

June 21, 1927.

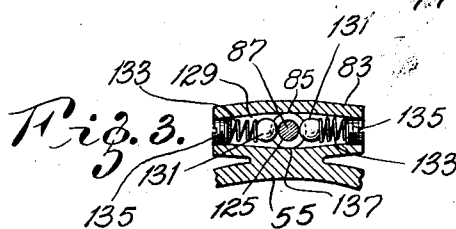
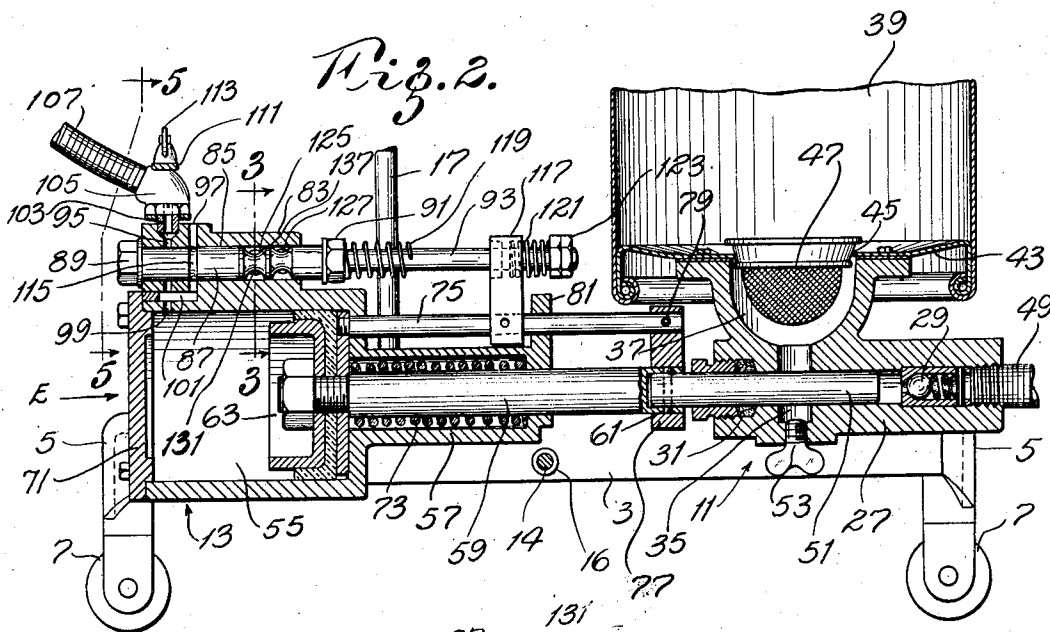
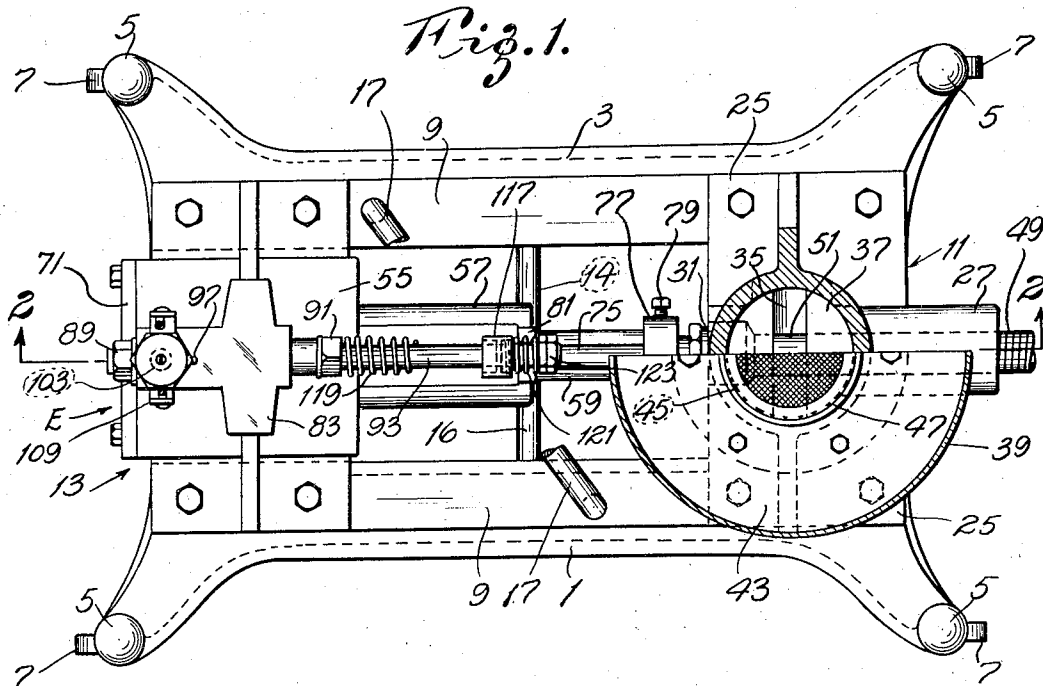
1,633,304

F. S. BARKS

LUBRICATING APPARATUS

Filed March 12, 1926

3 Sheets-Sheet 1



Frank S. Barks,
Inventor,
Debor S. Haynes,
Attorney

June 21, 1927.

1,633,304

F. S. BARKS

LUBRICATING APPARATUS

Filed March 12, 1926

3 Sheets-Sheet 2

Fig. 6.

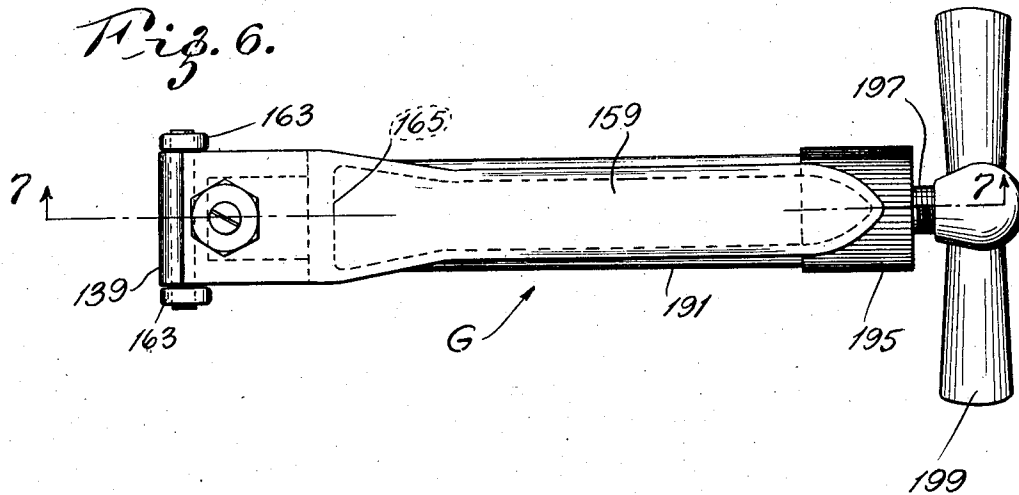


Fig. 4.

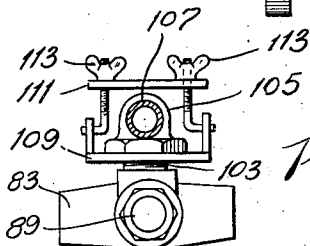
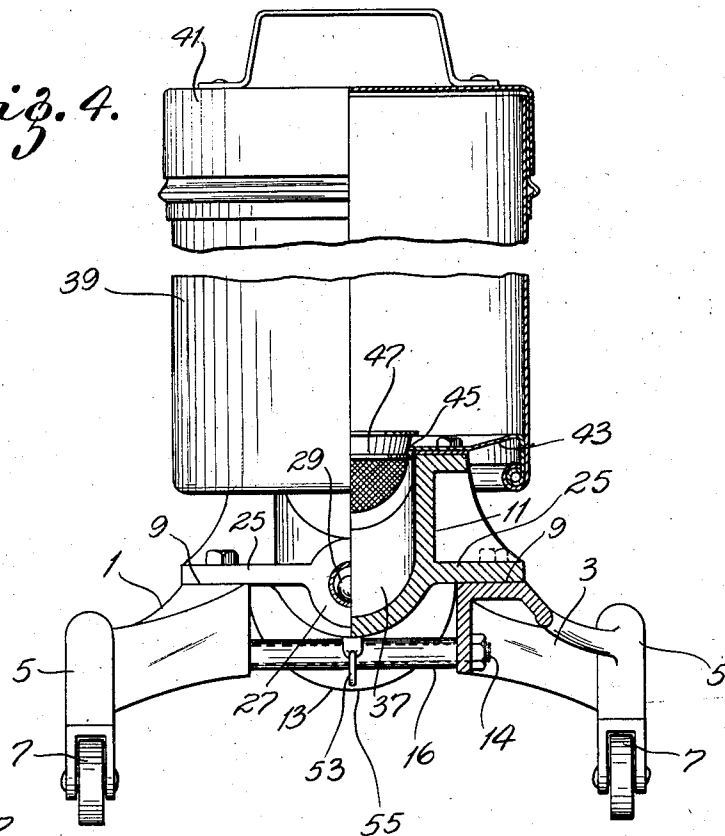


Fig. 5.

Frank S. Barks,
Inventor,
Delos S. Haynes,
Attorney

June 21, 1927.

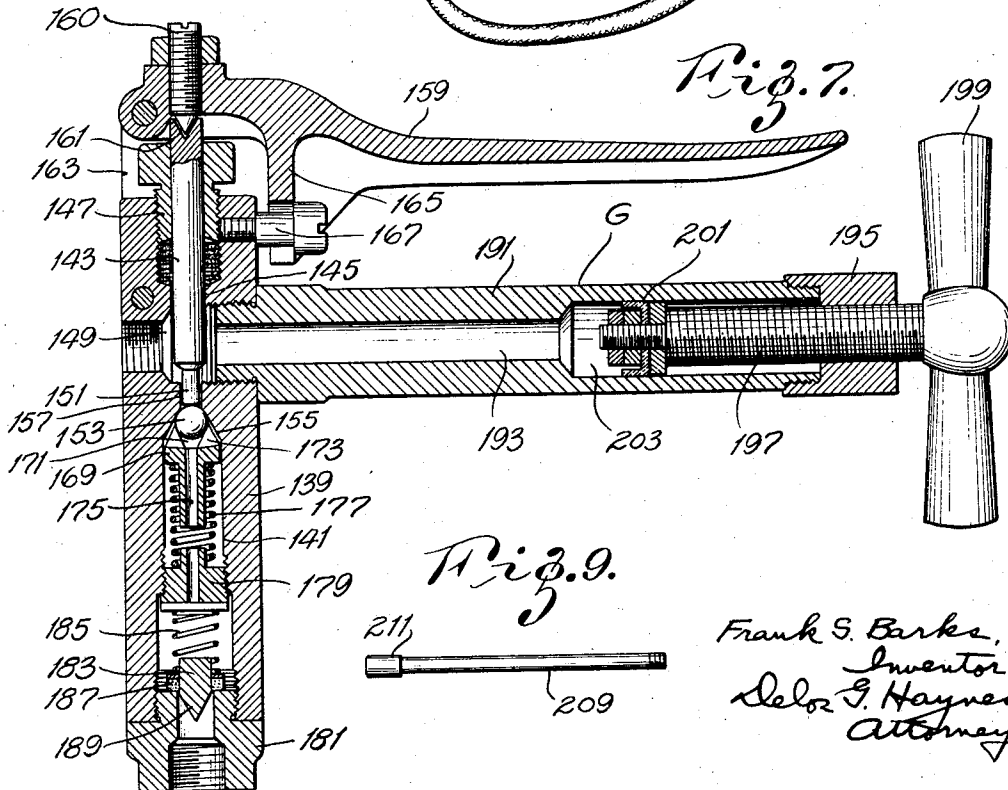
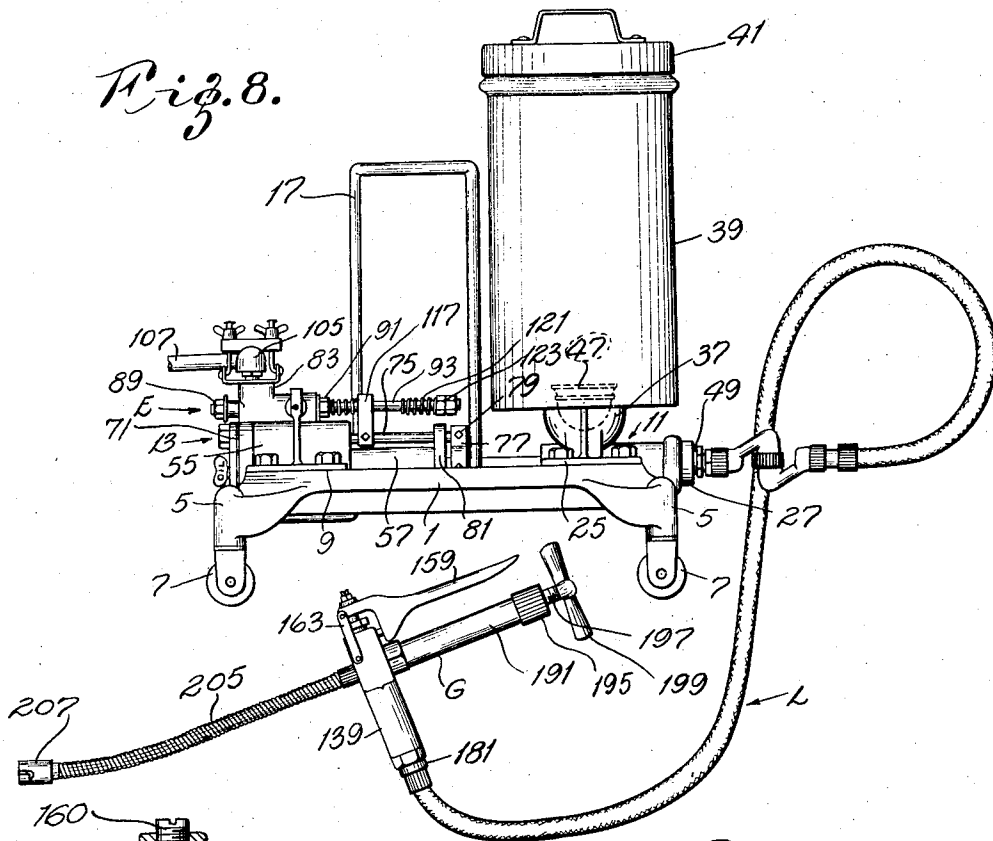
1,633,304

F. S. BARKS

LUBRICATING APPARATUS

Filed March 12, 1926

3 Sheets-Sheet 3



Frank S. Barks,
Inventor,
By S. Haynes,
Attorney.

UNITED STATES PATENT OFFICE.

FRANK S. BARKS, OF ST. LOUIS, MISSOURI.

LUBRICATING APPARATUS.

Application filed March 12, 1926. Serial No. 94,131.

This invention relates to greasing apparatus, and with regard to certain more specific features to a portable grease gun.

Among the several objects of the invention may be noted the provision of a portable grease-gun which is adapted to permit passage of pressured fluid therethrough and cut off such passage; the provision of a grease gun of the class described which is adapted to raise the pressure in the outlet lines connected therewith or to decrease said pressure independently of the inlet pressure; and the provision of a grease delivering assembly adapted to deliver grease at normal pressures by a simple movement of the hand, and to deliver grease at abnormally high pressures or retract it at abnormally low pressures by means of another simple movement. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists of the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structure hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, in which is shown one of various possible embodiments of the invention and a modified element therefor,

Fig. 1 is a top plan view of the pump, showing parts broken away;

Fig. 2 is a longitudinal vertical section taken on line 2—2 of Fig. 1;

Fig. 3 is a vertical lateral section taken on line 3—3 of Fig. 2;

Fig. 4 is a fragmentary front elevation of certain pumping elements;

Fig. 5 is a lateral section taken on line 5—5 of Fig. 2;

Fig. 6 is a plan view of the grease gun element;

Fig. 7 is a vertical longitudinal section taken on line 7—7 of Fig. 6;

Fig. 8 is a side elevation of the device completely assembled for operation; and,

Fig. 9 is a side elevation of a modified form of delivery tube.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

Referring now more particularly to Figs. 1 and 2 of the drawings, there is illustrated at numerals 1 and 3, a pair of longitudinal side frames or rails. Each of the frames or

rails 1 and 3 is formed with a leg 5 at the front and rear and each leg 5 is provided with a swivel caster 7. The casters 7 are adapted to stay with the legs 5, when the device is picked up, as will be hereinafter described.

The rails 1 and 3 are provided with upper horizontal flat and/or machined surfaces 9 for the purpose of receiving bolted thereto, at the forward ends, a laterally formed pump casting 11. Rearwardly the surfaces 9 of the frames 1 and 3 have bolted thereto a laterally formed engine casting 13. The frames 1 and 3 and castings 11 and 13 form a unit. For stiffening purposes a cross-bolt 14 and spacer 16 are provided laterally between and centrally of the side frames. This stiffening device may be dispensed with in small sizes of the pump.

Held to opposite sides of said castings 11 and 13 is a handle or grip 17 by means of which the greasing device as a whole may be lifted and transported about.

Referring now more particularly to the forward pump casting 11, it may be seen that said casting comprises flanges 25 whereby it is bolted to the side frames 1 and 3, as described. Longitudinally and centrally of said flanges and formed therewith is a bored plunger cylinder 27 provided at its forward end with a conventional ball check valve 29. As indicated in Fig. 2, the rear end of said plunger cylinder is counterbored to receive a stuffing gland 31. This gland can be omitted.

Around a more or less central portion of the bore of cylinder 27 is cored an inlet passage or space 35 which leads up to a chamber 37 cast integrally with the bored cylinder 27. Bolted to the flanged top of said chamber 37, in grease-tight fashion, is a grease container 39. The container is provided with a lid 41 (Fig. 4). The bottom 43 thereof is provided with an opening which aligns with the upper opening of the chamber 37 and is adapted to receive the conical rim of a strainer 47 therein.

Now, as will later be made clear, grease and the like is adapted to be drawn or forced from the container, through the strainer 47, passages 37, 35, bore of cylinder 27, valve 29, to a supply line L (preferably flexible) made fast to the outlet end of the valved cylinder 27.

To accomplish the above purpose, a plunger 51 is caused to reciprocate in the

bored cylinder 27 so that its forward end crosses and recrosses the space 35. The plunger is made to fit the cylinder 27 snugly and as the plunger recedes rearwardly, the check valve 29 automatically closes. Hence, a vacuum is drawn in the cylinder 27 and as the plunger end recedes over the more or less annular opening 35, grease rushes from all sides of the cylinder 27 and into said cylinder. At the next forward movement of the plunger the grease in cylinder 27 is forced through the check valve 29 and out into the line L. In starting the device, it may be primed by pouring oil into the passage 35 by way of the container 39. If after a period of operation the device should lose its prime, priming may be accomplished by inverting said device, removing a plug 53 leading to chamber 35 and pouring oil or the like into said chamber 35. This latter method of priming saves the operation of removing grease from the container 39 in order to get oil into the passage 35.

It is obvious that the reciprocating action of the plunger 51 may be continued indefinitely to draw grease from the container 39 and discharge it into line L. In order to reciprocate the plunger, an air engine E is provided at the rear of the device. This engine is associated with and cast (in part) with the said casting 13.

The air engine E comprises a work cylinder 55 to which is longitudinally cast, on center line, a spring retaining cylinder 57. These cylinders are adapted (as a unit) to be aligned on center line with the cylinder 27, at least approximately.

Passing through the cylinder 57 and into cylinder 55 is a piston rod 59. The rod 59 passes out of the forward end of said cylinder 57 and cooperates with the plunger 51 by means of a counterbore and cross pin combination 61. The stated combination 61 is permanent but during assembly permits of some mis-alignment between the cylinders 55, 57 and 27, in so far as the counterbore in the shaft 59 may be made somewhat larger than the diameter of plunger 51.

At the rear end, the rod 59 is provided with a driving piston 63. The piston 63 is normally held to the left or rear end of its cylinder by means of a spring 73 reacting between said piston and the front of cylinder 57.

A driving stem 75 for the valve gear of engine E is supported with regard to, and moves with the piston rod 59. It is so supported for the said movement by screwing the rear end of it into the piston 63 and pinning the forward end into a vertical bracket 77, which bracket is held by means of a tight fit, and set screw 79 to the forward jointed end of the piston rod 59. The said rod 75 passes through a proper passage in the head end of cylinder 55 and is steadied

by passage through an ear 81 at the front end of the cylinder 57.

A cross-shaped lug 83 is cast on the top of the work cylinder 55. The lug is provided with a longitudinal bore 85 for slidably receiving a valve 87. Positive movement-limiting heads 89 and 91 are provided at the rear and front ends respectively of this valve. The front head 91 serves also to lock a valve stem 93 to the valve.

Vertically drilled across the valve bore 85 are passages 95 and 97 serving inlet and exhaust purposes respectively. These passages are both joined to a cylinder port 99 by way of a common passage 101, which is also drilled, and thereafter end-plugged as shown in the drawings. The passage 101 is interposed between the valve 87 and the interior of cylinder 55. The exhaust passage 97 leads directly to the atmosphere and the inlet passage is provided with a conventional air inlet plug 103.

To bring air to the inlet passage 95 it is only necessary to hold a conventional air nozzle 105 (such as is used for filling automobile tires and available at most garages) to the plug 103. The plug 103 and nozzle 105 mutually open one another and air may flow from the compressed air line 107, associated with said nozzle 105, to the inlet passage 95. The description of the plug 103 and nozzle 105 is not detailed here, in so far as their constructions and combination are well known, conventional, and are not claimed herein to be new per se.

In order to hold the nozzle 105 to the plug 103, a hinge block 109 is held to the lug 83 by means of a shoulder on the plug 103 (see Fig. 5). To this block 109 is hinged an adjustable saddle member 111, which is adapted to swing over the nozzle 105 and be clamped down thereon, thereby holding the nozzle in place for delivering air. Wing nuts 113 make removal of the saddle 111 from the nozzle 105 easy and handy, whereupon the nozzle may readily be removed by lifting, and whence air automatically ceases to flow from the nozzle 105, or tend to flow into the passage 95.

Returning to the valve construction, the drawings (Fig. 2) show that the valve 87 is provided with a groove 115 adapted to register with the said inlet passage 95 and outlet passage 97 when the valve is in its maximum rearward and forward positions respectively. Hence, by positioning the valve 85 rearwardly, the exhaust passage 97 is closed, while the inlet passage 95 is opened, whereby compressed air may pass from the line 107, through the open nozzle 105, open plug 103, passage 95 and groove 115, passage 101, passage 99 and to the cylinder 55, where work is done to press the piston 63 forwardly against the action of spring 73. By this means the plunger 51 is made to

take a grease forcing stroke as hereinbefore described.

Next, by positioning the valve 85 forwardly, the groove 115 aligns with the exhaust passage 97, as shown in Fig. 2, whereupon the inlet passage 95 is closed. This action permits movement of air from the cylinder 55 through passages 99, 101, 97 and groove 115. Such movement of air is caused by the tendency of the air to re-expand and the expanding action of spring 73 which pushes the piston 63 rearwardly. Of course the port 99 is near the head 71 so that the cylinder 55 may be substantially emptied of air.

Movement of the piston 63 and rod 59 rearwardly results in an evacuating stroke of plunger 51, whereby the grease cylinder 27 is again reloaded as hereinbefore described.

In order to automatically position the valve 85 at its said maximum forward and rearward positions, so that pumping may be continuous when desired, the following full-stroke mechanism is used:

Vertically fastened to the driving rod 75 is fastened a driving bracket 117 adapted to slidably engage the stem 93. Springs 119 and 121 are placed over said stem 93 rearwardly and forwardly respectively. These springs 119 and 121 respectively engage the said head 91 and another head 123 of the stem 93. The bracket 117 engages the springs in its travel back and forth along the stem 93. It is obvious that upon engaging and compressing a spring to a given point, that the driving bracket (moving with the piston rod 59) will drive the valve stem 93.

In order to prevent the valve 87 from moving to reverse a given stroke of the piston 63 before the stroke is substantially finished, and to cause said valve to take a full stroke at every movement thereof, it is recessed at points 125 and 127. Corresponding points on the recesses are a distance apart equal to the distance between the passages 95 and 97.

Formed horizontally across the valve passage 85, at a point corresponding to the position of recess 125 when the valve 87 is in forward position, is a passage 129 (see Fig. 3). On each side of the valve 87 in the recess 125 is placed a ball 131. The balls are each backed by a compressed spring 133 reacting against a retaining plug 135. By this means the valve 87 may be resiliently held in either its exhaust or inlet position, depending upon which recess 125 or 127, the balls 131 are cooperating with.

When the driving bracket 117 moves against the spring 119 (Fig. 2) and substantially compresses it, the rearward motion of the piston 63 is adapted to be about completed. In the meantime the recess 125 and balls 131 have caused the valve 87 not to be moved, despite the partial compression of spring 119. Finally at or near the end of

the stroke of piston 63, the spring is adapted to have been compressed enough to overcome the holding power of the balls 131, and the valve 87 moves under action of the spring 119. The valve must move rearwardly its full stroke because, as the high ridge 137 between the recesses 125 and 127 passes the balls 131, the inward movement of the balls into the recess 127 forces the valve to full stroke position as described, although the spring 119, may by this time have expanded to such a position that it would not, without the full stroke feature, be able to move the valve to a position such that the groove 115 aligns with port 95. Of course, as the valve opens the inlet air port 95, the motion of the piston is reversed to a forward direction, and reversal of the above events takes place. This time, however, the spring 121 comes into play, while spring 119 is idle. The reverse events will be obvious from the foregoing.

The pumping action by means of the engine E is then continuously automatic as long as certain other events, to be described, take place. Of course when the nozzle 105 is removed from the engine E, no air is available to do work, and no grease is pumped to the line 49.

In order to control the pumping action of the device, the supply line L is provided with a manually operable gun G (Figs. 6 to 8). This gun comprises certain novel features per se, which are also novel in combination with the pumping elements above described.

The gun G comprises a body 139 which is provided with a longitudinal differential bore 141. This bore 141 is provided with a plunger 143 which is held slidably in a section 145 of said bore and emerges from the bore through a conventional stuffing gland 147. The section 145 of the bore 141, as well as the plunger 143 are of a relatively small diameter so that leakage therearound and therefrom is negligible, and in view of the gland 147 cannot be detected even at high internal pressures.

At its upper portion, the bore 141 is intersected by a laterally formed passage 149. The stem or plunger 143 crosses the passage 149 and is provided at its lower end with a nose 151 adapted to press a ball check 153 from its seat 155. The portion 157 of the bore 141 around the nose 151 is amply large enough to permit passage of greases and like fluids therethrough.

The plunger 143 is adapted to be pressed down by means of an adjustable pivot pin 160 locked to a handle 159, and cooperating with a pivot bearing 161 of said plunger 143. The handle 159 is pivoted to oscillating links 163 which in turn are pivoted to the said body 139. A downwardly extending slotted lug 165 of said handle 159 is

adapted to slidably engage a stud 167 made fast to the upper portion of the body 139. The purpose of this engagement is to limit the travel of the lug 165 of the handle 159 between the upper portion of the body 139 and the head of the stud 167. The travel of the handle 159 is thus limited between predetermined positions.

Referring now again to the ball check valve 153 it may be noted that the ball is normally held up to a seat by means of a spring pressed reaction member 169. The member 169 comprises an upward crater-like tip 171 which supports the ball 153 in its mouth. A lateral slot 173 is cut across said crater-like portion 171 and a vertical passage 175 leads down from the crater of the tip 171 and the said slot 173. The member 169 is guided in the bore 141 and is held upwardly against the ball 153 by means of the spring 177. The spring 177 reacts at its lower end against a bored plug 179 which is screwed into the passage 141. It is evident that if grease or the like under pressure, passes upwardly through the passage 175, having come through the bored plug 179, that it will tend to seat the ball valve 153. The spring 177 assists this action. By this means the handle 159 is held in its Fig. 7 position with the lug 165 preferably at or against the head of the stud 167. If it is desired to open the check valve 153, the handle 159 may be depressed, whereupon the nose 151 of the cooperating plunger 143 unseats the ball valve 153. Hence, grease may flow through the passage 175, slotted portion 173 and around the ball valve 153 to empty itself into the passage 149 by movement through the opening 157 around the said nose 151. Release of the handle again permits the ball valve 153 to seat under incoming pressure of the fluid and pressure of the spring 177.

The lower end of the body 139 is closed by means of a bored and tapped tip or cap 181. The bore of this tip 181 is provided with a check valve 183 which is adapted to open under influence of incoming pressure but to close under outgoing pressure. The valve 183 is normally held to a seat by means of a spring 185 reacting thereon. The gasket 187 held fast to the valve body provides a tight seat on the enclosure 181. The valve body 183 is provided with a downwardly extending nose 189 for purposes hereinafter to be described. It should be noted that the spring 185 reacts against the plug 179 as was the case with the case of the spring 177.

Screwed sidewardly into the intersecting passage 149 is a pressure-varying cylinder 191. This cylinder 191 is provided with a bore 193 and a rearward threaded cap 195. The cap 195 is provided with a cooperating threaded plunger rod 197 which carries an

operating handle 199 at the outer end thereof. The inner end of the rod 197 is provided with a fluid tight piston 201 which slidably cooperates with the rearward wall 203 of the bore 193.

The outlet end of the passage 149 is threaded to receive the threaded end of a flexible tube assembly 205 (Fig. 8). The assembly 205 is provided with a bayonet slotted head 207 such as is ordinarily used for connecting tube assemblies of this type to oiling tips screwed into the devices to be greased. The ordinary operation for greasing comprises pushing the head 207 down over its tip and the lug thereon, and then twisting it, whereat, if pressure is built up in the assembly 205, then it is almost impossible to remove the head 207 (under ordinary conditions) until said pressure is relieved. This is because of the bayonet connection at the head 207. With the ordinary grease guns it is difficult to release this pressure if a clogged bearing is encountered. These devices work on the principle that if pressure is built up in the assembly 205 that a clogged bearing will be forced to clear itself, but it so happens that pressures cannot be always built up to an extent great enough to clear some clogged bearings. As will be seen, the present device is readily removed in view of the contingency stated.

It is to be understood that the type of assembly illustrated at numeral 205 is not the only one that may be applied to the gun. For instance the modified nozzle assembly 209 (Fig. 9) may be used, which comprises a pipe to which a ported nozzle 211 is screwed. The port of this nozzle 211 is adapted to be pressed against an oiling tip by main force from the gun itself. By this means grease may be fed to the port opening in the opening of the oiling tip. The illustrated assemblies 205 and 209 are ones that are now ordinarily used in greasing practice. They illustrate two of the various systems now in use or those which might be put into use.

Fig. 8 illustrates the engine and pump assembly connected to the grease gun G by means of a line L leading from the outlet of the pump to the inlet tip 181 of said gun.

The operation of the assembled device is as follows:

The gun G has for its purpose the closing and opening of the passage of grease through the line L, whereby pumping by the engine E is prevented, or permitted to take place, as desired. If the line L is positively closed at the gun G, the air engine ceases to operate because grease cannot be ejected with the normal air pressure available. If the line is opened grease can pass and the air engine automatically goes into operation and continues operation until the line is again closed. The above described starting and

stopping events can be initiated at any stage of the cyclic action of the engine E. This is evident from the engine structure.

Referring now more particularly to the gun G it may be noted that the pressure-varying body 191 may be gripped by the operator's hand which also encircles the handle 159. By merely gripping the said handle 159 against the portion 191 the plunger 143 is depressed to open the ball check valve 153. Hence, grease flow from the line L in through the tip 181, opening the valve 183, passing through the open check valve system, to the passage 149, out through the assembly 205 or the like and to the bearing to be greased, if the head 207 or the like is properly connected. The nose 189 on the valve 183 permits a more or less stream-line action of the grease past said valve. Furthermore, when the valve 183 reseats, then the nose 189 acts to pierce the grease behind the valve whereby the valve may better seat with less back pressure required, that is the valve is more sensitive.

After a bearing has been sufficiently greased, the grip on the handle 159 is released whereupon the ball check valve 153 closes under action of the spring 177 and the pressure there-behind. If the bearing was not clogged, then the pressure in the assembly 205 and the portion 191 of the gun G automatically decreases after closure of the valve 153. This permits ready removal of the head 207. The pressure on both sides of the valve 183 is equalized and said valve comes to a seat under action of a spring 185.

If, after closure of the valve 153 from the handle 159, it should be discovered that the head 207 could not be removed from its tip because of a clogged bearing not permitting release of pressure, then the handle 199 might be screwed down to move the piston 201 into the bore 203. Hence the pressure in the cylinder 191 and line 205 connected therewith might be brought up to an enormous value. This pressure might be brought high enough to force out the obstruction in the bearing to be greased. In other words, the portion 191 would act as a pressure booster to clear the bearing. This action would unseat the ball 153 but the check valve 183 would prevent passage of pressure back into the line L. The pressure may be boosted enormously because of the mechanical advantage due to leverage at the handle 199 and the screw 197, as well as the fact that the piston 201 has a relatively small area.

If after the above boosting operation had been completed, it would be found that the enormously increased pressure were not enough to clear the bearing, (it usually would), then the handle 199 could be unscrewed or backed off. This would cause the pressure to again decrease. The pressure could be decreased to a point to or far below

that which obtained in the line 205 or the like, due to the operation of the pump connected therewith by means of line L or the like. Hence, the head 207 could readily be removed from its greasing tip. It is evident that if the pressure in the portion 191 were decreased below that of the line L, that the check valve 153 would seat thereby preventing pressure from again building up by passage from said line L.

It is evident from the above that the device herein described provides a grease gun which is ready at any and all times for immediate operation, merely by gripping the handle 159 against the portion 191. Furthermore, means is provided for decreasing the pressure therein below that of the inlet line pressure. Hence, in all cases the operator is in a position to readily remove an oiling head from its tip. He also has at his immediate disposal means for at least attempting to clear a bearing.

In view of the above, it is believed that the various features of this invention will be clear without further elaboration, and it will be seen that with the apparatus herein described, the several objects of the invention are attained and other advantageous results attained.

As many changes could be made in carrying out the above construction without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A grease gun comprising a body, an inlet therefor and an outlet, a check valve at the inlet and an inverted check valve in series therewith and therebehind with respect to the direction of grease flow, a plunger for opening the second valve operable from a handle linkage cooperating with the body, and means communicating with the passage between said second valve and the outlet for increasing and decreasing pressure at said outlet independently of the inlet pressure and independently of movement by said handle linkage comprising an independent pressure controlling mechanism adapted not to reverse under reaction of forces engendered thereby when manual pressure is not maintained to hold it in position.

2. A grease gun comprising a body, an inlet therefor and an outlet, a check valve at the inlet and an inverted check valve longitudinally aligned therewith and therebehind with respect to the direction of grease flow, a plunger for opening the second valve longitudinally aligned with both of said valves and passing from the body, a handle linked to said body and adapted to cooperate with the plunger to move it, means for

adjusting the handle with respect to the plunger, and means communicating with the passage between said second valve and the outlet for increasing and decreasing pressure at said outlet comprising a pressure controlling mechanism.

3. A grease gun comprising a body, an inlet therefor and an outlet, a check valve at the inlet and an inverted check valve longitudinally aligned therewith and therebehind with respect to the direction of grease flow, a plunger for opening the second valve longitudinally aligned with both of said valves and passing from the body, a handle linked to said body and adapted to cooperate with the plunger to move it, and means communicating with the passage between said second valve and the outlet for increasing and decreasing pressure at said outlet comprising a pressure controlling mechanism positioned adjacent said handle whereby when said mechanism is gripped with said handle the gun is made to normally function.

4. A grease gun comprising a body, an inlet therefor, an outlet, an automatically closing check valve at the inlet and an automatically closing inverted check valve in series therewith and therebehind with re-

spect to the direction of grease flow, said inverted check valve being longitudinally aligned with the first named check valve, a plunger for opening the second valve, said plunger being longitudinally aligned with both of said valves and passing from the body, a handle linked to said body, adjustable means for causing the handle to open the inverted check valve upon movement of the handle, and means communicating with the passage between said second valve and the outlet for increasing and decreasing pressure at said outlet independently of inlet pressure, comprising a cylinder having a plunger therein, means for operating the plunger adapted not to reverse under reaction of forces engendered thereby, said cylinder being juxtapositioned with respect to the handle in a manner whereby said cylinder and handle may be gripped with one hand to cause opening of said inverted check valve, and said plunger operating means operated with the other hand.

In testimony whereof, I have signed my name to this specification this 8th day of March, 1926.

FRANK S. BARKS.