No. 722,184. PATENTED MAR. 3, 1903.

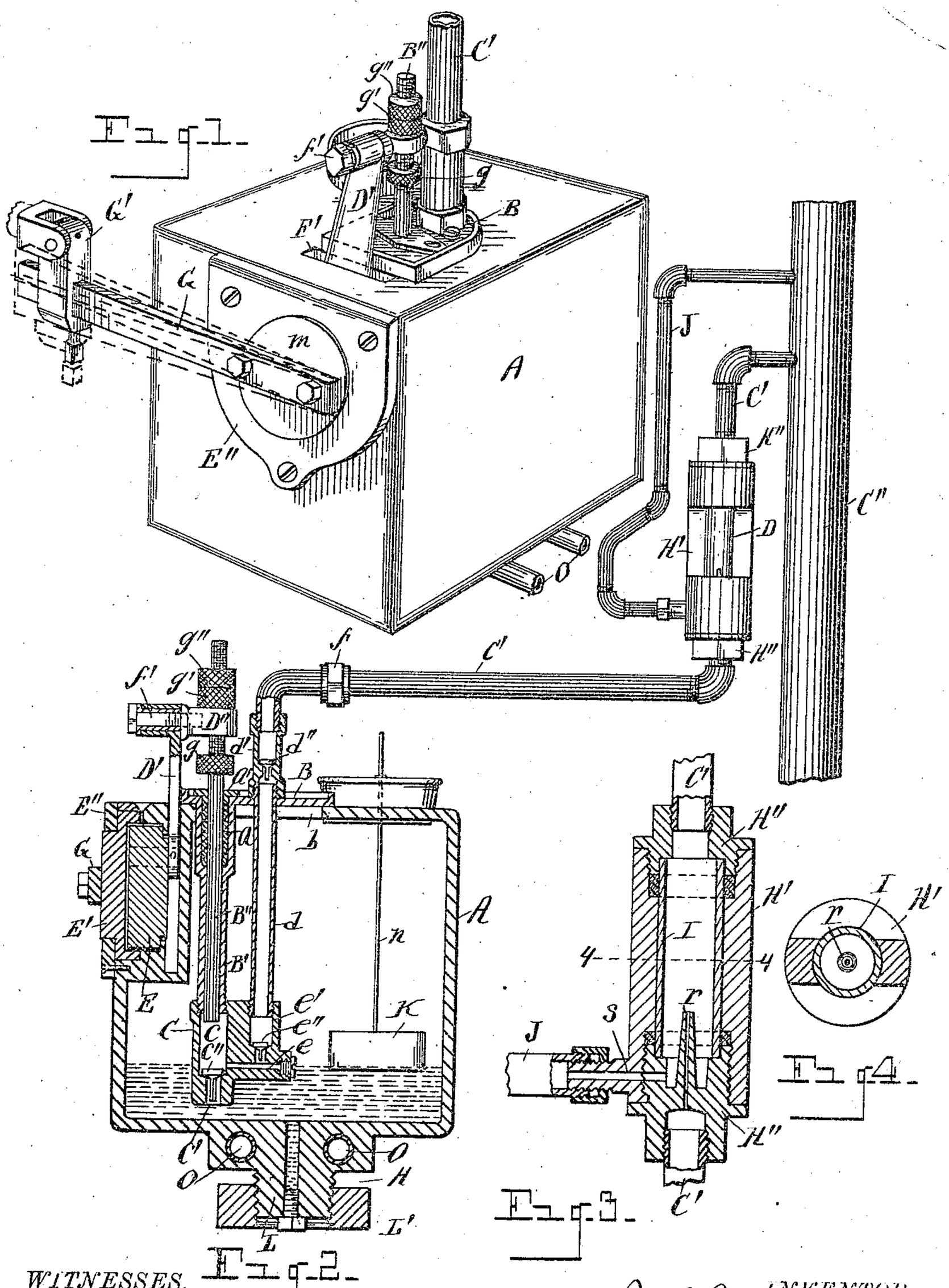
J. W. McCLURE.

OIL PUMP FOR CYLINDER LUBRICATION.

APPLICATION FILED APR. 1, 1898. RENEWED APR. 24, 1901.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1



WITNESSES.

O. B. Barringer.

M. A. Shorter.

INVENTOR.

John W. McClure

By L. B. Wheeler & Co.

Attorneys.

No. 722,184. PATENTED MAR. 3, 1903.

J. W. McCLURE.

OIL PUMP FOR CYLINDER LUBRICATION.

APPLICATION FILED APR. 1, 1898. RENEWED APR. 24, 1901.

NO MODEL. 2 SHEETS—SHEET 2.

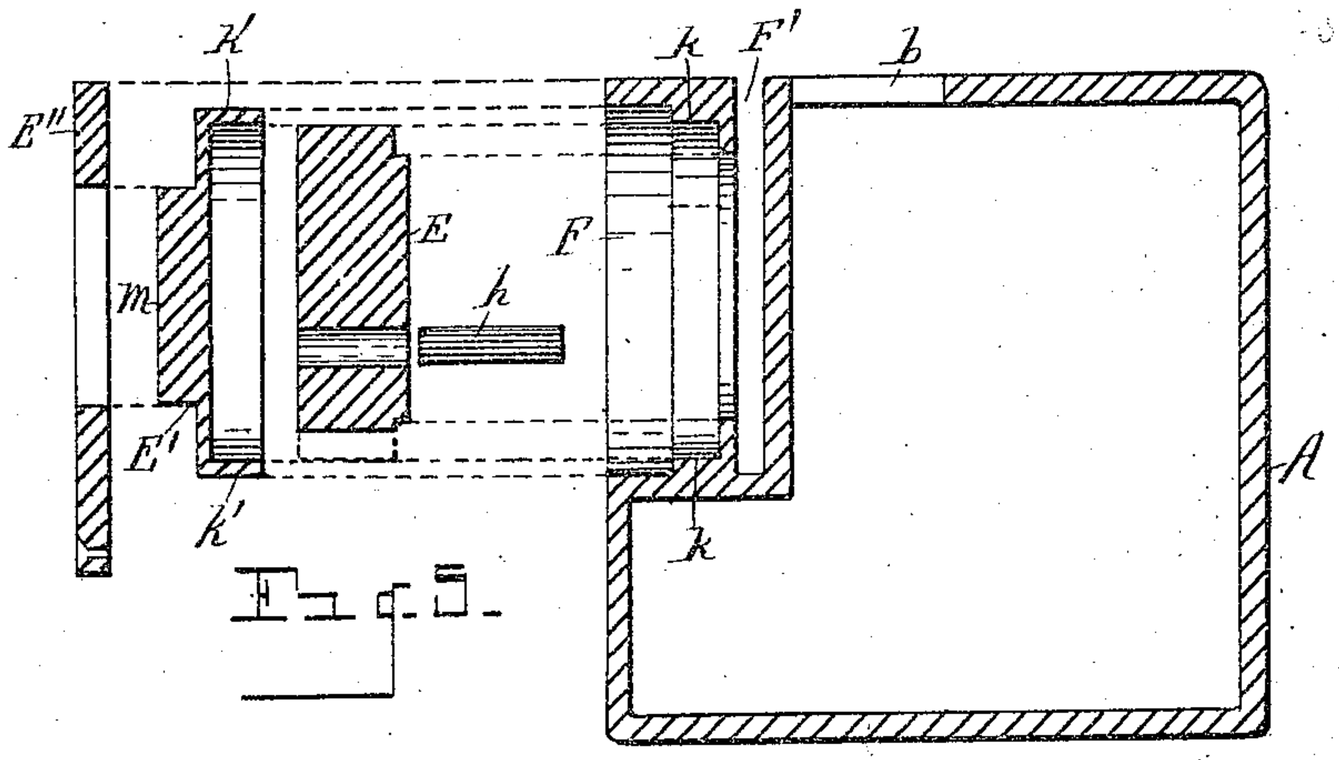


Fig. 5.

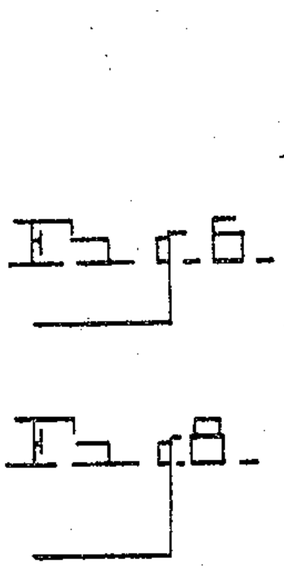


Fig. 6.

Fig. 8.

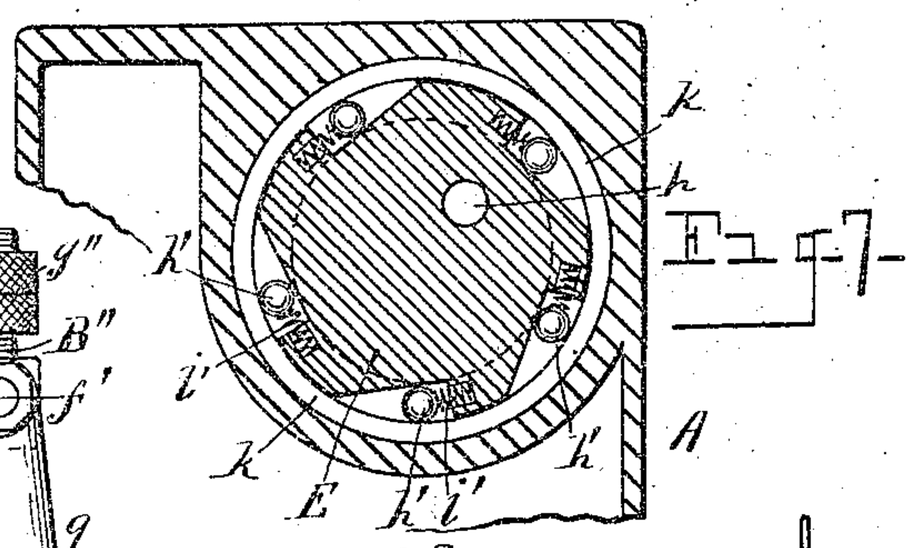
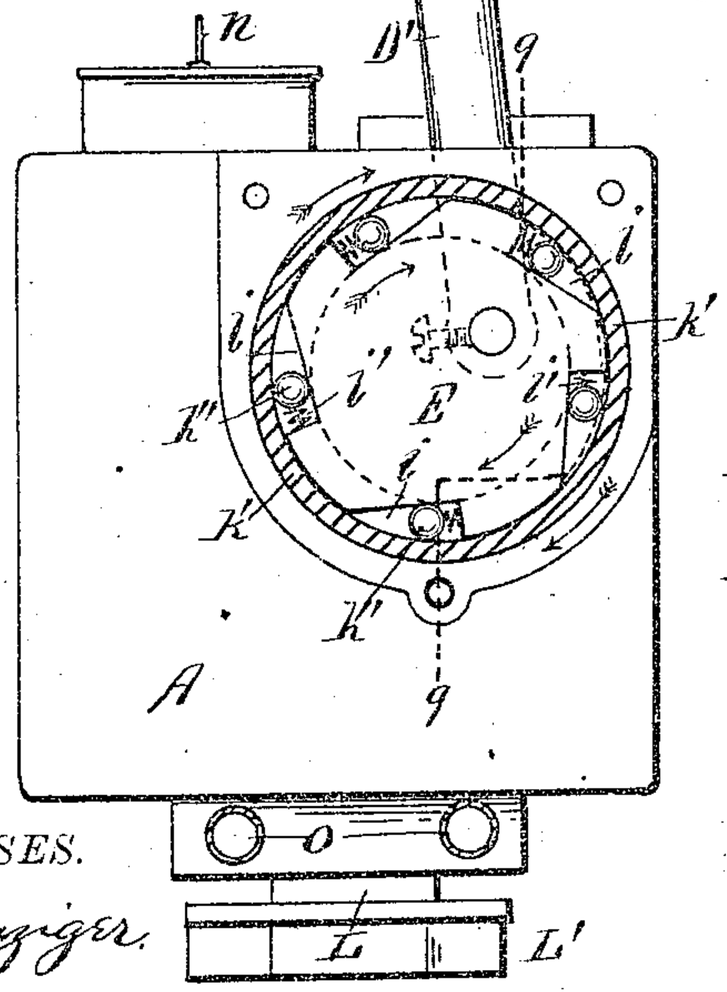


Fig. 7.



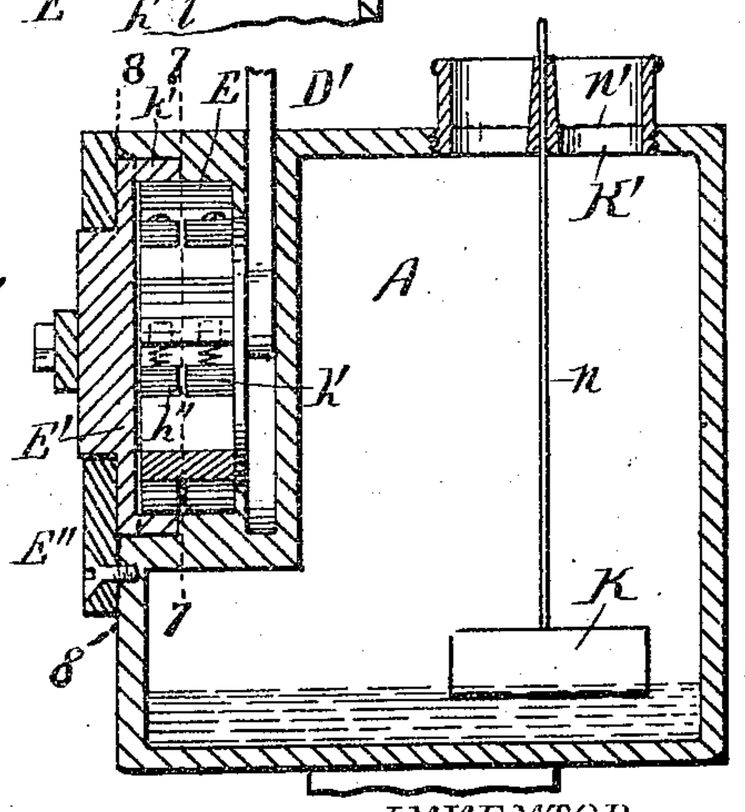


Fig. 9.

WITNESSES.

D. B. Sanziger.

M. A. Martin

INVENTOR.

John W. McClure.

By R. S. Wedderburn.

Attorneys.

UNITED STATES PATENT OFFICE.

JOHN W. McCLURE, OF DETROIT, MICHIGAN.

OIL-PUMP FOR CYLINDER LUBRICATION.

SPECIFICATION forming part of Letters Patent No. 722,184, dated March 3, 1903.

Application filed April 1, 1898. Renewed April 24, 1901. Serial No. 57,332. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. McCLURE, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new and useful Improvements in Oil-Pumps for Cylinder Lubrication; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to high-speed oil-pumps for cylinder lubrication; and it consists in the construction and arrangement of parts hereinafter fully set forth, and pointed out particularly in the claims.

The objects of the invention are to produce an oil-pump for cylinder lubrication of simple and inexpensive construction in which the arrangement is such as to provide for the most minute movement of the oil-pump for each turn of the engine, so that in high-speed engines no excess of oil need be fed, but only the requisite quantity to keep the cylinder properly lubricated.

A further object is to provide suitable adjusting means to regulate the movement of the pump-plunger for each stroke of the crank connected therewith.

A further object is to provide for the ready removal of the valves and pump mechanism from the oil-reservoir for the purpose of cleaning or repair.

A further object is to provide a sight-feed through which the passage of the oil to the steam-pipe may be readily seen and in which the arrangement is such as to provide for a circulation of water through the glass, so as to maintain the presence of clear water at all times within the feed-glass and prevent the accumulation of dirt therein.

These objects are attained by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of my improved pump ready for attachment to a moving part of the engine. Fig. 2 is a vertical transverse section through the pump, its driving mechanism, and the oil-reservoir, the steam-pipe, the oil-feed pipe connected therewith, the sight-feed, and the condensing-pipe in said figure appearing in elevation. Fig. 3 is an enlarged longitudinal section through the sight-feed and the end of the condensing-pipe connected therewith. Fig. 4 is a transverse section as on line 4 4 of Fig. 3. Fig. 5 is a sectional view through the oil-reservoir, the holder for the frictional driving mechanism located in the side thereof, and the disks of said mechanism, with the crank-pin and confining-plate drawn apart, but showing their relative position, as well as their position in the holder. Fig. 6 is an elevation of the edge of the friction-disk, showing the driving-rollers in the recesses in the edge thereof. Fig. 7 is a sectional view through the holder in the oil-reservoir and the friction-disk lying therein as taken on line 7 7 of Fig. 9. Fig. 8 is a sectional view through the driving-disk as taken on line 8 8 of Fig. 9. Fig. 9 is a sectional view as taken on line 9 9 of Fig. 8.

Referring to the letters of reference, A designates the oil-reservoir, which is made, preferably, of cast-iron and which may be of such size as to carry the amount of oil required. In the top of said reservoir is an aperture *b*, adapted to be closed by a removable plate B. Attached to and depending from said plate within the oil-reservoir is the barrel B′ of the pump, in which the plunger B″ is adapted to reciprocate vertically, the upper end of said barrel being provided with a suitable stuffing-box *a*, closed with a cap *a*′, through which the plunger passes. Attached to the lower end of the barrel of the pump is a valve-case C, having a chamber *c* therein provided with an intake-port *c*′, controlled by the check-valve *c*″. Leading from the chamber *c* is an oil-passage *e*, which communicates with a second chamber *e*′, having therein the check-valve *e*″, which controls the opening leading from said chamber to the passage *e*. Leading upward from the chamber *e*′ is a pipe *d*, whose upper end passes through the plate B and receives a coupling *d*′, in which is located a check-valve *d*″. Attached to the upper end of the coupling *d*′ is the oil-feed pipe C′, which leads to the steam-pipe C″ of the engine. (Not shown.) Located in said oil-pipe is the sight-feed glass D, which enables the engineer to see the amount of oil that is being fed to the

engine. Located in the oil-feed pipe C′ is a union-coupling *f*, which enables said pipe to be uncoupled for purposes hereinafter stated.

It will now be understood that upon the raising of the plunger of the pump the oil in the reservoir will flow into the chamber *c* past the valve *c″*. Then upon the descent of said plunger the oil will be forced out of said chamber and through the pipe *d* into the oil-feed pipe C′ and thence to the steam-pipe of the engine. The vertical movement of the pump-plunger is effected through the medium of the connecting-rod D′, which is jointedly and adjustably connected therewith. The jointed attachment of said connecting-rod to the pump-plunger consists of the journal-pin *f′*, to which the upper end of said rod is journaled, as clearly shown in Fig. 2, and which projects horizontally from a collar D″, that freely embraces the upper end of said plunger and is adapted to move vertically thereon. The adjustable connection between said rod and said plunger is obtained through the medium of the adjusting-nuts *g* and *g′*, which are screwed onto the threaded upper end of said plunger and stand on opposite sides of the collar D″. Said collar as it is moved vertically through the operation of the connecting-rod D′ is adapted to successively engage said adjusting-nuts to impart a vertical movement to the pump-plunger. It will therefore be understood that the position of said nuts with respect to said collar determines the movement that is imparted to the pump-plunger through the operation of said rod. The upper nut *g″* upon the plunger serves as a set-nut to lock the adjusting-nut *g′* when properly adjusted to impart the requisite movement to the plunger. It will be understood that the movement of the plunger determines the quantity of oil which is fed for each stroke thereof, said quantity varying as the plunger is caused to make a long or a short stroke.

The mechanism employed to impart movement to the connecting-rod D′ is a frictional driving mechanism consisting of a friction-disk E, to which said rod D′ is connected by means of the crank-pin *h*, and the frictional driving-disk E′, adapted to partially embrace the disk E, which disk E′ is held in place by a confining-plate E″, attached to the face of the oil-reservoir. This frictional driving mechanism is located in a holder F, which consists of a circular recess (see Fig. 5) formed in the face of the oil-reservoir and termed a "holder," for the reason that it holds and confines the driving mechanism. Back of the recess F and communicating therewith is a slotted opening F′, in which the connecting-rod D′ is adapted to play. The friction-disk E is adapted to occupy the innermost recess in the holder and carries the crank-pin *h*, which projects into the slotted opening F′ and receives the rod D′, which is journaled thereon. This disk E is provided transversely of its periphery with a series of recesses *i*, formed by cutting right-angled slots in the periphery of said disk, producing recesses, each of which has a radial side, as shown. These recesses are occupied by two series of rollers *h′* and *h″*, lying side by side. Each of these rollers is engaged by a separate spring *i′*, seated in the diametrical face of said recess and bearing against said rollers, respectively. The inner series of these rollers is confined in said recess in said disk by means of the annular shoulder *k*, formed in the holder F, the diameter of the opening of said holder within said annular shoulder being such as to snugly receive said disk E, as clearly shown in Fig. 7, so that said inner series of rollers in said recess is normally held by springs against the face of said shoulder and the tangent plane of said recess, whereby said disk is locked within said holder against any backward movement or a rotary movement to the left, as such movement would cause said rollers to wedge between the shoulder *k* of the holder and the tangent face of said recess, thereby arresting said disk. The outer series of rollers *h″* within the recesses of said disk is adapted to engage the inner face of the annular flange *k′*, projecting laterally from the frictional driving-disk E′, which is adapted to freely lie within the outer annular opening of the holder and embrace the outer edge of the disk E, so as to confine the series of rollers *h″* within the recesses of said disk E, which rollers, by means of the springs which bear against them, are normally held in contact with said flange *k′* of the disk E′ and the tangent plane of the recess of the disk E. Said disk E′ is adapted to rotate and is provided with a raised central portion or hub *m*, which projects through a central opening in the plate E″, that is secured to the face of the oil-reservoir and serves to retain the disk E′ in place, although permitting said disk to rotate. Movement is imparted to the disk E′ through the medium of the bar G, which is attached to the raised central portion thereof and is provided at its outer end with a suitable coupling G′, adapted for attachment to a moving part of the engine. (Not shown.) A reciprocating motion imparted to the outer end of the bar G will cause the driving-disk E′ to oscillate, which movement will impart an intermittent rotary motion to the frictional disk E and a consequent movement of the connecting-rod D′ and of the plunger of the pump. In the oscillation of the disk E′ the disk E is driven only during the movement of the disk E′ to the right, which movement wedges the outer series of rollers *h″* between the flange *k′* of the driving-disk and the tangent plane of the recesses *i*, causing the disk E to turn to the right with the disk E′. A backward movement of the disk E′ or a movement to the left causes the rollers *h″* to roll backward against their springs *i′*, thus releasing the disk E and permitting the disk E′ to move freely to the left, while the disk E remains

securely locked against backward movement by the inner series of rollers h', as before described. A succeeding movement of the driving-disk E′ to the right will again carry the disk E with it the distance of its own movement, and thereby imparting another impulse to the connecting-rod D′, and so on. The driving-disk E′ by its oscillation imparts an intermittent rotary motion to the disk E. The operation of this frictional driving mechanism is so perfect that the most minute movement of the driving-disk is imparted to the disk E to cause it to gradually turn to the right, so that the merest vibration of the outer end of the lever G is imparted to the disk E in the form of an intermittent rotary movement to the right, thereby operating the connecting-rod and driving the pump. The arrangement of parts is such as to enable the attachment of the operating-rod G to the movable part of an engine running at the highest speed, and yet impart but the requisite number of strokes to the pump, owing to the very minute movement which may be imparted to the disk E through a movement of the connecting-bar G, and by a further adjustment, made possible by the adjusting-nuts upon the upper end of the pump-plunger, the movement imparted to said plunger by each full stroke of the connecting-rod D′ may be so regulated as to pump but a single drop of oil for a number of strokes of said rod, whereby the requisite amount of oil may be fed in an even and perfect manner no matter at what speed the engine may be running.

For the purpose of keeping the oil in the reservoir at the proper state of fluidity a steam-pipe o is passed and returned through the casting H at the bottom of the reservoir. The presence of steam in said pipe tends to heat the contents of the reservoir to the proper temperature.

The sight-feed D, located in the oil-feed pipe C′, leading from the pump to the steam-pipe, comprises a coupling H′, having at each end the stuffing-boxes H″, which receive and confine the ends of the glass I, into the lower end of which the oil-feed nozzle r projects. The oil leaves the end of said nozzle r in a drop and passing upward through the glass enters the steam-pipe through a continuation of the oil-feed pipe, so that the engineer is enabled to see at all times the amount of oil that is being fed by the pump. To provide for the presence of water in the feed-glass and maintain said water in circulation, a condensing-pipe J is employed, which is tapped at its upper end into the steam-supply pipe and at its lower end communicates with a passage s, leading into the sight-feed at a point below the lower end of the glass therein, as clearly shown in Fig. 3. The condensation of steam within said pipe J will cause the sight-feed glass to fill with water, which stands in said glass and in the oil-feed pipe above it. It will be seen that the condensing-pipe will fill with water to a point on a line with the entrance to the oil-feed pipe into the steam-pipe C″ (see Fig. 2) and that a further accumulation of water in the condensing-pipe will cause a like amount of water to flow out of said oil-pipe into said steam-pipe, thereby maintaining a circulation through the feed-glass, which insures the presence of clear water in the glass at all times and obviates the accumulation of dirt therein.

To indicate at all times the quantity of oil within the reservoir, a float K is employed, (see Fig. 9,) which is provided with a vertical stem n, that projects through the filling-aperture K′ and indicates by the length projecting from the reservoir the quantity of oil therein. Crossing the mouth of the filling-aperture K′ is a screen n', which prevents any foreign matter entering the reservoir with the oil.

The threaded projection L on the bottom of the reservoir carrying the nut L′ and shown in Figs. 2 and 8 is for the purpose of affording means for attaching the reservoir and pump to any suitable support.

The check-valves e'' and d'' in the oil-passage hold the oil within the oil-feed pipe and prevent a backward flow thereof to the pump, and because of the fact that these valves, as well as the pump-valve c'', are located within the oil-reservoir which is supplied with heat the operation of said valves is not interfered with through the congealing of the oil, as would be the result were said valves exposed to cold air or drafts by reason of their location upon the exterior of the oil-reservoir. The power developed by the frictional driving mechanism is such as to easily force the oil into the steam-pipe against any pressure that the boiler may carry, insuring a perfect feeding of oil under all conditions of temperature and pressure.

Having thus fully set forth this invention, what is claimed is—

1. In a pump for engine lubrication, the combination of the oil-reservoir, the oil-pump within the reservoir, a holder for the driving mechanism also within said reservoir but separated from the pump-chamber, the plunger of the pump standing adjacent to the wall of said holder, the frictional driving mechanism located in said holder, a connecting-rod projecting from said holder through the top of said reservoir, the lower end of said rod being journaled on a pin carried by a disk of the driving mechanism, the upper end of said rod being pivotally connected with the plunger of the pump, and a vibratory rod connected with the driving mechanism and adapted for attachment to a movable part of an engine.

2. In a pump for engine lubrication, the combination of the oil-reservoir, the pump therein, a holder in the reservoir to receive the driving mechanism, a frictional driving mechanism located in said holder consisting of a rotary frictional disk, a connecting-rod

projecting from said holder, the lower end of said rod being journaled to a pin on said disk and the upper end of said rod being connected with the plunger of the pump, a second rotary driving-disk having a circular flange which projects from the vertical face thereof and embraces the periphery of said first-mentioned disk, a series of friction-rollers interposed between the periphery of said first-mentioned disk and the circular flange of the driving-disk, a rod crossing the outer face of the driving-disk and rigidly attached thereto, and means for imparting a vibration to said rod to oscillate said driving-disk.

3. In an oil-pump, the combination with the oil-reservoir, having a pump connected therewith, and the driving mechanism located within the reservoir, of a driving mechanism, a rotary disk of said driving mechanism having a journal-pin projecting therefrom, a connecting-rod journaled on said pin and projecting upwardly through the top of the reservoir, the pump-plunger also projecting from the reservoir adjacent to and parallel with said connecting-rod, a collar fitting loosely on the upper end of said plunger, said collar having a journal-pin projecting laterally therefrom, the upper end of the connecting-rod journaled on said pin, the upper end of the plunger of the pump having a screw-thread extending above and below said collar thereon, a movable stop upon said thread below said collar, an adjusting-nut upon said thread above said collar, and a jam-nut engaging said adjusting-nut.

4. In an oil-pump, the combination with the oil-reservoir having an aperture in the top thereof, a removable plate covering said aperture, means for heating said reservoir, a valve-case depending within the reservoir, the pump-cylinder depending from said removable plate and screwing into said valve-case, a pump-chamber within the valve-case into which said pump-cylinder leads, and a valve-controlled opening leading from the bottom of said chamber, a plunger within the pump-cylinder, the pump-operating mechanism mounted in the reservoir and detachably attached to the upper end of said plunger, an oil-pipe projecting through the removable plate in the top of the oil-reservoir, the lower end of said pipe communicating with an oil-chamber within said valve-case, a valve-controlled passage connecting said pump-chamber with said oil-chamber, a detachable coupling in said oil-pipe adjacent to said removable plate whereby the oil-pipe may be uncoupled to permit of the removal of the valve-case from the reservoir.

In testimony whereof I sign this specification in the presence of two witnesses.

JOHN W. McCLURE.

Witnesses:
E. S. WHEELER,
M. A. MARTIN.