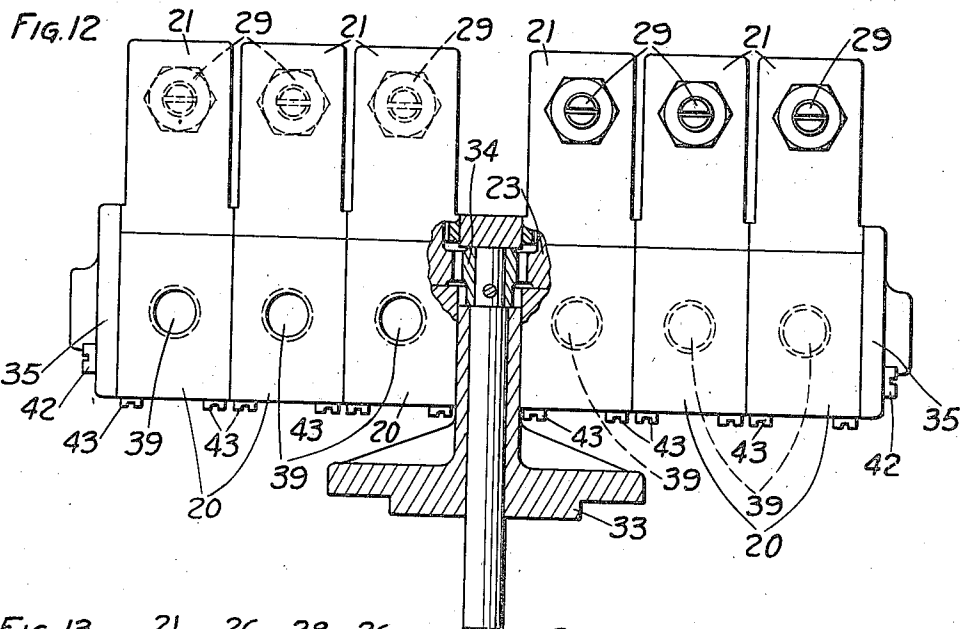
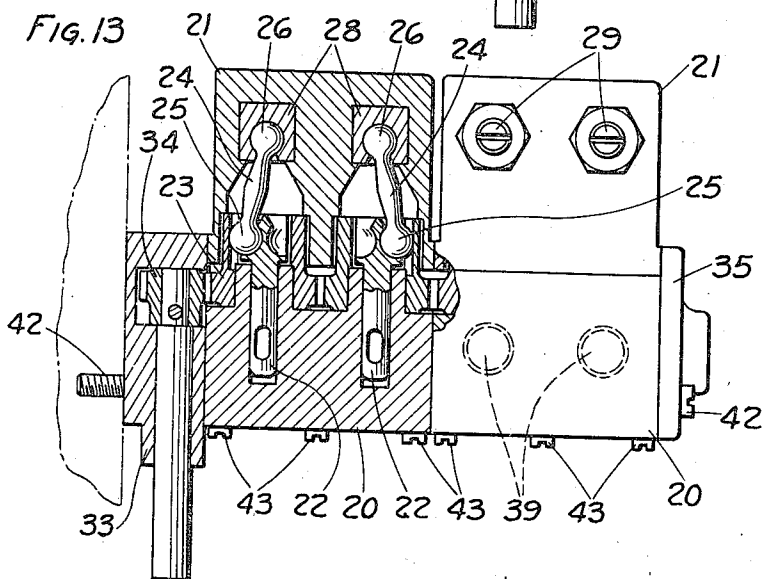
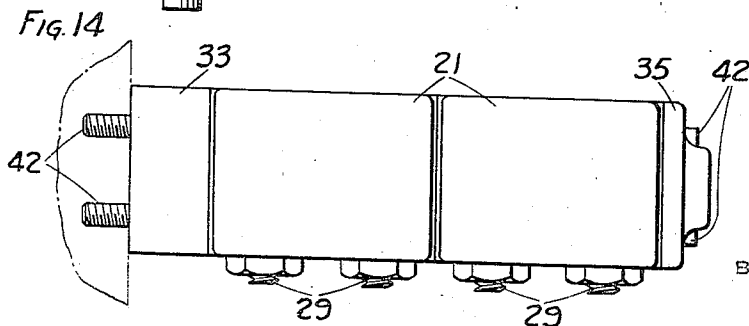
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PUMPING UNITS FOR MECHANICAL LUBRICATORS

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3 Sheets-Sheet 3



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2,436,492

PUMPING UNIT FOR MECHANICAL
LUBRICATORS

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9 Claims. (Cl. 184—33)

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This invention relates to lubricators of the force feed or mechanical type in which a lubricant is forced under pressure to points to be lubricated by pumping units having pistons reciprocating within cylinders.

To meet the varying demands of industry, i. e., to supply lubricators with the required number of pumping units, manufacturers must either keep in stock a quantity of lubricators with an assorted number of pumping units, or else make up the lubricators specially according to customers' orders with resulting delays and at relatively high cost.

It is the principal object of the invention to provide pumping units for lubricators of the force feed type which can be readily coupled together to form a multiple feed instrument.

Another object is to provide each pumping unit with actuating mechanism which engages similar mechanisms of adjacent units, so that when one of the actuating mechanisms is operated by suitable driving means, all units coupled together will be driven thereby.

A further object is to use in the pumping units piston operating principles disclosed in Patent No. 2,369,345, issued to Bengt E. Folke on February 13, 1945.

A still further object is to make all component parts of the units interchangeable with each other so that they can be produced in quantities, enabling a manufacturer to make up instruments with required number of units without delay and at relatively low cost.

Other objects will become apparent after a perusal of the following specification and an inspection of the accompanying drawings in which preferred embodiments of the invention are described and shown.

In the drawings,

Fig. 1 is a longitudinal sectional view of the pumping unit with its piston at the end of its suction stroke;

Fig. 2 is a sectional view along the plane of line 2—2 in Fig. 1;

Fig. 3 is a cross sectional view along the plane of line 3—3 in Fig. 1;

Fig. 4 is a cross sectional view along the plane of line 4—4 in Fig. 1;

Fig. 5 is a cross sectional view along the plane of line 5—5 in Fig. 1;

Fig. 6 is a cross sectional view along the plane of line 6—6 in Fig. 1;

Fig. 7 is a longitudinal sectional view similar to the one shown in Fig. 1, but with the piston at the end of its forcing stroke;

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Fig. 8 is a sectional view, partly in elevation, of two pistons and their common actuating members in operative contact;

Fig. 9 is a fragmentary cross sectional view along the plane of line 9—9 in Fig. 8;

Fig. 10 shows an elevational view of three of the pumping units connected together and the driving means for the units at one end;

Fig. 11 is a plan view of the units and driving means shown in Fig. 10;

Fig. 12 shows three units at either side of the driving means;

Fig. 13 shows two double pumping units connected together; i. e., each unit contains two pistons and cylinders and their actuating mechanism; and

Fig. 14 is a plan view of the assembly shown in Fig. 13.

Like characters of reference denote similar parts throughout the several views and the following specification.

The lubricator unit as shown in Fig. 1 consists of a body 20 and a cap 21, comprising a housing, a piston 22 within a cylinder in the body, and a driving gear 23 for rotating the piston, together with mechanism for reciprocating said piston within limits manually controllable.

The reciprocating mechanism for the piston consists of a link 24 with a lower ball terminal 25 and an upper ball terminal 26 at its ends. The lower ball terminal 25 fits in either one of semi-spherical sockets 27a at the side of an enlarged head 27 of the piston 22 and serves as a pivot eccentric with the axis of the piston. The upper ball terminal 26 fits in a socket in a block 28 forming a fixed pivot therewith, the block being capable of movement transverse to the piston axis by means of a screw 29 for regulation. When the unit is regulated so that ball terminal 26 is in alignment with the axis of piston 22, rotation will impart no reciprocating motion to the piston. When ball terminal 26 is to the right, as shown in Fig. 1, however, and the lower ball terminal 25 is to the left, the piston will be raised, and when the piston is rotated 180°, as shown in Fig. 7, with the center of the upper ball terminal 26 stationary, the piston will be lowered. Thus, it will be seen that the lower ball terminal moves in a cylindrical plane during the rotation of the piston.

Rotation of the piston 22 is effected by rotating gear 23 which is mounted over a bearing 30 in a body 20 concentric with piston 22. Axial movement of gear 23 is prevented by its position between body 20 and cap 21. Hence, ball terminal 25 must slide vertically in a half-cylindrical

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groove 31 in gear 23. Thus gear 23 actually rotates the piston 22 by means of ball terminal 25 which acts as a key. The gear 23 protrudes through openings 32 in each side of the body 20 as shown in Fig. 2.

Attention is drawn to the fact that either one of the sockets 27a in head 27 of the piston 22 is semi-spherical in shape and when the ball terminal 25 is assembled within it and within the groove 31, the ball terminal 25 causes the piston 22 to travel with it by virtue of the close fit of the socket around the ball part of the terminal.

A complete unit as shown in Figs. 1 to 4 may be mounted upon a bracket 33 containing a driving pinion 34, see Figs 5 and 6. A plate 35 covers that side of the pumping unit opposite the bracket 33 and includes an inlet 36. Each piston 22 is provided with a duct made up, preferably, of a radial branch 37 and an axial branch 38, the branch 37 alternately communicating with the inlet 36 or an outlet 39 in the body 20 by way of passages 40 and 41 as the piston rotates.

If a plurality of pumping units are required, they may be assembled as shown in Fig. 10. It will be noticed that bodies 20 of the pumping units are held together and to the bracket 33 by screws 42 which pass through all of the parts mentioned. The body and cap of each unit are fastened together by screws 43.

It is obvious that the driving gears 23 of adjoining units will rotate in opposite directions as indicated in Fig. 9, so that in adjacent units, if all parts are assembled alike, the outlet of one unit will be in front and the outlet of its adjacent unit in the back of the assembly, as shown in Fig. 10. If it is desired to discharge lubricants from outlets at the same side of the multiple assembly having the regulating screws all on the same side, it becomes necessary to assemble adjoining units differently. Thus the ball terminals 25 would have to be fitted in sockets 180° apart in adjoining pistons, as shown in Fig. 8, if all other parts are kept in the same relation. This is the reason for providing the head 27 with sockets at either side. The same result can be achieved, however, by reversing the relation of the cap 21 with its assembled parts relative to base 20.

Fig. 10 shows an assembly of units with all regulating screws 29 at the same side while the bodies 20, as stated before, are assembled with outlets 39 alternately in front or in back.

The general construction may be modified to include two or more pumping units in a single body and/or a single cap as shown in Figs. 13 and 14. These figures also show pumping units with their axis parallel to the machine on which they are mounted instead of perpendicular as in the former figures.

It is apparent that the unit as disclosed herein lends itself to multiple assemblies in which the driving means may be either at one of the sides of the assembly, see Figs. 10 and 13, or at any convenient place within the assembly between two units, see Fig. 12. The unit may, of course, be used as a single feed instrument, as shown in Figs. 1 to 7. Inasmuch as the component parts of one unit are identical with corresponding parts of any other unit in the assembly, production is greatly simplified and stocking of lubricators with a variety of feeds or pumping units is eliminated.

While the units are shown so as to connect with a suitable source of oil supply through their common inlet, this source of supply usually be-

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ing remote from the units, the units may, of course, be mounted in an oil reservoir from which oil flows directly into the inlet to the units in the conventional form of a force feed lubricator.

It is understood that various changes of form, proportions and minor details of construction may be resorted to without departing from the principles or sacrificing any of the advantages of the invention as defined in the appended claims.

What I claim as new is:

1. A pumping unit for mechanical lubricators comprising a housing having an inlet passage, an outlet passage and a cylinder, a rotary and reciprocatory piston in the cylinder having a duct for alternately placing the inlet passage and the outlet passage in communication with the cylinder as the piston rotates, a driving gear within the housing concentric with and keyed to the piston and in axially slidable relation to the piston, an eccentric pivot carried by the piston and serving as means to key the gear to the piston, a fixed pivot laterally displaced with reference to the piston axis, said pivots being connected together, and means for rotating the gear and thereby rotating and reciprocating the piston.

2. A pumping unit for mechanical lubricators comprising a housing having an inlet passage, an outlet passage and a cylinder, a rotary and reciprocatory piston in the cylinder having a duct for alternately placing the inlet passage and the outlet passage in communication with the cylinder as the piston rotates, a driving gear within the housing concentric with the piston, a regulating block, a link having a ball terminal at each end, one of the terminals being movably fitted within a substantially semi-spherical socket in the side of the piston and within a substantially semi-circular groove in the gear keying the piston and gear together, its other terminal being movably fitted within a socket in the block laterally displaced with reference to the piston axis, and means for rotating said gear and thereby rotating and reciprocating the piston.

3. A pumping unit for mechanical lubricators comprising a housing having an inlet passage, an outlet passage and a cylinder, a rotary and reciprocatory piston in the cylinder having a duct for alternately placing the inlet passage and the outlet passage in communication with the cylinder as the piston rotates, a driving gear within the housing concentric with the piston, a regulating block, a link having a ball terminal at each end, one of the terminals being movably fitted within a substantially semi-spherical socket in the side of the piston and within a substantially semi-circular groove in the gear keying the piston and gear together, its other terminal being movably fitted within a socket in the block laterally displaced with reference to the piston axis, movement of the block adjusting the lateral displacement of the ball terminal in the block, and means for rotating said gear and thereby rotating and reciprocating the piston.

4. A pumping unit for mechanical lubricators comprising a housing having an inlet passage, an outlet passage and a cylinder, a rotary and reciprocatory piston in the cylinder having a duct for alternately placing the inlet passage and the outlet passage in communication with the cylinder as the piston rotates, a driving gear within the housing concentric with the piston and protruding from the housing, a regulating

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block, a link having a ball terminal at each end, one of the terminals being movably fitted within a substantially semi-spherical socket in the side of the piston and within a substantially semi-circular groove in the gear keying the piston and gear together, its other terminal being movably fitted within a socket in the block, and means for rotating said gear and thereby rotating and reciprocating the piston.

5. A plurality of pumping units for mechanical lubricators coupled together, each unit comprising a housing having an inlet passage, an outlet passage and a cylinder, a rotary and reciprocatory piston in the cylinder having a duct for alternately placing the inlet passage and the outlet passage in communication with the cylinder as the piston rotates, a driving gear within the housing concentric with and keyed to the piston and in axially slidable relation to the piston, an eccentric pivot carried by the piston, a fixed pivot laterally displaced with reference to the piston axis, said pivots being connected together, the gear of one unit operatively engaging the gears of its adjacent units, and means for rotating the gear and thereby rotating and reciprocating the piston in each unit.

6. A plurality of pumping units for mechanical lubricators coupled together, each unit comprising a housing having an inlet passage, an outlet passage and a cylinder, a rotary and reciprocatory piston in the cylinder having a duct for alternately placing the inlet passage and the outlet passage in communication with the cylinder as the piston rotates, a driving gear within the housing concentric with and keyed to the piston and in axially slidable relation to the piston, an eccentric pivot carried by the piston, a fixed pivot laterally displaced with reference to the piston axis, said pivots being connected together, the gear of one unit operatively engaging the gears of its adjacent units, and means for rotating the gear and thereby rotating and reciprocating the piston in each unit, the component parts of the units being alike.

7. A plurality of pumping units for mechanical lubricators coupled together, each unit comprising a housing having an inlet passage, an outlet passage and a cylinder, a rotary and reciprocatory piston in the cylinder having a duct for alternately placing the inlet passage and the outlet passage in communication with the cylinder as the piston rotates, a driving gear within the housing concentric with the piston, a regulating block, an eccentric pivot carried by the piston, a fixed pivot laterally displaced with reference

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to the piston axis and carried by the block, said pivots being connected together, the gear of one unit operatively engaging the gears of its adjacent units, and means for rotating the gear and thereby rotating and reciprocating the piston in each unit.

8. A plurality of pumping units for mechanical lubricators coupled together, each unit comprising a housing having an inlet passage, an outlet passage and a cylinder, a rotary and reciprocatory piston in the cylinder having a duct for alternately placing the inlet passage and the outlet passage in communication with the cylinder as the piston rotates, a driving gear within the housing concentric with and keyed to the piston and in axially slidable relation to the piston, a regulating block, an eccentric pivot carried by the piston, a fixed pivot laterally displaced with reference to the piston axis and carried by the block, said pivots being connected together, the gear of one unit operatively engaging the gears of its adjacent units, and means for rotating the gear and thereby rotating and reciprocating the piston in each unit.

9. A plurality of pumping units for mechanical lubricators coupled together, each unit comprising a housing having an inlet passage, an outlet passage and a cylinder, a rotary and reciprocatory piston in the cylinder having a duct for alternately placing the inlet passage and the outlet passage in communication with the cylinder as the piston rotates, a driving gear within the housing concentric with the piston, a regulating block, a link having a ball terminal at each end, one of the terminals being movably fitted within a substantially semi-spherical socket in the side of the piston and within a substantially semi-circular groove in the gear keying the piston and gear together while maintaining axially slidable relation between piston and gear, its other terminal being laterally displaced with reference to the piston axis and being carried by the block, the gear of one unit operatively engaging the gears of its adjacent units, and means for rotating the gear and thereby rotating and reciprocating the piston in each unit.

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The following references are of record in the file of this patent:

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