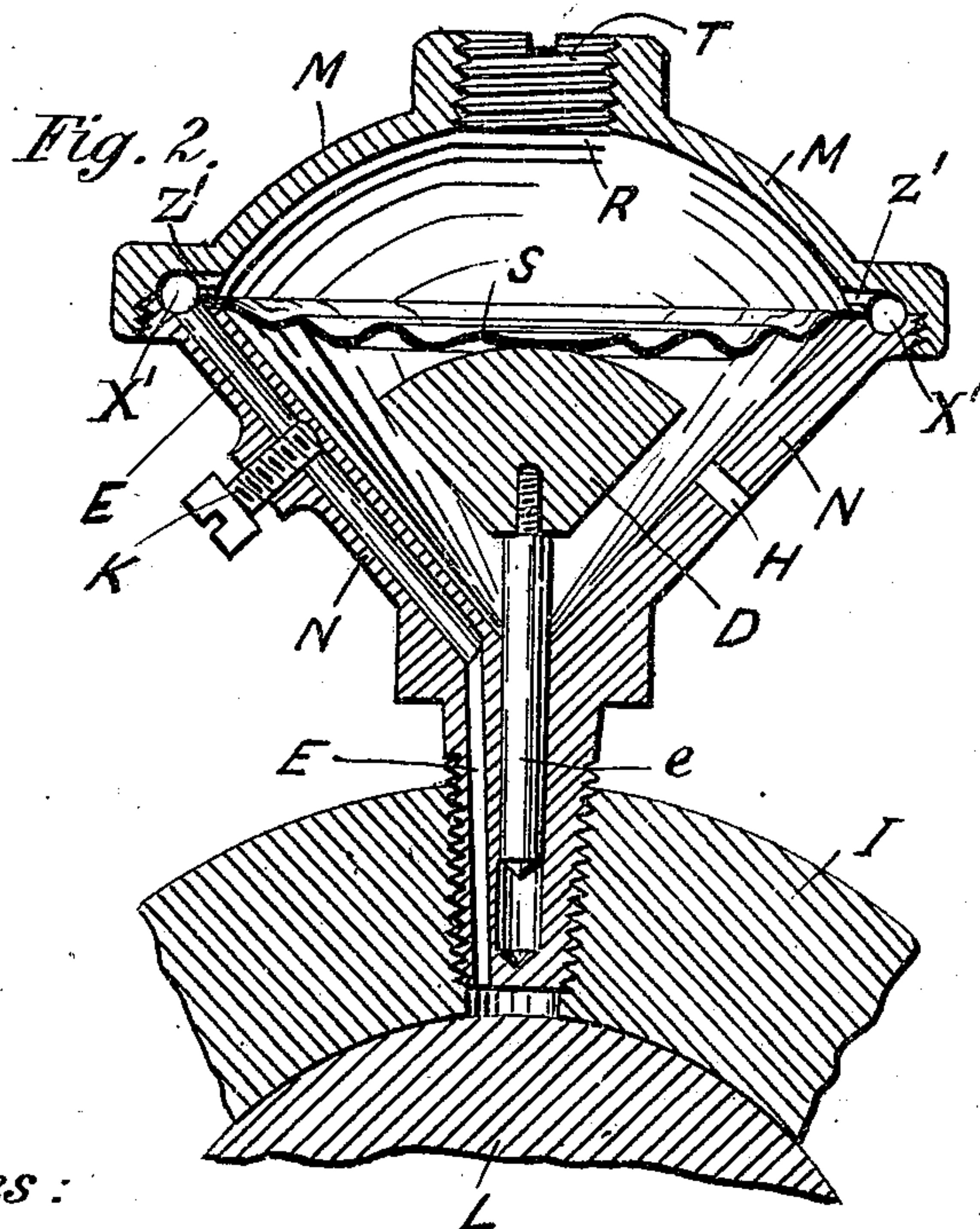
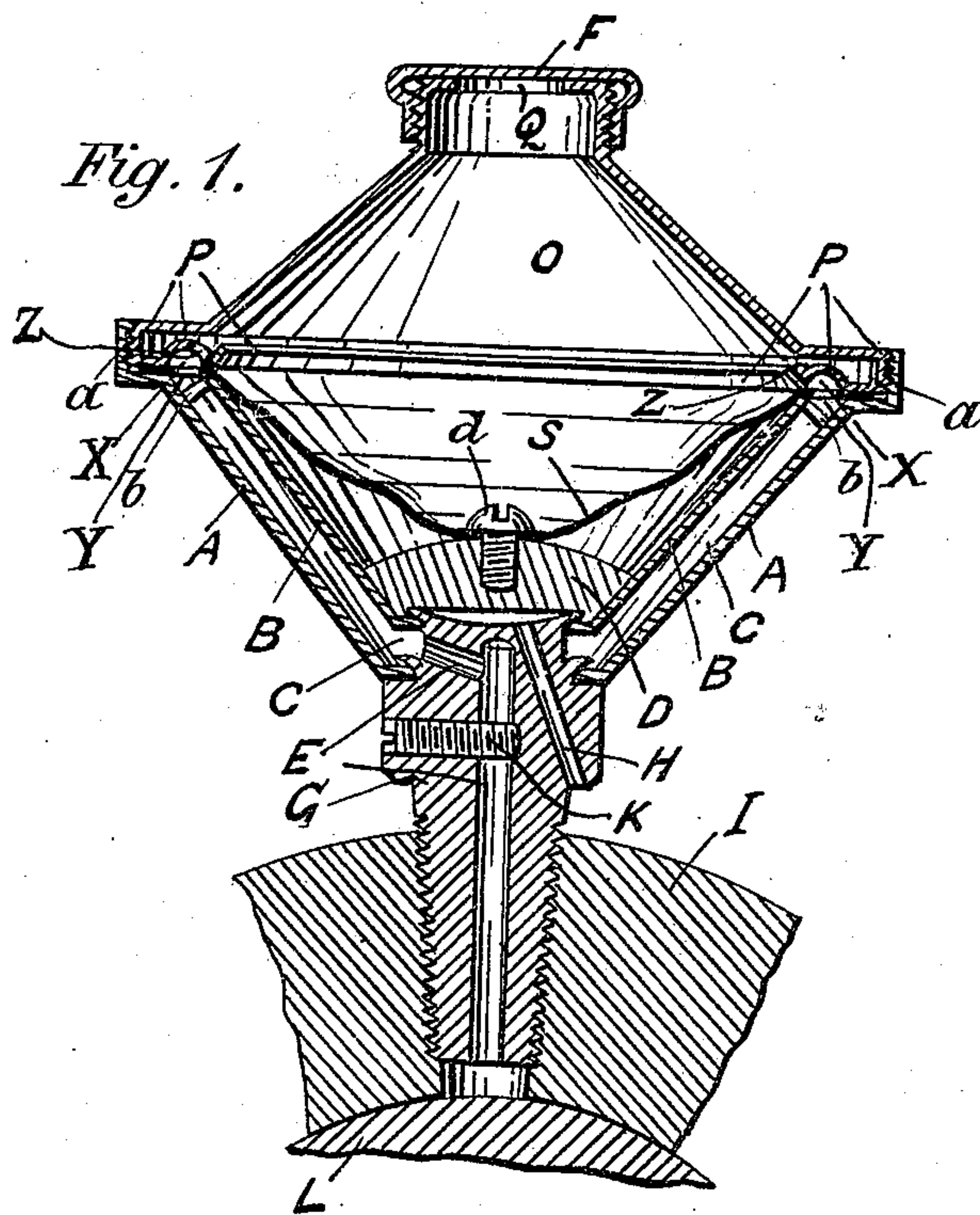


(No Model.)

P. F. KRUG.  
LUBRICATOR.

No. 502,100.

Patented July 25, 1893.



Witnesses:  
E. T. Meyer  
C. S. Barber.

Inventor:  
Philip F. Krug  
by Chas. L. Holack  
his Attorney.



# UNITED STATES PATENT OFFICE.

PHILIP F. KRUG, OF NEW YORK, N. Y.

## LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 502,100, dated July 25, 1893.

Application filed July 5, 1892. Serial No. 438,918. (No model.)

*To all whom it may concern:*

Be it known that I, PHILIP F. KRUG, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Lubricators, of which the following is a specification.

My invention refers to means for lubricating automatically the bearing surfaces on loose pulleys, wheels, collars and gearing running loose on shafts, shanks, pins, &c., particularly where such lubrication is to be performed continuously while the appliances to be lubricated are in rotative motion.

The purposes of my invention are to provide simple and effective means for utilizing the centrifugal force produced by revolving machinery in gradually and automatically moving and directing lubricating oil toward the bearing surfaces to be lubricated and to so construct the lubricating appliances as to prevent wasteful escape of lubricating oil from the same, even when very fluid or "light" oil is employed therein. The means employed by me in accomplishing these and other useful purposes are described hereinafter and more fully set forth in the claims.

In the accompanying drawings forming part of this specification, Figure 1 represents a vertical section of a lubricator constructed according to my invention, while Fig. 2 represents a vertical section of a modified form and construction of my lubricator.

Corresponding letters in both figures refer to corresponding parts.

In Fig. 1, A and B are shells preferably made of sheet metal, both shown to be arranged and constructed as inverted conical caps, shell A being made of greater depth and of greater maximum diameter than shell B, so as to be capable of entirely surrounding said shell B. The outer and upper edge of shell A is provided with a flange *a* of a rectangular cross section, and between the two shells stays *b*, *b* are provided to maintain said shells in their proper relative positions. These stays may either be constructed in the form of pins attached to one or both of said shells, or might preferably be formed by leaving prongs or

extensions of proper length along the upper edge of shell B when stamping out or spinning such shell, and afterward bending such projections at right angles to the outer surface of such shell. Both of said shells are mounted solidly on a nipple G, so as to leave between them a space C extending from the upper part of the outer surface of such nipple laterally and upward.

O is a frame, also preferably made of sheet metal and constructed in the form of an inverted funnel with a flange P attached to the mouth of such funnel in such form, as to approach and face the inner surfaces of flange *a* on shell A and to extend from there in an arched form inwardly, so as to closely approach the upper edge of shell B.

S is a flexible, or pliable, diaphragm forming a bag-like receptacle for oil, and made of sheet rubber or any other suitable material. Its rim is inserted between the upper edge of shell B and the horizontal part of flange *a* on one side and the lower part of flange P on the other side, and it is firmly secured in such position, and tight joints are secured between such diaphragm or bag and the upper edge of shell B, the horizontal part of flange *a* and the parts of flange P directly adjoining its arched part, by means of screw-threads provided between the vertical parts of flanges *a* and P.

F is a cap detachably connected with the upper part of frame O by means of screw-threads, so as to close the upper opening Q in such frame while the lubricator is in operation. When the lubricator is to be charged with oil this is done through opening Q after first removing cap F.

D is a weight placed within the space underneath diaphragm or bag S and is attached to such diaphragm by means of a screw *d*.

Between the arched part of flange P and the outer part of diaphragm S an annular passage X, X, is formed, such passage being interposed between the oil receptacle above diaphragm S and space C located between the two shells A and B. Perforations Z, Z, in the inner part of said arch provide a passage for the oil from said receptacle into said annular space X, X, and perforations Y, Y,



in the part of the diaphragm underneath said arch provide a passage from space X, X, into space C, C.

E is a passage provided for the oil within nipple G and leading from space C to the surface which is to be lubricated, the screw-thread on the outer surface of such nipple being provided to attach it thereby to the hub I of the pulley or other revolving part of machinery whose bearing surfaces are to be lubricated.

K is a screw by means of which passage E may be closed wholly or in part, thus permitting of thereby regulating the quantity of oil which is to be discharged through passage E.

H is an air passage leading to a space underneath bag S.

After the device has been charged with oil and has been attached to hub I with which it is to be made to revolve, such revolving motion will produce centrifugal force which will move outward weight D and diaphragm or bag S and will thereby force the oil between said diaphragm and frame O through perforations Z, Z, annular space X, perforations Y, Y, and passages C and E to the surfaces to be lubricated, air meantime entering through passage H into the space between shell B and diaphragm S, the weight D aiding materially in obtaining sufficient centrifugal force to secure the prompt outward movement of the diaphragm. Where the revolving parts to be lubricated are subject to high rotative speed and where light or very liquid oil is employed in the lubricator thus minimizing the friction between such oil and the passages along which it must flow, and where the diaphragm is properly proportioned, and made of very flexible yet heavy material, the centrifugal force imparted to the diaphragm and tending to force its central part outward will be sufficient to overcome the difference existing between the centrifugal forces of the bodies of oil in the inward passages and in the outward passages and will thus secure proper lubrication.

The device shown in Fig. 2 differs from that illustrated in Fig. 1 principally only as to details of construction, it being designed with a view of employing cast metal in the place of sheet metal mentioned above. In said Fig. 2 the flexible diaphragm S is so inserted between an upper frame M and a lower frame N as to fully divide into two parts the space inclosed between said two frames, oil being introduced through opening R which is ordinarily closed by a plug T. The weight D is shown to be provided with a guide e sliding in frame N, for the purpose of compelling said weight when moving outward under the influence of centrifugal force to travel in a radial direction, thus producing only symmetrical changes in the form of diaphragm S, against which weight D is made to rest. The annular groove X', X', provided between frames M and N communicates through perforations Z', Z', with the oil receptacle be-

tween diaphragm S and frame M, and with passage E within frame N.

I prefer the form of my device as illustrated in Fig. 1, because it is simpler and cheaper in construction, because cap B furnishes efficient protection for diaphragm S and also because it is less liable to become clogged up in case of the oil thickening therein, particularly as the passage C, (which takes the place of the upper part of the passage E shown in Fig. 2) can be made of ample size. Besides, in case the oil should become gummy in the apparatus, this can be promptly rectified by heating the lubricator, the heat penetrating readily through the sheet metal employed in its construction.

It is desirable to be able to readily examine that part of the surface of the flexible diaphragm which is kept in contact with the oil and to clean it in case oily sediment should have formed a coating thereon impairing its elasticity, or to substitute a new diaphragm when required. By clamping the diaphragm between a lower frame or casing, and the upper or outer casing which latter contains the opening for charging the lubricator with oil, and confining such diaphragm in its position by means of screw-thread arrangement, I accomplish these important objects. It will however be seen that the lubricator might be charged with oil after unscrewing such upper or outer casing and without having to depend for such purpose upon a special inlet with a cap or plug for closing the same.

I claim as new and desire to secure by Letters Patent—

1. In a centrifugal lubricator the combination of an oil cup comprising a flexible bottom surmounted by a detachable cap, a frame supporting such bottom, a passage between the interior of the oil cup and the surfaces to be lubricated, and means for confining the rim of such flexible bottom between the supporting frame and the cap, substantially as set forth.

2. In a centrifugal lubricator the combination of an oil cup comprising a flexible bottom surmounted by a cap, an inlet with proper closing device for admitting oil to the oil cup, a frame supporting the flexible bottom, a passage between the interior of the oil cup and the surface to be lubricated, and means for confining the rim of the flexible bottom between the supporting frame and the cap, substantially as set forth.

3. In a centrifugal lubricator the combination of an oil cup comprising a flexible bottom and a casing O held in contact therewith, two shells as A and B attached to nipple G containing the oil passage, the space between said shells communicating with the interior of the oil cup and with such oil passage, and an air passage leading to the under side of the flexible bottom, substantially as set forth.

4. In a centrifugal lubricator, the combination of an oil cup with flexible bottom, a



dished casing, as A, inclosing and protecting  
said bottom, an oil passage connecting the in-  
terior of the oil cup with the surfaces to be  
lubricated, and an air passage communicat-  
5 ing with the under side of the flexible bot-  
tom, all substantially as set forth.

Signed at New York, in the county of New

York and State of New York, this 2d day of  
July, A. D. 1892.

PHILIP F. KRUG.

Witnesses:

CHAS. L. HORACK,  
ERNEST UNGER.