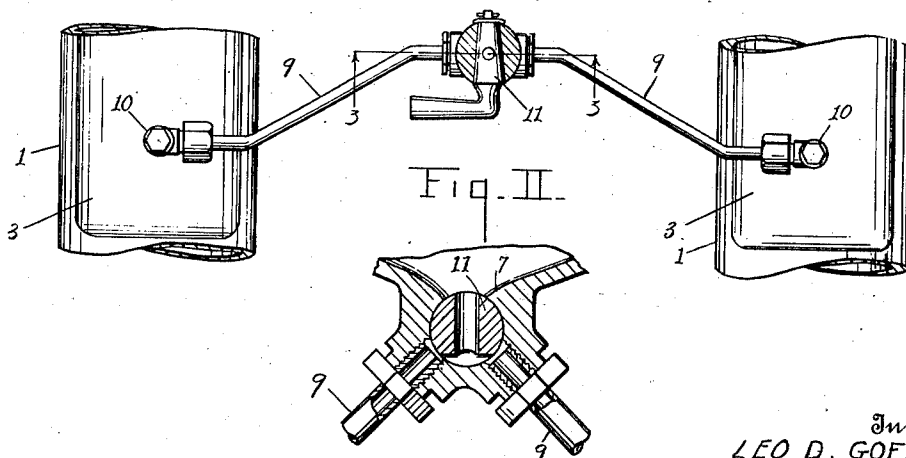
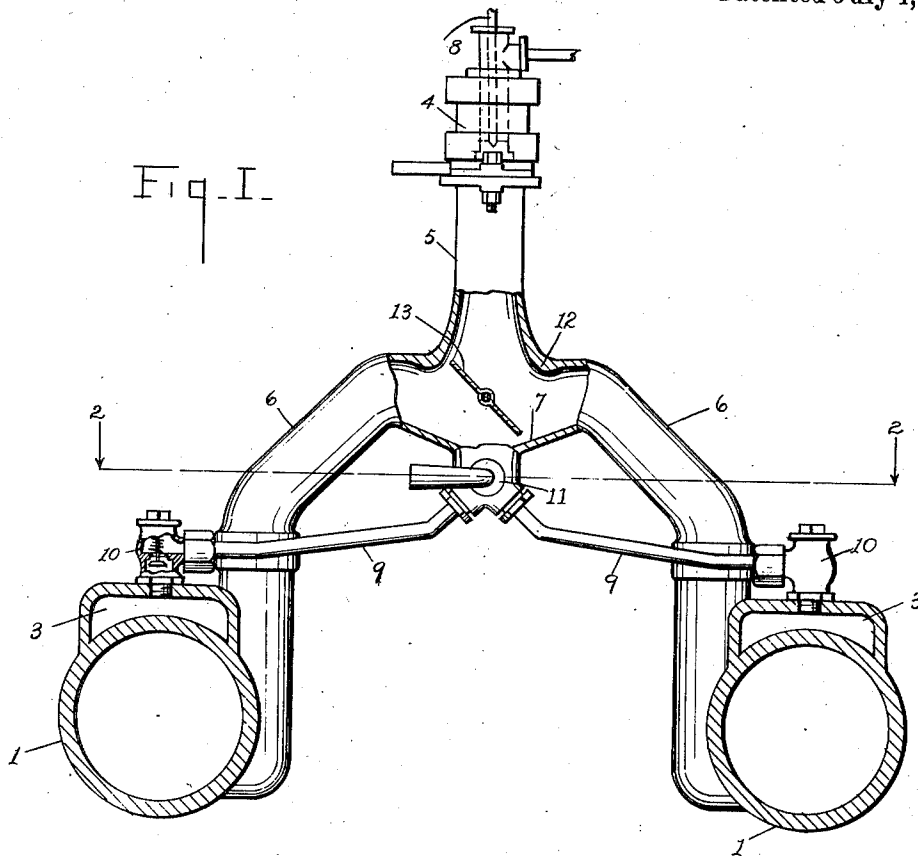


L. D. GOFF, E. D. GLIDDEN AND C. G. MAHANA.
INTERNAL COMBUSTION ENGINE.
APPLICATION FILED FEB. 18, 1918.

1,308,237.

Patented July 1, 1919.



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UNITED STATES PATENT OFFICE.

LEO D. GOFF, EARL D. GLIDDEN, AND CHARLES G. MAHANA, OF THREE RIVERS, MICHIGAN, ASSIGNORS, BY MESNE ASSIGNMENTS, TO FAIRBANKS, MORSE & CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

INTERNAL-COMBUSTION ENGINE.

1,308,237.

Specification of Letters Patent.

Patented July 1, 1919.

Application filed February 18, 1918. Serial No. 217,828.

To all whom it may concern:

Be it known that we, LEO D. GOFF, EARL D. GLIDDEN, and CHARLES G. MAHANA, citizens of the United States, residing at Three Rivers, county of St. Joseph, and State of Michigan, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

10 This invention relates to improvements in internal combustion engines.

Our invention is particularly designed by us for embodiment in engines of the two-cycle type and we have illustrated the same as we have embodied it in practice, various parts, however, being shown mainly in conventional form and no attempt being made to maintain the relative proportion of the parts.

20 The main objects of this invention are:

First, to provide an improved priming device for internal combustion engines.

25 Second, to provide an improved charge feeding device for a multiple internal combustion engine having means for regulating the feed to the individual cylinders.

30 Third, to provide an improved fuel feed means for internal combustion engines which prevents the collection of liquid fuel in the engine.

Fourth, to provide an improved feed device for internal combustion engines having these advantages which is simple in structure and operation.

35 Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

40 We accomplish the objects of our invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

45 A structure which is a preferred embodiment of our invention is clearly illustrated in the accompanying drawing, forming a part of this specification, in which:

50 Figure I is a detail view partially in section of a structure embodying the features of our invention, various parts being shown in conventional form and no attempt having been made to maintain the proper relative proportions of the parts.

Fig. II is a detail plan view partially in

section on a line corresponding to line 2—2 of Fig. I.

Fig. III is an enlarged detail section on a line corresponding to line 3—3 of Fig. II.

In the drawing similar reference characters refer to similar parts throughout the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawing, 1 represents the cylinders, and 3 the charging passages leading from the compression chambers, not 65 illustrated, to the cylinders. These parts are, in the accompanying drawing, shown in conventional form, there being a pair of engines in the embodiment illustrated. 4 represents a carbureter, mixing valve or other 70 fuel feed device. We hereinafter use the term carbureter as a matter of convenience.

The manifold 5 is provided with branches 6 leading to the compression chambers of the engines. The manifold is provided 75 with a well or sump 7 below the carbureter so that the liquid fuel from the carbureter will be delivered to this sump. A valve, as 8, may be provided to secure the increased 80 supply of fuel.

Leading from the bottom of this sump or well to the inlet passages 3 are priming passages 9. These priming passages are provided with check valves, shown conventionally at 10, preventing the pressure from 85 the engines being transmitted up through the priming passages to the manifold.

The feed to these pipes is controlled through the valve 11, that is, the valve may be adjusted so that each priming passage 90 receives the same amount of fuel or may be adjusted so that one receives more than the other.

The manifold is provided with lip-like drip edges 12 positioned so that any liquid 95 fuel collecting on the walls of the manifold above these edges will drip into the sump 7 instead of into the manifold branches 6. A valve 13 is provided at the branching of the manifold to control the delivery of the 100 charges through the branches.

The operation of the device is as follows: To start the engine the carbureter 4 is caused to give a rich mixture. The method of accomplishing this depends of course upon the 105 type of fuel injection device used. This

- rich mixture causes fuel to collect in the sump. The next step is to turn the engine in whatever manner is customary for the particular engines. This creates a suction on the carbureter drawing in the mixture to the compression chamber in the regular way and also the priming fuel flows down the priming passages by gravity and also by suction past the check valves into the inlet passage
3. The discharge of air or the charge from the crank case to the cylinder through the inlets 3 picks up the priming charge and carries it into the cylinder. Further, the delivery into the cylinder tends to break up the charge and mix it. This priming into the by-pass or inlet passage breaks up the priming charge and thoroughly mixes it with the air which renders it more easily ignitable than when injected direct into the cylinder.
- This priming charge may be maintained as long as desired and will continue as long as the carbureter remains adjusted to that end. After starting or on regular running the carbureter is adjusted so that little, if any, fuel will pass through the priming passages, practically all of it passing in vaporous form through the regular manifold branches.

However, if any liquid does pass from the carbureter into the manifold after the engine is in operation this surplus fuel is mainly collected in the sump and passes therefrom to the cylinders direct rather than going to the crank case, so that it tends to reduce deposits of fuel in the crank case, which is a common difficulty experienced with two-cycle engines, particularly with the low grade fuels now commonly used.

The valve 11 may be omitted and the structure still be used to advantage. The valve 13 may be adjusted to control in a measure the quantity of charge passing to each cylinder.

Our improvements are, as stated, especially designed by us for use in two-cycle engines and have been embodied by us in two-cycle engines for driving motor cars.

By our improvements the priming may be continued until the engine runs satisfactorily under natural conditions.

We have illustrated our improvements in a more or less conventional embodiment and have not attempted to illustrate various modifications and adaptations which we contemplate, as we believe the disclosure made will enable those skilled in the art to which our invention relates to embody or adapt the same as may be desired.

Having thus described our invention what we claim as new and desire to secure by Letters Patent, is:

1. The combination with a plurality of internal combustion engines each comprising a cylinder, and an inlet passage for the cylinder, of a carbureter, a branch intake manifold provided with a sump below the

carbureter, priming passages connecting said sump to said inlet passages, check valves for said priming passages, a valve controlling said priming passages whereby varying amounts of fuel may be delivered therethrough, and a distributing valve located at the branching of said manifold.

2. The combination with a plurality of internal combustion engines each comprising a cylinder, and an inlet passage for the cylinder, of a carbureter, a branched intake manifold provided with a sump below the carbureter, priming passages connecting said sump to said inlet passages, check valves for said priming passages, and a valve controlling said priming passages whereby varying amounts of fuel may be delivered therethrough.

3. The combination with a plurality of internal combustion engines each comprising a cylinder, and an inlet passage for the cylinder, of a carbureter, a branched intake manifold provided with a sump below the carbureter, priming passages connecting said sump to said inlet passages, check valves for said priming passages, and a distributing valve located at the branching of said manifold.

4. The combination with a plurality of internal combustion engines each comprising a cylinder, and an inlet passage for the cylinder, of a carbureter, a branched intake manifold provided with a sump below the carbureter, priming passages connecting said sump to said inlet passages, and check valves for said priming passages.

5. The combination with a plurality of internal combustion engines of the two-cycle type each provided with a cylinder charging passage, of a fuel feed means comprising a manifold having a sump disposed to receive liquid fuel, priming passages connecting said sump with said cylinder charging passages, check valves for said priming passages, a valve controlling said priming passages, and a distributing valve for the vaporized charge disposed within said manifold.

6. The combination with a plurality of internal combustion engines of the two-cycle type each provided with a cylinder charging passage, of a fuel feed means comprising a manifold having a sump disposed to receive liquid fuel, priming passages connecting said sump with said cylinder charging passages, check valves for said priming passages, and a valve controlling said priming passages.

7. The combination with a plurality of internal combustion engines of the two-cycle type each provided with a cylinder charging passage, of a fuel feed means comprising a manifold having a sump disposed to receive liquid fuel, priming passages connecting said sump with said cylinder charging

ing passages, check valves for said priming passages, and a distributing valve for the vaporized charge disposed within said manifold.

5 8. The combination with a plurality of internal combustion engines of the two-cycle type each provided with a cylinder charging passage, of a fuel feed means comprising a manifold having a sump disposed
10 to receive liquid fuel, priming passages connecting said sump with said cylinder charging passages, check valves for said priming passages.

15 9. The combination with an internal combustion engine comprising a cylinder, a compression chamber, an inlet passage from the compression chamber to the cylinder, of a carbureter, a manifold connected to said compression chamber and provided
20 with a sump disposed to receive liquid fuel from the carbureter, a priming passage connecting said sump to said inlet passage, a check valve for said priming passage, and a valve controlling said priming passage.

25 10. The combination with an internal combustion engine comprising a cylinder, a compression chamber, an inlet passage from the compression chamber to the cylinder, of a carbureter, a manifold connected to
30 said compression chamber and provided with a sump disposed to receive liquid fuel from the carbureter, and a priming passage connecting said sump to said inlet passage.

35 11. The combination with an internal combustion engine comprising a cylinder, a compression chamber, an inlet passage from the compression chamber to the cylinder, of a carbureter, a manifold connected to said compression chamber and provided
40 with a sump disposed to receive liquid fuel from the carbureter, the manifold being

provided with dripping connections above the sump so that the liquid fuel flowing down the walls of the manifold is directed to the sump, and a priming passage con- 45
necting said sump to said inlet passage.

12. The combination of an internal combustion engine of the two-cycle type having a cylinder charging passage, of a fuel feed means comprising an inlet pipe pro- 50
vided with a sump adapted to receive liquid fuel from said fuel feed means, a priming passage from said sump to said engine charging passage, a check valve for said priming passage, and a valve controlling 55
said priming passage.

13. The combination of an internal combustion engine of the two-cycle type having a cylinder charging passage, of a fuel feed means comprising an inlet pipe provided 60
with a sump adapted to receive liquid fuel from said fuel feed means, a priming passage from said sump to said engine charging passage, and a check valve for said priming passage. 65

14. The combination of an internal combustion engine of the two-cycle type having a cylinder charging passage, of a fuel feed means comprising an inlet pipe provided with a sump adapted to receive liq- 70
uid fuel from said fuel feed means, and a priming passage from said sump to said charging passage.

In witness whereof we have hereunto set our hands and seals in the presence of two 75
witnesses.

LEO D. GOFF. [L. S.]
EARL D. GLIDDEN. [L. S.]
CHARLES G. MAHANA. [L. S.]

Witnesses:

LEE W. McKEY,
MABELLE F. JONES.