Feb. 7, 1939. C. E. DIRKES 2,146,424

FEEDING DEVICE FOR LUBRICANTS OR THE LIKE

Filed July 24, 1937 2 Sheets-Sheet 1

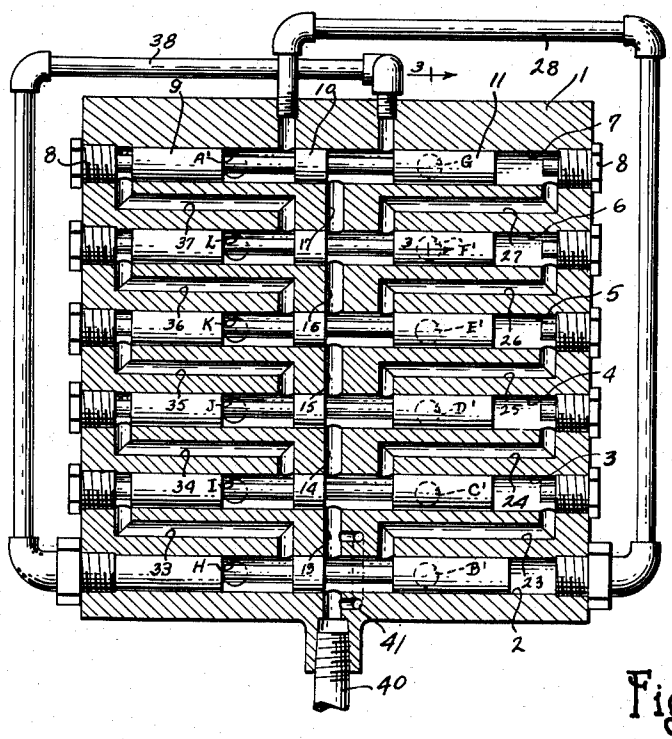



Fig. 1.

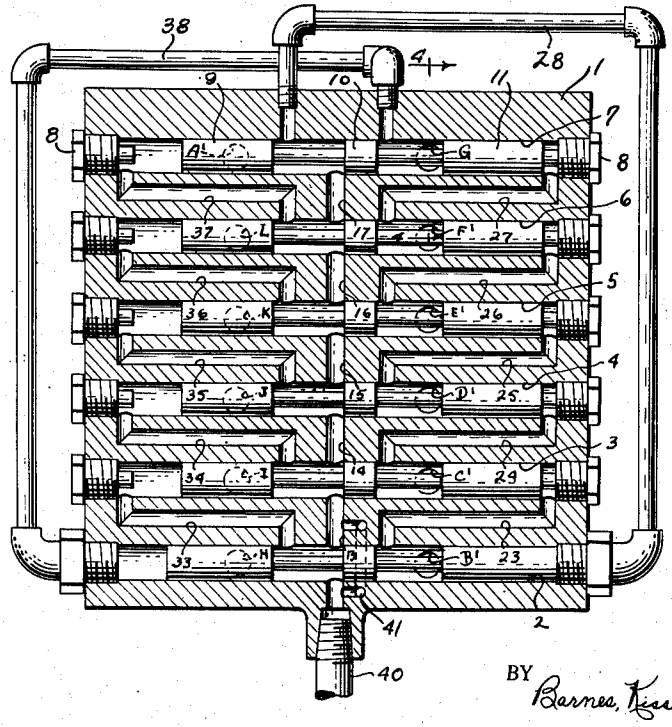



Fig. 2.

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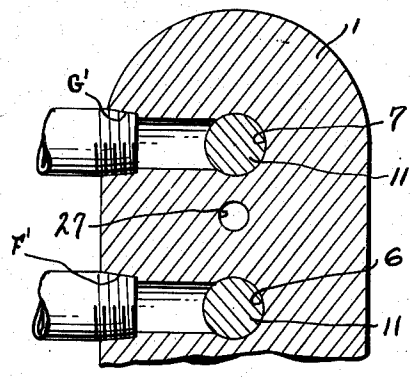



Fig. 3.

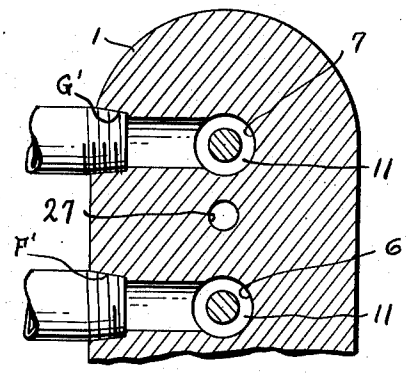



Fig. 4.

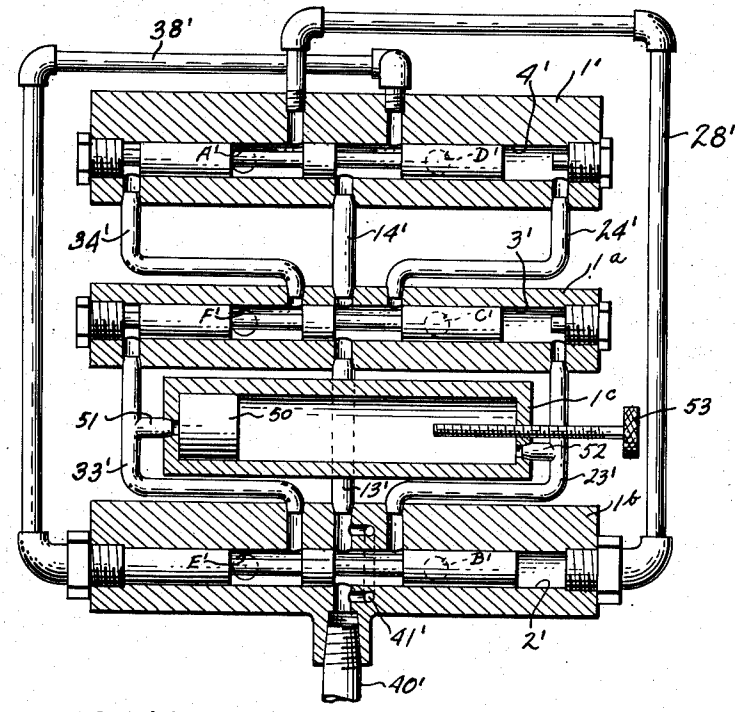



Fig. 5.

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Patented Feb. 7, 1939

2,146,424

# UNITED STATES PATENT OFFICE

2,146,424

## FEEDING DEVICE FOR LUBRICANTS OR THE LIKE

Carl E. Dirkes, Detroit, Mich.

Application July 24, 1937, Serial No. 155,400

8 Claims. (Cl. 184—7)

This invention relates to the dispensing or feeding of a fluid substance and the distributing of the substance in separate quantities to different locations. The invention is directed particularly to the feeding of quantities of lubricant to points requiring lubrication.

The invention aims to provide an arrangement wherein relatively small quantities of lubricant are automatically segregated from a supply of lubricant furnished under pressure, and delivered in such segregated quantities to the several places requiring lubrication. The device or distributor may be arranged to function automatically to constantly distribute quantities of the lubricant to the several places requiring lubrication so long as the supply of lubricant is furnished under pressure from a single line or in one direction.

In the accompanying drawings

Fig. 1 is a cross sectional view illustrating one form of an automatic distributor.

Fig. 2 is a cross sectional view similar to Fig. 1 illustrating the moving parts in a position opposite that shown in Fig. 1.

Fig. 3 is a fragmentary sectional view taken on line 3—3 of Fig. 1.

Fig. 4 is a view similar to Fig. 3 but taken on line 4—4 of Fig. 2.

Fig. 5 is a sectional view showing a system similar to that shown in Figs. 1 and 2, but illustrating a modified arrangement.

The device illustrated in Figs. 1 to 4 is compact and is representative of one arrangement for carrying out the invention. In Fig. 1 a single block of metal 1 is formed with a plurality of cylinders numbered 2 to 7 inclusive. These cylinders may extend through the block and may be closed at their ends by plugs 8. In each cylinder is a piston and each piston has three enlarged portions 9, 10 and 11, which preferably nicely fit in the cylinders, the enlarged portion 10 being joined to portions 9 and 11 by parts of reduced cross section.

The several cylinders are connected together by certain passageways. For instance, cylinders 2 and 3 are connected by a passageway 13, cylinders 3 and 4 by a passageway 14, cylinders 4 and 5 by a passageway 15, cylinders 5 and 6 by a passageway 16, cylinders 6 and 7 by a passageway 17. These several passageways form, in effect, when all are open, a single passageway through the block. An intermediate portion of each cylinder is connected to the end of another cylinder, as for example, cylinder 2 is connected to cylinder 3 by a passageway 23; successive cylinders are connected to the passageways 24, 25, 26 and 27. Also, these cylinders are similarly connected with oppositely disposed passageways illustrated at 33, 34, 35, 36 and 37.

Lubricant is provided under pressure to cylinder 2 by lubricant supply inlet 40, which is at all times connected to cylinder 3, by a passageway diagrammatically illustrated at 41. The cylinder 7 is connected to the cylinder 2 by a passageway which may be in the form of a pipe line 28 and by another passageway which may be in the form of a pipe line 38.

Each cylinder has an outlet port and these are identified by the characters A to L inclusive. The order in which these outlet ports are lettered on the drawings is, for convenience, such that the outlets ars lettered consecutively in the order in which lubricant is discharged therefrom in the structure shown.

Generally speaking, lubricant under pressure is furnished through the port 40, and so long as this pressure is maintained quantities of lubricant will be forced out through the outlets A to L inclusive in succession and continuously. The pressure may be afforded by any suitable pump or pressure device located either remote or in proximity to the unit, and the unit itself may be disposed in proximity to a machine to be lubricated. Suitable conduits or tube lines may be connected to the outlets A to L inclusive, and the bearings or other portions requiring lubricant will have such lubricant fed therethrough in successive charges. These charges may be small so as to not be wasteful of lubricant; yet fresh lubricant may be fed continuously during machine operation. The means which is used to supply grease under pressure may be set into operation at the time the machine to be lubricated is set into operation, and all the time the machine is operating small charges of grease are successively fed to the several bearings to which the outlet ports are connected. Only a single tube line is needed for each bearing and a single tube is all that is needed for the main source of supply.

Specifically, this distributor or unit functions as follows: With the pistons in the position shown in Fig. 1, lubricant under pressure passes in through inlet 40, through the intermediate portion of cylinder 2 through passageway 13, and on up through the several cylinders and passageways 14, 15, 16 and 17. This lubricant pressure will then pass through tube line 38 and the pressure will force the piston in the cylinder 2 to the right. The charge of lubricant which was previously in the right hand end of chamber 2 is forced out through the line 28 into the cylinder

7 and out through the outlet port A, where it may be conducted to a point to be lubricated. As the enlarged portion 10 of the piston in cylinder 2 passes to the right and closes off passageway 13, the lubricant may pass through passageway 41 to maintain the pressure. When the piston in cylinder 2 strikes the right hand end of the cylinder the lubricant in the passageway 38 is blocked, and then it is caused to flow through passageway 33 into the left hand end of cylinder 3. The piston in this cylinder is then forced to the right and the charge therein is forced out through passageway 23 and outlet port B. After this lubricant flows through passageway 34 into the left hand end of cylinder 4, and the charge at the right hand end of cylinder 4 is forced out through passageway 24 and outlet C. This continues in progression and the charges in the right hand ends of cylinders 5, 6 and 7 are discharged respectfully through the outlet ports D, E and F. The pistons are all now in the position shown in Fig. 2, and as the enlarged portion 10 of the piston in the cylinder 7 shifts to the Fig. 2 position, the lubricant under pressure passes out through the pipe line 28 into the right hand end of cylinder 2. This forces the piston in that cylinder to the left, and the charge of lubricant in the left hand end of cylinder 2 is forced out through the passageway 38 into cylinder 7 and through the outlet G. Subsequently the lubricant passes progressively through the passageways 23, 24, 25, 26 and 27 successively forcing the several pistons to the left and the lubricant charges at the left hand ends of the cylinders are discharged through passageway 33 and out port H, out passageway 34 and port I, out passageway 35 and port J, out passageway 36 and port K, out passageway 37 and port L. Now when the enlarged part 10 of the piston in cylinder 7 shifts to the right, or in other words to its Fig. 1 position, the lubricant under pressure again flows through line 28 to the left hand end of cylinder 2, and the cycle starts over again. Thus it will be seen that so long as lubricant is supplied under pressure from this single line that the several pistons function automatically and continuously to force charges of grease through the outlet ports A to L inclusive. Thus a plurality of points may be automatically lubricated so long as pressure is maintained with the charges supplied in consecutive impulses. It may be said that when the pistons are in the positions shown in Fig. 1 that the ports B to G inclusive are closed and the ports A and H to L inclusive are open. When the pistons are in the position shown in Fig. 2 ports B to G inclusive are open, and port A and ports H to L inclusive are closed.

Any number of cylinders may be employed, more or less than that shown. In fact only two cylinders may be used. Furthermore, the cylinders may be located remote from each other by employing suitable tubes for connecting them instead of associating the cylinders together all in a single block of metal. These variations lie within the scope of the invention.

In Fig. 5 a similar system is shown and many of the same reference characters are employed, these being applied to similar parts, thus avoiding needless duplication of description. In this form the blocks are shown separately and are numbered 1', 1a and 1b. However, instead of six cylinders only three are shown, but the principle is the same. The outlet ports are labelled A' to F' inclusive. In this form, however, an intermediate cylinder 1c is provided which has a piston 50 therein but which is not connected in its intermediate portion to the adjacent cylinders. This cylinder, however, is connected into the lines 33' and 23' by passageways 51 and 52. The stroke of the piston in this cylinder may be adjusted as for example by a screw threaded stop member 53. The cylinder 1c is an auxiliary cylinder designed to increase the charge of grease to be applied to some particular bearing or bearings. The device operates in the manner of that above described, briefly reiterated as follows: Grease under pressure, with the pistons in the position shown, forces the piston in the cylinder 2' to the right. A charge of grease is forced out through tube line 28' and port A'. Then grease will flow through the passageways 33' and 51, and substantially simultaneously will shift the piston in the cylinder 1a to the right as well also as piston 50. The grease in advance of these pistons will be forced out through port B', and then lubricant will pass through passageway 34', and the charge in the right hand end of cylinder 4' will be discharged through port C'; as the piston in cylinder 4' reaches the right hand end of its movement, grease will then pass through line 28' and shift the piston in the lower cylinder back to the left discharging lubricant through the port D'; then piston 50 and the piston in the cylinder 1a will discharge lubricant through the port E', and then the piston in the cylinder 1' will discharge lubricant through the port F'. The interposition of the supplementary cylinder 1c provides for an enlarged regulable discharge of lubricant through the ports B' and E'. This may be regulated by controlling the stroke of the piston 50 through the means of the screw threaded stop member 53.

I claim:

1. An apparatus for distributing lubricant or the like to differently located devices such as bearings comprising, a plurality of cylinders, a supply line for lubricant under pressure connecting into an intermediate portion of two of said cylinders, passageways connecting the intermediate portions of a plurality of cylinders including at least one of the cylinders to which the supply line is connected, a set of conduits each connecting into an intermediate portion of one cylinder and to one side of said passageway and into the end of another cylinder, a set of conduits each connecting into an intermediate portion of one cylinder and to the opposite side of said passageway and into the opposite end of another cylinder, each cylinder having two lubricant outlets, one positioned between one end of the cylinder and the point where one conduit connects into said cylinder and the other located between the other end of said cylinder and the point where the other conduit connects into said cylinder, and a piston member in each cylinder arranged to reciprocate therein, and each having a piston portion at opposite ends arranged to open one outlet while closing the other outlet, and vice versa, and having an intermediate piston portion arranged to shift from one side to the other of the passageway.

2. An apparatus for distributing lubricant or the like to differently located devices such as bearings comprising, a plurality of cylinders, a supply line for lubricant under pressure connecting into an intermediate portion of two of said cylinders, passageways connecting the intermediate portions of a plurality of cylinders including at least one of the cylinders to which the supply line is connected, a set of conduits each connecting into an intermediate portion of one

cylinder and to one side of said passageway and into the end of another cylinder, a set of conduits each connecting into an intermediate portion of one cylinder and to the opposite side of said passageway and into the opposite end of another cylinder, each cylinder having two lubricant outlets, one positioned between one end of the cylinder and the point where one conduit connects into said cylinder and the other located between the other end of said cylinder and the point where the other conduit connects into said cylinder, and a piston member in each cylinder arranged to reciprocate therein, and each having a piston portion at opposite ends arranged to open one outlet while closing the other outlet, and vice versa, and having an intermediate piston portion arranged to shift from one side to the other of the passageway, said intermediate portion of each piston having an axial extent not exceeding the distance between the points where the passageway and conduits connect into a cylinder.

3. An apparatus for distributing lubricant or the like to definitely located devices such as bearings comprising, a plurality of cylinders, passageway means connecting intermediate portions of the cylinders, a supply line for lubricant under pressure connecting into the passageway means, a set of conduits each connecting into an intermediate portion of one cylinder at a point spaced to one side of the passageway means and into one end of another cylinder, another set of conduits connecting into an intermediate portion of one cylinder and spaced to the opposite side of the passageway means and into the opposite end of another cylinder, each cylinder having two lubricant outlets, one disposed between one end and the point of connection of one conduit and one disposed between the opposite end and the other connection of the other conduit, a piston member in each cylinder having a piston head at each end and an intermediate piston head, said piston members arranged to be reciprocated by lubricant under pressure, said intermediate portions, when the pistons are shifted to one end of the cylinders, closing off the first set of conduits and opening the second set to the lubricant supply whereby a lubricant is passed through said second set of conduits to one end of all cylinders to shift the pistons and force lubricant ahead of the pistons through the first set of conduits and out through some of the outlets, said intermediate piston head moving across the passageway means in such movement of the pistons to connect the first set of conduits to the lubricant supply whereby the pistons are reversely shifted, and lubricant in advance thereof is discharged through the second set of conduits and out the other outlets.

4. An apparatus for distributing lubricant or the like to differently located devices such as bearings comprising, a plurality of cylinders, a lubricant supply line for lubricant under pressure connecting into the first and second cylinders, passageways connecting the intermediate portion of the second cylinder and all of the remaining cylinders to and including a last cylinder, a first set of conduits, one connecting into each cylinder at a point spaced to one side of the passageway and connecting into one end of another cylinder, a second set of conduits, one connecting into an intermediate portion of each cylinder at a point spaced to one side of the passageway and to the opposite end of another cylinder, each set of conduits including a conduit connecting the last cylinder to the ends of the first cylinder which are opposite the connected ends of the other cylinders, two lubricant outlets in each cylinder, a piston in each cylinder adapted to be reciprocated by lubricant under pressure, each piston having a head at opposite ends arranged to open one outlet port when the other is closed and vice versa, each piston having an intermediate head adapted to shift back and forth across the passageway, whereby when the intermediate piston head is on one side of the passageway the supply line is connected to a conduit in one set, and an outlet port is connected to a conduit in the other set, and vice versa.

5. An apparatus for distributing lubricant or the like to differently located devices such as bearings comprising, a plurality of cylinders, a supply line for lubricant under pressure connecting into an intermediate portion of two of said cylinders, passageways connecting the intermediate portion of a plurality of cylinders including at least one of the cylinders to which the supply line is connected, a set of conduits each connecting into an intermediate portion of one cylinder and to one side of said passageway and into the end of another cylinder, a set of conduits each connecting into an intermediate portion of one cylinder and to the opposite side of said passageway and into the opposite end of another cylinder, each cylinder having two lubricant outlets, one positioned between one end of the cylinder and the point where one conduit connects into said cylinder and the other located between the other end of said cylinder and the point where the other conduit connects into said cylinder, a piston member in each cylinder arranged to reciprocate therein, and each having a piston portion at opposite ends arranged to open one outlet while closing the other outlet, and vice versa, and having an intermediate piston portion arranged to shift from one side to the other of the passageway, and an auxiliary cylinder with a piston therein, connected at opposite ends into two of the conduits which in turn connect the intermediate portions of one and the opposite ends of another of said first mentioned cylinders.

6. An apparatus for distributing lubricant or the like to differently located devices such as bearings comprising, a plurality of cylinders, a supply line for lubricant under pressure connecting into an intermediate portion of two of said cylinders, passageways connecting the intermediate portions of a plurality of cylinders including at least one of the cylinders to which the supply line is connected, a set of conduits each connecting into an intermediate portion of one cylinder and to one side of said passageway and into the end of another cylinder, a set of conduits each connecting into an intermediate portion of one cylinder and to the opposite side of said passageway and into the opposite end of another cylinder, each cylinder having two lubricant outlets, one positioned between one end of the cylinder and the point where one conduit connects into said cylinder and the other located between the other end of said cylinder and the point where the other conduit connects into said cylinder, a piston member in each cylinder arranged to reciprocate therein, and each having a piston portion at opposite ends arranged to open one outlet while closing the other outlet, and vice versa, and having an intermediate piston portion arranged to shift from one side to the other of the passageway, an auxiliary cylinder with a piston therein, connected at opposite ends into two of the conduits which in turn connect the inter-

mediate portions of one and the opposite ends of another of said first mentioned cylinders, and an adjustable abutment for limiting the stroke of the piston in the auxiliary cylinder.

7. An apparatus for distributing lubricant or the like to differently located devices such as bearings comprising, a plurality of cylinders each having two outlets, conduit means connecting the ends of each cylinder to another cylinder a supply line for lubricant under pressure, passageways interconnecting the cylinders for the flow of lubricant through all cylinders, and a piston member in each cylinder arranged to be automatically shifted back and forth by the lubricant under pressure and each piston having spaced piston heads so positioned relative to the said passageways connecting into the cylinders as to alternately connect the cylinders at one end to lubricant under pressure and to connect the cylinders at their opposite ends to outlets in other cylinders through said conduit means, whereby the pistons continuously reciprocate to discharge lubricant from opposite ends thereof so long as lubricant under pressure is provided.

8. An apparatus for distributing lubricant or the like to differently located devices such as bearings comprising, a plurality of cylinders each having two outlets, conduit means connecting the ends of each cylinder to another cylinder, a supply line for lubricant under pressure, each cylinder having a port connected to the supply line for the flow of lubricant through all cylinders, and a piston member in each cylinder arranged to be automatically shifted back and forth by the lubricant under pressure and each piston having spaced piston heads so positioned relative to the said ports as to alternately connect the cylinders at one end to lubricant under pressure and to connect the cylinders at their opposite ends to outlets in other cylinders through said conduit means, whereby the pistons continuously reciprocate to discharge lubricant from opposite ends thereof so long as lubricant under pressure is provided.

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