

UNITED STATES PATENT OFFICE

2,136,492

LUBRICATING MEANS

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Application July 17, 1933, Serial No. 680,891

4 Claims. (Cl. 221—47.4)

My invention pertains to that class of lubricating devices employed for forcing a lubricant, usually in the form of heavy oil or grease, through a fitting commonly known as a nipple, connected by a port or duct with a part to be lubricated.

An object of my invention is to provide a novel, hand-operated, device for servicing such nipples, of the general type now known in the art as a "push gun", including a novel receptacle or cartridge forming a part of such device or gun which may also be used in connection with other gun parts now known in the art.

Another object of my invention is to provide such a gun with a nozzle which will be able to form a tight contact joint with different types or nipples now in use.

Other objects will be plain from the following specification and the drawing forming a part thereof.

In the drawing,

Fig. I is a partial elevation and partial section illustrating part of a gun, to which no claim is here made, per se, combined with a receptacle comprehending an element of my present invention, said complete gun being shown as applied to a nipple to be serviced.

Figs. II and III are sections of forms of gun engaging nipples (shown on enlarged scale) which may be used to form parts of the cartridges comprehended by my invention.

Fig. IV is a fragmentary top plan of the cartridge shown in Fig. I.

Fig. V is a fragmentary section of the cartridge of Fig. I, showing the arrangement of parts thereof on enlarged scale.

Fig. VI is a longitudinal section and partial elevation of one form of gun and cartridge comprehending my invention.

Fig. VII is a section of the nozzle of my improved gun shown applied to one form of nipple (shown in elevation) now in use.

Fig. VIII is a section of a discharge nozzle now in common use and a well-known type of nipple, intended to be used therewith, shown in elevation.

Fig. IX is a section and partial elevation of a modified form of gun embodying my invention and is somewhat similar to Fig. VI.

Fig. X is a section of the discharge nozzle of my improved gun, shown as in operative relation to the nipple of Fig. VIII.

Fig. XI is a partial section and partial elevation of the cartridge of my present invention,

shown as cooperating with another type of gun invented by me.

Figs. XII and XIII are sections illustrating modified forms of cartridges which include elements of my invention and which may be used with the other parts shown in Figs. I, VI, IX and XI.

Fig. XIV is a fragmentary section of a cartridge comprising an element of my invention which may be used with the other parts of Fig. I.

Fig. XV is a partial section and partial elevation of a form of nozzle and nipple now known in the art, showing the axis of the nozzle at an angle to that of the nipple.

Fig. XVI is a view similar to Fig. XV but showing the axis of the nozzle in line with that of the nipple.

In Fig. I, the gun illustrated comprises a nozzle portion 1, shown applied to a ball type nipple 2, which is assumed to be connected with a part to be lubricated, in the usual manner. The barrel 3 of the gun is provided with a proper piston and a gland 4 through which the piston rod 5 passes, the arrangement being such that, when the rod 5 is moved toward the nipple by means of the handle 6, a lubricant-tight contact will be maintained between nozzle 1 and nipple 2 and lubricant contained in the barrel 3 will be expelled through nozzle 1 and nipple 2 to the part to be lubricated. Then, movement of the piston rod 5 in the reverse direction, as under the influence of spring 7, will cause a partial vacuum in the gun barrel which is connected with a port (shown in dotted lines) passing through the member 11, having a tapered shoulder 25, as indicated. The barrel portion 3 carries a flange 8, provided with a depending skirt provided with inwardly projecting lugs 9 having spaces therebetween to allow the passage of the outwardly projecting bosses 10 (see also Fig. IV) of the cartridge. The upper faces of the lugs 9 are inclined so that after the bosses 10 are engaged rotation of the cartridges with respect to the flange 8 will cause the parts to be drawn together so as to form a fluid-tight joint between the tapered portion 25 and the inturned wall 23 of the cover 12 of the cartridge. The cartridge is provided with a bottom 14, formed with a flange or skirt 26 having a groove 15 therein which may be filled with cord or other suitable packing so that the bottom forms a fluid-tight, though freely moving, piston (see also Fig. V) which at the time the cartridge is filled is pressed down into the space between the side wall 13 and the upturned lip 16 to form a tight

joint. At or near the center of the bottom 14 there is an opening surrounded by the collar 17 into which is pressed a nipple 18 having a nozzle-engaging portion 20 with a small opening there-through, as indicated at 21, which may be closed as by means of a small lump of soft solder, as indicated at 22. When the cartridge is filled at the factory, the cover or top 12 has the central opening therein closed by the disc 24, which may be part of the blank from which the cover is formed, and is preferably scored or weakened at its point of connection with the conical wall 23. Such cartridge may be readily filled before the nipple member 18 is pressed into place, and shipped and stored and sold as "original packages" not easily refilled.

When a fresh cartridge is to be applied to the other parts of the device of Fig. I, the nozzle 11, which is provided with a shearing edge, is first pressed downwardly into the cover so as to cut away part of the disc 24 and bend it back out of the way, as shown. Then, when the cartridge is revolved as above described, the gun is ready for use; and, as the lubricant is drawn up into the barrel 3, atmospheric pressure will cause the bottom 14 to move upwardly, in an obvious manner, until the grease is practically exhausted, when a fresh cartridge may be applied as before.

The gun shown in Fig. VI employs the same cartridge as that of Fig. I, though it is applied differently to form a symmetrical device having certain advantages over the arrangement in Fig. I.

In the gun of Fig. VI, 27 represents the high-pressure cylinder which may be formed of a piece of ordinary cold rolled tubing, and is shown as provided with a conical shoulder 28 against which is fastened a circular flange 8, which is similar to the like numbered flange in the device of Fig. I, and provided with parts adapted to engage the lugs 10 upon the cartridge, in the same manner as in the device of Fig. I, and cause a tight joint between parts 23 and 28.

With the complete gun assembled, as shown in Fig. VI, and the cylinder 27 full of grease, if the nozzle 11 be placed upon a suitable nipple and the handle 29 pressed with sufficient force toward the nipple, rod 30 will cause the plunger 31 to cover the inlet ports 32, and then further movement of the plunger will cause grease contained in the cylinder 27 to be expelled past the valve 33, into the part to be lubricated. Then, if the pressure upon the handle 29 be relieved sufficiently, spring 34 will cause the plunger to be returned to the position indicated in the drawing. This will cause a partial vacuum in the cylinder 27 and, as soon as the plunger 31 uncovers the ports 32, grease will be forced into the cylinder through said ports by the action of atmospheric pressure upon the movable end 14 of the cartridge which is free to move under atmospheric pressure while maintaining a fluid-tight joint at its contact with the shell 13 and at the sliding contact between the collar 17 and the outside of cylinder 27.

When the lubricant has all been used from the cartridge, it can be removed by merely giving it a slight rotary movement with respect to the member 8, so as to release the lugs 10, and then sliding it off the cylinder 27, in an obvious manner.

To apply a fresh cartridge, one has merely to press the cutting edge 35 of nipple 1 against the weakened portion of the disc 24 to cut out the

said disc, and then the nozzle can be passed through the contents until it strikes the member 18 (see Fig. I) which may thus be forced out to allow the cylinder 27 to pass through the opening defined by the collar 17. Then, if the cartridge has its bosses 10 placed in engaging relation to the lugs 9 and revolved, the cartridge will be held in place and a fluid-tight joint secured between parts 23 and 28, and the gun may be used as stated above.

The gun of Fig. IX is quite similar to that of Fig. VI, save that the cartridge is applied differently. With this structure, a fresh cartridge is applied by using the cutting edge 35 of the nozzle as a tool to cut the edge of disc 24 at its connection with the tapered, depressed, portion 23; then the hand grip 36 is unscrewed from the piston rod 37 and removed with its attached spring 38 (the rod 37 being held from revolving by the screw 39 engaging the groove or key-way 40); then the rod 37 and cylinder 41 are passed through the cartridge and the bosses 10 engaged with the lugs 9, as shown in the drawing and described with respect to Figs. I and VI, the plug 18 being removed by the rod 37 during this process. The operation of this type of gun is believed to be obvious from the stated operation of the structure of Fig. VI.

In Figs. I, VI and IX, the nozzle 1 may be of the type having a pocket, as shown at 42 in Fig. XV, which has an annular contacting portion 43 of circular form, with a diameter slightly less than the diameter of the ball head of nipple 2, to permit application of the gun at an angle approximating 90 degrees, as shown in Fig. XV; or with the axes of the gun and nipple in line, as shown in Fig. XVI.

There are now in service a great number of nipples as shown in Fig. VIII at 44, which are adapted to be serviced by guns having nozzles as shown at 45 in this figure, and these nipples cannot be serviced by means of the guns having the usual nozzles as shown in Figs. XV and XVI, intended for use with ball type nipples; though it happens that the usual nozzles 45 of Fig. VIII having a spherical pocket 46 of such radius that the guns intended for use with nipples 44 can be used to service the ball type fittings now in use, provided the axes of the guns be held nearly in line with the axes of the fittings.

In Fig. VII there is shown a nozzle 47, adapted to provide a fluid-tight contact with the ball-type fitting 2, which fitting may hold such contact throughout wide relative displacements, as shown in Figs. XV and XVI. The pocket 48 is, however, so formed as to be applicable to fittings of the type indicated in Fig. VIII, as shown in Fig. X, where it will be noted that the pocket 48 has a spherical portion 49, adapted to form a fluid-tight contact with nipple 44, throughout reasonable angular displacement of the axes of the nozzle and nipple.

In Fig. XI, I have shown a very simple type of gun which comprises merely a cylinder 50, which may be a piece of ordinary tubing swaged into proper shape at one end to form a nipple-engaging nozzle, as indicated at 51, and a plunger 52 having a rod 53 bent into the form of a hand grip 54. To use this arrangement, one has merely to cut off the soft solder button 22 of Fig. I and apply the nozzle to the member 18, as shown in Fig. XI, and push upon the cylinder 50, as the pressure thus placed upon the piston cover 14 will cause the lubricant in the cartridge to pass through the open-

ing 21 (Fig. I) of nipple 18 and fill the cylinder 50 and move the plunger 52 toward the opposite end of the cylinder, as pressure applied against the cylinder will maintain a tight contact joint between the head 20 of nipple 18 and the nozzle 51. When the required amount of lubricant has entered the cylinder 50, one has merely to grasp the grip 54, place the nozzle against the nipple to be serviced, and push upon the grip 54.

It is here to be noted that the plungers shown in Figs. I, VI, IX and XI, are preferably of such area that pressure upon the respective hand grips toward the nipple to be serviced will cause a fluid-tight contact between the nozzle and nipple.

In Figs. II and III, I have shown different types of nipples which may be used in place of that shown at 18 in Fig. I; and, in Fig. II, the opening 21 is closed by a soft metal or solder disc 55 which may be punched in by means of an implement such as a nail; while in Fig. III the opening is closed by a "tear strip" 56 which may be grasped and torn off.

In Fig. XII there is shown another type of nipple 57 which is provided with a check valve which may be used if desired; while in this figure the fixed cover is shown as provided with a central opening normally closed by a stopper 58 which may be pried out, instead of the disc arrangement shown in Figs. I, VI and IX.

In all of the above mentioned cartridges, one end closure member has been assumed to act as a follower, and this dual office requires a good sliding fit between the wall 13 and flange of the closure, which is more or less difficult to obtain.

In Fig. XIII there is shown a cartridge provided with fixed closure 59 and a follower 60 having a fairly good fit within the cartridge, such as can be obtained with dies. When this type of cartridge is filled, it may be hermetically sealed, and the follower contact is not relied upon to prevent leakage during shipment or while carried in stock and subjected to wide temperature changes causing the difference between inside and outside pressure to vary greatly. When a fresh cartridge of this type is to be applied to any of the gun parts here shown, the strip or cover portion 61 is torn off and then the cartridge may be manipulated as above pointed out, and there will be small tendency for lubricant to leak past the follower when not in use as the follower is then free to move and cause the pressure upon each side thereof to equalize.

This idea may, of course, be employed with cartridges for use with guns of the type shown in Fig. I only, and such a structure is indicated in Fig. XIV where the follower is not provided with the nipple 18 and merely a vent 62 is shown as normally closed by the "tear strip" 63.

I do not in any way limit myself to any of the exact constructions or details of operation here explained merely to point out embodiments of my invention, for it will be obvious that wide departure may be made in the way of apparatus

and modes of operation without departing from the spirit and scope of my invention which is as set forth in the following claims.

I claim:

1. Lubricating means including a high pressure pump provided with means for engaging one end of a readily removable lubricant container of the interchangeable "original package" type having end closures, said parts being so constructed and arranged that the container may be engaged and disengaged without changing the operative relation of the elements of said pump with respect to each other, a container engaged and attached to the pump thereby and provided at its opposite end with movable means forming part thereof and throughout movement operatively engaging a portion of said pump to functionally affect the operations thereof.

2. Lubricating means including a pump, a cartridge of the interchangeable original package type providing a reservoir therefor and having relatively movable perforated end closures through which said pump extends, and cartridge engaging means carried by said pump and adapted to hold the cartridge in place by lockingly engaging one end thereof only, said pump being provided with an inlet port communicating with said cartridge at the end nearest said engaging means, and means forming a fluid-tight joint with the closure at said end when the cartridge is engaged, said cartridge being applied as a unit and removable as such.

3. Lubricating means of the "push gun" type wherein lubricant-expelling thrust causes an outlet to form a lubricant-tight joint with a nipple, including a nipple-engaging discharge outlet seat of circular section in a plane normal to the axis of said means and also a seat of circular section in a different plane whereby different nipples presenting different pressure reaction angles and areas may have circular contact therewith, and lubricant-expelling means producing sufficient expulsion thrust to cause a fluid-tight joint with each kind of said nipples in spite of any difference in lubricant pressure reaction upon said joint due to the difference in kind of said nipples.

4. Lubricating means of the "push gun" type wherein lubricant-expelling thrust causes an outlet to form a joint with a nipple including a nipple-engaging discharge outlet face at an acute angle to the axis of said means and the direction of thrust and having a circular nipple-engaging opening therein, and a spherical seat for engaging and forming a fluid-tight joint with non-spherical nipples reached through said opening and lubricant-expelling means producing sufficient expulsion thrust to cause a fluid-tight joint with each kind of said nipples in spite of any difference in lubricant pressure reaction upon said joint due to the difference in kind of said nipples.

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