July 12, 1938. H. R. TEAR ET AL 2,123,755

DISPENSER

Filed March 3, 1937 2 Sheets-Sheet 1

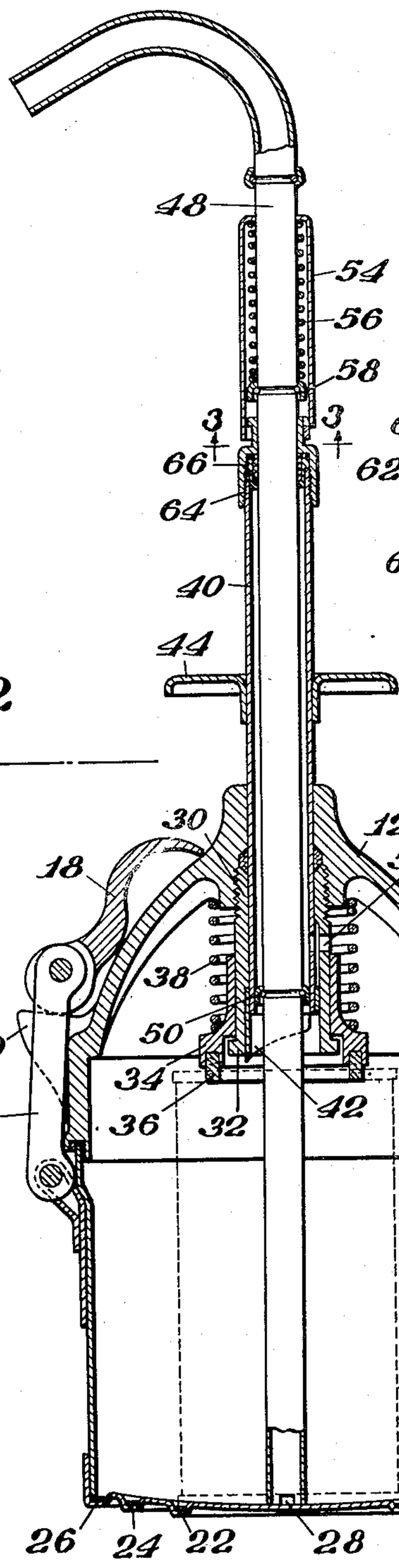

Fig. 1

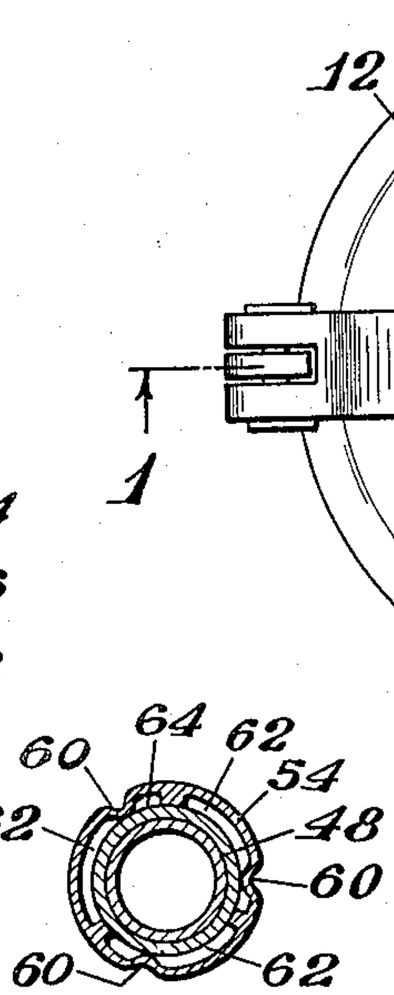

Fig. 3

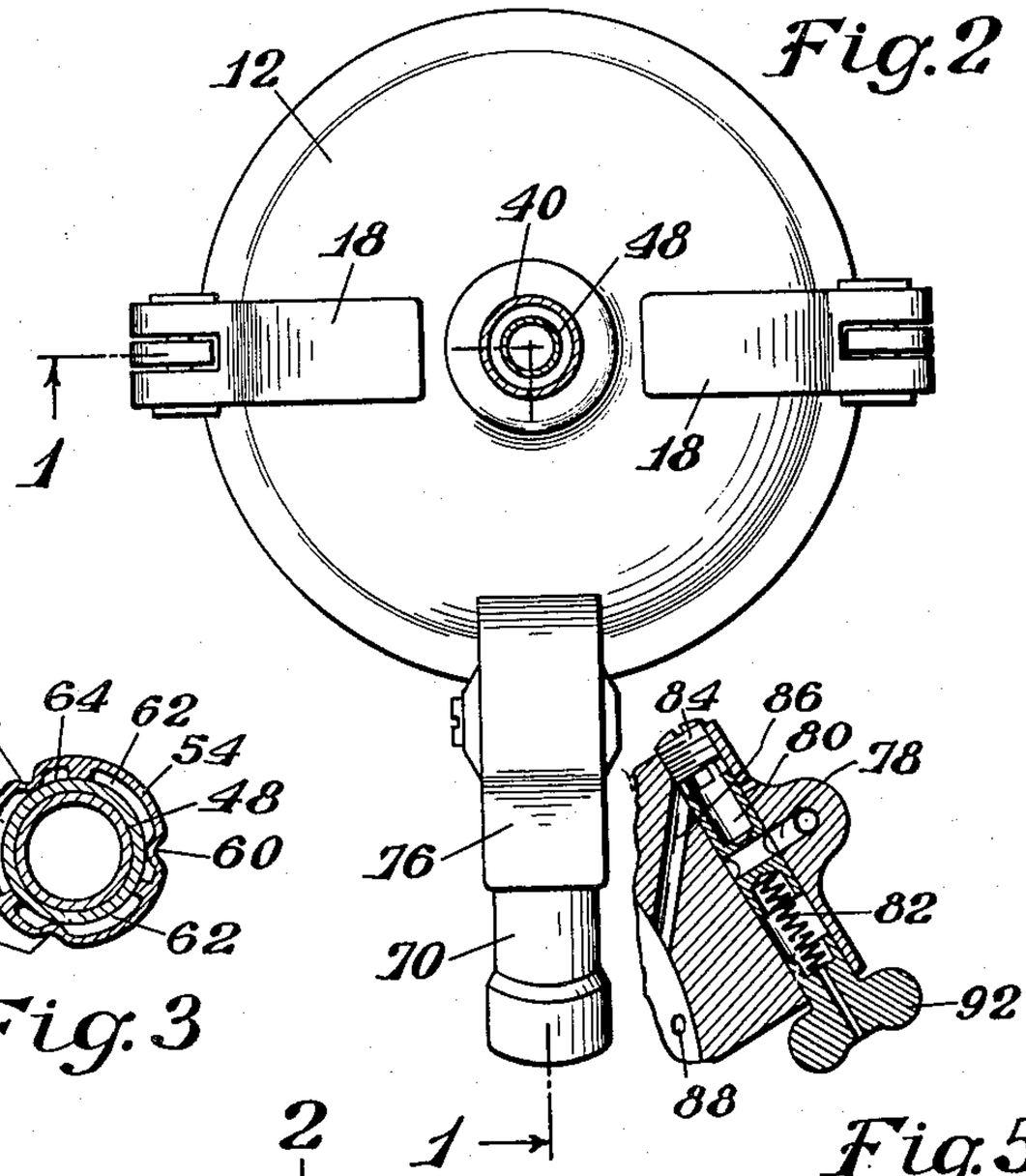

Fig. 2

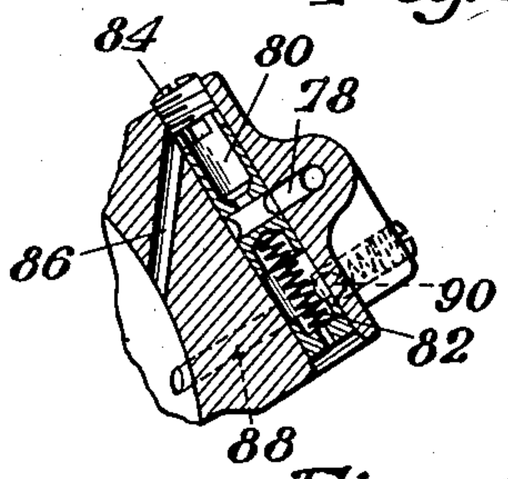

Fig. 4

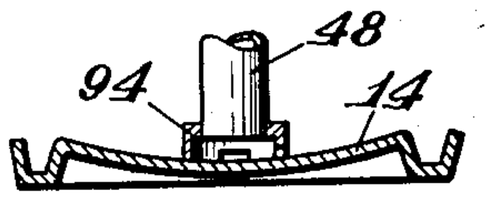

Fig. 6

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DISPENSER

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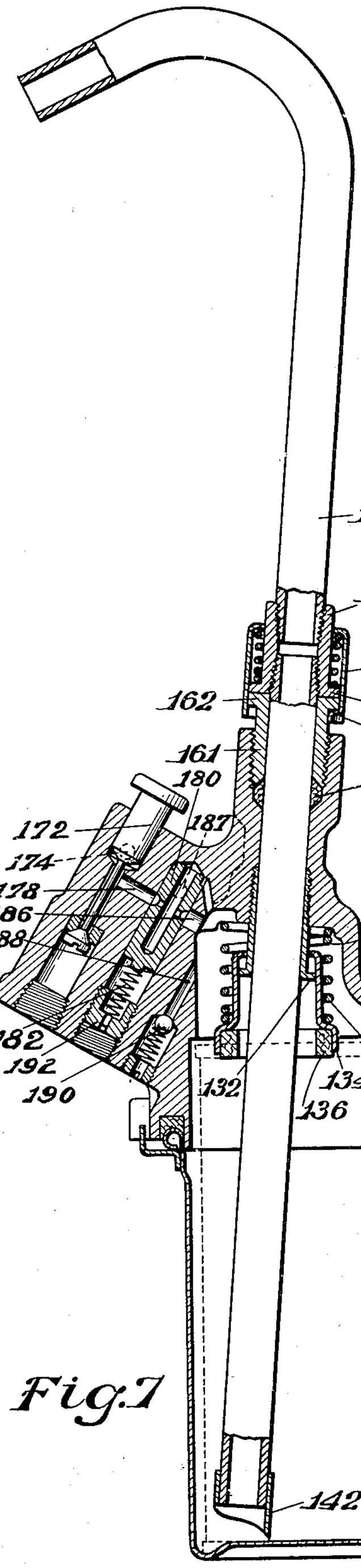

Fig. 7

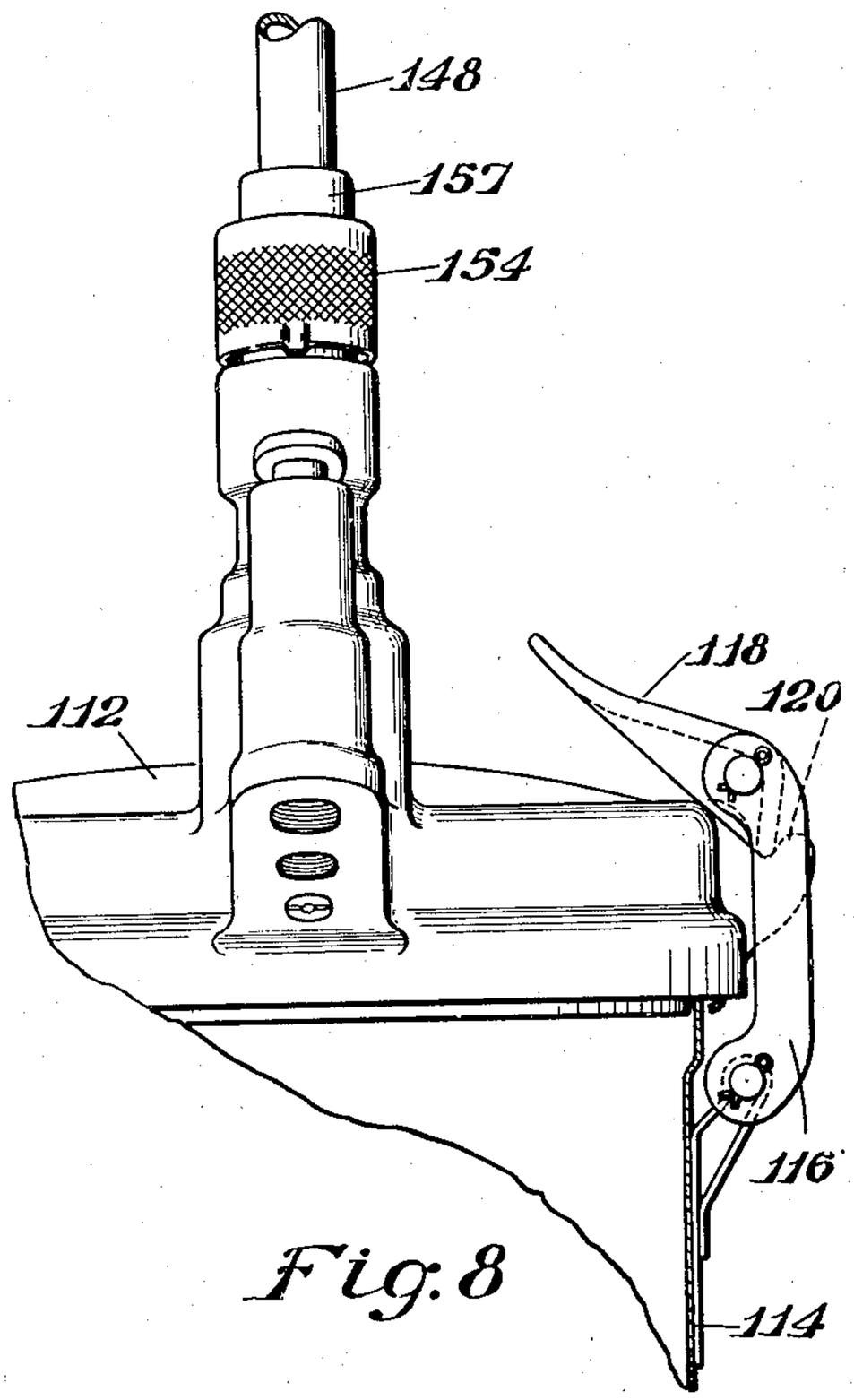

Fig. 8

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UNITED STATES PATENT OFFICE

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DISPENSER

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Application March 3, 1937, Serial No. 128,724

29 Claims. (Cl. 221—47)

This invention relates to dispensers, and is illustrated as embodied in a device for dispensing under low pressure lubricants for differentials, transmissions, and the like.

An object of the invention is to provide a simple and easily-operated device for dispensing the contents of an original-package container, such as a sealed "tin" can containing lubricant. Various features of the invention have this object in view, and relate to the construction and arrangement of means for forming an opening in the container, and for introducing through the opening so formed a discharge tube through which the contents of the container are dispensed under low pressure. It is desirable that the container be held in a housing, so that the fluid pressure in the housing can be equalized on the interior and exterior of the container.

We prefer to arrange the opening-forming means for operation from the exterior of the dispenser, and show it in the illustrative embodiments in the form of a tubular plunger surrounding the discharge tube and having an annular cutter at its lower end and in the form of a similar cutter carried by the discharge tube itself.

Important auxiliary features of the invention relate to arranging a spring or the like to hold the discharge tube at the bottom of the container, to an arrangement providing a seal against the container around the discharge opening, to a construction which causes the fluid pressure to dish downwardly the bottom of the container to insure that it is completely emptied, and to the arrangement in the pressure-supplying connections of pressure-relief and safety valves.

Another important object of the invention relates to constructing the container to take containers of various sizes, without particular adjustment therefor.

The above and other objects and features of the invention, including various novel combinations of parts and desirable particular constructions, will be apparent from the following description of the illustrative embodiment shown in the accompanying drawings, in which:

Figure 1 is a vertical section through a dispenser embodying the invention on the line 1—1 of Figure 2;

Figure 2 is a horizontal section there-through on the line 2—2 of Figure 1;

Figure 3 is a horizontal section there-through on the line 3—3 of Figure 1;

Figure 4 is a partial section on the line 4—4 of Figure 1, showing the pressure-reducing valve;

Figure 5 is a section corresponding to Figure 4, but showing an adjustable pressure-reducing valve;

Figure 6 is a partial section corresponding to the bottom of Figure 1, but showing a modified structure;

Figure 7 is a central section of another dispenser embodying the invention; and

Figure 8 is a partial elevation looking from the left of Figure 7.

Our novel dispenser, in the form illustrated in Figure 1, is intended to take without adjustment either one or two or three pound cans of lubricant, a one-pound can being indicated therein in dotted lines at 10. It includes a housing for inclosing and holding the lubricant container, and which may consist of a die-cast upper section 12 and a sheet-metal lower section 14, detachably connected by a plurality of links 16 pivotally connected to the lower section 14 and pivotally carrying toggle levers 18 having cam surfaces adapted for locking engagement past a dead-center position with lugs 20 on the upper section 12.

The bottom of the lower section 14 is provided with annular sealing rings 22, 24, and 26, engageable respectively with the peripheries of the bottoms of one, two, and three pound cans of lubricant. The center of the bottom of section 14 is preferably formed with a hole 28, so that atmospheric pressure acts on the bottom of the container. Thus when fluid under pressure is admitted to the interior of the container, as described below, the bottom of the container is dished downwardly, thereby insuring that the container will be completely emptied.

The upper section 12 has threaded therein a guide tube 30, having a stop flange 32 at its lower end, on which is sleeved a ring 34 provided with an annular gasket or seal 36 engaging the top of the container 10. A spring 38, confined between a shoulder on the ring 34 and the upper section 12, yieldingly holds the seal 36 against the top of the can 10.

The parts 30—34—36—38 serve two functions: (1) They hold the can 10 yieldingly clamped in place, and (2) they prevent the lubricant from slopping over into the housing through the discharge opening if the dispenser is not held level.

The sleeve 30 forms a guide for a tubular plunger 40 having a cutter or knife 42 at its lower end, and operable by downward pressure on a ring or hand abutment 44 welded thereto to cut a tongue of metal out of the top of the can 10 and bend it downwardly to provide a discharge opening. The knife 42 also serves as a stop, when

the plunger 40 is moved upwardly, to limit upward movement of the plunger.

Inside the plunger 40 is coaxially arranged a discharge tube 48, having its upper end suitably curved to discharge lubricant into differentials, transmissions, and the like. The lower end of the tube 48 is notched, so that when it is in engagement with the bottom of the can the contents may be forced through the notches and upwardly through the discharge tube 48. A stop ring 50 mounted on the tube 48 is adapted to engage the closed top of the plunger 40 to limit outward movement of the tube 48.

Openings 52 through the sleeve 30 and the plunger 40 serve to equalize pressures in the container 12—14 around the can 10 and, through the plunger 40 and past the yielding washer 50, inside the can 10 through the discharge opening formed by the knife 42.

The plunger 40 has at its upper end a separate section 54 formed at its upper end with a flange serving as an abutment for the upper end of a spring 56 sleeved on the discharge tube 48 and engaging at its lower end a washer 58 mounted on the tube 48 and serving as a lower abutment for the spring 56.

The bottom of the section 54 is deformed as illustrated in Figure 3, to form teeth 60 having bayonet-type interengagement with an interrupted flange 62 at the end of a fitting 64 threaded on the end of the lower section of the plunger 40. The fitting 64 also serves to compress a gasket 66 forming a sealed sliding joint between plunger 40 and tube 48.

The section 54 may be disconnected from the plunger 40 when the container 10 is placed in the housing, so that the spring 56 does not resist depression of the plunger to form a discharge opening in the top of the can. After the opening is formed, section 54 is pressed downwardly, thereby forcing tube 48 to the bottom of the can 10 through the discharge opening just formed therein, and is interlocked with plunger 40. Thereafter the spring 56 urges the tube 48 downwardly and the plunger 40 upwardly.

Compressed air, or other fluid under pressure, is admitted to the housing from a suitable airline (not shown) connected to an intake passage 70, under the control of a spring-held two-way plunger valve 72 which also controls an exhaust passage 74, and which is operated by means such as a pivoted hand-operated lever 76.

Air so admitted goes through a lateral passage 78 past a piston-type pressure-reducing valve 80 urged by a pressure-measuring spring 82 against a threaded member 84. The valve 80 is notched at its upper end, to afford communication with an inlet passage 86. This passage discharges into the housing across an outlet passage 88 controlled by a spring-held ball-type safety or relief valve 90, thereby insuring that the entrance to the outlet passage 88 is kept clear.

It will be seen that as the pressure builds up in the housing, it acts to urge the piston valve 80 downwardly. When the pressure is strong enough to overcome the spring 82, the piston valve 80 is moved downwardly to cut off the passage 78. Thus the pressure-relief valve and the manually-operated valve act in series.

If desired, the compression of spring 82 may be varied, for example by a threaded adjusting plug 92 (Figure 5), to give different fluid pressures in the housing for lubricants of different viscosities.

Figure 6 shows tube 48 provided at its bottom end with a cup-shaped fitting 94, so that shallower notches may be formed in its edge to permit more complete emptying of the can without slowing up the discharge.

Figures 7 and 8 illustrate another form of dispenser also adapted to take either one, two or three pound cans of lubricant and parts therein corresponding to like parts in Figures 1 to 4 have been indicated by the same reference numbers plus 100. In this construction the housing 114 is formed in its bottom with raised lugs 115 to stiffen the bottom and to locate one and two pound cans properly, the three pound cans fitting within the housing 114 and being located thereby. The annular knife 142 is carried directly by the discharge tube 148 which is slidably mounted in the upper section 112 through a packing 150. A gland nut 161 holds the packing in place and is formed at its upper end with an interrupted flange 162 for bayonet type interengagement with the teeth 160 pressed in the sleeve 154.

The discharge tube 148 is formed in two sections connected by a coupling 157 having a flange 158 forming a seat for the spring 156. It will be noted that when the sleeve 154 is connected to the gland nut 161 the upper end of the gland nut abuts the coupling 157 thereby to limit downward movement of the discharge tube into the can. This is desirable to prevent the knife 142 from cutting a hole in the bottom of the can through which lubricant might leak into the housing 114.

A slightly modified type of pressure regulating valve is illustrated in this construction as best seen in Figure 7. Air admitted past the manual valve 172 flows directly through and around the valve 180 and into the housing through a port 186. The tubular end of the valve 180 normally closes an exhaust port 187 but when the back pressure in the housing gets high enough to move the valve 180 against the spring 182, it first closes the port 178 and then opens the port 187 to exhaust some of the air. With this construction the valve 180 serves both as a reducing valve and a safety valve and the relief valve 188, 190 may be omitted if desired. If desired the valve can be adjusted by turning the screw plug 192 with a screw driver or the like.

In use, a can is placed in the housing section 114 and the sections 112 and 114 are secured together by the clamps 116. The discharge tube 148 is then pressed down to cut a hole in the can through which the discharge tube extends to adjacent the bottom of the can and the sleeve 154 is locked to the nut 161. It will be noted that the discharge tube lies at an angle so that its lower end will project toward the side of the can. By tilting the device slightly during use the lubricant will be caused to flow toward the end of the discharge tube thereby permitting almost complete evacuation of the can.

While two embodiments of the dispenser have been shown and described, it is not intended that the scope of the invention shall be limited thereto or otherwise than by the terms of the appended claims.

What is claimed is:

1. A dispenser comprising means for inclosing and holding any one of several sizes of sealed containers, means for forming an opening in the container held thereby, a discharge tube carried by the inclosing means and arranged to be inserted through said opening to the bottom of the container, and means for admitting fluid under pressure to the inclosing means and through said opening into the container above the contents thereof.

2. A dispenser comprising a sectional housing arranged to inclose and hold any one of several sizes of sealed containers, means mounted in one part of said housing for forming an opening in the container held thereby, a discharge tube carried by said part of the housing and arranged to be inserted through said opening to the bottom of the container, and means for admitting fluid under pressure to the housing and through said opening into the container above the contents thereof.

3. A dispenser comprising a sectional housing arranged to inclose and hold any one of several sizes of sealed containers, means mounted in one part of said housing for forming an opening in the container held thereby, a discharge tube carried by said part of the housing and arranged to be inserted through said opening to the bottom of the container, and means for admitting fluid under pressure to the housing and through said opening into the container above the contents thereof, said opening forming means including a tube surrounding the discharge tube and having an annular cutter at its container-engaging end.

4. A dispenser comprising a sectional housing arranged to inclose and hold any one of several sizes of sealed containers, means mounted in one part of said housing for forming an opening in the container held thereby, a discharge tube carried by said part of the housing and arranged to be inserted through said opening to the bottom of the container, and means for admitting fluid under pressure to the housing and through said opening into the container above the contents thereof, said opening-forming means including a tube surrounding the discharge tube and having an annular cutter at its container-engaging end and said two tubes being independently movable lengthwise through said part of the housing.

5. A dispenser comprising a housing including detachably-connected upper and lower sections, the lower section having in its bottom concentric rings of sealing material for engagement with the lower ends of cans of different sizes and the upper section having an annular seal yieldingly held against the upper end of the can in the housing, a cutter within said seal and operable from the exterior of the housing to form a discharge opening in said upper end of the can, a discharge tube mounted in the upper section of the housing and movable through said opening to the bottom of the can, and means for admitting fluid under pressure to the interior of said can above the contents thereof.

6. A dispenser comprising a housing including detachably-connected upper and lower sections, the lower section having sealing material for engagement with the lower end of a can and the upper section having holding means yieldingly engaging the upper end of said can, a cutter operable from the exterior of the housing to form a discharge opening in said upper end of the can, a discharge tube mounted in the upper section of the housing and movable through said opening to the bottom of the can, and means for admitting fluid under pressure to the interior of said can above the contents thereof.

7. A dispenser comprising a housing including detachably-connected upper and lower sections, the lower section having sealing material for engagement with the lower end of a can and the upper section having holding means yieldingly engaging the upper end of said can, a cutter operable from the exterior of the housing to form a discharge opening in said upper end of the can, a discharge tube mounted in the upper section of the housing and movable through said opening to the bottom of the can, and means for admitting fluid under pressure to the interior of said can above the contents thereof, said lower section having an opening within the space defined by the sealing material to admit atmospheric pressure to the bottom of the can, whereby said bottom will be dished by the pressure within the can, to insure complete removal of the contents through the discharge tube.

8. A dispenser comprising a housing for holding and inclosing a can, means for forming an opening in said can, a discharge tube insertable through said opening to the bottom of the can, and means for admitting fluid under pressure to the interior of the can and to said housing around the can to force the contents of the can out through said tube.

9. A dispenser comprising a housing for holding and inclosing a can, means for forming an opening in said can, a discharge tube insertable through said opening to the bottom of the can, and means for admitting fluid under pressure to the interior of the can and to said housing around the can to force the contents of the can out through said tube, said opening-forming means and said tube being carried by said housing.

10. A dispenser comprising a housing for holding and inclosing a can, means for forming an opening in said can, a discharge tube insertable through said opening to the bottom of the can, and means for admitting fluid under pressure to the interior of the can and to said housing around the can to force the contents of the can out through said tube, said opening-forming means being carried by said housing and being operable from the exterior of the housing.

11. A dispenser comprising a housing for holding and inclosing a can, means for forming an opening in said can, a discharge tube insertable through said opening to the bottom of the can, and means for admitting fluid under pressure to the interior of the can and to said housing around the can to force the contents of the can out through said tube, together with a spring urging said tube lengthwise toward the bottom of the can.

12. A dispenser comprising a housing for holding and inclosing a can, means for forming an opening in said can, a discharge tube insertable through said opening to the bottom of the can, and means for admitting fluid under pressure to the interior of the can and to said housing around the can to force the contents of the can out through said tube, said opening-forming means including a tube surrounding the discharge tube and operable from the exterior of the housing to form said opening.

13. A dispenser comprising container-engaging support means, a hollow plunger movably carried by said means and having at one end a cutter for forming an opening in a container engaged thereby, a stop limiting movement of said plunger in said means away from the container, a discharge tube in said plunger and movable lengthwise through said opening into the container and a normally-compressed spring urging said tube into said container and urging said plunger against said stop.

14. A dispenser comprising container-engaging support means, a hollow plunger movably carried by said means and having at one end a cutter for forming an opening in a container engaged thereby, a stop limiting movement of said plunger

in said means away from the container, a discharge tube in said plunger and movable lengthwise through said opening into the container, said plunger and said tube having spaced spring abutments associated therewith, and a normally-compressed spring sleeved on said tube within said plunger and confined between said abutments urging said tube into said container and urging said plunger against said stop.

15. A dispenser comprising container-engaging support means, a hollow plunger movably carried by said means and having at one end a cutter for forming an opening in a container engaged thereby, a stop limiting movement of said plunger in said means away from the container, a discharge tube in said plunger and movable lengthwise through said opening into the container, and a normally-compressed spring urging said tube into said container and urging said plunger against said stop, together with means for relieving the pressure of said spring on said plunger while said opening is being formed.

16. A dispenser comprising container-engaging support means, a hollow plunger movably carried by said means and having at one end a cutter for forming an opening in a container engaged thereby, a stop limiting movement of said plunger in said means away from the container, a discharge tube in said plunger and movable lengthwise through said opening into the container, said plunger and said tube having spaced spring abutments associated therewith, and a normally-compressed spring sleeved on said tube within said plunger and confined between said abutments urging said tube into said container and urging said plunger against said stop, said spring abutment for the plunger being carried by a part arranged to be disconnected from the plunger to relieve the spring pressure thereon while the opening is being formed.

17. A dispenser comprising container-engaging support means, a hollow plunger movably carried by said means and having at one end a cutter for forming an opening in a container engaged thereby, a stop limiting movement of said plunger in said means away from the container, a discharge tube in said plunger and movable lengthwise through said opening into the container, and a normally-compressed spring urging said tube into said container and urging said plunger against said stop, said plunger being in two readily-detachable sections coaxially surrounding said tube, and one of which is arranged at the opposite end from said cutter and is provided with an abutment engaging said spring.

18. A dispenser comprising a housing adapted to contain an original-package container formed with a discharge opening, a discharge tube slidably mounted in the end of said housing and movable through said opening into the container, a spring for urging said tube toward the bottom of the container, and means for admitting fluid under pressure to said housing around the container and through said opening into the container to force the contents of the container out through said tube.

19. A dispenser comprising a housing adapted to contain an original-package container formed with a discharge opening, a discharge tube slidably mounted in the end of said housing and movable through said opening into the container, and connections for admitting fluid under pressure to said housing and which include an outlet passage controlled by a safety valve and a fluid-inlet passage discharging across the outlet passage to keep it clean.

20. A dispenser comprising a housing adapted to contain an original-package container formed with a discharge opening, a discharge tube slidably mounted in the end of said housing and movable through said opening into the container, and connections for admitting fluid under pressure to said housing and which include a manually-controlled valve and a pressure-reducing valve in series with each other, said pressure reducing valve including a spring determining the pressure of the fluid admitted to said housing, and manually-adjustable means for varying the effective pressure of said spring and correspondingly varying the pressure of the admitted fluid.

21. A dispenser comprising a housing for inclosing and holding any one of a series of containers of different sizes, means cooperating with said housing to position and hold any of said containers therein, a discharge tube mounted in said housing and slidable therein to move lengthwise through an opening in the top of a container in said housing, and means for supplying fluid under pressure to said housing and through said opening into said container to force the contents of the container out through said tube.

22. A dispenser comprising a housing formed in upper and lower detachably-connected sections and adapted to inclose and hold an original-package container having an opening in its top, means providing a seal between the peripheral lower edge of the container and the bottom of the lower section and for establishing communication between the space so sealed and the atmosphere, discharge means extending through said opening to the bottom of the container, and means for admitting fluid under pressure to the housing and through said opening to the interior of the container to force the contents of the container out through the discharge means and at the same time to dish the bottom of the container downwardly.

23. A dispenser comprising a housing formed in detachably connected sections and adapted to inclose an original-package container having its end engaging one of said sections, means carried by the other of said containers for yieldingly holding the container against said one section, and fluid-pressure means for forcing out and dispensing the contents of the container.

24. A dispenser comprising a housing formed in detachably connected sections and adapted to inclose an original-package container having its end engaging one of said sections, an annular seal carried by the other of said containers for yieldingly holding the container against said one section, a discharge tube carried by the housing and extending through said seal into the container, and means for supplying fluid under pressure to force the contents of the container out through said tube.

25. A dispenser comprising a housing adapted to inclose an original package sealed container, a discharge tube slidably carried by the housing and carrying a cutter adapted to cut a hole in the container through which the discharge tube may project to a point adjacent the bottom of the container, and means for supplying fluid under pressure to the housing to force the contents of the container out through said tube.

26. A dispenser comprising a housing adapted to inclose an original package sealed container, a discharge tube slidably carried by the housing

and carrying a cutter adapted to cut a hole in the container through which the discharge tube may project to a point adjacent the bottom of the container, said tube being mounted at an angle to the container so that its end will be adjacent the bottom and side thereof, and means for supplying fluid under pressure to the housing to force the contents of the container out through said tube.

27. A dispenser comprising a housing adapted to inclose an original package sealed container, a discharge tube slidably carried by the housing and adapted to project into the container to a point adjacent the bottom thereof, a spring acting against said tube and the housing for urging the tube into the container, releasable means for compressing the spring to hold the tube in the container or for releasing said spring so that the tube can be slid out of the container, and means for supplying fluid under pressure to the housing to force the contents of the container out through the tube.

28. A dispenser comprising a housing adapted to inclose an original package sealed container, a discharge tube slidably carried by the housing and adapted to project into the container to a point adjacent the bottom thereof, detachable means for securing the tube to the housing with its end projecting into the container or for releasing the tube so it can be slid out of the container, and means for supplying fluid under pressure to the housing to force the contents of the container out through the tube.

29. A dispenser comprising a housing having a cup shaped bottom and a removable top, a discharge tube slidably carried by said top and projecting into the bottom, said tube being mounted at an angle to the axis of the cup-shaped bottom so that its end will extend toward the side wall of the bottom, means to secure said tube to the top to prevent sliding thereof, and means for supplying fluid under pressure to said housing to force the contents thereof out through the discharge tube.

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