

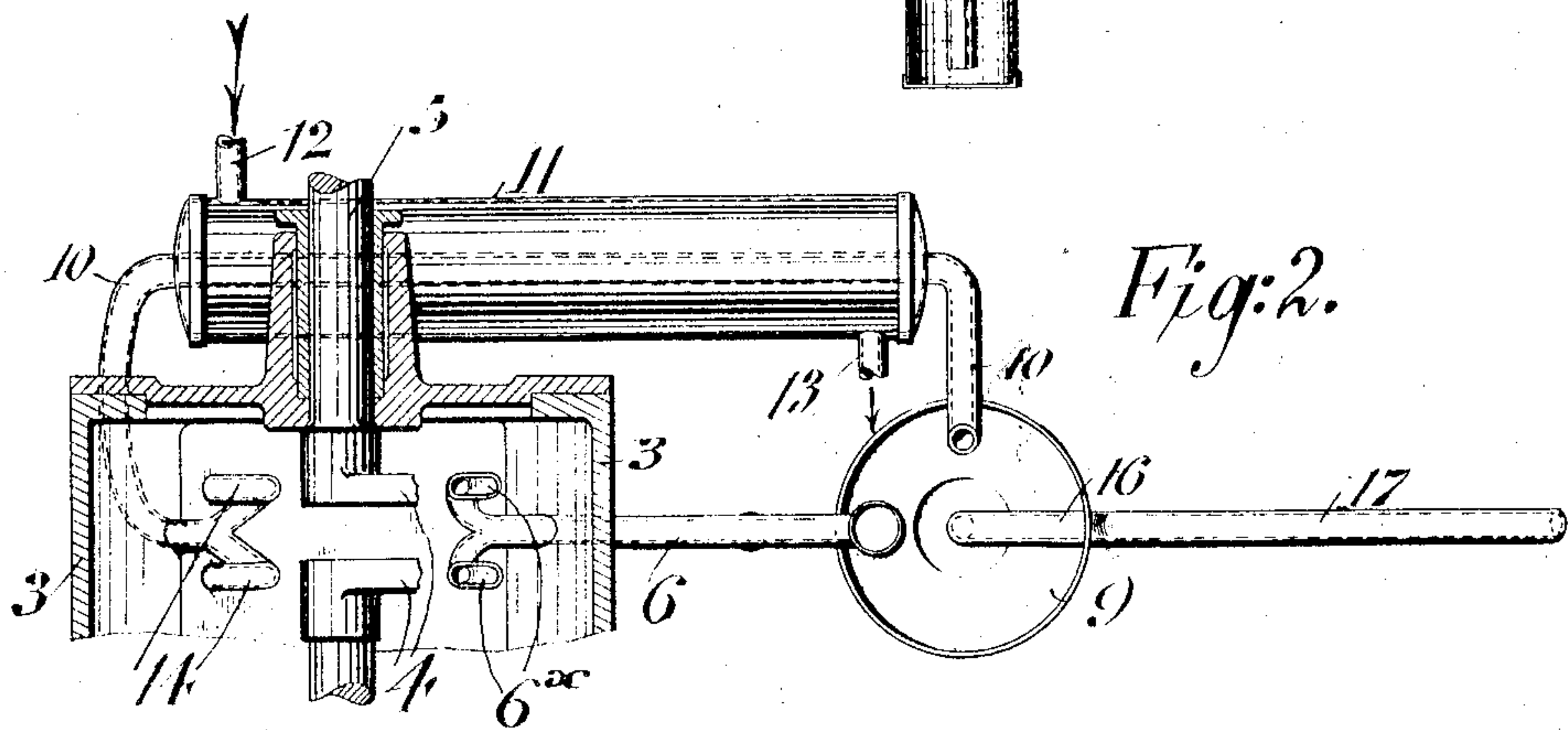
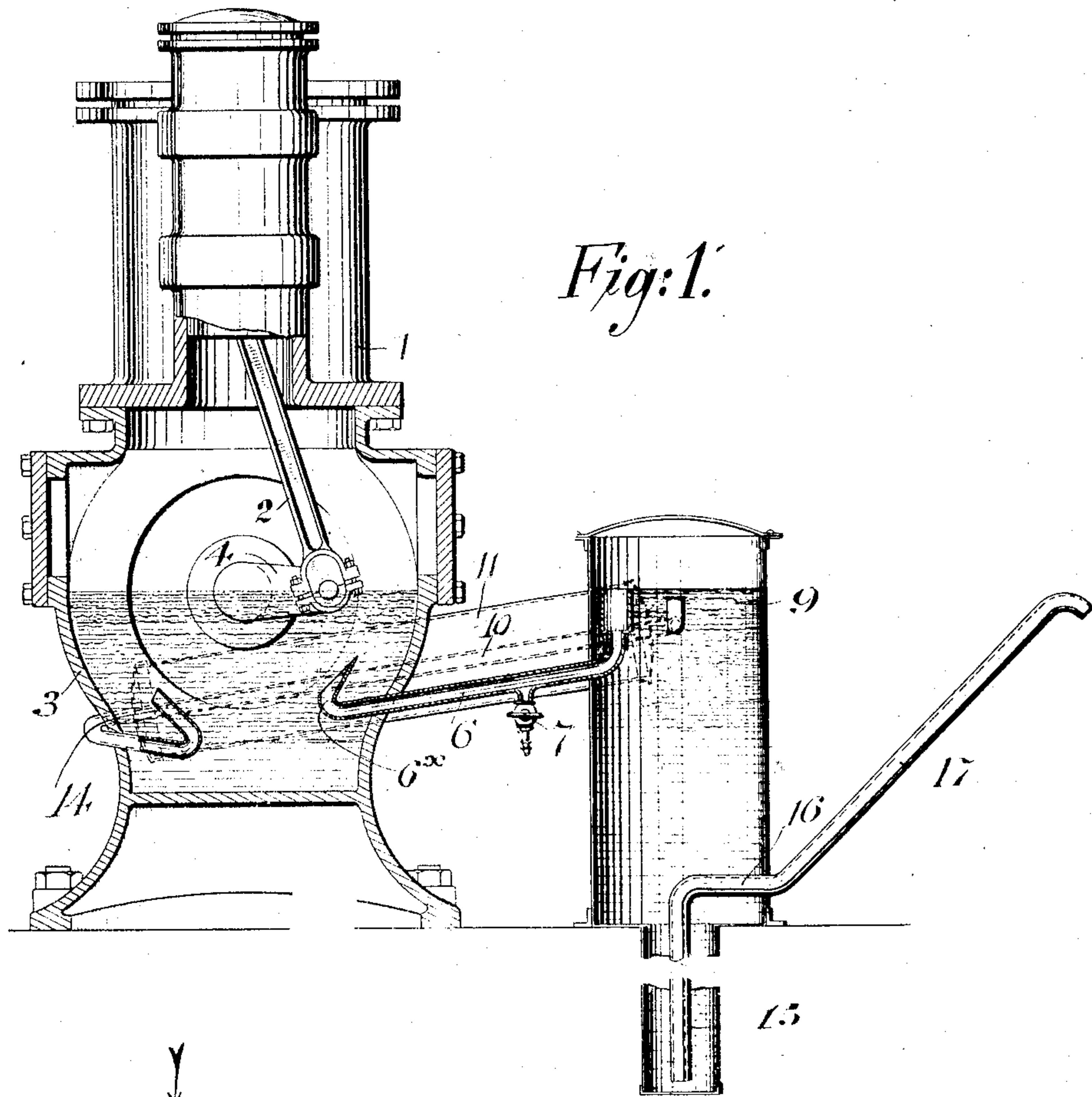
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G. BROWN.

APPARATUS FOR COOLING AND LUBRICATING CRANK CASE ENGINES.

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UNITED STATES PATENT OFFICE.

GEORGE BROWN, OF CENTRAL AQUIRRE, PORTO RICO.

APPARATUS FOR COOLING AND LUBRICATING CRANK-CASE ENGINES.

No. 831,532.

Specification of Letters Patent.

Patented Sept. 25, 1906.

Application filed December 7, 1905. Serial No. 290,831.

To all whom it may concern:

Be it known that I, GEORGE BROWN, a citizen of the United States, residing in Central Aquirre, Porto Rico, have invented certain new and useful Improvements in Apparatus for Cooling and Lubricating Crank-Case Engines, of which the following is a specification.

This invention relates to means for lubricating and cooling engines of the Westinghouse type, in which the crank is inclosed in a suitable case which serves as a container for the lubricant, so that upon each revolution of the crank the same is submerged in such lubricant in order to thoroughly lubricate the crank-bearing.

The present invention has among its objects to provide an apparatus in which the condensed steam which finds its way into the crank-case is disposed of in such a manner that the level of the oil in the crank-case is automatically maintained.

A further object of the invention is to provide means whereby the oil contained in the mixture of water and oil which is usually employed in the crank-case is conducted from said case and cooled in a suitable manner, after which it is reintroduced into the crank-case in cooled condition so as to have a maximum cooling and lubricating effect upon the crank-bearing.

It is also an object of the invention to furnish an apparatus in which the operations just mentioned are effected by the movement of the crank-arm, the use of pumps or other similar instrumentalities being unnecessary.

With these and other objects in view the invention consists in an apparatus for the purpose specified which embodies the novel features, arrangements, and combinations of parts to be hereinafter described, and recited in the appended claims.

In the accompanying drawings, in which corresponding parts are denoted by the same reference characters, Figure 1 is a vertical section through the improved apparatus, showing the same in connection with a crank-case engine; and Fig. 2 is a plan view of the same, parts of the engine being removed for the sake of clearness.

The device forming the subject-matter of the invention is applicable to any engine in which a crank-case is employed; but I have illustrated the same as being used in conjunction with an upright engine of the Westinghouse type. Said engine is indicated by ref-

erence-numeral 1, and the crank-case thereof, in which the connecting-rod 2 is movable, is designated by the numeral 3. The connecting-rod 2 has journaled therein in the usual manner a double crank-arm 4, attached to the transversely-extending engine-shaft 5. In engines of this type the case 3 is usually filled with a quantity of oil or other lubricating fluid, into which the crank-arm 4 and the bearing thereof, with the connecting-rod, dip at every revolution, so that the latter is thoroughly lubricated. In carrying out the present invention the mixture of water and oil which is usually employed has the level indicated in Fig. 1—that is to say, it extends upwardly to approximately the center of the engine-shaft, so that half of the rotary movement of the crank-arm takes place while the same is submerged in the lubricant, the oil by reason of its lighter weight being at the level of the lubricant where the crank-arm passes through the same.

Extending into the crank-case 3 at a point intermediate of the height of the lubricant and at the side where the downward movement or overthrow of the crank-arm 3 takes place is a pipe 6, the inner end of which is bifurcated so as to form two branches having funnel-shaped ends 6^x, the edges of which are arranged approximately concentrically with the movement of the crank-arm, said ends being spaced apart so that they are alined with the two halves of the crank-arm 4. The inner bifurcated end portion of the pipe 6 enters the crank-case at the side at which the downward movement or throw of the crank-arm and crank-bearing take place and is disposed upwardly and in close proximity to the path of the crank-bearing. Said end is also arranged approximately tangent to said path, as shown. At a point exterior of the crank-case 3 the pipe 6 is provided with a draw-off cock 7. The extreme outer end of the pipe 6 enters the side wall of a separator 9, constituted by a covered cylinder or other suitable receptacle, said outer end of the pipe 6 being bent upwardly and reaching almost to the top of said separator, as shown. A pipe 10 leads from the separator 9 at approximately the level of the inner end of the pipe 6, and thence downwardly at the side of the crank-case, where it passes through a cooling cylinder or drum 11, having an inlet 12 and outlet 13, and then to the crank-case 3, which it enters at the side opposite pipe 6 and

where it is provided with bifurcated ends or branches 14, extending into close proximity to the path of the crank-bearing. The bifurcated end of the pipe 10 is disposed upwardly and approximately tangential to the path of the crank-bearing at the side of the crank-case at which said bearing moves upwardly.

At the lower part of the separator 9 is arranged a downwardly-extending pipe 15, having a portion 16, leading laterally from the separator-cylinder, and an inclined outer portion 17, extending upwardly to approximately the level of the pipes 6 and 10 in said cylinder.

In practice the crank-case is filled with a mixture of oil and water up to the point indicated, and the separator 9 is filled with water. During the rotation of the crank-arm 4 when the same moves downwardly in proximity to the inner end 6^x of the pipe 6 a small amount of the mixture of oil and water is forced outwardly through the pipe 6 and upwardly into the separator 9, where it discharges at the level of the lubricant in the crank-case. The action of the separator 9 then takes place, the oil owing to its weight forming a stratum above the water, which moves downwardly into the lower portion of the separator. At the same time that the mixture of oil and water discharges into the separator a corresponding amount of oil will overflow into the pipe 10, no water being admitted to said pipe because of the level thereof, as will be understood. The oil entering said pipe flows downwardly through the same and through the portion thereof surrounded by the cooling-drum 11. By causing cold water to flow into the inlet 12 through said drum and out through the outlet 13 an efficacious cooling action is exerted upon the oil, which then passes onto the lower end of the pipe 10 and the bifurcated ends 14 of the same, where owing to the suction exerted thereon by the crank-arm in passing it is sucked up again into the crank-case. In this manner the oil is removed from the crank-case and cooled, so that its action upon the crank-bearing is always efficacious.

It is obvious that the water of condensation which escapes from the engine-cylinders and finds its way into the crank-case is conducted off by the outlet-pipe 17 in such a manner as to maintain the lubricant at the proper level in both the crank-case and the separator.

The improved apparatus has the advantage that in addition to the efficient lubricating and cooling action upon the crank-bearing which may be obtained the operation of the different parts is entirely automatic.

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

1. In an apparatus for cooling and lubricating crank-case engines, the combination,

with the crank-case and the crank-arm rotatable therein, of an exterior separator, and pipes connecting said crank-case and separator and having their crank-case ends so disposed with relation to the crank-arm that the latter will force out the lubricant by one and suck in the same from the other.

2. In an apparatus for cooling and lubricating crank-case engines, in combination, with the crank-case and the crank-arm, pipes entering said case and having their inner ends disposed at opposite sides of the same, said ends being alined with the crank-arm, and a separator in communication with said pipes.

3. The combination, with the crank-case and the crank-arm, of pipes entering said case and having their inner ends disposed in substantially the same direction with respect to the path of the crank-bearing but oppositely in the crank-case, and a separator in communication with said pipes.

4. In combination, with the crank-case and crank-arm, a separator, and pipes leading from said separator into the crank-case at opposite sides of the latter, the inner end portions of said pipes being disposed upwardly, one adjacent the downward throw of the crank-arm, and the other adjacent the upward throw thereof.

5. An apparatus for cooling and lubricating crank-case engines, comprising a separator for the water and oil, and pipes extending from said separator into the crank-case and having their inner ends in close proximity and substantially tangential to the path of the crank-bearing, such inner ends being disposed in substantially the same direction but at opposite points in the throw or path of the crank-arm.

6. In an apparatus for cooling and lubricating crank-case engines, a pipe leading into the crank-case and having its inner end disposed in close proximity to the path of the crank-bearing.

7. In an apparatus for cooling and lubricating crank-case engines, a pipe extending into the crank-case and having its inner end disposed in close proximity and approximately tangential to the path of the crank-bearing.

8. In an apparatus for cooling and lubricating crank-case engines, a pipe extending into the crank-case and having a bifurcated inner end, the branches or legs formed at said end being alined with the halves of the crank-arm.

9. In an apparatus such as described, a discharge-pipe for the mixed water and oil extending into the crank-case and having its inner end bifurcated, the legs or branches formed at said end being of funnel shape and alined with the halves of the crank-arm.

10. In an apparatus such as described, a discharge-pipe for the lubricating mixture, said pipe extending into the crank-case and

having interior funnel-shaped branches 6× the edges of which are arranged approximately concentrically with respect to the path or throw of the crank-arm.

5 11. The combination, with the crank-case, of the pipe 6 leading therefrom, the separator 9 into which said pipe discharges, the pipe 10 leading downwardly from the upper portion of said separator and entering the crank-case

at its lower end, and the cooling-drum 11 surrounding the pipe 10.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

GEORGE BROWN.

Witnesses:

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