

The invention relates to a lubricating device for supplying lubricant, preferably oil, to several lubrication points, in particular in a knitting machine, in accordance with the preamble of patent claim 1. Such a device is known from US-A 3 217 835.

In knitting machines, for example, the needle drive carried out via cam parts requires constant lubrication, as is also the case for the needle guide in the needle bed or cylinder etc. Perfect regular lubrication is of very great importance, particularly in modern high-speed knitting machines. These machines are therefore often equipped with pressure oilers or pressure oil lubricating systems which supply pressurised oil from a central point through corresponding pipes to the individual lubrication points.

In a pressure oil lubricating device known from FR-A 1 094 985, a pulsed electromagnetically actuated piston pump is connected for this purpose to several lubrication points on the pressure side via pipes containing check valves. The piston stroke of the lubricant pump can be changed in order to change the amount of lubricant delivered per stroke. However, this device cannot guarantee that all lubrication points will be supplied with identical amounts of lubricant. Since the lubricant pipes are connected in parallel to the pressure side of the lubricant pump, the amount of lubricant supplied to the individual lubrication points also depends, among other things, on the line flow resistance to this lubrication point.

In another pressure oil lubricating device, in particular for knitting machines, known from DE-A1 36 24 982, an oil pump is provided in the form of an electromagnetically operable oscillating piston pump, and said oil pump is

connected on the suction side to an oil supply container and its pressure pipe branch branches off into several branch pressure pipes, each of which can be opened and closed by an electromagnetic valve. Each of these branch pressure pipes leads to an oil distributor chamber, to which several oil supply pipes leading to the individual lubrication points are connected via check valves. The drive of the oscillating piston pump and successive opening of the electromagnetic valves can be automatically and arbitrarily activated by a control device comprising a programmable microprocessor. Since several oil supply pipes are connected to each oil distributor chamber, it likewise cannot be guaranteed here that each lubricating pint will necessarily receive the same amount of lubricant per piston stroke of the oscillating piston pump.

This is the case in an oil lubricating system, in particular for knitting machines, known from DE-A 29 36 374, in which each lubrication point has a piston pump of its own and an electronic circuit for controlling the respective drive, in which case several piston pumps with their electronic circuits and an oil supply container can be combined to form one structural unit. In high-feed knitting machines with a substantial number of lubrication points, the cost involved in the resulting large number of individual piston pumps required is relatively high.

In contrast, in another central lubricating device known from US-A 3 217 835, which the invention works from, the arrangement is such that between a single lubricant pump constructed in the form of a centrifugal pump and the lubricant pipes leading to the lubrication points, a lubricant distributor is provided which has a rotatably mounted valve or distributor plug driven at a constant

rotational speed. The valve or distributor plug is provided with through holes, which are arranged in circles of different diameters and during the rotational movement periodically for a short time create a connection between a storage area connected to the pressure side of the centrifugal pump and the individual respectively selected lubricant pipes. Despite the fact that the lubricant pipes can only be selected consecutively in a sequence predetermined by their arrangement, the constantly working centrifugal pump leads to fluctuations in pressure in the storage area and thus to an irregular supply of lubricant. Although these fluctuations in pressure are reduced by a pressure relief valve connected to the storage area, they cannot be completely excluded. The same applies in principle to a central lubricating device of basically similar structure known from DE-C 383 387.

Therefore, the object of the invention is to provide a lubricating device for supplying several lubrication points, in particular in a knitting machine, which in association with a simple design reliably supplies the individual lubrication points with precisely determined amounts of lubricant per lubricating cycle.

This object is achieved according to the invention with the aforementioned lubricating device with the features of the characterising clause of patent claim 1.

A pipe connection is established between the pressure side of the lubricant pump discharging a precisely metered amount of lubricant per stroke and the selected lubrication point via the movable distributor element of the lubricant distributor during each lubricating operation. This ensures that each lubrication point must necessarily receive

precisely the amount of lubricant supplied by the lubricant pump per lubricating cycle, and that is irrespective of whether the pipes leading to the individual lubrication points have different line flow resistances, or whether changes in temperature of the lubricant occur or other influences prevail to otherwise impair the distribution of the lubricant. Nevertheless, the device operates with only a single lubricant pump to supply all the lubrication points.

In one embodiment, the arrangement is such that the distributor element has a distributor plug inserted and sealed into a corresponding rotation-symmetrical bearing point of the distributor housing, said distributor plug having a ring-shaped lubricant supply channel opening towards its cylindrical circumference, which has a lubricant supply channel discharging into the cylindrical circumferential wall of the distributor housing leading into it and a distributor channel arranged on the circumference of the distributor element leading out of it, and to said distributor channel channels in the distributor housing are allocated, which discharge into the cylindrical circumferential wall of the distributor housing and lead to the lubricant pipes.

Simple structural conditions also result if the distributor element has a distributor plug, which is inserted and sealed into a corresponding rotation-symmetrical bearing point of the distributor housing and which comprises at least one distributor channel, which discharges centrally onto a face side and on the circumference of the distributor plug, and to which channels in the distributor housing are allocated, which discharge on the bottom of the bearing point and on its circumferential wall and lead to the lubricant inlet or to the lubricant supply pipes. In this case the lubricant

distributor may include a pressure relief valve arranged in the region of the distributor plug and leading to its bearing gap, said pressure relief valve serving at the same time to monitor operation. It is also of advantage if the distributor plug is pressed axially with spring force against the bottom of the bearing point.

It is expedient if the lubricant distributor is arranged in the lubricant supply container, in which it may be at least partially submerged in the quantity of lubricant contained in the supply container, so that any unavoidable leakages do not require any special additional measures. A simple structural solution results if the lubricant supply container contains a chamber, which is designed for receiving a quantity of lubricant and is closed to the outside and into which the lubricating pump and/or the lubricant distributor is inserted. The drive means of the lubricating pump and/or the drive means of the lubricant distributor may then be attached to the outside of a wall of the chamber, so that they do not come into contact with the lubricant itself.

Moreover, the lubricating device may also have connection means for an additional source of liquid, which discharge at the lubricating pump and/or in the region of the inlet of the lubricant distributor, and through which, e.g. for flushing purposes, a quantity of liquid may be conducted under pressure at least via the lubricant distributor and the connecting devices for the lubricant pipes. In practice, a gear pump may thus be connected, for example, which flushes the entire system with oil or floods the lubrication points with oil independently of the actual lubricant pump. Each of the lubricant pipe connecting devices may also have its own lubricant flow monitor to enable all the devices to

be checked for proper operation at any time. This checking can be facilitated if the lubricating device has a visual display unit which is actuated via the flow monitors to display the operational state of the lubricant pipes.

The rotational movement of the discussed rotatable distributor element may be initiated by a drive source of any chosen design suitable for this purpose. This only needs to be capable of precisely aligning the distributor channel of the distributor element with the respectively selected lubricant outlet of the distributor housing. It is synchronised with the drive device of the lubricant pump, usually in the form of a piston pump, by the electronic control device in such a way that the amount of lubricant conveyed by the pump is delivered to the lubricant pipe which is respectively selected and activated in accordance with the program after the corresponding pipe connection between the pressure side of the distributor housing and the corresponding lubricant outlet of the distributor housing has been established via the distributor channel of the distributor element. A relatively simple and precise activation of the distributor element by the programmable control unit results if the drive source of the distributor element is designed to implement its rotational movement in predetermined angle increments, for example, as a stepping motor.

Finally, to facilitate the placement of the lubricating device on the knitting machine itself, its connecting devices each have a plug connection for a lubricant pipe provided with a safety means for the lubricant pipe, which is generally in the form of a hose. This safety means may advantageously have a forked part, which may be inserted into holding means and partially embraces the hose-like

lubricant pipe.

The drawing shows an embodiment of the subject of the invention.

Figure 1 shows a schematic side view of a lubricating device according to the invention in the form of a pressure oiler for a knitting machine in axial section;

Figure 2 shows a plan view of the operating side of the pressure oiler according to Figure 1;

Figure 3 shows a plan view of the lubricant distributor of the pressure oiler according to Figure 1, taken along line II-II in Figure 1, partly cut away and on a different scale;

Figure 4 shows a schematic perspective representation of a lubricant hose plug connection of the pressure oiler according to Figure 1 or 2;

Figure 5 shows a side view of the assembly according to Figure 4, cut along line V-V in Figure 4, on a different scale;

Figure 6 shows a plan view of the safety slide of the assembly according to Figure 4, and

Figure 7 shows a corresponding partial sectional representation of a modified embodiment of the lubricant distributor according to Figure 3.

The pressure oil lubricating device shown in Figures 1, 2, referred to in short as pressure oiler, comprises a housing 1 made of a plastic material and approximately rectangular in cross-section. The housing 1 forms a lubricant storage container and for this purpose encloses a chamber 2 designed to receive a storage quantity of oil and into which an oil filling hole 4 opens, which is arranged in a filling funnel 3 and may be closed by a plug. The chamber 2 is closed to the top by an intermediate bottom 5 placed on it to form a seal, said intermediate bottom forming the bottom wall of a tub-like partial housing 6 which is closed at the top by a removable cover wall 7.

The housing 9 of the electromagnetic drive of a piston pump, provided with reference 10, is inserted into a corresponding opening in the intermediate bottom 5 and sealed by a sealing sleeve 8. The piston pump serves as a lubricant pump and conveys a precisely metered amount of oil per piston stroke. The piston pump 10 comprises a pump pipe 11, which has a suction opening 12 at its end, and to which a pressure connection piece 13 is connected through which oil aspirated from the chamber 2 is conveyed in surges in the conveying direction indicated by an arrow 14.

A lubricant distributor 16, which is inserted in a corresponding opening in the intermediate bottom 5 and held on the intermediate bottom 5 by means of a screwed-on threaded ring 17, is connected to the pressure connection piece 13 of the piston pump 10 via a pipe 15.

The lubricant distributor 16 has a distributor housing 18 of essentially cylindrical design, which is shown in detail in Figure 3, and is attached by means of a coaxial spacer pipe 19 in the manner already described to the intermediate

bottom 5. A coaxial cylindrical recess 20 forming the bearing point for a disc-shaped cylindrical distributor element 21 mounted for rotational movement in the distributor housing 18 is arranged in the distributor housing 18. The hole 20 is provided with a flat bottom wall 22 which is arranged at right angles to the cylindrical circumferential wall 23 and into the centre of which an oil supply hole 24 forming an oil inlet opens. The supply hole 24 is connected to the pipe 15 via an oil feed channel 25 formed in the distributor housing 18.

Radial oil channels 26 feed at regular angular distances into the cylindrical circumferential wall 23 of the hole 20. Each of the oil channels forms a lubricant outlet and is connected to a connecting hose 27, which is sealed by an elastic ring 28 and is guided through a corresponding hole in the intermediate wall 5 to a lubricant pipe connecting device 29.

The distributor element 21 contains a substantially L-shaped distributor channel 30, the horizontal leg 31 of which opens into the cylindrical circumferential surface at the level of the radial channels 26, and the vertical leg of which extends coaxially and is oriented towards the oil supply hole 24. With its cylindrical circumferential surface, the distributor element 21 is fitted with an exact close fit into the hole 20 of the distributor housing 18, the mating of the cylindrical circumferential wall of the hole 20 and the cylindrical circumferential surface of the distributor element 21 being selected in such a way that the distributor element 21 remains freely rotatable around the vertical axis, while on the other hand the cylindrical bearing gap allows no oil to exit under normal pressure conditions. Additionally provided in the distributor housing is an

excess pressure hole 33 which opens into the region of the bottom 22 of the hole 20 forming a kind of pressure relief valve and enabling general operation checking, as will be explained in detail below.

A coaxial shaft 34, which extends through the spacer pipe 19 and is rotatably, but axially immovably, mounted in it by means of two ball bearings 35, is non-rotatably connected to the rotatable distributor element 21. A follower pin 36, which engages in an axial follower slot open at the rim in an associated bushing 37 of the distributor element 21, serves to connect the shaft 34 with the distributor element 21. A compression spring 38, which presses the distributor element 21 with corresponding pre-tensioning against the bottom wall 22 of the hole 20 of the stationary distributor housing 18, is arranged between the distributor element 21 and the shaft 34.

A pinion 39 of a toothed gearing is positioned on the drive side of the shaft 34, said toothed gearing being connected to a servomotor 40 which is attached to the intermediate bottom 5 by means of an angled part 41 and constitutes the drive source for the lubricant distributor 16. The servomotor 40 is an electric stepping motor, for example.

On the rear wall of the partial housing 6, the lubricant pipe connecting device 29 has a strip-shaped connection housing 42 protruding beyond the top of the rear wall of the partial housing 6 (cf. Figures 1 and 2). For each lubrication point to be supplied, the connection housing contains a through-channel 43 with a connection pipe 27 connected to one end to form a seal and a lubricant pipe 44 leading away to the respective lubrication point connected to the other end to form a seal. An inspection member 45

with a compression spring 46 associated with one side thereof is arranged in each through-channel 43. The movement of said inspection member can be observed from outside through a viewing window 47 providing a view onto the inspection member 45. Also arranged in the region of each viewing window 47 is an electric position indicator 48, for example, in the form of a Hall generator, which together with the inspection member 45 forms an electronic lubricant flow monitor for the respective lubricant pipe 44, thus enabling electronic checking of operation. In the event of clogged or impaired oil flow, the oil pulse reporting signal generated by the indicator 48 is interrupted, which causes the disturbance to be optically displayed on the operating side of the housing 1 and a stop motion OFF signal for the knitting machine to be simultaneously generated.

The connecting hoses 27 and the lubricant pipes 44, likewise in the form of hoses, are connected by plug connections, i.e. by screw-free connection, to the distributor housing 18 and the connection housing 42 respectively to form a seal. The design of these plug connections is shown in particular in Figures 4 to 6:

Each plug connection has a connecting bush 49 inserted in a corresponding cylindrical hole 49 of the distributor housing 18 and the connection housing 50 respectively. Together with a cylindrical sleeve 51, likewise inserted into the hole 49 to form a seal, the connecting bush 50 defines a ring gap, into which an elastic O-ring 52 is inserted to seal off the inserted end of an inserted hose, for example, a connecting hose 27, from the wall of the hole 49 in the manner shown in Figure 5.

Two parallel transverse grooves 53 are formed on either side

of each hole 49 in the distributor housing 18 and the connection housing 42 respectively. Said transverse grooves together form a longitudinal guide for a safety slide in the form of a metallic fork-shaped angled part 54, which when inserted embraces the inserted plastic hose 27 with its two legs 55 on either side thereof. The plastic hose 27 is slightly compressed between the legs 55 and is thus held securely at its outer circumference.

The electromagnetic drive device 9 of the piston pump 10 and the servomotor 40 of the lubricant distributor 16 are activated by an electronic programmable control device, the printed circuit boards of which are indicated at 56 (Figure 1), for example. A display device 58 for identifying the respective oiling position, a display device 59 for indicating the respective lubricating interval, a minimum oil level display 60, a main ON/OFF switch 61 and an optical display 62 for flushing the lubrication points ("flush") are arranged on the front panel 57 of the housing 1.

The respectively indicated oiling position can be selected by two pushbuttons 63, whilst two pushbuttons 64 serve to adjust the time duration of the likewise indicated lubrication interval time.

The described pressure oil lubricating device operates as follows:

After a time interval, which is previously set and indicated by the display device 59, is reached for a selected oiling point indicated on the display device 58, the control device activates the servomotor 40 so that it directs the distributor element 21 with its distributor channel 30 towards the radial channel 26 of the distributor housing 18

associated with the respective oiling point and positions the distributor element 21 in the angular position reached. In this way, a direct pipe connection is established between the pressure side of the piston pump 10 and the selected oiling point. The control device 56 now initiates corresponding activation of the piston pump 10, as a result of which a precisely metered amount of oil is conveyed via the pipe connected to the selected oiling point.

After completion of the lubricating operation at this oiling point, the servomotor 40 turns the distributor element 21 further in a program-controlled manner into an angular position, in which a pipe connection is in turn established in the manner described above between the pressure side of the piston pump 10 and the new oiling point, whereupon the piston pump 10 is actuated again. This procedure is repeated until all the oiling points have been provided with the predetermined amount of oil.

The radial channels 26 in the distributor housing 18 associated with the individual oiling points do not have to be selected in a sequence corresponding to their spatial arrangement on the circumference of the hole 20. Selection of the respective oiling point to be supplied is instead carried out according to the program in conformity with the respective operating conditions and requirements. The time intervals for supplying the lubricating oil to each oiling point can be selected individually and set by the pushbuttons 64, the respectively set interval being indicated by the display device 59.

It is also possible, in principle, for the amount of oil supplied to the oiling point to be individually selected in accordance with the respective requirements. After the

connection between the pressure side of the piston pump 10 and the respective oiling point has been established in the manner already described, the respectively required amount of oil can be conveyed by appropriate selection of the duration of actuation of the piston pump 10 in dependence on the respective programming of the control device 56.

Instead of the described stepwise turning of the distributor element 21 for selection at intervals of individual oiling points, the servomotor 40 can also be controlled in such a way that it imparts constant rotational movement to the distributor element 21 (e.g. $1/3$ revolution per second). The electromagnetic drive 9 of the piston pump 10 is synchronised with the servomotor 40 via the control device 56 so that the piston pump 10 always conveys the respectively predetermined amount of oil when the distributor channel 30 at least partially covers a radial channel 26 in the distributor housing 18. For example, in the case of 18 radial channels 26, and therefore 18 oiling points, the resulting pumping frequency amounts to 6 strokes per second.

The lubricant distributor 16 is arranged with its distributor housing 18 at the lowest possible point in the chamber 2 so that it is submerged in the oil supply. Therefore no special measures are required for any slight leaks which may occur. If an oil pressure exceeding the rated operating pressure should occur in the lubricant distributor 16, for example, as a result of clogging of the pipe connection to the respectively selected oiling point, the distributor element 21 is raised off the bottom 22 of the hole 20 of the distributor housing 18 against the action of the compression spring 38. The otherwise closed excess pressure hole 33 is thus released, and so the oil conveyed

by the piston pump 10 can flow off safely along this path.

Finally, the pipe 15 connecting the pressure side of the piston pump 10 to the lubricant distributor 16 is fitted with a pipe branch 65 which is provided for connection of an additional pump (not shown), e.g. a gear pump. On this path, the lubricant distributor 16 and the connected pipes, including the lubricant pipe connecting device 29, can be flushed if necessary, and it is also possible to flush the oiling points with oil ("flush" operation).

The modified embodiment of the lubricant distributor 16 shown in the partial representation in Figure 7 corresponds substantially to the embodiment already described in association with Figures 3, 4. Hence, identical parts are provided with identical references and will not be explained again.

In contrast to the embodiment according to Figures 3, 4, the disc-shaped cylindrical distributor element 21 in Figure 7 does not have an essentially L-shaped distributor channel in alignment with an oil supply hole arranged in the centre of the distributor housing 18. Instead, the distributor element 21 is provided with a ring-shaped oil supply channel 66, which opens towards its cylindrical circumferential surface, is closed by the cylindrical circumferential wall 23 of the distributor housing 18 and into which the oil supply channel 25 opens. At one location on the circumference of the distributor element 21, an axially parallel, short groove-shaped distributor channel 30a is arranged, its width corresponding approximately to the diameter of a radial oil channel 26, and said channel 30a extends from the oil supply channel 66 to the level of the top of the openings of the radial oil channels 26.

In this case, the hole 20 receiving the distributor element 21 is in the form of a cylindrical through hole in the distributor housing 18, and the flat bottom wall 22 in Figure 3 is dispensed with. Accordingly, the shaft 34 rigidly connected to the distributor element 21. The compression spring 38 in Figure 3 is omitted and the follower pin 36 extends through a corresponding transverse hole in the bush 37 of the distributor element 21.

The distinctive feature of this embodiment is its simplified manufacture because a simple through hole 20 with a precise fit is sufficient.

The lubricating device has been described above as a pressure oiler for knitting machines. In principle, it can naturally also be used for supplying lubricant in other machines and devices in which a plurality of lubrication points must be supplied from a central point with exactly metered amounts of lubricant and at predetermined time intervals. Similarly, it is not absolutely necessary for the lubricant to be oil. Other lubricant preparations can also be supplied by this lubricating device. The lubricant pipes 44 themselves lead to the spray nozzles known per se at the individual oiling points. However, they can just as well serve to supply other lubricating or oiling devices, which for their part include means for applying the supplied lubricants to the parts to be lubricated.

**Patent Claims:**

1. Lubricating device for supplying lubricant, in particular oil, to several lubrication points, in particular in a knitting machine, with a lubricating pump (10), a lubricant supply container (1), to which the lubricating pump is connected on the suction side, with connecting devices for the lubricant pipes (44), which lead to the individual lubrication points and which may be supplied selectively with lubricant from the pressure side of the lubricating pump, and with a lubricant distributor (16), which includes a rotatable distributor element (21) connected to control means and which is attached to a lubricant inlet (25) at the pressure side of the single lubricating pump and connected on the output side to the individual lubricant connecting devices, wherein the rotation-symmetrical distributor element is arranged between the lubricant inlet and a respective selected lubricant outlet (26) to create a connection dependent on position, said lubricant outlet being allocated to a specific lubricant pipe of the connecting device, characterised in that the lubricating pump (10) is constructed to discharge a precisely dosed quantity of lubricant intermittently; that the control means of the distributor element (21) have their own drive means (40), which may be actuated by an electric control device (56); and that the lubricating pump and the drive means (40) are synchronised by the control device (56) in such a way that a quantity of lubricant dosed by the lubricating pump is delivered via the pipe connection created by the distributor element to the respective selected lubrication point.



2. Lubricating device according to Claim 1, characterised in that the distributor element (21) has a distributor plug inserted and sealed into a corresponding rotation-symmetrical bearing point (20) of the distributor housing (18), said distributor plug having a ring-shaped lubricant supply channel (66) opening towards its cylindrical circumference, which has a lubricant supply channel (25) discharging into the cylindrical circumferential wall (23) of the distributor housing (18) leading into it and a distributor channel (30a) arranged on the circumference of the distributor element (21) leading out of it, and to said distributor channel channels (26) in the distributor housing are allocated, which discharge into the cylindrical circumferential wall (23) of the distributor housing (18) and lead to the lubricant pipes (44).
3. Lubricating device according to Claim 1, characterised in that the distributor element (21) has a distributor plug, which is inserted and sealed into a corresponding rotation-symmetrical bearing point (20) of the distributor housing (18) and which comprises at least one distributor channel (30), which discharges centrally onto a face side and on the circumference of the distributor plug, and to which channels (25) in the distributor housing (18) are allocated, which discharge on the bottom (22) of the bearing point (20) and on its circumferential wall and lead to the lubricant inlet (24) or to the lubricant supply pipes (44).
4. Lubricating device according to Claim 2 or 3, characterised in that lubricant distributor (16) has a



pressure relief valve (33) arranged in the region of the distributor plug (21) and leading to its bearing gap.

5. Lubricating device according to Claim 4, characterised in that the distributor plug (21) is pressed axially with spring force against the bottom (22) of the bearing point (20), and a normally closed excess pressure hole (33) in the pressure relief valve extends down from the bottom.
6. Lubricating device according to one of the preceding claims, characterised in that the lubricant distributor (16) is arranged in the lubricant supply container (1).
7. Lubricating device according to Claim 6, characterised in that the lubricant distributor (16) is arranged so that it is at least partially submerged in the quantity of lubricant contained in the supply container (1).
8. Lubricating device according to Claim 6 or 7, characterised in that the lubricant supply container (1) contains a chamber (2), which is designed for receiving a quantity of lubricant and is closed to the outside and into which the lubricating pump (10) and/or the lubricant distributor (16) is inserted.
9. Lubricating device according to Claim 8, characterised in that the drive means (9) of the lubricating pump (10) and/or the drive means (40) of the lubricant distributor (16) are attached to the outside of a wall (5) of the chamber (2).



10. Lubricating device according to one of the preceding claims, characterised in that it has connection means (65) for an additional source of liquid, which discharge at the lubricating pump (10) and/or in the region of the inlet (25) of the lubricant distributor (16), and through which a quantity of liquid may be conducted under pressure at least via the lubricant distributor (16) and the connecting devices (29) for the lubricant pipes (44).
11. Lubricating device according to one of the preceding claims, characterised in that each of the lubricant pipe connecting devices has its own lubricant flow monitor (45, 46, 48).
12. Lubricating device according to Claim 11, characterised in that it has a visual display unit (47) to display the operational state of the lubricant pipes (44) which is optionally actuated via the flow monitors.
13. Lubricating device according to one of the preceding claims, characterised in that the connecting devices each have a plug connection for a lubricant pipe (15, 27, 44) which is provided with a safety means (54) for the lubricant pipe.
14. Lubricating device according to Claim 13, characterised in that the safety means has a forked part (54), which may be inserted into holding means (53) and partially embraces the hose-like lubricant pipe.
15. Lubricating device according to one of the preceding



claims, characterised in that the distributor element (21) of the lubricant distributor (16) may at least at intervals be set in continuous rotational movement by its drive means (40); and that the drive means (9) of the lubricating pump (10) is synchronised with this rotational movement in such a way that the lubricating pump (10) delivers its quantity of lubricant when a respective pipe connection has been created to the lubrication point.

16. Lubricating device according to one of Claims 2 to 14, characterised in that the drive means (40) of the lubricant distributor (16) is designed to move the distributor element (21) in rotation in predetermined angular increments.