C. P. BROCKWAY.

OILING SYSTEM.

APPLICATION FILED FEB. 10, 1919.

1,402,281. Patented Jan. 3, 1922.

2 SHEETS—SHEET 1.

Fig. I.

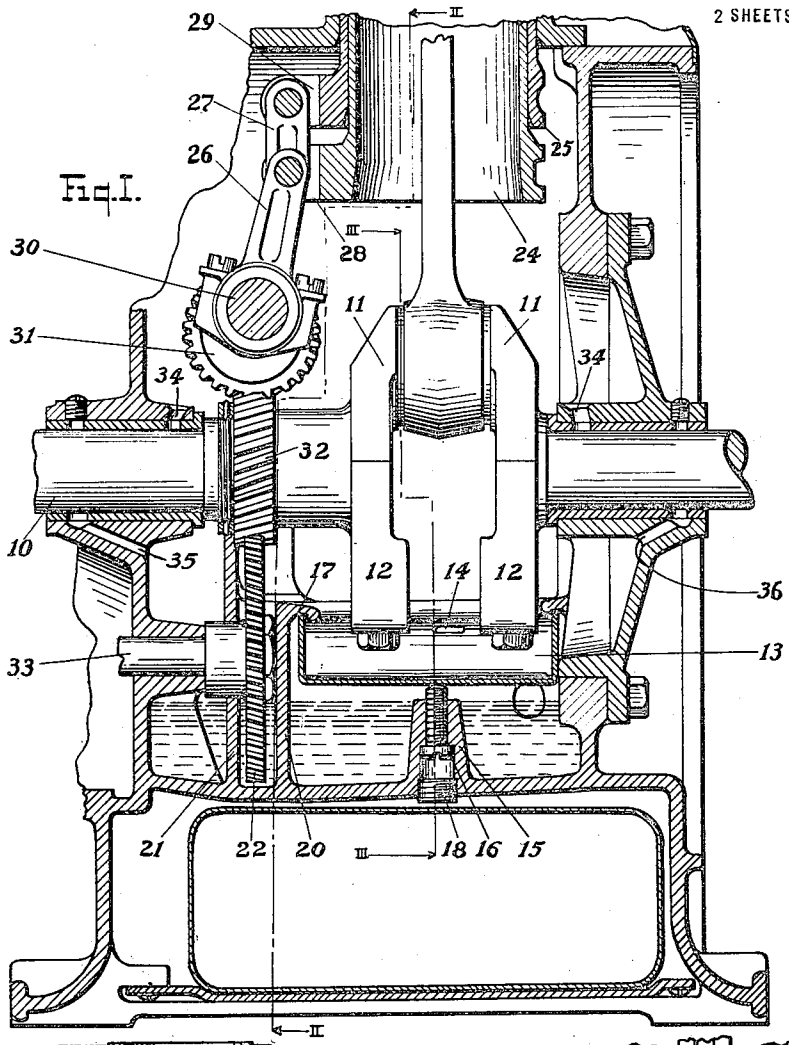
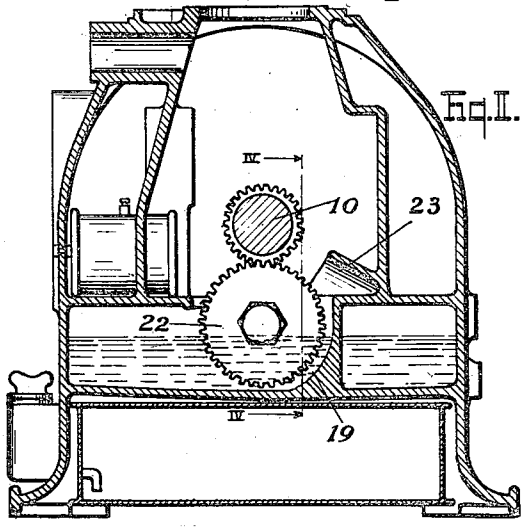


Fig. II.



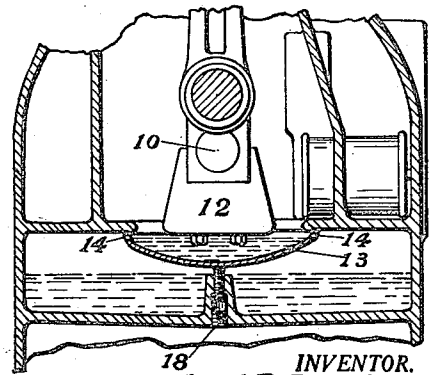


Fig. III.

INVENTOR.

Carl P. Brockway

BY Chester H. Braselton

ATTORNEY

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2 SHEETS—SHEET 2.

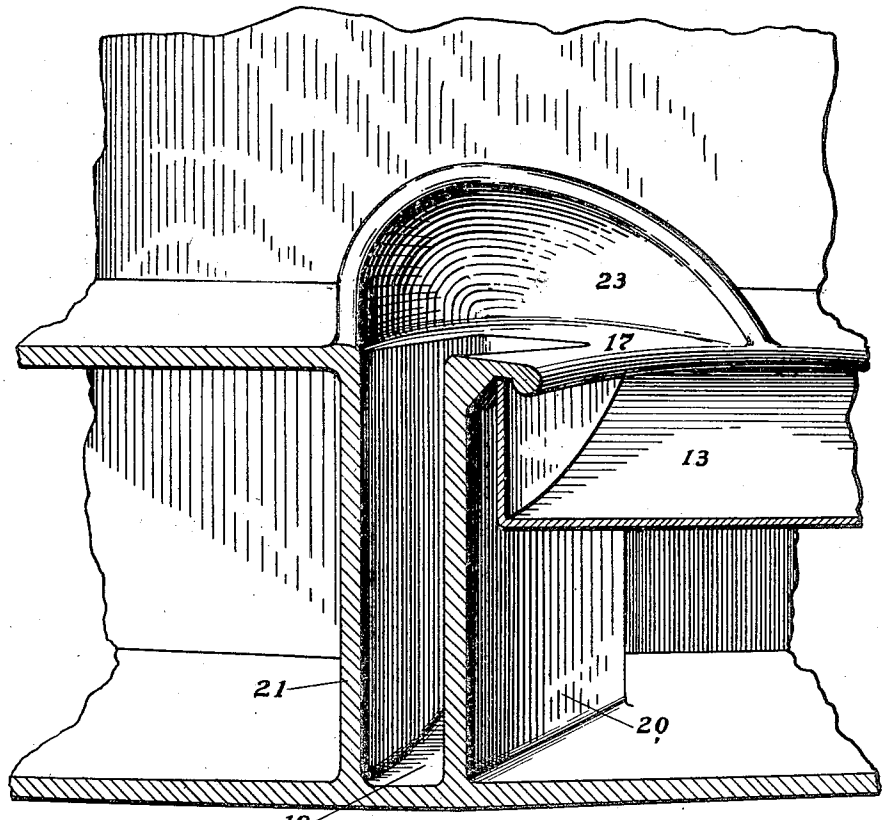


Fig. IV.

INVENTOR.
Carl P. Brockway
BY Chester W. Braselton
ATTORNEY

UNITED STATES PATENT OFFICE.

CARL P. BROCKWAY, OF TOLEDO, OHIO, ASSIGNOR TO INDUSTRIAL RESEARCH CORPORATION, OF TOLEDO, OHIO, A CORPORATION OF DELAWARE.

OILING SYSTEM.

1,402,281. Specification of Letters Patent. Patented Jan. 3, 1922.

Application filed February 10, 1919. Serial No. 276,168.

To all whom it may concern:

Be it known that I, CARL P. BROCKWAY, a citizen of the United States, residing at Toledo, county of Lucas, and State of Ohio, have invented certain new and useful Improvements in Oiling Systems, of which I declare the following to be a full, clear, and exact description.

This invention relates to improvements in oiling systems of the splash type, and is intended to be employed principally for the lubrication of internal combustion engines.

The principal object of the invention is to provide for gas engines lubricating means of the type named, which shall be simple in construction, certain in operation and inexpensive to manufacture.

Another object of the invention is the provision of a pump for raising oil from the oil reservoir to the splash pan, which pump contains but one moving part and is therefore unlikely to get out of order.

Another object of the invention is the provision of means for driving the aforesaid single moving part, which may be a gear, from the same gear that drives the valve operating mechanism.

A further object is the provision of a deflecting hood for catching any oil that may be thrown off the periphery of the rotating gear and directing it into the splash pan.

Other objects, and objects relating to details of construction and economies of manufacture, will appear as I proceed with the description of that embodiment of the invention which, for the purposes of the present application, I have illustrated in the accompanying drawings, in which:

Fig. I is a cross sectional view through the crank case of a single cylinder gas engine of the sleeve vale type embodying my invention.

Fig. II is a cross sectional view taken substantially on the line II—II, Fig. I, the sleeves and their operating mechanism being omitted.

Fig. III is a cross section taken substantially on the line III—III, Fig. I.

Fig. IV is a sectional perspective view taken substantially on the line IV—IV, Fig. II, the pump gear being omitted.

Similar reference characters refer to similar parts throughout the views.

In the drawings the numeral 10 indicates the crank shaft of an internal combustion engine. It should be understood however, that the invention is applicable to any other type of engine having a crank shaft. In the present case, the weight of the cranks 11 and of the piston rod bearings carried thereby is balanced by the counterweights 12. Both the cranks 11 and the counterweights 12 are adapted to enter and pass through the upper part of a splash pan 13, as the shaft 10 rotates, the counterweights 12 splashing at the time the piston is at its outer point relative to the crank shaft, and thereby securing very efficient distribution of the lubricating oil over the cylinder walls.

In order that lubrication of the splash system type may be of the greatest efficiency, it is necessary that the body of oil entered by the cranks and counterweights be kept at a constant level, or practically so. My invention aims to provide means to accomplish this result. The oil is prevented from rising above a certain level by means of overflow openings 14 in the pan. It is kept constantly up to that level by the pumping means which will be presently described.

The lower portion of the crank case of the engine constitutes an oil reservoir. An internally threaded lug 15 extends upwardly into this reservoir and carries a machine screw 16 on the top of which the pan 13 is supported. The upper edge of the pan bears against the under side of a beaded rim 17, which is preferably an integral part of the crank casing. A firm and noiseless connection between the pan and rim 17 may be obtained by adjustment of the screw 16, as will be readily understood. The bottom of the opening in the lug 15 may be closed by a screw cap 18, if desired.

Along one side of the pan 13 I locate an inclined surface 19, flanked by side walls 20 and 21, which together form what is in effect a pump casing. The oil is lifted and pushed up the inclined surface 19 by means of a rotary element, which I prefer to make in the form of a gear 22. When the oil reaches the top of the casing, formed by the walls 20 and 21 and the inclined surface 19, it is directed to the pan 13 by the inclined surface of the rim 17, as plainly indicated in Figs. I and IV.

The gear 22 rotates more or less rapidly, depending upon the speed of the engine, and some of the oil which it raises will be thrown off at a tangent. The greater part

so thrown off is caught by the overhanging deflecting hood 23 and directed downwardly into the pan 13.

For purposes of illustration merely I have shown my invention as applied to an engine of the sliding sleeve valve type. The sleeves 24 and 25 are arranged to be reciprocated by means of small piston rods 26 and 27 pivoted to lugs 28 and 29 integral with the respective sleeves. The piston rod 26 is driven by an eccentric 30, and the piston rod 27 by a similar eccentric not shown in the drawing. The eccentric shaft is rotated by means of a gear 31, which meshes with a gear 32 upon the crank shaft, the latter gear being also in mesh with the gear 22, which constitutes the single moving element of the pump of my invention. The gear 22 is mounted upon a stub shaft 33 journaled in the crank case.

In the crank shaft bearings are located oil passages 34, 35 and 36, by means of which oil splashed up by the cranks or counterweights is directed to the main bearings, and thence back into the oil reservoir.

The operation of my invention will be obvious. When the engine is started the gear 22 is rotated by the gear 32 upon the crank shaft and raises oil from the oil reservoir by pushing it up the inclined surface 19 and throwing particles against the deflecting hood 23, all of which oil finds its way down the inclined rim 17 into the pan 13. As soon as the level of oil in the pan is of sufficient height it is entered by the moving cranks 11 and counterweights 12 and splashed up to the cylinder, valve sleeves, and other moving parts of the engine. Should the oil in the pan not be splashed out rapidly enough to maintain the proper level, the overflow openings 14 will prevent it from rising too high. Thus, a constant circulation of oil is maintained, and just enough oil is kept in the pan to accomplish efficient oiling.

I am aware that the particular embodiment of my invention above described and illustrated in the accompanying drawings is susceptible of considerable variation without departing from the spirit thereof, and therefore I desire to claim my invention broadly as well as specifically, as indicated by the appended claims.

I claim as my invention:

1. In combination with an engine having a crank shaft and piston, a splash pan, an oil reservoir below the level of said pan, an inclined surface extending upwardly from the reservoir to a point above the edge of the pan, vertical walls at the sides of said surface, a rotating element fitting closely between said walls for forcing oil up said inclined surface into said pan and means secured to the crank shaft for entering said splash pan when the piston is at the outer limit of its movement.

2. In combination with an engine having a crank shaft and piston, a splash pan, an oil reservoir below the level of said pan, an inclined surface extending upwardly from the reservoir to a point above the edge of the pan, vertical walls at the sides of said surface, a rotating gear fitting closely between said walls for forcing oil up said inclined surface and into said pan and splash means secured to the crank shaft adapted to enter said splash pan when the piston is at the outer limit of its movement relative to the crank shaft.

3. In combination with an engine having a crank shaft and piston, a splash pan, an oil reservoir below the level of said pan, an inclined surface extending upwardly from the reservoir to a point above the edge of the pan, vertical walls at the sides of said surface, a gear driven from the said crank shaft fitting closely between said walls for forcing oil up said inclined surface, means for guiding said raised oil into said pan and additional means, including crank arms secured to the crank shaft for entering said splash pan when the engine piston is at the outer limit of its movement relative to the crank shaft.

4. In combination with an engine having a crank shaft and piston, a splash pan, an oil reservoir below the level of said pan, an inclined surface extending upwardly from the reservoir to a point above the edge of the pan, side walls for said inclined surface, a rotating gear extending into and approximately filling the space between said side walls and inclined surface for forcing oil up said inclined surface, means for guiding said raised oil into said pan and additional means including crank arms secured to the crank shaft for entering said splash pan when the engine piston is at the outer limit of its movement relative to the crank shaft.

5. In combination with an engine having a crank shaft and piston, a splash pan, an oil reservoir below the level of said pan, an inclined surface extending upwardly from the reservoir to a point above the edge of the pan, vertical walls at the sides of said surface, a rotating element fitting closely between said walls for forcing oil up said inclined surface, a deflecting hood arranged to catch the oil thrown from said rotating element and guide it into said pan and splashing means secured to the crank shaft adapted to enter said splash pan when the engine piston is at the outer limit of its movement relative to the crank shaft.

6. In combination with an engine having a crank shaft, a splash pan, an oil reservoir below the level of said pan, an inclined surface extending upwardly from the reservoir to a point above the edge of the pan, vertical walls at the sides of said surface, a rotating gear fitting closely between said walls for

forcing oil up said inclined surface, and a deflecting hood arranged to catch the oil thrown from said rotating gear and guide it into said pan.

7. In combination with an engine having a crank shaft, a splash pan, an oil reservoir below the level of said pan, an inclined surface extending upwardly from the reservoir to a point above the edge of the pan, vertical walls at the sides of said surface, a gear fitting closely between said walls and driven from the crank shaft for forcing oil up said inclined surface, a deflecting hood arranged to catch the oil thrown from said gear, and means for guiding the oil raised by the gear and caught by the deflecting hood, and directing it into said pan.

8. In combination with an engine having a crank shaft, valve operating mechanism, a gear mounted upon the crank shaft for driving said valve operating mechanism, a splash pan, an oil reservoir below the level of said pan, an inclined surface extending upwardly from the reservoir to a point above the edge of the pan, vertical walls at the sides of said surface, a rotating gear in mesh with said first named gear fitting closely between said walls and arranged to force oil up said inclined surface, a deflecting hood arranged to catch the oil thrown from said last named gear, and means for guiding the oil raised by the gear and caught by the deflecting hood and directing it into said pan.

9. In combination with an engine having a crank shaft, a splash pan, an oil reservoir below the level of said pan, an inclined surface extending upwardly from the reservoir to a point above the edge of the pan, side walls for said inclined surface, a rotating disc extending into and approximately filling the space between said side walls and inclined surface for forcing oil up said inclined surface, and a deflecting hood arranged to catch the oil thrown from said rotating disc and guide it into said pan.

In testimony whereof, I affix my signature.

CARL P. BROCKWAY.