

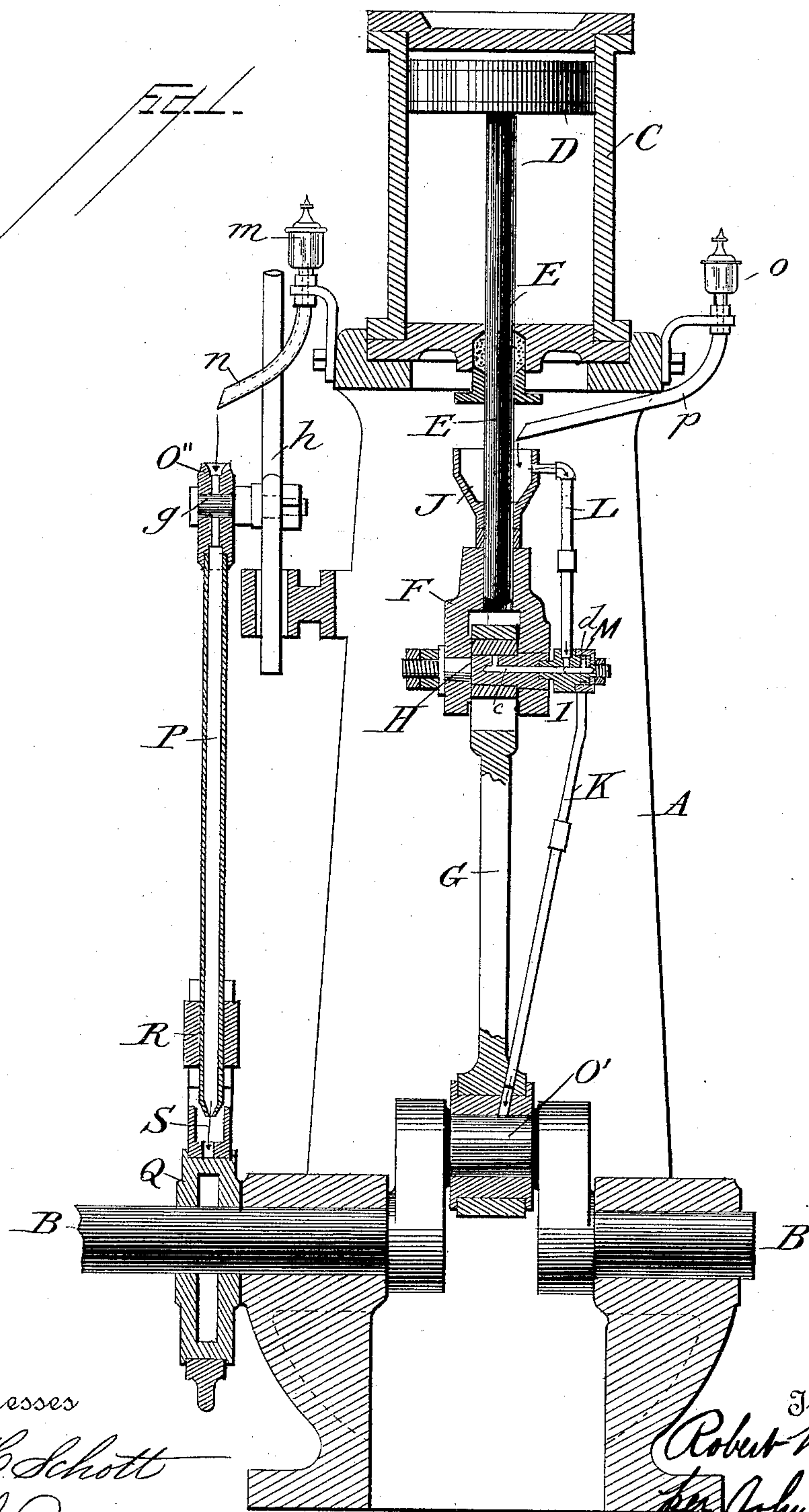
(No Model.)

2 Sheets—Sheet 1.

R. M. BECK.  
LUBRICATOR.

No. 409,660.

Patented Aug. 27, 1889.



Witnesses

*J. H. Schott*  
*W. L. Boyden*

Inventor

*Robert M. Beck*  
*per John L. Parker*  
Attorney

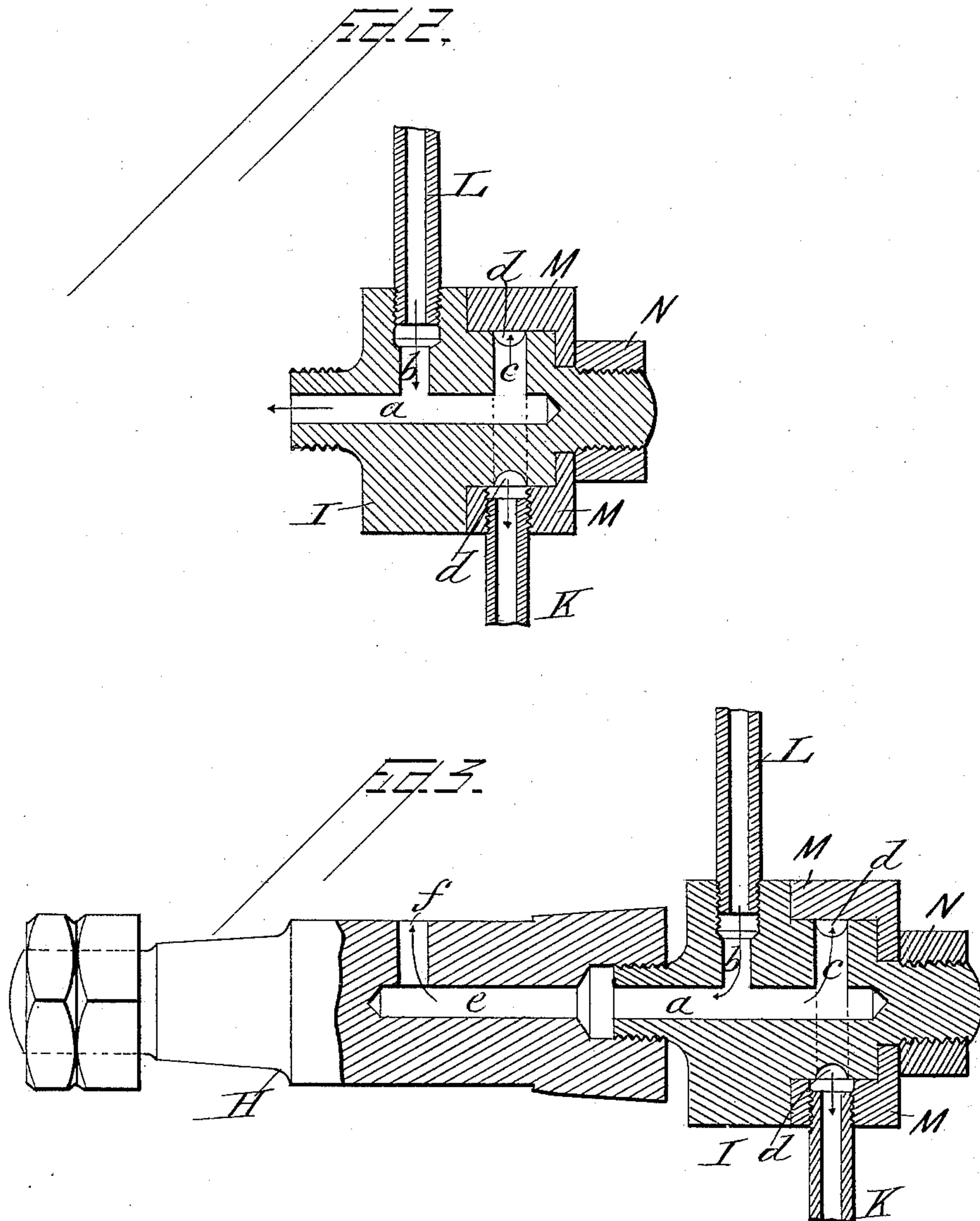
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# UNITED STATES PATENT OFFICE.

ROBERT M. BECK, OF CHAMBERSBURG, PENNSYLVANIA.

## LUBRICATOR.

SPECIFICATION forming part of Letters Patent No. 409,660, dated August 27, 1889.

Application filed November 30, 1888. Serial No. 292,178. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT M. BECK, a citizen of the United States, residing at Chambersburg, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Lubricators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improvement in lubricators for vertical steam-engines, the object thereof being to lubricate the bearing or moving surfaces of the engine by means of stationary oil-cups; and it consists in the construction, arrangement, and combination of parts, substantially as will be hereinafter described and claimed.

In the accompanying drawings, illustrating my invention, Figure 1 is a vertical section in partial elevation of an upright steam-engine provided with my improved lubricating devices. Fig. 2 is an enlarged detail section of the attachment for the cross-head pin. Fig. 3 is a section of this attachment and also the cross-head pin, showing their mode of connection and the relative location of the ports and passages in each.

Like letters of reference designate corresponding parts in the several figures.

A denotes the main frame of an upright steam-engine, said frame being of any convenient and desirable structure. Upon this frame is mounted the steam-cylinder C, containing the vertically-moving piston D, having a piston-rod E, the lower end of which is attached to the moving cross-head F. In the lower portion of the frame the main engine-shaft B is journaled in suitable bearings, said shaft being cranked and having a crank-pin O'. The connecting-rod G is attached to the crank-pin O' at one end, and at the other end is movably connected to the cross-head by means of the cross-head pin H, passing through said connecting-rod and also the cross-head. (See Fig. 1.)

My present invention aims to lubricate certain of the moving surfaces of the parts just enumerated by means of stationary oil-feeders.

The piston-rod E is provided with a small reservoir J, attached thereto near its lower end, said reservoir consisting simply of a cup-shaped jam-nut. Oil is fed into this reservoir through an inclined pipe *p*, leading from an oil-cup *o*, secured in a stationary position upon a bracket projecting from the engine-frame, said pipe *p* being also stationary and having its mouth so located in close proximity to the piston-rod that oil may drop from it into the reservoir during the reciprocations of said rod and the consequent downward and upward movement of said reservoir.

The attachment for the cross-head pin H consists, essentially, of a casting I. (Represented in detail in Figs. 2 and 3, Fig. 2 representing the attachment alone and Fig. 3 representing it as connected to the cross-head pin.) The casting I has a screw-threaded projection which is adapted to be screwed into an internally-screw-threaded recess in one end of the cross-head pin H. Said casting I has a central horizontal passage *a*, and when the said casting has been attached to the cross-head pin by being screwed into the end thereof, as just stated, the passage *a* is brought into communication with a central longitudinal passage *e* in the cross-head pin. The tubular passage *e* in the cross-head pin communicates with a vertical side passage *f*, located in the pin at right angles to the direction of passage *e*, said passage *f* leading to a point underneath the box that joins the connecting-rod to the pin; hence oil flowing through passage *e* and out through the top of passage *f* will lubricate the whole bearing-surface of the connecting rod and pin at this point. In the casting I a vertical passage *b* connects with the horizontal passage *a*. A pipe L leads out from the reservoir J and enters the casting I at the upper end of the passage *b*. This pipe L is preferably of a right-angled form, the part leading from the reservoir being horizontal and the part entering the casting I being vertical. Thus it will be seen that the oil which has been fed into the reservoir J will find an outlet therefrom through pipe L, by which it will be fed to the attachment I. Thence through passages *b*, *a*, *e*, and *f* it will be supplied to the moving surfaces of the upper end of the cross-head for



the purpose of lubricating the same. The attachment I also has a passage *c*, situated in a vertical position in the casting and connecting with the horizontal passage *a*. The vertical passage *c* connects with an annular groove *d*, turned in the externally-rounded surface of the casting I. Surrounding this rounded portion of the casting is a loose collar M, which is held close upon the casting by means of a nut N, securely screwed upon a screw-threaded projection on the casting, so that any sidewise movement of the collar M may be prevented, although the nut is not sufficiently tight to prevent this collar from being easily rotated. A pipe K is fastened to this collar by having its upper end screwed into it, so as to be in communication with the annular groove *d* in the casting proper. Said pipe K leads downward from this attachment I until it reaches the lower end of the connecting-rod, which it enters in such a manner that oil passing through it may be deposited upon the bearing-surfaces of the crank-pin O and the lower end of the connecting-rod.

It will be observed that the upper end of the side passage *f* in the cross-head pin and also the upper edge of the annular groove *d* in the attachment I will be upon a level, or, in other words, will lie in the same horizontal plane. This is so that the oil or lubricant which enters the attachment from the reservoir J may, when it has risen sufficiently high in the passage *f* to lubricate the contiguous bearings, be also sufficiently high in the passage *c* to enter the groove *d*, and from which it will pass into the pipe K, to be conveyed thereby to effect the lubrication of the crank-pin O and the bearing at the lower end of the connecting-rod. Inasmuch as the connecting-rod is constantly vibrating during the operation of the engine, the pipe K will also have a similar vibration, since it is attached to the lower end of the connecting-rod near where the crank-shaft acts upon the same and where the extent of vibration of the connecting-rod is greatest. This vibration of the pipe K, however, is permitted by having it attached to the loose collar M, which surrounds the annular groove *d* in the attachment I, which collar rotates as the pipe vibrates, and having the same axis of rotation as the pin H, to which the upper end of the connecting-rod is attached, the vibration of the parts will proceed harmoniously.

Upon the main engine-shaft B is the eccentric Q, having cast upon the band thereof a receptacle S, which communicates with the eccentric proper through a small opening or oil-hole, as shown in Fig. 1. A stationary oil-cup *m* is carried on brackets secured permanently to the engine-frame near the steam-cylinder, and this oil-cup has a pipe *n*, which conveys oil out of the cup. This oil, passing out of the lower end of the pipe *n*, will drop or fall into the cup-shaped upper end of the connection O'' for the wrist-pin *g* of the valve-stem *h*. The oil will be fed through this con-

nection around the wrist-pin, so as to thoroughly lubricate this bearing, after which it will pass into a vertical hollow rod or tube P, extending downward and having its lower end supported by a bearing R, carried on the eccentric, the support of said pipe P being such that its lower end will open into the receptacle S, which it has already been stated is cast on the eccentric band. It will be observed that the part O'' has a vertical movement at all times directly beneath the end of the pipe *n*, and thus oil will be continually entering it from the oil-cup. Thus the wrist-pin *g* will be lubricated and also the bearings of the eccentric will be lubricated at the same time by means of the oil which proceeds from the stationary cup *m*. In this way it will be seen that by the provision of the several devices that I have just described the various moving surfaces of an upright engine may be easily and effectively lubricated by means of stationary oil-feeding devices; hence the lubrication of the engine is made easier and more effective.

Various changes may doubtless be made in the detailed structure, location, arrangement, size, and form of the several parts hereinabove described. I do not therefore wish to confine myself to the precise and exact definition of the parts and their location and arrangement, as already stated, but reserve the liberty of varying therefrom within the scope of the claims hereto appended.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a lubricator for upright engines, in combination with the piston-rod, the cross-head, the connecting-rod, and the main crank-shaft of the engine, an oil-reservoir on the piston-rod, an attachment fastened to the cross-head pin having suitable ports and passages therein communicating with passage in said pin, and a pipe leading from the reservoir to the attachment, and also the pipe leading from the attachment to the lower end of the connecting-rod, substantially as and for the purpose described.

2. The combination, with the piston-rod, the cross-head, and connecting-rod, of an oil-reservoir on the piston-rod, cross-head pin having suitable passages therein, an attachment thereto having likewise suitable passages, a pipe extending from the reservoir to said attachment, a movable collar on said attachment, and a pipe extending from said collar to the lower end of the connecting-rod, all arranged substantially as and for the purpose described.

3. In combination with the cross-head pin having suitable passages therein, an attachment having a horizontal passage and two vertical passages connecting therewith, one of which receives oil from a stationary feeder and the other communicates with an annular groove on the attachment, and a loose collar surrounding the grooved portion of said at-



attachment and having a pipe whereby oil is conveyed from the attachment, substantially as described.

4. In combination with a moving cross-head, a connecting-rod, a cross-head pin having suitable oil-passages therein, the attachment for said pin having suitable internal passages, an oil-supply pipe for said attachment, a movable collar surrounding the same, and the pipe attached to the collar for conveying oil from the attachment to lubricate the bearing at the lower end of the connecting-rod, substantially as described.

5. In a lubricator for upright engines, the combination, with the piston-rod having an oil-reservoir thereon, of a stationary oil-feeder for said reservoir attached to the main frame, the cross-head, connecting-rod, cross-head pin having suitable passages therein, an attachment fastened to said pin having likewise suitable passages, a pipe passing from the oil-reservoir to said attachment, a movable collar on the attachment, and a pipe attached thereto and extending to the lower end of the connecting-rod, substantially as described.

6. In combination with the cross-head pin H, having horizontal passage *e* and side passage *f*, the attachment I, screwed into the end of the cross-head pin, having horizontal passage *a* and vertical passages *b c*, said passage *b* communicating with an oil-supply and said passage *c* communicating with an annular groove on the attachment, a loose collar surrounding the grooved portion of said attachment, and a pipe fastened to the loose collar and extending to the lower end of the connecting-rod, substantially as described.

7. The combination, with the piston-rod,

cross-head, cross-head pin, connecting-rod, and main engine-shaft, of the reservoir J on the piston-rod, the attachment I for the cross-head pin, the pipe L between the reservoir and said attachment, and loose collar M on said attachment, and the pipe K, fastened to the attachment and to the lower end of the connecting-rod, all substantially as described.

8. The combination, with the moving cross-head, the connecting-rod, and the cross-head pin having suitable passages, of the piston-rod, an oil-reservoir thereon, the attachment I for the cross-head pin having horizontal passage *a*, side passages *b c*, and annular groove *d*, the pipe L, running from the reservoir to the passage *b*, the collar M, surrounding the grooved portion of the attachment I, and the pipe K, extending from said collar to the lower end of the connecting-rod, substantially as described.

9. In a lubricator for upright engines, the combination, with the moving cross-head, its pin having the horizontal passage and a vertical passage, and the connecting-rod, of an attachment to said pin, said attachment having a horizontal passage and vertical passages, and a pipe running to said attachment from an oil-feeding device and another pipe from said attachment to the lower end of the connecting-rod, whereby the upper and lower bearings of said rod may be thoroughly lubricated, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT M. BECK.

Witnesses:

D. K. WUNDERLICH,  
J. E. WOODWORTH.