

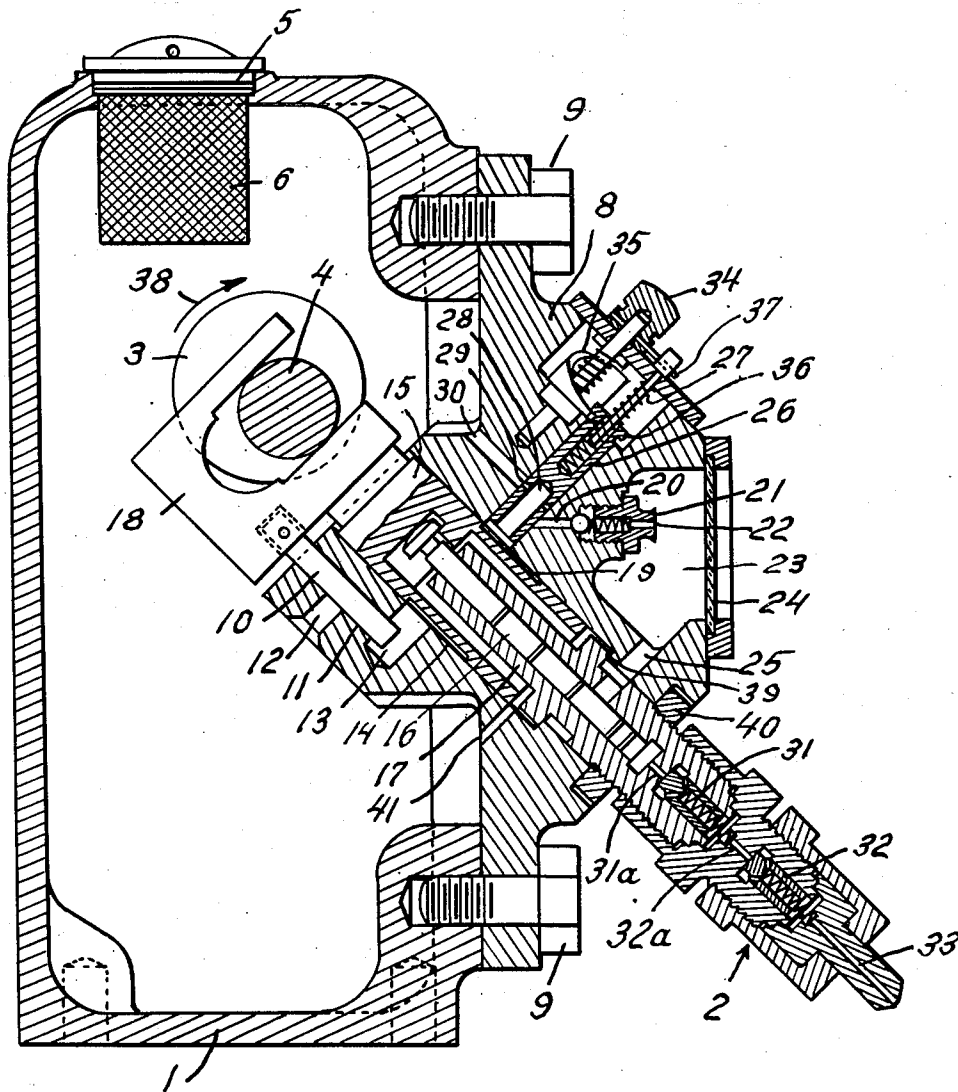
March 7, 1950

E. SCHMIDT

2,499,784

VARIABLE CAPACITY LUBRICATING PUMP

Filed Sept. 20, 1945



INVENTOR
EUGEN SCHMIDT

BY

Patricia Davis Mann
ATTORNEYS

UNITED STATES PATENT OFFICE

2,499,784

VARIABLE-CAPACITY LUBRICATING PUMP

Eugen Schmidt, Winterthur, Switzerland, assignor to Sulzer Freres, Societe Anonyme, Winterthur, Switzerland

Application September 20, 1945, Serial No. 617,647
In Switzerland November 16, 1943

Section 1, Public Law 690, August 8, 1946
Patent expires November 16, 1963

3 Claims. (Cl. 184—27)

1

The invention relates to a lubricating apparatus and its purpose is to reduce the width of the pump set and to simplify manufacture. It consists in that a pump set interchangeable as a whole is provided at least with one feed pump and one high-pressure lubricating pump which are connected by an overflow passage in which is provided an adjustable member for measuring the quantity of lubricating medium, the bores for the pistons, their guide means and the overflow passage being arranged in the same plane. It is preferable for the cylinder of the high-pressure pump to be inserted in the pump set so as to be individually interchangeable.

One embodiment of the invention is shown diagrammatically in the drawing.

The figure shows in cross-sectional elevation a lubricating apparatus with the container 1 in which are inserted a number of pump sets 2 which can be interchanged as a whole and whose joints with the container are oil-tight. All the pump sets are driven by the driving shaft 3, a crank 4 being provided for each pump set 2. The shaft 3 is driven in a known manner and at constant speed by the engine to be lubricated, or if the drive is taken from a reciprocating part the shaft 3 is equipped with a ratchet drive. The lubricating oil is introduced into the container 1 through the filling opening 5 with a filter 6.

Each pump set 2 has at least one feed pump and one high-pressure lubricating pump in the casing 8 which is attached to the container 1 by means of bolts 9. The feed pump has a piston 10 in the bore 11, and this controls the suction passage 12. Beside the feed pump 10, 11 is the bore 14 for the guide bushing 15 in the drive for the high-pressure piston 16, which works in the cylinder 17 of the high-pressure pump arranged in the casing 8 so as to be interchangeable. The guide bushing 15 has an open-ended Scotch yoke surrounding the crankpin 4, and to this yoke the piston 10 of the feed pump is also attached. The yoke 18 is open at one side in order to allow the set 2 to be removed without dismantling the shaft 3.

The feed pump 10, 11 is connected to the high-pressure pump 16, 17 through a passage consisting of the delivery bore 13 connecting up to the bore 11 (the two parts of the bore 13 being connected by the recess 19 in the bushing 15), of the outlet 20 with the non-return valve 21 and the discharge 22, of the chamber 23 with the sight glass 24, and finally of the suction passage 25 of the high-pressure pump 16, 17. The bores for the pistons 10 and 16, the bushing guide 15 and the

2

passage 13, 19—25, are arranged in the same plane.

In the upper part of the delivery bore 13 is provided the metering piston 26 which is pressed down by means of the spring 27 as a piston opposed to the feed piston 10. The piston 26 is provided with a bore 28 which communicates through the transverse ports 29 with the return passage 30 in the casing 8.

The high-pressure cylinder 17 is equipped with two delivery valves 31 and 32 which communicate with the pipe 33 for the lubricating medium. A knurled knob 34 is provided for adjusting the quantity of lubricating medium, and the cam 35 of this knob cooperates with the flange 36 of the metering piston 26, the position of the knob 34 being indicated by means of a pointer 37.

The method of working is the following:

Starting from the position shown, when the shaft 3 turns in the direction of the arrow 38, the pump pistons 10 and 16 perform a suction stroke. The feed piston 10 draws the lubricating oil through the passage 12, or this oil flows to the piston, so that the swept space of the piston 10 and the bore 13 are filled with oil. During the delivery stroke, after the passage 12 has been closed, the piston 10 forces a definite quantity into the delivery bore 13. If the metering piston 26 is so set with the knob 34 that the return passage 30 is just covered, the piston 26 is raised until the outlet 20 is uncovered and the oil delivered by the piston 10 is forced through the non-return valve 21 and the discharge 22 into the chamber 23, thus flowing into the suction passage 25 and arriving in the swept space of the piston 16 when the latter is raised.

The drawing shows piston 26 in the idling position, at which position all the oil delivered by the feed pump returns through passage 28 and openings 29 and 30 to the container. For delivering oil the piston 26 is to be raised and so set by turning the knob 34 that the openings 29 do not coincide with the passage 30. The higher the piston 26 is raised by the cam 35, i. e. the smaller the stroke of the piston 26 up to the uncovering of the discharge 20, the greater is the quantity of lubricating oil supplied to the high-pressure cylinder 17. If on the other hand the piston 26 is so far down that the ports 29 are adjacent to the passage 30, but do not uncover it, the smallest quantity is supplied to the high-pressure pump 16, 17, while in the lowest position of the piston 26 when the ports 29 coincide with the passage 30 (as illustrated) the quantity of oil supplied is returned through the return passage

30 into the container 1 and the high-pressure pump 16, 17 receives no lubricating medium.

During the delivery stroke the high-pressure piston 16 delivers the quantity supplied, after the closing of the suction passage 25, through the passages 31a, 32a and the delivery valves 31, 32 into the pipe 33 and thus to the subsequent lubricating point.

The counter-pressure composed of the pipe resistance and the pressure at the end of the pipe, for instance the compressor pressure, determines the pressure of the high-pressure pump, whose piston 16 remains oil-tight against a pressure of more than 1000 atm. abs. The high-pressure pump cylinder 17 rests against the stop 39 and is fixed in the casing 8 by means of the nut 40. The guide bushing has at its lower end an open connection to the container 1 through the passage 41.

In the casing 8 of a set 2 two or more feed pumps 10, 11 and an equal number of high-pressure pumps 16, 17 might also be arranged, so that a reduction of the distance between the pumps of a set 2 and thus an increase in the total number of pumps is possible without any change in the length of the apparatus.

I claim:

1. In a reciprocating pump assembly of the type including a body member, a feed pump cylinder in said body member, a pressure delivery pump cylinder in said body member, a feed pump piston fitted in said feed pump cylinder, a pressure delivery pump piston fitted in said pressure delivery pump cylinder, intake openings in said body member leading to said cylinders, discharge openings in said body member leading from said cylinders, passage means interconnecting the discharge opening from said feed pump cylinder and the intake opening to said pressure delivery pump cylinder, and a spring loaded metering piston fitted in said passage means and preventing flow therethrough until moved through a predetermined stroke against its spring loading, the improvement which comprises providing a recess in the pressure face of said metering piston, a passage connecting said recess to the outside of said metering piston behind said face, a vent leading outside said body member arranged to connect with said passage at the extreme end position of said metering piston under influence of its spring loading and means for adjusting the end position of said metering piston.

2. In the improved assembly of claim 1 the further improvement which comprises providing as the means for adjusting the end position of the metering piston a flange on said metering piston and a helical cam engaging said flange.

3. In a reciprocating pump assembly of the type including a body member, a feed pump cylinder in said body member, a pressure delivery pump cylinder in said body member, a feed pump piston fitted in said feed pump cylinder, a pressure delivery pump piston fitted in said pressure delivery pump cylinder, intake openings in said body member leading to said cylinders, discharge openings in said body member leading from said cylinders, passage means interconnecting the discharge openings from said feed pump cylinder and the intake opening to said pressure delivery pump cylinder, and a spring loaded metering piston fitted in said passage means and preventing flow therethrough until moved through a predetermined stroke against its spring loading, the improvement which comprises arranging said pressure delivery pump cylinder to intersect said passage means and providing a guide bushing to carry said pressure delivery pump piston, said guide bushing having an exterior annular groove which cooperates with the walls of said pressure delivery pump cylinder to form a part of said passage means.

EUGEN SCHMIDT.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
895,683	Rice	Aug. 11, 1908
920,769	Manzel	May 4, 1909
1,171,825	Wood	Feb. 15, 1916

FOREIGN PATENTS

Number	Country	Date
10,815	Great Britain	1907
36,446	Sweden	Apr. 1, 1914
122,561	Great Britain	Jan. 30, 1919
370,502	Great Britain	Apr. 14, 1932
377,335	Great Britain	July 28, 1932