

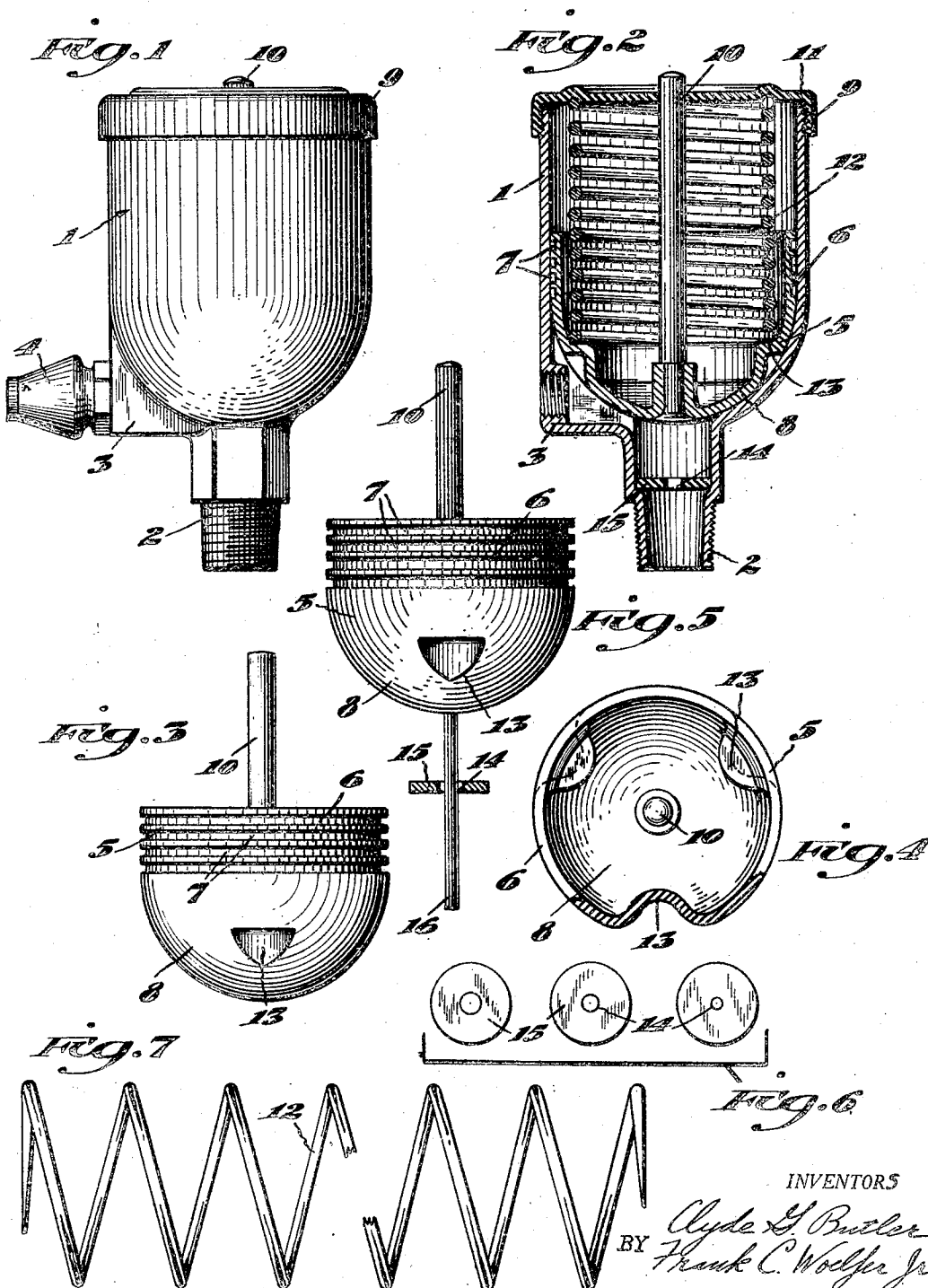
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C. G. BUTLER ET AL

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GREASE CUP

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INVENTORS

Clyde L. Butler
BY Frank C. Woolper Jr.

Wood & Wood ATTORNEYS

UNITED STATES PATENT OFFICE

CLYDE G. BUTLER AND FRANK C. WOELFER, JR., OF CINCINNATI, OHIO, ASSIGNORS TO
THE CINCINNATI BALL CRANK COMPANY, OF CINCINNATI, OHIO, A CORPORATION
OF OHIO

GREASE CUP

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The invention relates to grease cups or lubricators from which the lubricant is ejected by means of a follower piston moving under spring pressure.

5 An object of the invention is to provide a grease cup or lubricator with a follower piston having a cylindrical barrel or skirt for stabilizing sliding bearing within a cylindrical cup, and a spherical head cooperating
10 with a corresponding spherical base of the cup for concentrating the lubricant with the movement of the piston toward a central discharge port through the base, adapting the entire contents of the cup to be ejected with
15 the piston moving under a constant or invariable pressure for the full length of its stroke, ejecting or discharging the lubricant at a uniform rate, solely controlled by the retardation of the lubricant flow beyond the
20 discharge port, and in the utilization of a spring of extended length and increased number of convolutions having but an infinite variation in its pressure in expanding for a full piston stroke.

25 Another object of the invention is to provide a lubricator with a removable port member through which the lubricant is discharged or ejected interchangeable with control members having relatively different gauge discharge ports.
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Further objects and advantages will be more fully set forth in the description of the accompanying drawings, forming a part of this specification, in which:

35 Figure 1 is a side elevation of the lubricator cup containing the improvement.

Figure 2 is a central vertical section through the lubricator.

40 Figure 3 is a side elevation of the follower piston movable within the cup under spring pressure for automatically discharging the lubricant.

45 Figure 4 is a top plan view of the follower piston with a portion thereof broken away and shown in section.

Figure 5 is a side elevation of a modified form of follower piston provided with a stem projecting axially from the lower side thereof and engaged through an aperture or discharge port of an interchangeable discharge control disk or washer adapted to be seated within the lubricator cup.

Figure 6 discloses a plurality of discharge control disks in plan views having different gauge discharge ports.
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Figure 7 is a side elevation of the spring for depressing the follower piston.

Referring to the drawings, 1 indicates the hollow body of the grease cup provided with a spherical base having a screw-threaded nipple 2 extending centrally therefrom. The cup body has a hub 3 at the base thereof bored and tapped to receive a check valve nipple or coupling fitting 4, for making a quick coupling connection with a chuck or connector of a grease gun or high pressure lubricator pump, utilized for filling the grease cup or for forcing the lubricant through the cup in flushing a bearing to which the cup is attached. The connector fitting may be of any of the standard or commercial types employed in pressure lubricator systems.
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For uniformly discharging the contents of the cup under a pressure feed, a follower piston 5 slidable within the cup body and under the action of a spring supplies a head pressure upon the grease or lubricant within the body for ejecting the lubricant. The follower has a cylindrical body or barrel portion 6 of a sliding fit with the bore surface of the cup and is of sufficient length to guide and sustain the piston valve so that it will not cant in its movement or bind with the bore of the cup body which would retard the movement of the valve or impose an additional load on the spring. The skirt portion is provided with a plurality of annular narrow grooves 7 which efficiently serve to avoid the escape or passage of lubricant from the grease chamber in front of the piston to
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compression chamber at the rear side of the piston to the elimination of packing. The elimination of packing materially relieves the piston of friction resistance in its movement which would increase the load upon the spring. The annular grooves also reduce the area of piston sliding contact with the bore of the cup without affecting its stability. Also that if leather packing is used capillary attraction takes place and quantities of oil separated from the grease will pass piston or follower. Using higher pressure springs to overcome leather friction aggravates this condition.

Beyond the barrel or skirt portion the piston is provided with a spherical head 8 of a contour corresponding to the spherical surface of the base of the cup body to concentrate the lubricant to the centrally disposed discharge port or aperture located axially of the body and piston so that substantially all of the contents of the cup can be discharged. It provides a relief against back pressure which would tend to force the grease rearwardly beyond the barrel of the piston and into the compression chamber.

The upper or head end of the body is provided with a closure cap 9 screw-threaded upon the body, the cap being centrally apertured for guidingly receiving a stem 10 fixed to and projecting from the follower piston, serving as an indicator or gauge of the quantity of lubricant within the cup. A packing or gasket 11 may be interposed between the edge of the cup body and the cap to be engaged by the follower piston when the cup is filled to its capacity, sealing against the escape of lubricant into the compression chamber when filling the cup with a high pressure gun, or when the lubricant has passed through the cup under the pressure gun for flushing a bearing.

A spring 12 has one end seating and bearing against the closure cap and its opposite end engaged within the socket of the piston and against abutment lugs 13 integral with the walls of the piston. The spring is of undue length having a large number of coils or convolutions so that its expanding pressure for the determined movement of the follower piston is of exceedingly slight variation between its maximum fully compressed condition when the follower piston is engaged with the cup cap and its full expanded position when the follower piston reaches its limit of movement with the contents of the cup discharged and the piston bearing against the base of the cup.

Under such condition with the moving pressure of the piston practically invariable, adapting the employment of an invariable discharge opening, as no compensation is required for variations in spring pressure between the limits of piston movement, a uniform discharge of lubricant under a deter-

mined degree of pressure is had and maintained for the entire contents of the cup, regulatable as to rate of discharge by a change in the gauge or size of discharge port or opening. The gauge of the discharge port or opening is governed by the grade or kind of lubricant and for a definite capacity discharge to meet a particular service demand for each instance of use.

The lubricant is discharged through a port or opening 14 coaxially of the piston in a removable disk or washer 15 seated against an annular shoulder formed in the nipple extension of the cup body. The discharge control disk, therefore, is readily interchangeable with other disks each of a different gauge discharge port, as illustrated in Figure 6, for a definite regulation or metering necessary to meet each particular service demand, variation being necessary for light or heavy greases.

In the form of follower piston shown in Figure 5, the piston is provided with an extended stem 16 which engages through the discharge port and, therefore, serves as a means for further regulating the discharge opening, and different diameters of stems can be substituted one for the other for a determined size of port opening for obtaining a variation in the rate of lubricant fed.

Many types of spring operated piston lubricators have been designed having an outlet automatically variable in area to compensate for variations in spring pressure as the spring expanded and its pressure decreased, but it has been experienced that such forms of lubricators are not reliable nor dependable.

For production it is necessary to make a machining allowance and in this type of device the allowance is .001 more or less from a designated measurement. As the variable feature is usually accomplished by a tapering stem passing through a straight bore or tapering bore with a straight stem it will be appreciated that if the bore is on the minus side and a stem on the plus side as the result of assembling, the port opening or area is very much restricted from the conditions contemplated, involving additional load on the spring destroying its proper functioning.

In the provision of a follower piston freely slidable within the cup body and of a form when moving under pressure, concentrating the lubricant against which it bears toward a centrally disposed discharge port and the piston subjected to a constant pressure with an invariable discharge port, a complete discharge of lubricant contents of the cup can be had.

Under such condition and discharging through a port of invariable area, the lubricant can be ejected at a uniform rate with the delivery governed by the retardation in flow beyond the port. With the particular

type of piston herein shown and described, there is no opportunity for the lubricant to pocket within the cup as the piston reaches its limit of movement, so that no added resistance is encountered which would exert an increased load upon the spring weakening in pressure with its expansion. The lubricant is directed to or toward a common center so that no increase in pressure upon the piston is required as it reaches its limit of stroke.

Effort has been made to counteract the degrees in spring pressure with its expansion by automatically increasing the area of the discharge port, but it has been found in practice impossible to compensate with any degree of accuracy for these variations and it is impossible to realize the governing factors existing in one installation over another or in the variation in quality of lubricant employed, and for production manufacture of the lubricators it has not been found feasible to standardize the construction of the parts to give satisfactory and efficient results under the conditions met in service.

With the present invention for a given capacity of cup, easy and efficient regulations can be made by interchange of a discharge control disk by merely taking one out and slipping in another having a different port area or, in fact, the port area can be readily altered when condition is met requiring a greater area of port over that with which the lubricant is equipped in general production, which is not possible in lubricators having an automatic variable port area.

With the frictionally retarding influences to the movement of the piston or counter pressures, due to the pocketing of the lubricant, a spring can be constructed which will exert an approximate constant pressure within the definite moving length of the piston by extending its length and increasing its number of coils so that its variation in pressure from its maximum compressed condition to its expanded condition for the amount of movement is of no deterring consequence.

With the inlet port in non-valve control communication with the discharge port and also with the head end of the piston, the cup will be filled initially when the lubricant is forced from a gun and through the fitting or coupling, the lubricant initially taking the path of the least resistance into the cup until the cup is filled, whereupon for flushing a bearing the grease will be diverted through the discharge port to the bearing. This always insures a full cup or reservoir supply of grease after flushing and the lubricator in condition to automatically lubricate the bearing.

Having described our invention, we claim:

A device of the class described, comprising, a grease cup having an outlet extending from its lower end, a hollow thin wall piston in

said cup, a spring urging said piston downwardly to force the grease through the outlet, said piston having a spherical head and a skirted body portion in sliding engagement with the wall of the grease cup, said piston having an internal shoulder formed in its spherical head for engagement by the spring, and means for maintaining the spring under compression against the piston.

In witness whereof, we hereunto subscribe our names.

CLYDE G. BUTLER.
FRANK C. WOELFER, JR.

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