

E. M. WHITE.
OILING SYSTEM FOR ENGINES.
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1,060,653.

Patented May 6, 1913.

Fig. 1.

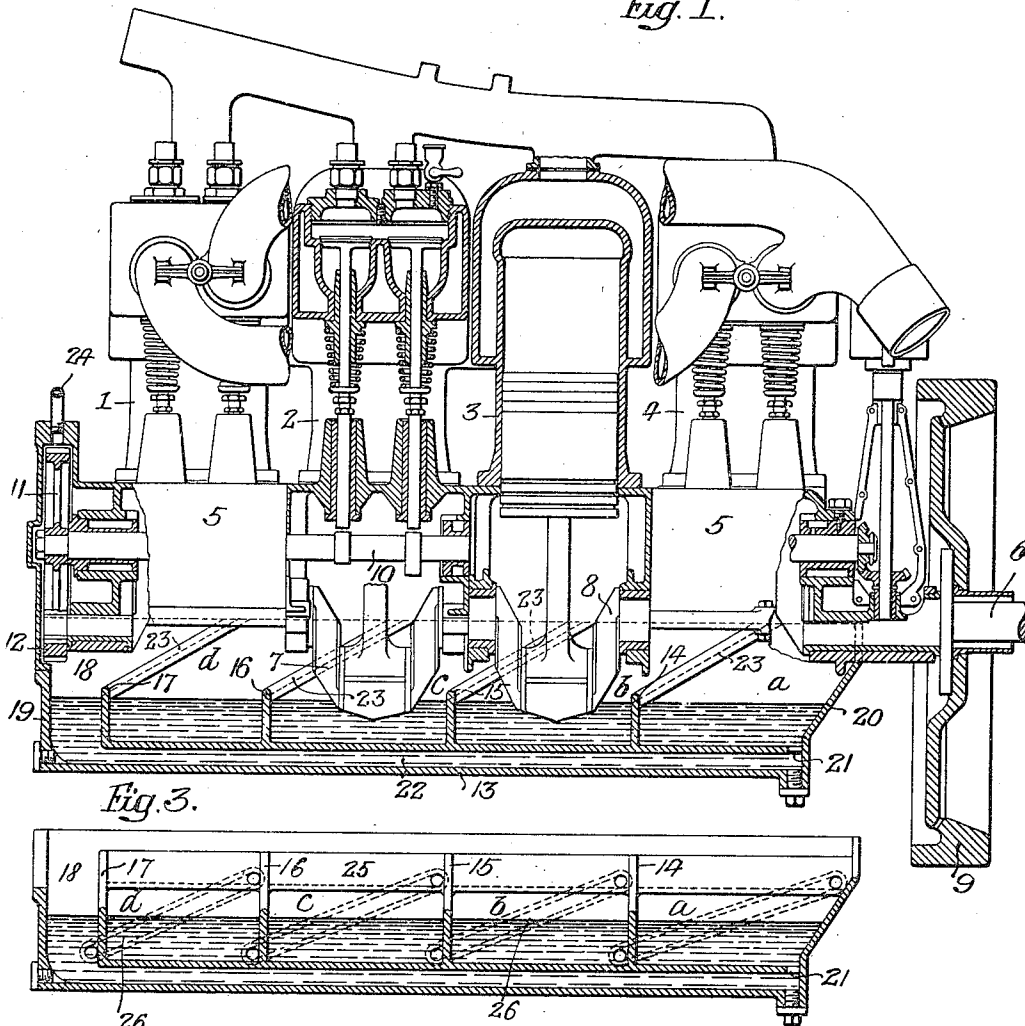


Fig. 2.

Fig. 4.

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UNITED STATES PATENT OFFICE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ERNEST M. WHITE, a citizen of the United States, and a resident of Globe, Gila county, Arizona, have invented certain Improvements in Oiling Systems for Engines, of which the following is a specification.

My invention relates to a novel construction and arrangement of parts particularly designed for use in connection with internal combustion engines such as are employed on motor vehicles, although it may be used on other types of engines; one object being to arrange the oil containing vessels and conduits so that an ample supply of lubricant will be automatically circulated under all conditions and particularly when the engine is inclined as when the motor vehicle on which it is mounted is ascending a grade.

I further desire to provide an oiling system of the above noted general type in which when the engine is inclined an increased quantity of oil is automatically caused to be put in active circulation; the arrangement being such that when the engine again assumes a substantially horizontal position, the amount of oil in such active circulation is automatically reduced to the normal.

Another object of the invention is to provide a novel form of engine crank case particularly designed to act in coöperation with the engine cranks of a multi-cylinder engine for automatically circulating oil under operating conditions; the construction being such that a relatively large amount of oil is normally held in storage but is automatically supplied to or removed from active circulation as the case may be, when the position of the engine is varied in a predetermined manner.

These objects and other advantageous ends I secure as hereinafter set forth, reference being had to the accompanying drawings, in which:—

Figure 1, is an elevation, partly in vertical section illustrating my invention as applied to a four cylinder engine; Fig. 2, is a transverse vertical section of the crank case of the engine shown in Fig. 1; and Figs. 3 and 4 are respectively longitudinal and transverse sections of a slightly modified form of crank case provided with my invention.

In the above drawings 1, 2, 3, and 4 represent the cylinders of a four cylinder engine having a crank case 5 and a main shaft 6 arranged in any desired and suitable manner; the crank case being of the inclosed type. The shaft 6 is provided with four cranks of which two are shown at 7 and 8, and has fixed to it a fly wheel 9, which, as is customary in most forms of motor vehicles, is at what is in practice the rear end of the engine.

The timing shaft of the engine is shown at 10 and is actuated from the crank shaft by the timing gears 11 and 12. The lower portion of the crank case is preferably though not necessarily, made in the form of a single elongated casting 13 of a generally semi-cylindrical form, divided into a number of crank compartments *a*, *b*, *c*, and *d* by transverse partitions 14, 15, 16, and 17 in each of which operates one of the cranks.

An important feature of the invention, however, lies in the provision of a chamber 18 forming a reservoir between the front partition 17 and the front end 19 of the crank case, and this reservoir is preferably of such form as to contain a relatively large amount of oil, being at all times in connection with the compartment *a* formed between the partition 14 and the end 20 of the crank case through a conduit or channel 22 extending centrally under the crank case and opening into said compartment through a port 21. This conduit or passage 22 is likewise of considerable cubic capacity so that it and the compartment 18 are capable of holding a considerable amount of oil when the engine is in its normal level position shown in Fig. 1. Each of the four compartments in which the cranks operate has on its opposite sides inclined gutters or troughs 23, the upper end of each of which extends from a point at one side of the crank case above and some distance in front of one of the partitions of its compartment, down to the other partition of said compartment; the arrangement being such that the oil splashed upon the walls or sides of the crank case by the revolution of the crank is collected by said gutters and discharged thereby into the next adjacent forward compartment.

Oil may be fed to the crank case through a conduit 24 delivering on to the timing

gears, and under operating conditions the crank operating in the compartment *a*, together with its cooperating parts, is lubricated in the well known manner by the oil in said compartment. This oil is finally collected from the sides of the crank case by a set of the troughs 23 and is delivered into the compartment *b* between the partitions 14 and 15 where it again serves for the lubrication of the second of the cranks. Thence said oil is successively passed in the same manner to the compartments *c* and *d* and is finally delivered into the reservoir 18.

While the engine is level, the oil flows by gravity rearwardly through the conduit 22 and the port or opening 21 into the compartment *a*, from whence it is again taken into active circulation and serves to lubricate the engine as described. If, however, the engine be inclined, as when the vehicle on which it is mounted is ascending a grade, the oil in the reservoir 18, as well as the greater portion of that in the conduit 22, immediately flows under the action of gravity into the compartment *a*, so that the crank operating in this compartment receives a greatly increased amount of lubricant.

In ascending a grade the parts of the engine require more lubricant owing to the increase of work performed and by my oiling system the increase in the amount of lubricant delivered to the compartment *a* and consequently passed therefrom to the other compartments, is proportional to the inclination of the engine and hence to the grade. The greater volume of oil thus placed in active circulation is passed by the crank in the compartment *a* to the compartments *b*, *c* and *d*, with the result that the engine is provided with an amount of oil greater than that normally in active circulation, depending upon the grade and hence in a large measure upon the work being performed. As soon as the engine returns to its level position the reservoir 18 and the passage 22 are again filled with oil which, while maintaining a supply to the compartment *a*, is not in active circulation in the same sense as that within the compartments *a*, *b*, *c*, and *d*. However, as long as the engine is inclined as indicated, there is no oil in storage in the compartment 18 and but relatively little in the lower part of the conduit 22.

If desired, in place of the inclined troughs 23 or their equivalent constructions, I may form the lower part of the crank case as in Figs. 3 and 4 with two horizontal collecting troughs 25 for each of the four track compartments. From each of these troughs a conduit 26 leads down to the lower portion of the next adjacent forward crank compartment or in the case of the last crank compartment *d*, into the reservoir 18.

I claim:—

1. The combination in an engine oiling system of a crank case provided with a series of crank compartments and a reservoir; means for collecting the oil splashed up by each crank and delivering it into the next adjacent compartment and finally into said reservoir; with a conduit extending from one of the compartments under the other compartments and opening into the bottom of the reservoir.

2. The combination in an engine oiling system of a crank case having a series of oil-containing crank compartments; a reservoir in line with and at substantially the same level as said compartments; a series of conduits for causing oil to be successively passed through said compartments and finally to the reservoir; with a conduit connecting the bottom of the first compartment of the series to the bottom of the reservoir.

3. The combination in an engine oiling system of a crank case having a series of crank compartments; with means for causing oil to be passed successively through said compartments, the same including a container normally holding a relatively large body of oil out of active circulation; and means for connecting said container to one of the compartments of the series in position to cause the oil in storage to be automatically delivered to said compartment when the engine is inclined.

4. The combination in an engine oiling system of a crank case having a series of compartments; a reservoir at the forward end of the engine at substantially the level of said compartments; a conduit connecting the lower part of said reservoir with the lower part of the compartment at the rear end of the engine; and means for causing oil thrown up by the cranks to flow from one compartment to another and finally to said reservoir; the reservoir being formed to retain a relatively large body of oil out of active circulation when the engine is in a level position.

5. The combination in an engine oiling system of a crank case having a series of compartments; a reservoir at the forward end of the engine; a conduit connecting said reservoir with the compartment at the rear end of the engine, and means for causing oil thrown up by the cranks to flow from one compartment to another and finally to said reservoir; the reservoir and conduit being formed to retain a relatively large body of oil out of active circulation when the engine is in a level position and mounted to deliver said oil to the compartments when the engine is longitudinally inclined.

6. The combination in an engine oiling system of a crank case having a crank compartment and a reservoir at the forward end thereof; means for collecting the oil splashed

up by the crank and delivering it into said
reservoir; and a conduit connecting the res-
ervoir and the crank compartment in posi-
tion to deliver a materially increased amount
5 of oil to said compartment when the engine
is inclined.

In testimony whereof, I have signed my

name to this specification, in the presence of
two subscribing witnesses.

ERNEST M. WHITE.

Witnesses:

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ROY N. DAVIDSON.