No. 644,149. Patented Feb. 27, 1900.

C. E. SARGENT.

LUBRICATING DEVICE FOR ENGINES.

(Application filed Nov. 1, 1899.)

(No Model.) 2 Sheets—Sheet 1.

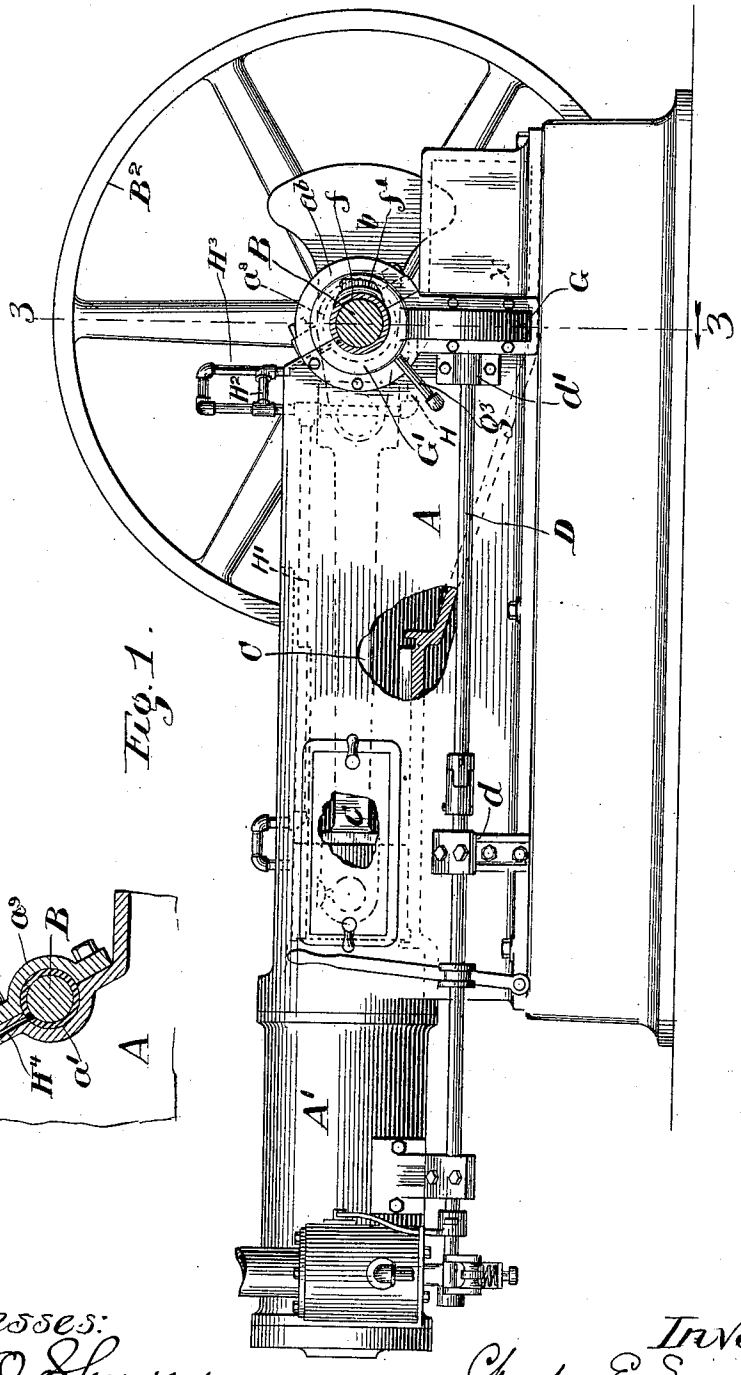

Fig. 1.

Fig. 2.

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Fig. 5.

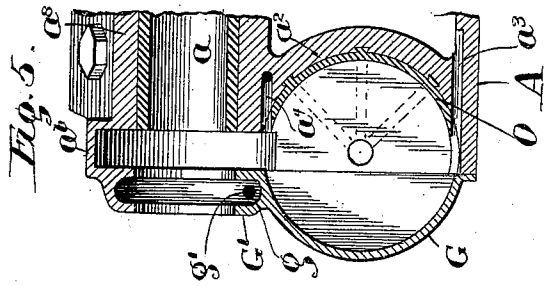


Fig. 4.

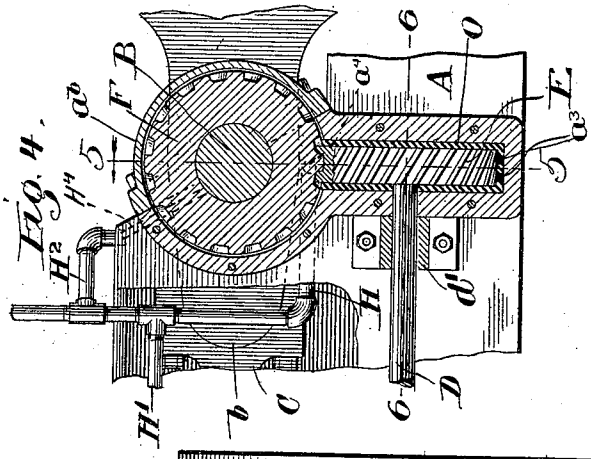


Fig. 6.

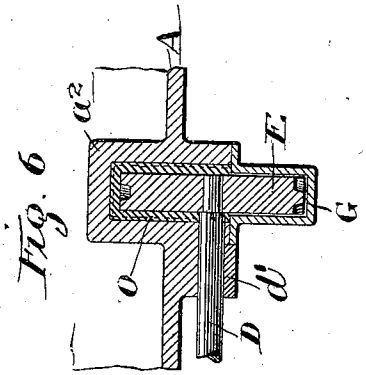
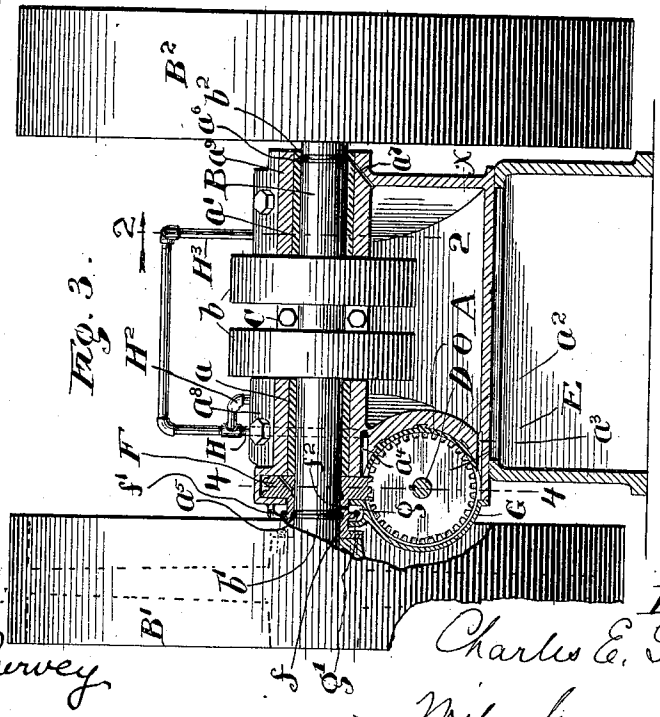


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES E. SARGENT, OF CHICAGO, ILLINOIS.

LUBRICATING DEVICE FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 644,149, dated February 27, 1900.

Application filed November 1, 1899. Serial No. 735,474. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. SARGENT, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Lubricating Devices for Engines, of which the following is a specification.

My invention relates to a certain class of engines, mostly of the internal-combustion type, in which the valves are operated from the driving-shaft by certain interposed gears adapted to communicate motion to the valves by means of a connecting-shaft, the object of the gears being to control the motion of said shaft and also the direction of the same.

The object of the invention is to utilize the said gears to maintain a constant circulation of oil through the working parts and bearings of the engine, using the same oil over and over again and keeping a constant supply at the points where it is needed.

To such end the invention consists in certain novel features, a description of which will be found in the following specification and the essential features more definitely pointed out in the claims.

The invention is illustrated in the drawings furnished herewith by means of six figures, of which—

Figure 1 is a side elevation of an engine with certain portions broken away to illustrate other more important portions. Fig. 2 is a vertical cross-section in line 2 2 of Fig. 3. Fig. 3 is a vertical cross-section in line 3 3 of Fig. 1. Fig. 4 is a detail longitudinal section in line 4 4 of Fig. 3. Fig. 5 is a vertical cross-section of a portion of the frame of the machine, the line of section being indicated at line 5 5 in Fig. 4; and Fig. 6 is a horizontal section in line 6 6 of Fig. 4.

Referring to the drawings, A represents the bed of the engine, and A′ the cylinder, which is provided with the ordinary valves used in engines of this class. The main driving-shaft B is journaled in bearings a a', provided with caps a^8 a^9, and carries upon its ends fly-wheels B′ B². At its middle portion it has a preferably integral double crank b, on which is pivoted the connecting-rod C, the latter being secured to the piston in the ordinary manner. The valves are operated by a shaft D, journaled in boxes d d', secured to the bed of the machine and carrying upon one end a spiral gear-wheel E in mesh with a second spiral gear-wheel F, secured to the main driving-shaft B.

The bed of the machine is formed with a socket a^2, in which one half of the gear E lies, and a cap G is bolted to the frame, as seen in Figs. 1 and 5, to inclose the other half of said gear. The latter runs in Babbitt metal O, which is poured into the socket a^2 to make a perfect fit between the gear and the surrounding walls. The Babbitt metal is preferably run in after the blank gear has been trued up, but before the teeth have been cut in same, the gear having been mounted upon the shaft and fitted to its place in the socket. This makes a perfectly-smooth bearing between the outer peripheries of the teeth and the surface of the Babbitt metal, which is quite essential to the perfect operation of the device. The cap G extends upward and also incloses the greater portion of the gear F, as seen at G′. (See Fig. 1.)

The bed of the machine is preferably so constructed as to form a reservoir or tank in which a quantity of lubricant may be stored at a convenient point. This tank is shown at X in the drawings and should preferably be located as near the parts of the engine which use the most oil as possible. Looking at Fig. 3, it will be seen that openings a^3 are formed in the wall of the socket a^2 and in the Babbitt metal to permit the oil to flow into the chamber occupied by the gear E. At the top of this chamber is formed a second opening a^4, communicating with a pipe H, which may extend to any of the parts of the machine which require oiling. The pipe in the drawings is shown as having a branch H′, running to the cross-head of the engine, and branches H² H³, extending to the bearings of the main driving-shaft B. In Fig. 2 it will be seen that the branch H³ connects with a port H⁴ in the frame, which extends to the shaft B. The branch H² is similarly connected to the shaft B. The shaft is preferably formed with ribs b' b^2, running in grooves a^5 a^6. The groove a^5 is formed in a boss f, the gear F and the groove a^6 in the bearing a', the object of the same being to prevent the flowing of oil out upon the shaft beyond

the bearing a' and gear F. A port a^7 connects the groove a^6 with the interior of the bed and allows oil to run from the bearing back into the bed of the machine. The collar f embraces the shaft B and is formed with an annular rib f', rotating in a channel g, formed in the upper portion G' of the cap, said rib f' being adapted to stop any flow of oil which may escape from the chamber in which the gear F travels. An aperture f^2 in the collar f of the gear F communicates with the channel g and allows the oil to flow from the shaft B into said channel g. An aperture g' is formed in the cap G and communicates with the interior of the bed of the machine through a pipe g^3, (see Fig. 1,) conveying the oil which collects in the channel g to the reservoir X. The cap a^8 is formed with a hood a^b, (see Figs. 4 and 5,) which, together with the upper portion G' of the cap G, completely incloses the gear F and prevents any oil from getting out of the engine at this point.

The oil in the reservoir X flows by gravity through openings a^3 into the socket a^2 and fills the spaces in the teeth of the gear E. As these pass upward from the openings a^3 the oil becomes penned in between the sides of the gear and walls of the socket until it reaches the gear F. As the teeth of the latter advance in the gear-wheel E they force the oil out from between the teeth of the latter through the port a^4, from which it passes to the pipe H and thence to the various parts of the engine through the connecting-pipes before described. After it has performed its work in lubricating said parts it flows by gravity back to the reservoir and cools off for another round.

The valve of the invention herein disclosed will be recognized when it is considered, first, that the series of gears between the main driving-shaft and the valve-operating shaft are a common and desirable feature of engines of this class; second, that said gears should run in oil for their own lubrication, and, third, that devices should be provided for maintaining a constant circulation of oil through the said gears and also through the other working parts of the engine. All of these desirable features are attained by the simple expedient of babbitting a portion of the gear-casing and providing connecting-passages between the gears and the reservoir, the gears and the working parts, and the working parts and the reservoir.

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

1. The combination, in an engine of the class described, of a frame, a cylinder, suitable valves, a main driving-shaft, a piston connected therewith, a valve-operating shaft, a series of gears between the driving-shaft and the valve-operating shaft, a reservoir located below the working parts, a passage leading from the reservoir to one of said gears, passages leading from another point of said gear to the working parts of the engine, passages leading from said working parts to the reservoir and an approximately oil-tight casing about the said gear, whereby the same operates both to pump the oil from the reservoir to the working parts and to operate the valves; substantially as described.

2. In an engine and in combination with the working parts thereof, a reservoir below said working parts and connected therewith by suitable passages, a babbitted casing having an inlet and an outlet port, a passage connecting the inlet-port with the reservoir, passages connecting the outlet-port with the working parts of the engine, a gear in the casing, a second gear in mesh with the first and connections between said gears and the working parts of the engine for driving the gears; substantially as described.

In witness whereof I have hereunto set my hand, at Chicago, in the county of Cook and State of Illinois, this 28th day of October, A. D. 1899.

CHARLES E. SARGENT.

Witnesses:
CHAS. O. SHERVEY,
S. BLISS.