Feb. 18, 1941. R. J. GRAY 2,232,522

LUBRICANT DISPENSING DEVICE

Filed March 27, 1939 2 Sheets-Sheet 1

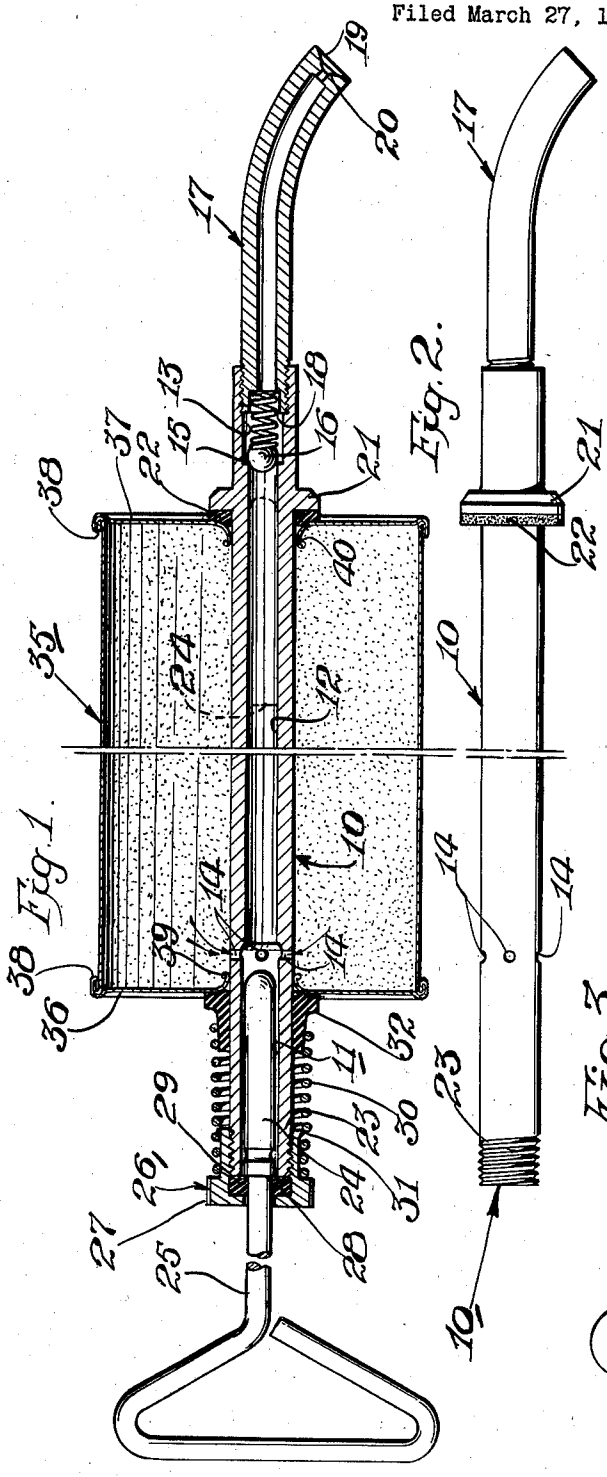


Fig. 1.

Fig. 2.

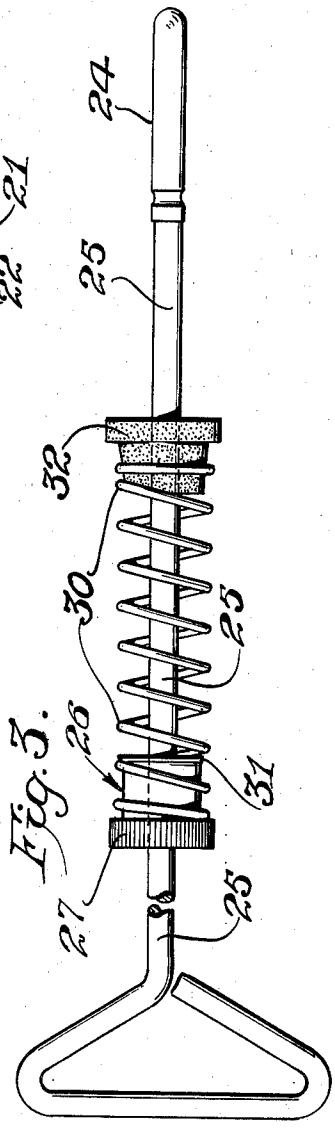


Fig. 3.

INVENTOR
Russell J. Gray
BY
Leonard L. Kalish
ATTORNEY

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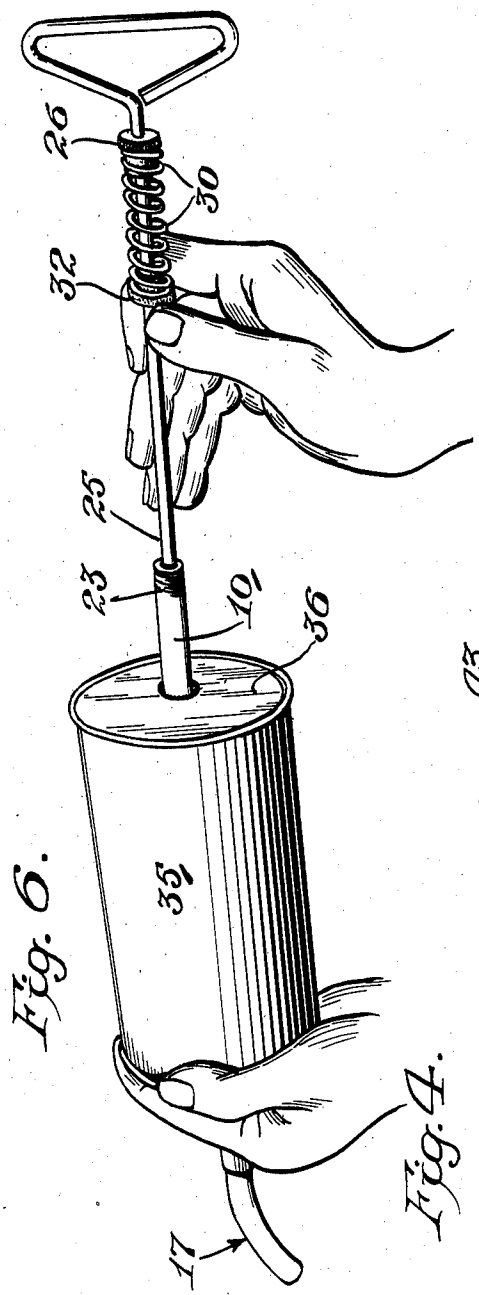


Fig. 6.

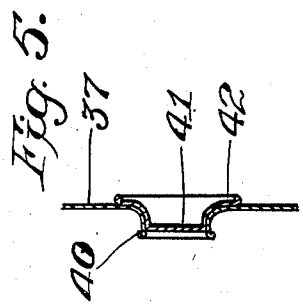


Fig. 5.

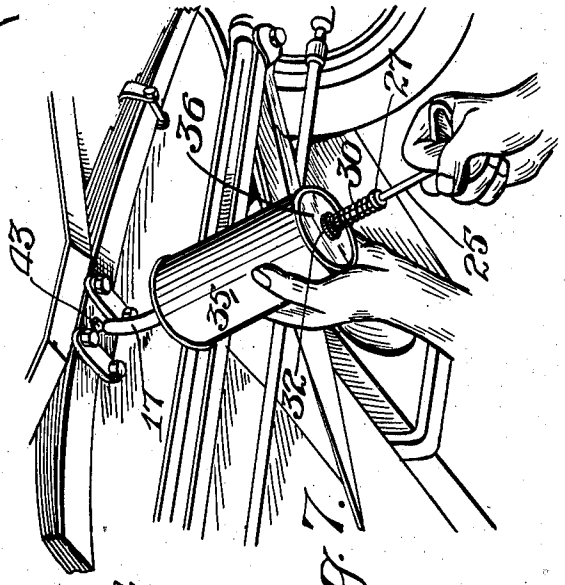


Fig. 7.

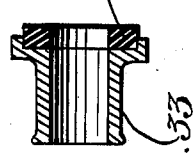


Fig. 4.

INVENTOR.
Russell J. Gray
BY Leonard L. Kalish
ATTORNEY.

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UNITED STATES PATENT OFFICE

2,232,522

LUBRICANT DISPENSING DEVICE

Russell J. Gray, Meadville, Minn.

Application March 27, 1939, Serial No. 264,333

2 Claims. (Cl. 221—47.4)

The present invention relates to lubricant dispensing devices, and it relates more particularly to a compact and handy dispensing device adapted to dispense lubricant of generally low viscosity to overhead lubricant-receiving nipples or fittings on automobiles and other machinery.

One of the objects of the present invention is to provide an improved and efficient lubricant-dispensing device whose component parts may be quickly and easily operatively assembled in fluid-tight relation, and which is adapted to dispense lubricant of generally low viscosity to overhead lubricant-receiving receptacles without waste.

Other objects will appear more fully from the following detailed description, accompanying drawings, and appended claims.

For the purpose of illustrating the invention, there is shown in the accompanying drawings forms thereof which are at present preferred, since the same have been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized and that the invention is not limited to the precise arrangement and organization of the instrumentalities as herein shown and described.

Referring to the drawings, wherein like reference characters indicate like parts—

Figure 1 represents a fragmentary longitudinal sectional view taken through an operatively assembled lubricant dispensing device constituting one embodiment of the present invention.

Figure 2 represents a fragmentary elevational view of the tubular barrel portion of the device illustrated in Figure 1 as the same appears when disassociated from the rest of the device.

Figure 3 represents a fragmentary elevational view of the reciprocable plunger portion of the device illustrated in Figure 1 as the same appears when disassociated from the rest of the device.

Figure 4 represents a longitudinal sectional view taken through a modified thrust-transmitting member, which may be associated with the forward end of the compression spring shown in Figures 1 and 3 in lieu of the resilient member there shown.

Figure 5 represents a fragmentary sectional view taken through an end wall of the lubricant reservoir portion of the dispensing device, and shows how the same may be sealed prior to use as an integral part of the assembled lubricant dispensing device.

Figure 6 represents a perspective view showing the manner in which the component parts of the lubricant dispensing device may be readily operatively assembled for use.

Figure 7 represents a perspective view illustrating the preferred manner in which the lubricant dispensing device may be operated to supply lubricant to an overhead receptacle.

The lubricant-dispensing device illustrated in the accompanying drawings preferably includes a tubular barrel portion 10 having three communicating passageways 11, 12 and 13 therethrough; passageway 11 constituting a piston retraction chamber, the somewhat smaller-diametered communicating passageway 12 constituting a cylindrical chamber within which a piston or plunger is adapted to reciprocate, and communicating passageway 13 constituting a chamber for housing a check-valve at the discharge end of the cylinder 12.

A plurality of inlet ports 14, 14, preferably communicate with the intake end of the cylindrical chamber 12, and are preferably so situated along the barrel 10 as to lie within the body of the lubricant reservoir in proximity to an end wall thereof, and specifically the end wall which is lowermost when the device is operatively held as illustrated in Figure 7.

The circular edge of an annular shoulder 15 provided at the juncture of the differently-sized passageways 12 and 13 acts as a valve seat for a spring-pressed ball-check-valve 16 disposed within the slightly enlarged end passageway 13.

A curved push-on nozzle 17, is preferably secured to the forward or discharge end of the barrel 10. The term "push-on" nozzle is intended to comprehend all lubricant-delivery nozzles which are adapted to establish a seal against a lubricant-receiving fitting or nipple when thrust and held more or less axially thereagainst, and includes not only the non-interlocking type of nozzle illustrated in Figure 1, but also the chuck-type interlocking nozzles or couplers as for instance those shown in Patents Nos. 2,016,809; 2,056,249; and 2,061,062.

The inwardly projecting end portion 18 of the nozzle 17 may act as an abutment for the valve spring of the check-valve 16. The discharge end of the illustrated nozzle 17 is provided with a frusto-conical guide surface 19 which serves to guide the adjacent concavely spherical sealing surface 20 into sealing contact with the end of the particular lubricant-receiving fitting or nipple selected for servicing.

An external annular flange or shoulder 21 may

be provided on the outside of the barrel 10 near its forward or discharge end, to serve as a stop limiting the extent to which the barrel may be thrust longitudinally through the lubricant reservoir. In the preferred embodiment, the shoulder 21 is faced with a sealing member 22, formed of any suitable oil-resistant material, such as "Thiokol," "Duprene," "Neoprene" or other synthetic rubber-like compounds.

The opposite or retracting-chamber end 23 of the barrel 10 may be externally threaded for engagement with a knurled nut 26 for a purpose which will presently appear.

The illustrated embodiment of the present invention further includes a piston 24 proportioned to slide snugly within the cylindrical passageway 12, said piston being provided with a rearwardly extending reciprocable piston-rod 25. The leading end of piston 24 is preferably rounded or tapered, as is the entrance into the cylindrical passageway 12, in order that the piston will be guided into said passageway 12 on its forward stroke.

Resilient means are preferably slidably mounted on the reciprocable piston-rod 25 for operatively urging the lubricant reservoir up against the barrel stop shoulder 21. Such means may include the spaced spring-abutment members 26 and 32 which, when the dispensing device is operatively assembled, are constantly urged apart by the coiled compression spring 30. The spring-abutment member 26 is preferably internally threaded for screw-threaded engagement with the projecting barrel end 23, and is provided with a knurled or milled periphery as at 27 to facilitate the manipulation thereof. A packing ring 28 which may be formed of any suitable oil-resistant material, is preferably disposed inside said spring-abutment member 26, and is adapted, when axially compressed between the barrel end 23 and said member 26, to seal against the reciprocable piston rod 25, thereby sealing the end of the piston-retraction chamber 11. If desired, a protective metal washer 29 may be placed against the face of the packing 28.

If desired, the end of the knurled nut 26 may be flared outwardly as at 31, to prevent separation of said nut from its associated compression spring 30.

The opposite spring-abutment member 32, which serves to transmit the thrust of the compression spring to the lubricant reservoir, preferably also seals the adjacent opening in the reservoir end wall. This member 32 may be entirely constructed from any suitable oil-resistant and resilient material, such as synthetic rubber or the like. If desired, this member 32 may be replaced with a metallic sleeve 33 faced with a sealing chamber 34, all as illustrated in Figure 4. In either case, however, a fluid-tight seal will be established between the barrel 10 and the lowermost end wall of the lubricant reservoir, just as the sealing member 22 establishes a like seal between said barrel and the opposite reservoir end wall.

The lubricant-dispensing device forming the subject matter of the present invention further includes a thin sheet-metal lubricant reservoir 35, preferably cylindrical in form, which is adapted longitudinally to receive the barrel 10. The particular reservoir 35 illustrated in the accompanying drawings includes a cylindrical body portion having circular end walls 36 and 37 secured to opposite ends thereof in any suitable fashion, as for instance by means of the overlapped peripheral beads 38, 38 illustrated in Figure 1. If desired, these end walls may be strengthened by providing circular corrugations or indentations therein.

End walls 36 and 37 are each preferably provided with central openings defined by the inturned annular flanges 39 and 40, respectively. These end openings may be sealed, prior to use, by means of two outwardly removable closure caps frictionally retained within said openings. Thus, as illustrated in Figure 5, these end openings may each be closed by means of a hat-shaped closure cap 41, preferably so proportioned as to follow closely the contour of the inturned flange portions 39 or 40. The closure cap 41 is preferably provided with an outer lip or brim 42 to facilitate its removal from the end opening. Thus, a screw driver or any other suitable implement may be inserted between the closure cap lip 42 and the juxtaposed end wall 37 or 38 and twisted to pry out the closure cap 41. If desired, however, these caps 42 may be omitted, and the end openings sealed by frangible metal discs, or by discs soldered onto the end panels and provided with pull-tabs for removal therefrom, or by any other suitable means, or suitable openings may be punched out of originally imperforate end walls.

The hereinabove described lubricant-dispensing device may be operatively assembled in the following manner. Closure cap 41 in forward reservoir end wall 37 is pried out, and the barrel portion 10 inserted through the opening provided thereby. The aligned closure cap in the opposite end wall 36 is then pried out, and the barrel then further projected longitudinally through the body of the reservoir until the screw-threaded end 23 thereof extends beyond the opening in end wall 36. The gasketed annular stop 21 limits the extent to which the barrel portion may be projected through the reservoir.

The piston portion shown in Figure 3 is then seized, and piston 24 is slid into the bore of the barrel portion 10, as illustrated in Figure 6. The piston-rod 25 is then advanced, pushing piston 24 into the cylindrical passageway 12. Spring-abutment member 26 is then slid along the rod 25 towards the reservoir end wall 36, causing the resilient spring abutment sleeve 32 to slide along the outer surface of the projecting barrel portion 23 and to contact said end wall 36. The milled spring-abutment member 26 is then further advanced, compressing the spring 30, and is then screw-threadedly engaged with the barrel end 23, thus compressing packing 28 and establishing a seal around the reciprocable piston rod 25.

Compression spring 30, acting through the thrust-transmitting abutment-member 32, pushes the lubricant reservoir 35 up against the annular stop 21, and more particularly against the sealing portion 22 thereof. Furthermore, by virtue of the expansive force exerted by the compression spring 30, the sealing members 32 and 22 are urged towards each other and into intimate contact with their respective reservoir end walls, thereby establishing and maintaining seals around the reservoir end wall openings through the barrel 10 projects.

The low viscosity lubricant within the reservoir of the lubricating device may be dispensed to an overhead receptacle by merely seizing the body of reservoir 35 in one hand and reciprocating the piston rod 25 with the other hand, all as illustrated in Figure 7. The piston 24 on its for-

ward stroke creates a pressure which hydraulically unseats check valve **16**, causing the lubricant in cylindrical passageway **12** to flow past said valve, and be expelled through the push-on nozzle **17** into the particular fitting against which said nozzle is thrust, as for instance the fitting **43** indicated in Figure 7. At the end of the forward stroke, the check valve **16** seats itself, and return movement of piston **24** creates a suction in passageway **12** which, when the piston **24** is retracted from the chamber **12** and positioned within the retraction chamber **11**, causes the lubricant to flow into passageway **12** through the inlet openings **14, 14**. This lubricant flow is aided by the vertical position of the lubricant dispensing device, which causes the lubricant to collect around the inlet ports **14, 14**.

The piston **24** is then again advanced, and the hereinabove described cycle of operation is repeated until the desired amount of lubricant has been dispensed.

One of the desirable features of the hereinabove described lubricant-dispensing device resides in the fact that the seals around the openings in the reservoir end walls are left intact when the device is operated, and are furthermore not weakened nor broken even though one of the operator's hands grasps the reservoir portion of the device while his other hand reciprocates the piston rod. During the forward stroke of the piston **24**, the thrust is transmitted axially along the barrel **10** and push-on nozzle **17** directly to the lubricant nipple or fitting **43**. Accordingly, the seals established by the sealing members **32** and **22** against their respective end-walls are operatively maintained intact. The force exerted by the compression spring **30** is preferably sufficient to prevent any unintended downward or rearward movement of the reservoir portion **35** along the barrel portion **10** during the forward stroke of the piston. On the return stroke of piston **24**, a manual forward thrust is exerted on the body of the lubricant reservoir **35**, serving to increase the effectiveness of the seal around the opening in the forward end wall, and the seal around the opening in the rear end wall is maintained intact by the pressure of spring **30**.

Another feature of the present invention resides in the fact that the piston stroke is approximately confined or limited to the spacing between the reservoir end walls **36** and **37**, and takes place substantially wholly within the body of the lubricant reservoir. By thus confining the piston stroke, the axial dimension of the lubricant-dispensing device is reduced to a minimum, and encumbering projecting portions are avoided, thereby providing a handy and compact device.

Although the hereinabove lubricant-dispensing device is intended for use in dispensing lubricant of generally low viscosity, such as lubricating oils and the like, it may readily be adapted to dispense lubricants of generally higher viscosity such as grease and the like. This adaptation might consist in providing a lubricant follower axially slidable through the body of the lubricant reservoir **35**. Such follower would preferably be provided with a central opening in alignment with the openings in the reservoir end walls, and would slide along the barrel portion **10** of the lubricant dispensing device. In use, the lubricant follower would compact the body of the lubricant and would insure a full discharge of the contents of the reservoir.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiments be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

Having thus described the invention, what is hereby claimed as new and desired to be secured by Letters Patent is:

1. A lubricant-dispensing device for dispensing low viscosity lubricant to overhead receptacles comprising a relatively thin sheet-metal lubricant reservoir having fixed non-slidable sheet-metal end walls, a tubular pump housing extending therethrough, said housing including a high-pressure cylinder generally co-extensive in length with said reservoir, a spring-pressed check-valve and a push-on nozzle at the forward discharge end of said high-pressure cylinder, inlet openings associated with the opposite rear end of said cylinder, said inlet openings being disposed inside the body of said lubricant reservoir and in proximity to the rearmost end wall thereof, a piston-retraction chamber at the rear end of said high-pressure cylinder and in axial alignment therewith and of an external diameter greater than that of said high-pressure cylinder, said retraction chamber extending exteriorly of said reservoir, a reciprocable high-pressure piston in axial alignment with said high-pressure cylinder and retractable into said piston-retraction chamber, a reciprocable piston-rod of smaller diameter than said piston extending from the rear end thereof exteriorly of said pump housing and in axial alignment with said high-pressure cylinder, a handle associated with said piston-rod for manual operation, and means establishing a fluid-tight seal between said reciprocable piston-rod and said pump housing.

2. A lubricant-dispensing device adapted to dispense lubricant of low viscosity to overhead receptacles comprising a rigid tubular pump housing including a high-pressure cylinder having a spring-pressed check valve and a push-on nozzle at the forward discharge end thereof, a relatively thin sheet metal lubricant reservoir having fixed non-slidable sheet metal end walls provided with aligned openings, said tubular pump housing extending through the body of said lubricant reservoir and projecting through said aligned openings, the projecting rear end portion of said pump housing bearing a piston-retraction chamber communicating with the rear end of said high-pressure cylinder and in alignment therewith, an inlet opening in the wall of said pump housing communicating with the rear end of said high-pressure cylinder and disposed within the body of said lubricant reservoir in proximity to that reservoir end wall which is lowermost when the lubricant-dispensing device is positioned for dispensing lubricant to an overhead receptacle, a high-pressure piston slidably disposed in said high-pressure cylinder and retractable into said piston-retraction chamber at the end of its return stroke, a piston rod of smaller diameter than said piston extending from the rear end thereof exteriorly of said pump housing, and means establishing a fluid tight seal between said piston rod and the rear end of said pump housing.

RUSSELL J. GRAY.