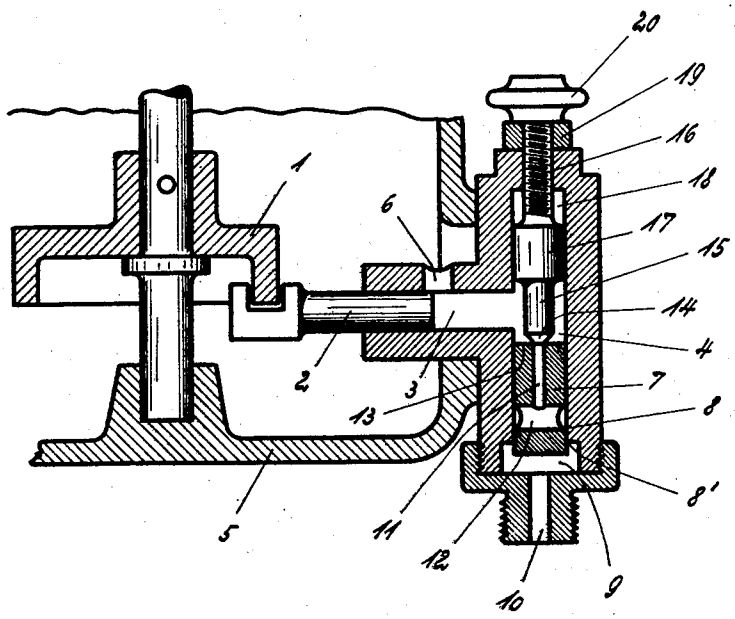
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LUBRICATING PUMP

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LUBRICATING PUMP

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This invention relates to lubricating pumps and more particularly to those in which an eccentric rotating within a lubricant container moves a pump piston to and fro in a cylinder which is in communication with a lubricant container, and having a movable controlling piston in a chamber having a cylindrical bore communicating with the bore of the said cylinder with an adjustable stop which limits the length of stroke of the controlling piston and thereby the quantity of lubricant conveyed at each stroke.

One object of the invention is to shorten the controlling piston and consequently to reduce the dimensions of the pump to a minimum.

Another object of the invention is to improve the fluid-tightness of the pressure spaces at the controlling piston.

A further object of the invention is to improve the fluid-tightness at the adjusting device which leads to the outside.

The accompanying drawing shows diagrammatically a vertical section through the new lubricating pump.

In the drawing 5 is a lubricant container, in the middle of which is a shaft carrying an eccentric 1, which is rotated by driving means, not shown. The eccentric 1 engages in a recess of a piston 2 and pushes the latter to and from in a cylinder 3 which extends into the container 5. The cylinder 3 is in communication with a chamber having a cylindrical bore 4 located on the outside of the container 5. The cylinder 3 has an opening 6 communicating with the container 5, which opening is alternately opened and closed during the reciprocating motion of the piston 2.

In the cylindrical bore 4 is a floating controlling piston 7 through which extends a transverse bore 12 and between the latter and the upper end surface 13 of the piston an axial bore 11. The cylindrical bore 4 is widened at its lower end to form a pressure space 9, from which extends a bored threaded nozzle 10.

Above the piston 7 is a threaded spindle 15, the threaded part 16 of which screws through a female thread in the top end wall of the cylindrical bore 4 and which is provided with an external head 20, by means of which it can be turned for adjusting it in the longitudinal direction. By means of a lock nut 17 or some other device the spindle can be fixed after its adjustment.

When no lubricant is being conveyed, the transverse bore 12 of the piston 7 is closed by the wall of the cylindrical bore 4. When the piston 2 is pushed into the cylinder 3 and the opening 6 is closed, the quantity of lubricant enclosed in the cylinder 3 and the bore 4 will during the further inward motion of the piston 2 push the piston 7 along in front of it, until the edge 8 of the bore 12 has passed the shoulder 8′ of the widened part 9 and the lubricant can enter this part.

The lubricant is conveyed into the widened part 9 and from there into the delivery pipe connected to the threaded nozzle 10, until the piston 2 has reached its innermost position. On the piston 2 being then withdrawn the suction produced by the piston 2 causes the piston 7 to move upwards, whereupon after the edge 8 has moved past the shoulder 8′, the bore 12 is closed again by the wall of the cylindrical bore 4. The piston 7 follows the motion of the piston 2 until it strikes against the spindle 15 and is arrested by the latter. During the further backward motion of the piston 2 a vacuum is formed in the space between the pistons 2 and 7, into which lubricant is drawn by suction from the container 5 after the piston 2 has passed the opening 6. The earlier the piston 7 is arrested, the greater will be the volume of the space in which the vacuum is formed and the greater will therefore be the quantity of lubricant drawn into this space by suction during one stroke. When the spindle 15 is screwed further upwards and the piston 7 therefore arrested later, the volume of the space in which the vacuum is formed and consequently the quantity of lubricant drawn into the space by suction is smaller.

In the known lubricating pumps of this kind the spindle 15 was connected rigidly to the piston 7 and moved with a smooth part

extending to the outside through the end wall of the cylindrical bore 4 against an external stop when the piston 7 moved to and fro. During the suction stroke, during which a vacuum is formed above the piston 7, that part of the piston surface lying between the edge 8 and the shoulder 8' formed the only seal between the vacuum above the piston 7 and the lubricant in the pressure space 9, which space is under high pressure. For obtaining a sufficient sealing effect it was necessary in the known pumps for the sealing part of the piston 7 below the edge 8 to be made very long, which entailed a corresponding increase in the length of stroke of the pistons 7 and 2 and consequently in the size of the apparatus.

This enlargement is avoided according to the present invention by separating the spindle 15 from the piston 7 and arranging it in such a manner that with its end surface 14 it forms a valve-like closure which closes the bore 11 when the piston 7 strikes against the spindle. As in this way a tight closure is established at the upper end of the piston 7 the cylindrical surface of the piston 7 acts over its entire length as a seal and the part of the piston between the edge 8 and the shoulder 8' can be made very short without the sealing effect in any way suffering. Hence in a pump delivering the same quantity all the parts can be made smaller than heretofore.

As stated above, the spindle 15 has hitherto been made integral with the piston 7 and moved to and fro with the piston, so that the motion of the piston 7 was hindered by its being extended through the end wall of the cylindrical bore 4 and it had therefore to be made so as to work with as little friction as possible. Consequently lubricant always leaked out at this place. According to the invention a sealing effect is produced by a part 17 of larger diameter being provided on the spindle 15, which part fits accurately and with friction in the cylindrical bore 4 and shuts off the part 18 of the cylindrical bore from the lubricant. The cylindrical bore is thus completely sealed against the escape of lubricant along the spindle 15.

What I claim is:

1. A lubricating pump comprising a lubricant container, a cylinder having an inlet opening therein for connecting the cylinder to the lubricant container, a piston movable in said cylinder, a driving eccentric for said piston, a chamber having a cylindrical bore communicating with the said cylinder and having a part of greater diameter with a delivery opening in the said part, a piston in the said chamber capable of moving freely therein and having a transverse bore and an axial bore therein, a stop member capable of limiting the motion of the latter piston, means for adjusting the said stop member and a surface on the stop member adapted to close the axial bore in the said piston, as set forth.

2. In a lubricating pump a chamber having a cylindrical bore communicating with the pump, said chamber having a part of greater diameter, a piston in said chamber capable of being moved into the said part of greater diameter and having a transverse bore therein capable of being brought into communication with the said part of greater diameter, an axial passage between the said transverse bore and one end surface of the piston, a stop member disposed in the path of the said piston and capable of limiting the stroke of the said piston and of closing the said passage, the said stop member extending through the wall of the chamber and being capable of adjustment in the said wall and a thickened part on the said stop member for preventing the lubricant reaching the said hole, as set forth.

3. In a lubricating pump a lubricant container, a cylinder having an inlet opening therein for connecting the cylinder to the lubricant container, a piston capable of moving to and fro in the said cylinder, means for imparting motion to the said piston, a chamber having a cylindrical bore communicating with the said cylinder and having a part of greater diameter with a delivery opening in the said part, a piston in the said chamber having passages therein leading from one end surface to the cylindrical surface of the piston and an adjustable spindle arranged in the said chamber capable of limiting the motion of the piston and of closing the said passages, as set forth.

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

ROBERT von KALMANN.