Feb. 24, 1931. H. KREIDEL 1,793,492

LUBRICATING GUN

Original Filed June 13, 1927

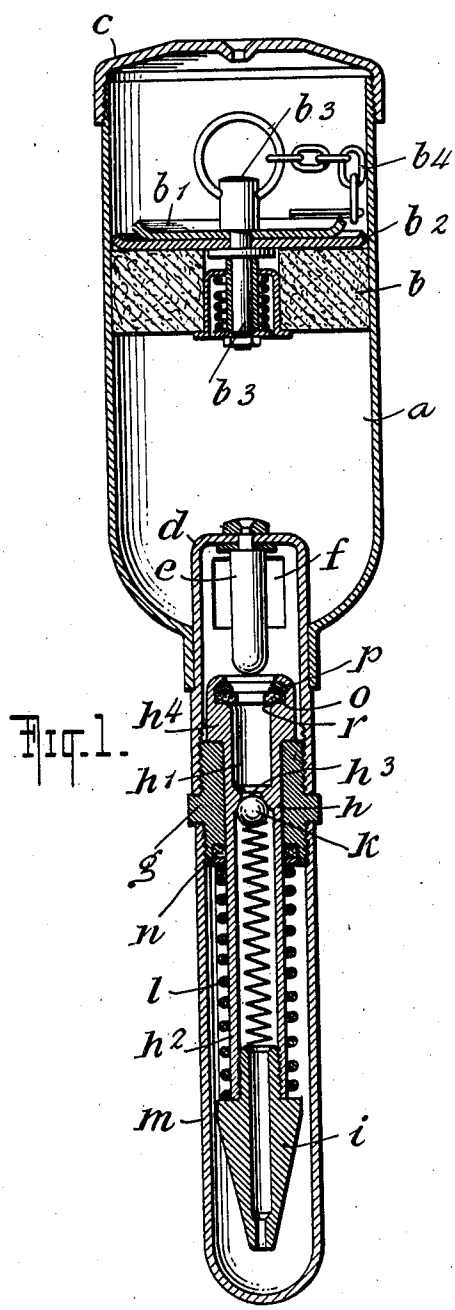


Fig. 1.

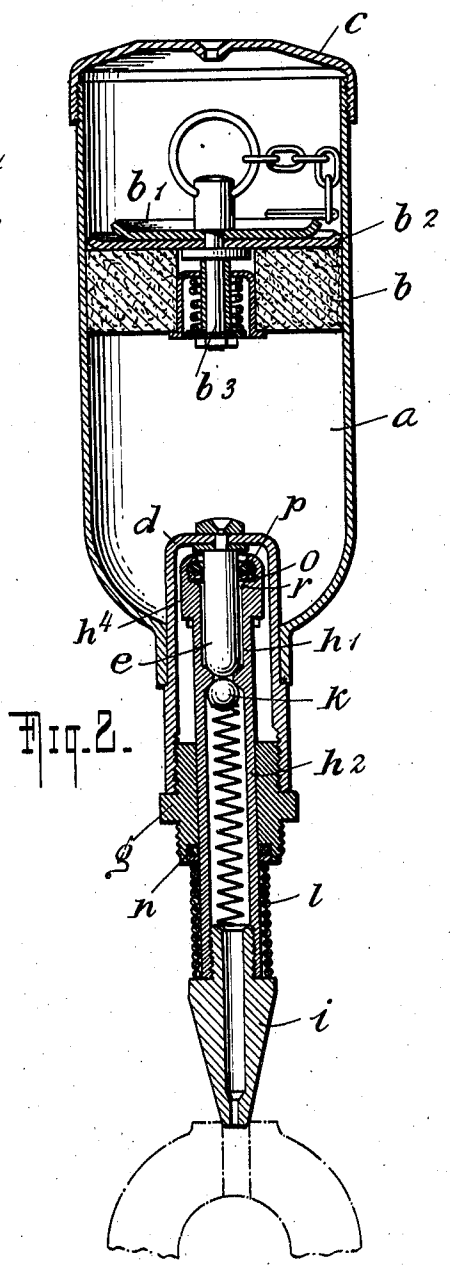


Fig. 2.

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LUBRICATING GUN

Original application filed June 13, 1927, Serial No. 198,395, and in Germany April 13, 1927. Divided and this application filed December 28, 1927. Serial No. 243,176.

My invention relates to devices or so-called "guns" for discharging liquid or semi-solid consistent lubricants, such as oil or grease, and is particularly intended for use in lubricating guns operating under high pressures. The object of my present invention is to improve the tightness of the joints between the working cylinder and its guide, and between the plunger and the working cylinder in such a manner that the gun will operate efficiently in all positions and with various kinds of lubricants, even if the maximum pressure is employed.

The subject-matter of my present application is also disclosed in my earlier application Serial No. 198,395 filed in the United States Patent Office on June 13, 1927, my present application being a division of said earlier case.

Reference is to be had to the accompanying drawings, which illustrate, as an example, a satisfactory and preferred form of my invention, Fig. 1 showing the gun in longitudinal section, in its inactive position; Fig. 2 is a similar view with the gun in the position of use, and the plunger in its lowermost position.

The lubricant container a is shown as provided with a main piston b and a removable cover c provided with a small hole or vent for the admission of air, said cover being removable to give access to the interior of the casing, as for filling the latter with the lubricant. The piston b is illustrated as combined with a dished rigid metal disk b' located on the side of the piston facing the cover c, a disk b^2 of hard leather or other flexible material, of a diameter only slightly larger than the interior diameter of the container, located between the piston b and the metal disk b', and a spring-pressed bolt b^3 slidably mounted in a perforation of the said piston and adapted normally to press the disks b' and b^2 toward the piston b. A chain b^4 or like flexible connection serves to exert a pull on the spring bolt when desired, for moving the piston toward the open end of the container after removal of the cover c. The parts composing the piston b, or associated therewith, that is, the special features of this piston and its adjuncts, are not claimed herein, but are claimed in my earlier application above referred to.

My present application relates particularly to the parts illustrated at the lower portions of Figs. 1 and 2. In the reduced neck of the container a is fitted rigidly a closure member d provided with a cap projecting into said container. The plunger e is secured to the end wall of said cap, and lateral apertures f in said cap establish a communication between the interior of said container and the gun mechanism proper and afford a passage to the lubricant. A sleeve g screwed into the closure member d serves as a guide for the working cylinder h which is adapted to slide axially in relation to the plunger e. The rear or inner portion of the working cylinder forms the pressure chamber proper h'. Said cylinder has a tubular extension h^2 the free end of which is provided with a nozzle i for application to the part to be lubricated. The top of the pressure chamber, as illustrated, is open toward the plunger e, while at the bottom said chamber has an outlet h^3 adapted to be closed by a check valve k arranged in the tubular extension of the working cylinder. The strengthened cylinder head h^4 which projects into the closure member d limits the movement of the working cylinder h in the guiding sleeve g. A spring l, coiled around said working cylinder, bears with its ends against the nozzle i and the sleeve g respectively, and serves to return the working cylinder h to its normal position, Fig. 1. When the gun is not in use, a protecting cap m is fitted over the nozzle end of the gun, said cap being indicated as a screw cap screwed on the sleeve g. For the purpose of providing a tight joint between the working cylinder h and its guide sleeve g, the latter is provided with an elastic packing n which preferably is constantly under the pressure of the return spring l, and for establishing a tight joint between the plunger e and the pressure chamber of the working cylinder, a packing ring o of elastic material, for instance leather, is clamped in the top of the pressure chamber in such a manner that the edge of the circular opening of said ring or

washer will be in tight sliding engagement with the surface of the plunger *e* as the latter moves within said washer during the operation of the gun. The packing ring *o* is held in position by a metal ring *p*, over which the end of the working cylinder is spun. The inner diameter of the pressure chamber *h'* is sufficiently larger than the diameter of the plunger *e* to avoid contact of said plunger with the wall of said pressure chamber, see Fig. 2; in other words, said plunger is in contact only with the packing or washer *o*. Adjacent to the said washer *o*, the pressure chamber *h'* has a short enlarged portion *r* in which collects the lubricant which tends to escape rearwardly whilst the working cylinder is being drawn over the plunger and exerts a high surface pressure upon the free annular edge of said washer *o*, which pressure increases with the working pressure. The resultant compression of the elastic washer *o*, which is held firmly on the outside, forces the inner edge of said washer firmly against the plunger, and the greater the pressure, the more firmly will said washer fit the plunger.

In operation, after removing the cap *m*, the nozzle *i* of the gun is applied to the bearing or other part to be lubricated, as indicated in Fig. 2, and the container *a* is pressed manually toward such part. The spring *l* is thus placed under tension, and the pressure chamber *h'* of the working cylinder *h*, filled with lubricant, moves along the plunger *e*, the check valve *k* opens and allows the lubricant to pass under pressure to the nozzle *i*. As soon as the container reaches the end of its stroke (Fig. 2), together with the plunger *e* moving in unison with said container, the valve *k* will close, it being understood that the nozzle *i*, cylinder *h*, and packing *o*, *p* remain stationary while the parts *a*, *d*, *e*, *g* are moved downwardly in unison. As the manual pressure exerted downwardly on the container *a* is relaxed, the spring *l* will expand and the container *a* and parts attached thereto will rise, the plunger *e* being thus withdrawn from the pressure chamber *h'*, and a vacuum created which, as soon as the plunger comes out of contact with the washer *o*, causes fresh lubricant to be drawn from the container into the pressure chamber *h'*. The atmospheric pressure acting upon the upper surface of the main piston *b* will move the latter inwardly (downwardly) in the container *a* a distance corresponding to the amount of lubricant which has passed into the said pressure chamber.

By reason of the improved construction employed by me for obtaining a tight joint between the working cylinder *h* and its guide sleeve *g*, as also between the pressure chamber *h'* of said cylinder and the plunger *e*, a proper operation of the gun is effectively maintained at all times even when using lubricants of a very heavy consistency. At the moment that the tightly clamped washer *o* comes out of engagement with the upwardly moving plunger *e*, the relatively high vacuum existing in the pressure chamber *h'* is destroyed so suddenly that the lubricant is projected from the container *a* into said chamber *h'* by a sort of recoil action. The further expulsion of the lubricant from said chamber *h'* is ensured by reason of the tight joint between the plunger *e* and the washer *o*, as also owing to the prevention of backward flow, without any loss or impairment of the amount expelled at each operation of the gun, even when the pressure is very high. The invention therefore insures a uniform supply of lubricant to the bearing or other part.

By reason of the particular construction briefly described above, and more fully set forth (as well as claimed) in my earlier application above referred to, the main piston *b* can be moved upwardly away from the cap or closure *d*) very readily after each stroke or operation of the gun, whilst entirely excluding air and at the same time preventing the passage of the lubricant to the nozzle *i* which has been removed from the part to be lubricated, or during movement in the opposite direction, if the device should be used with the nozzle pointing upwardly, and the container, therefore, at the bottom, since as explained in my earlier application, in such case the weight of the lubricant resting on the main piston *b* will cause the edge of the flexible disk b^2 to be pressed firmly and tightly against the inner surface of the container *a*.

Various modifications may be made without departing from the nature of my invention as set forth in the appended claims.

I claim as my invention:

1. In a lubricant gun, or the like, a cylinder provided with a nozzle, a pressure chamber, and an elastic, compressible diaphragm type washer retained at the inlet end of said chamber and having an opening therein coaxial with the bore of said chamber, in combination with a container movable lengthwise of said cylinder and adapted to communicate with said pressure chamber, and a plunger movable in unison with said container and adapted to come into and out of contact with said washer at the opening thereof to control the admission of lubricant thereto, said plunger being of sufficiently smaller diameter than the pressure chamber to be clear of contact with the walls of said chamber but in contact with the elastic diaphragm washer, thereby to accumulate lubricant behind said washer and compress it to closely fit said plunger.

2. In a device of the class described, a tubular member provided with a nozzle, a

pressure chamber the outlet of which leads to said nozzle, and an elastic, lubricant compressible washer at the inlet portion of said chamber of sufficient diameter to extend beyond the walls of said chamber, in combination with a container movable lengthwise of said tubular member and adapted to communicate with said pressure chamber, a plunger engaged by said elastic washer but of smaller diameter than the pressure chamber, said plunger being movable in said pressure chamber through said washer and connected with said container, a sleeve connected with said container and arranged to engage the tubular member toward the nozzle portion thereof, and an elastic packing in engagement with said tubular member and said sleeve.

3. In a device of the class described, a tubular member provided with a nozzle, a pressure chamber the outlet of which leads to said nozzle, and an elastic, lubricant compressible washer at the inlet portion of said chamber, the latter being provided, on the side adjacent to the washer, with an enlargement in the form of a funnel-shaped recess flaring toward the under surface of said washer said washer projecting over the recess after the fashion of a diaphragm, in combination with a container movable lengthwise of said tubular member and adapted to communicate with said chamber, and a plunger movable in said chamber through said washer and connected with said container to move in unison therewith.

In testimony whereof I have signed this specification.

HANS KREIDEL.