No. 826,923. PATENTED JULY 24, 1906.

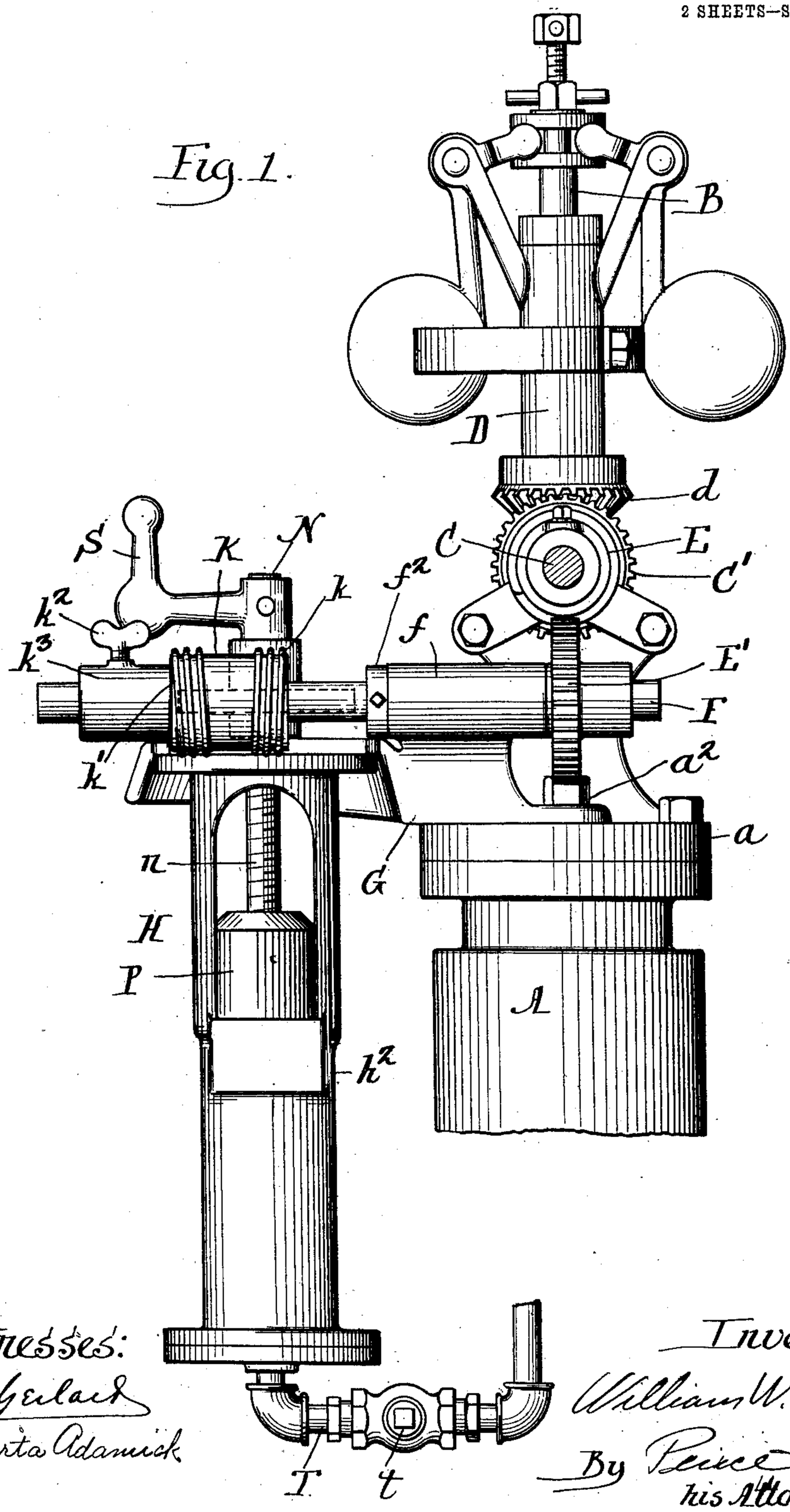
W. W. DINGEE.

AUTOMATIC MEANS FOR FEEDING LIQUIDS.

APPLICATION FILED FEB. 16, 1904.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

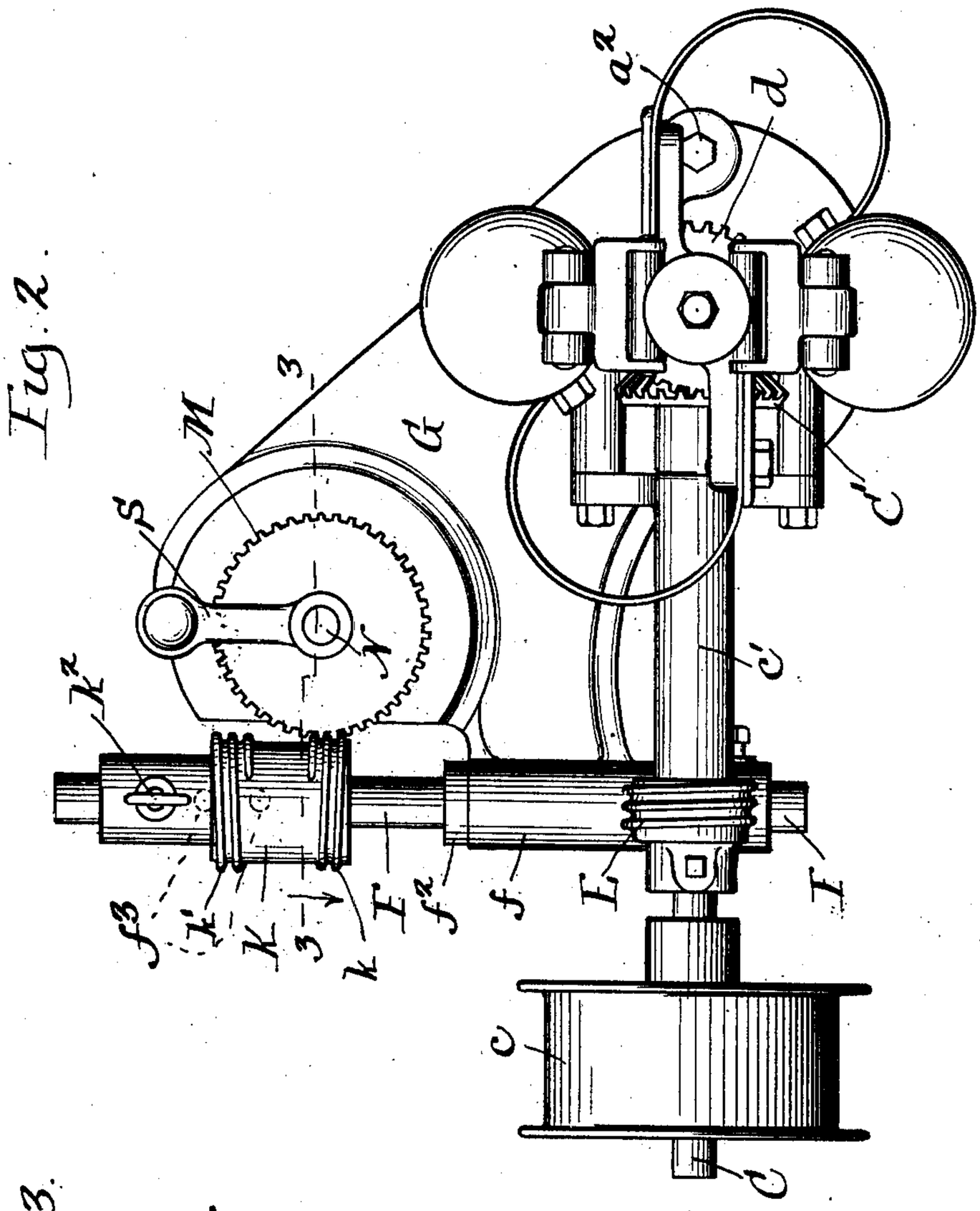
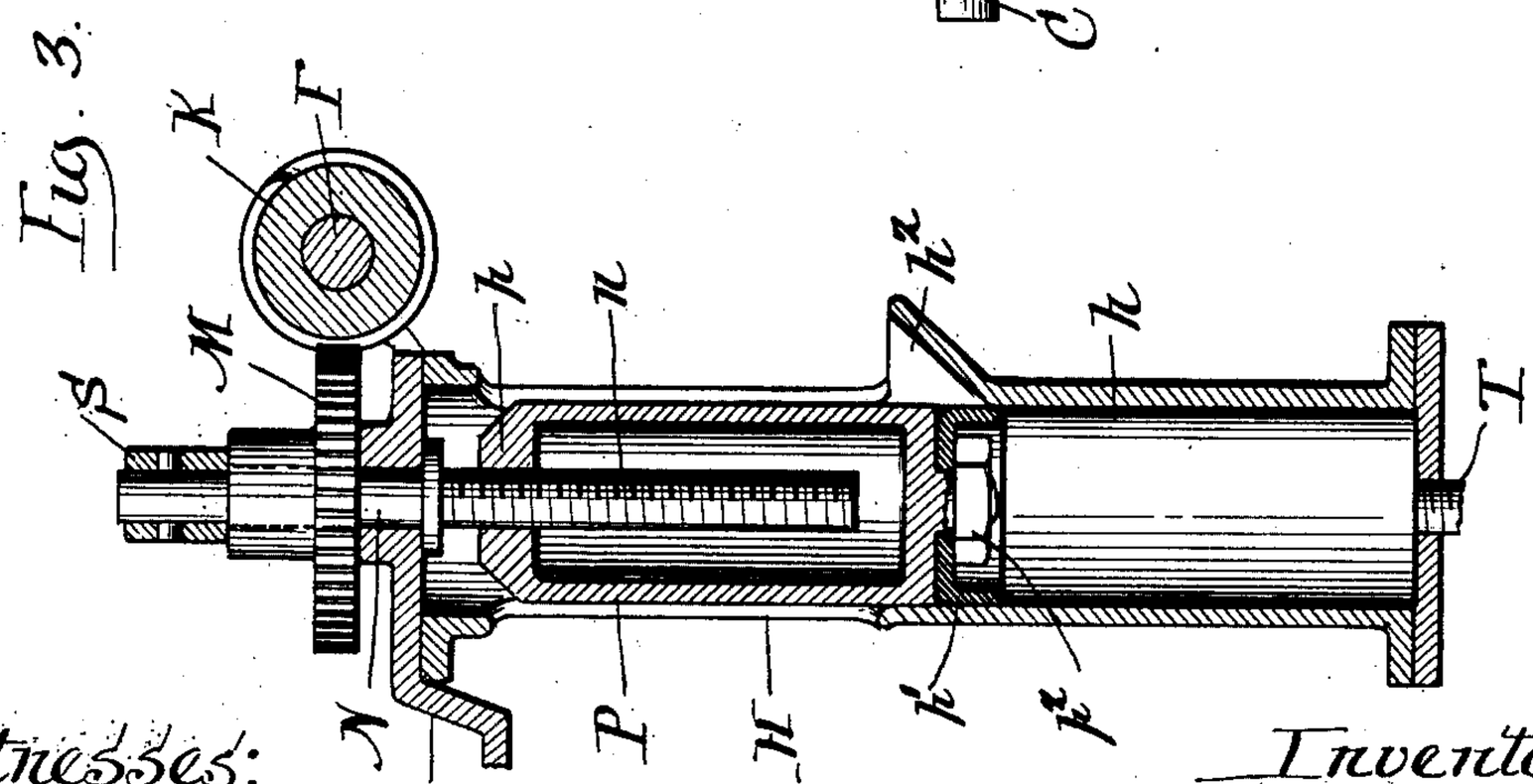


Fig. 3.



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AUTOMATIC MEANS FOR FEEDING LIQUIDS.

No. 826,923. Specification of Letters Patent. Patented July 24, 1906.

Application filed February 16, 1904. Serial No. 193,895.

To all whom it may concern:

Be it known that I, WILLIAM W. DINGEE, a citizen of the United States, and a resident of the city and county of Racine, in the State of Wisconsin, have invented certain new and useful Improvements in Automatic Means for Feeding Liquids, of which the following is a full, clear, and exact description.

This invention has for its object to provide an improved construction of automatic means for feeding liquids that is particularly adapted as a lubricator of the "forced-feed" type for traction and like engines; and the invention consists in the features of improvement hereinafter described, illustrated in the drawings, and more particularly pointed out in the claims at the end of this specification.

My invention is especially adapted as a force-feed lubricator for traction and like engines and provides a simple construction which may be mounted on the casing of the governor-controlled valve and be operated from the governor-shaft.

Figure 1 is a view showing my improved lubricator in side elevation and in position to be driven from the governor-shaft of the engine. Fig. 2 is a plan view of the parts shown in Fig. 1. Fig. 3 is a view in vertical section on line 3 3 of Fig. 2.

In the accompanying drawings, A designates the governor-valve casing, which is usually mounted upon the cylinder of the engine, to the head *a* of which casing leads the governor-valve stem B, that is controlled by suitable governor mechanism. The specific form of governor mechanism employed forms no part of the present invention, and in the drawings I have illustrated a governor of the well-known "Waters" style.

The governor-shaft C is driven by a suitable pulley *c* and is mounted in a long bearing *c'*, the inner end of this governor-shaft being provided with a bevel gear-wheel C', that meshes with a corresponding bevel gear-wheel *d* at the lower end of the vertical sleeve D of the governor. As the construction and operation of the parts of the governor are well understood, they need not be particularly described.

The governor-shaft C has keyed thereto a worm-sleeve E, that meshes with a worm-wheel E', keyed to the shaft F, by which the automatic lubricator will be driven. This shaft F is mounted in a long bearing *f*, rising from the top plate G. The top plate G is bolted, as at a^2, to the cover *a* of the governor-valve chamber A and supports the lubricator chamber or cylinder H, which depends from the top plate. The shaft F is held in proper relation to its bearing-sleeve *f* by means of a collar f^2, secured to the shaft. Upon the shaft F is mounted the worm-sleeve K, whereby the lubricator mechanism will be driven. This worm-sleeve K is preferably provided with two reversely-threaded sections *k* and *k'*, arranged at the opposite ends of the sleeve K. The sleeve K is fixed to the shaft F by means of a set-screw k^2, that passes through the section k^3 of the sleeve K, and by means of the screw k^2, the inner end of which is adapted to enter holes f^2 in the shaft F, the worm-sleeve K can be fixed at such position that either the section *k* or *k'* can be brought into gear with the worm-wheel M, or the blank space intermediate the sections *k* and *k'* may be brought opposite the worm-wheel M. The worm-wheel M is fixed to the screw-shaft N, that passes through the top plate G and has a threaded portion *n*, that passes through the correspondingly-threaded upper end *p* of the plunger or piston P of the lubricator. This plunger P carries at its lower end a cup-leather *p'*, held in place by the nut p^2 on the reduced and threaded lower end of the plunger. The plunger P is fitted within the cylindrical lower portion *h* of the lubricator-casing H, and this casing H is provided about midway with an offset mouth or nozzle h^2, whereby oil will be admitted to the lubricator when it is to be filled. As shown, the upper end of the lubricator feed-shaft N is provided with a handle S, by means of which the oil may be forced from the lower portion *h* of the lubricator-casing by hand when desired, and by means of which handle also the plunger P of the lubricator may be quickly restored to its initial position, which will be within the upper part of the casing H at a point slightly above that shown in Fig. 3 of the drawings. From the bottom of the lubricator-casing H extends a delivery-pipe T, that will lead to the steam-chest of the engine or to any other point at which it is desired to deliver the oil. As shown, a check-valve *t* will be interposed in the delivery-pipe T, so as to prevent the escape of the steam

through the pipe T at the time that the lubricator-casing is being filled through its mouth h^2.

From the foregoing description the operation of my improved lubricator will be seen to be as follows: When the lubricating-chamber is to have its lower portion filled with oil, the worm-sleeve K will be shifted lengthwise of the shaft F until the blank portion of the sleeve intermediate the worm-sections k and k' is opposite the worm-wheel M of the lubricator feed-shaft. The operator will then by means of the handle S rapidly turn the shaft N until the plunger P is withdrawn to the upper portion of the casing H to a position slightly above that shown in Fig. 3 of the drawings. The check-valve t of the delivery-pipe T being turned to prevent the admission of steam through the pipe T, oil will be poured through the filling-mouth h^2 until the lower portion h of the lubricator-chamber is practically full. The operator will then by means of the handle S force downward the plunger P until it passes below the filling-mouth h^2, after which the valve t of the delivery-pipe T will be turned to open position. The operator may then by hand force down the plunger P sufficiently to cause an initial charge of oil to pass into the steam-chest of the engine or may at once move the worm-sleeve K until one of its threaded sections k or k' is in engagement with the worm-wheel M. The worm-gearing intermediate the lubricator-feed shaft N and the governor drive-shaft C affords a most effective reducing-gear, so that about three thousand or more revolutions of the governor-shaft are necessary to effect a single revolution of the lubricator feed-shaft N. Hence it will be seen that the downward feed of the plunger will be very slow, and in practice I have found that a single charge of the lubricating-chamber will last for about six hours' work of the engine.

The object in providing the reversely-arranged worm-threads k and k' is to enable the lubricator feed-shaft to be driven in the same direction regardless of the direction of travel of the governor drive-shaft C and of the shaft F. This is a feature of importance, particularly in traction-engines, as with such class of engines it is necessary that provision be made for as effectively lubricating the engine when running in one direction as in the opposite direction. It will be understood, of course, that by setting the worm-sleeve K at different positions upon the shaft F, determined by the holes in the shaft to receive the set-screw k^2, either threaded section k or k' or the intermediate blank space may be brought opposite the worm-wheel M. The handle S not only serves for restoring the plunger P to the top of the casing H when a fresh supply of oil is to be delivered to the casing, but also enables the feed-shaft N to be quickly actuated by hand in case a greater supply of oil be temporarily desired.

It will be noted that gearing is provided for automatically operating the feed-screw of the plunger and that by shifting the worm-sleeve K so that its blank portion is opposite the worm-wheel M this gearing is disengaged, and the feed-screw may then be operated quickly by hand for retracting the oil-plunger. The handle S, however, cannot be properly operated for quick shift of the plunger until the automatic drive-gearing is disconnected. The worm-gear provides a slow automatic feed for the plunger, but may be disconnected in the manner described to permit a quick return of the plunger by hand.

The feed-screw n engages the upper portion of the plunger, and the plunger and screw are of such length that when the plunger reaches the lower end of its movement it is disengaged from the feed-screw, so that the continued movement of the screw cannot operate to break any of the parts. The upper portion of the cylinder or chamber H is broken away at its sides, so that the plunger may be readily lifted and again engage with the screw.

The present invention affords a most effective means for lubricating throttle-valves, steam-chests, and cylinders of engines, and while I have described what is regarded as the preferred form of the invention I wish it distinctly understood that the precise details of construction above set out may be varied without departure from the spirit of the invention and that features of the invention may be employed without its adoption as an entirety.

One marked advantage of the present invention is that of gearing the lubricator to the governor drive-shaft, as by this means a most simple and compact arrangement of parts is had and the lubricator is sustained in the most effective and convenient position. So, also, it will be seen that the inverted cup-leather at the lower end of the piston when raised to its uppermost position is filled with air, and when the piston is lowered the air thus confined within the cup-leather forms a cushion between the piston and the oil to be forced from the cylinder, thus doing the work of the air-chamber in an ordinary force-pump. The expansion of the cup-leather against the side walls of the cylinder renders unnecessary the use of expensive stuffing-boxes such as have been heretofore employed.

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

1. The combination of a casing, a plunger in said casing, a feed-screw whereon said plunger is threaded, a worm-wheel fixed to said feed-screw, a drive-shaft driven from an engine and a shiftable worm-sleeve on said

drive-shaft having reversely-threaded sections, either of which may be brought into engagement with said worm-wheel, whereby said plunger may be forced in the same direction notwithstanding the reversal of the engine, substantially as described.

2. The combination of a casing, a plunger in said casing, a feed-screw whereon said plunger is threaded, automatic slow-feed worm-gearing for driving said plunger from an engine comprising a worm-wheel fixed to said feed-screw, a drive-shaft driven from the engine and a worm on said shaft meshing with said worm-wheel but shiftable out of engagement therewith to permit the quick operation of said screw and plunger by hand, substantially as described.

3. The combination of a casing, a plunger in said casing, a feed-screw whereon said plunger is threaded, and slow-feed worm-gearing for automatically operating said plunger comprising a worm-wheel fixed to said feed-screw, a drive-shaft driven from an engine and a shiftable worm-sleeve on said shaft having reversely-threaded sections, either of which may be brought into engagement with said worm-wheel, said worm-sleeve having a blank space between its reversely-threaded sections, whereby it may be disengaged from said worm-wheel, substantially as described.

4. The combination with the governor and governor-shaft driven from an engine, of a casing for lubricant, a plunger therein, a feed-screw whereon said plunger is threaded, a worm-wheel fixed to said feed-screw, a drive-shaft, a worm on said drive-shaft meshing with said worm-wheel and worm-gearing connecting said drive-shaft and said governor-shaft, substantially as described.

5. The combination with the governor and governor-shaft driven from an engine, of a governor-valve casing, a top plate bolted thereto, a lubricator-casing sustained beneath said top plate, a plunger within said casing, a feed-screw whereon said plunger is threaded, a drive-shaft, worm-gearing connecting said drive-shaft and said feed-screw and worm-gearing connecting said governor-shaft and said drive-shaft, substantially as described.

6. The combination with a casing, of a plunger in said casing, a feed-screw whereon said plunger is threaded, a worm-wheel fixed to said feed-screw, a drive-shaft driven from an engine, a worm-sleeve on said drive-shaft having reversely-threaded sections, either of which may be shifted into engagement with said worm-wheel, said worm-sleeve being also shiftable out of engagement with said worm-wheel to permit the quick operation of said feed-screw and plunger by hand and said plunger being disengaged from said feed-screw at the end of its forward movement, substantially as described.

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