A. LOOMIS.

HYDROCARBON MOTOR.

APPLICATION FILED OCT. 4, 1916.

1,266,288.

Patented May 14, 1918

2 SHEETS—SHEET 1.

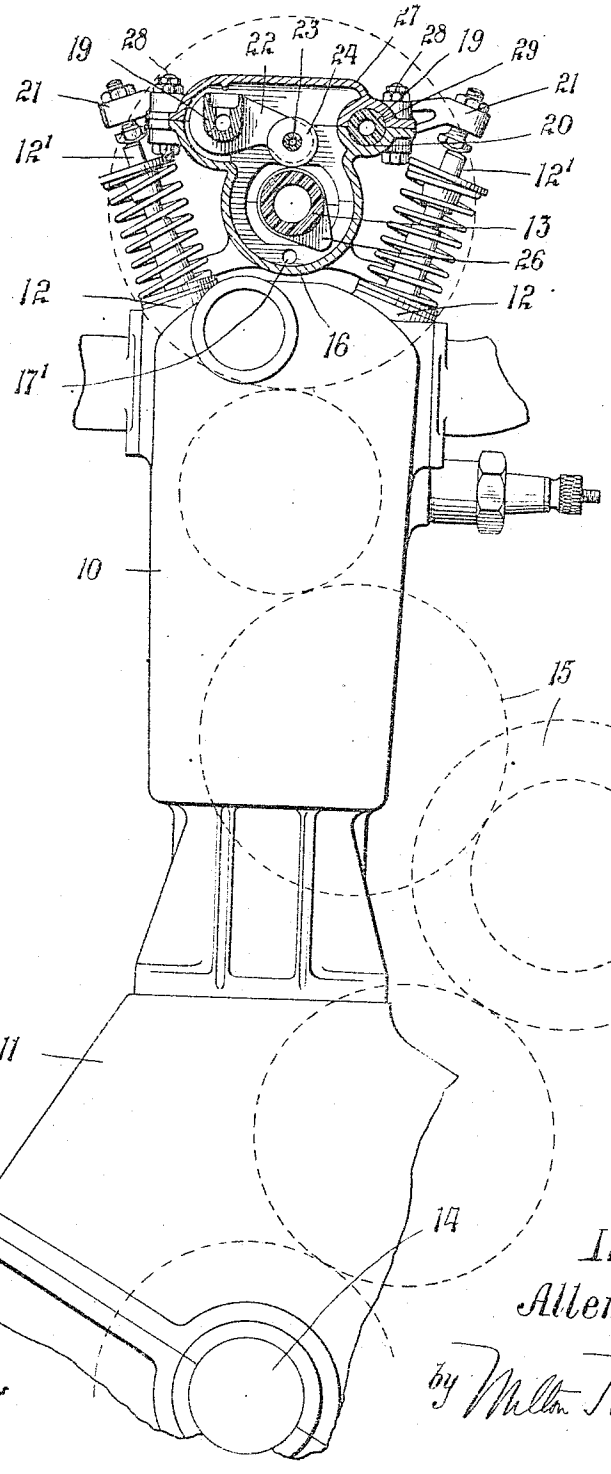


Fig. 1.

Witness:

J. C. L. Blackmore

Inventor:

Allen Loomis,

by Milton Tibbetts,

Atty.

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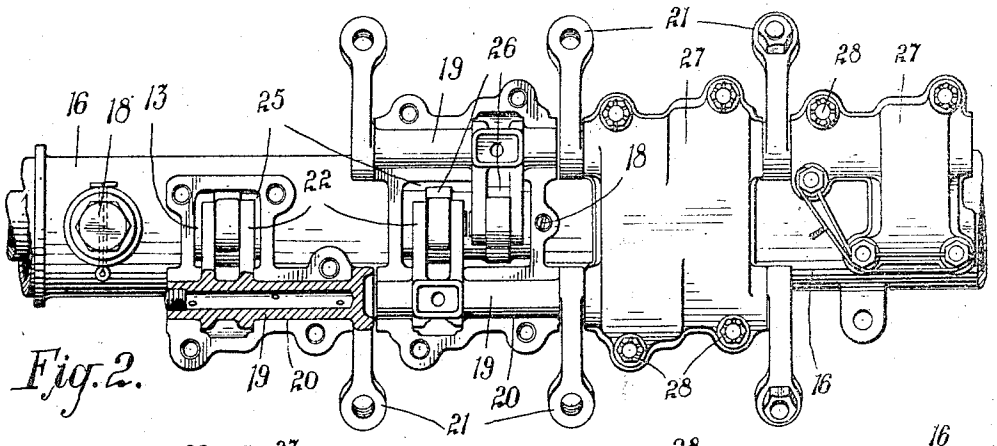


Fig. 2.

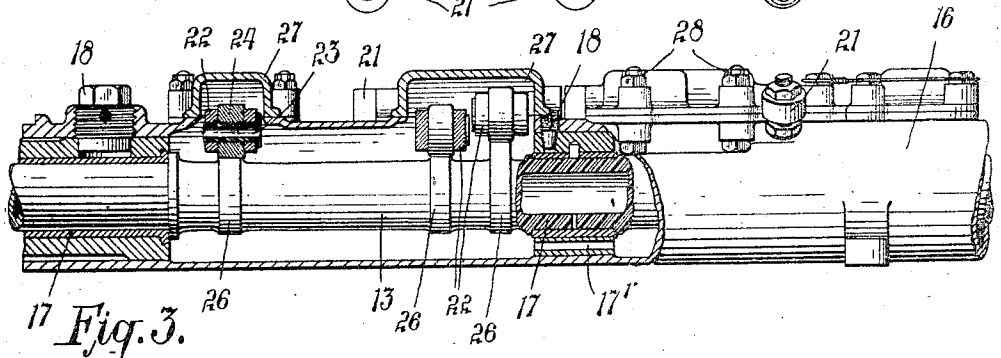


Fig. 3.

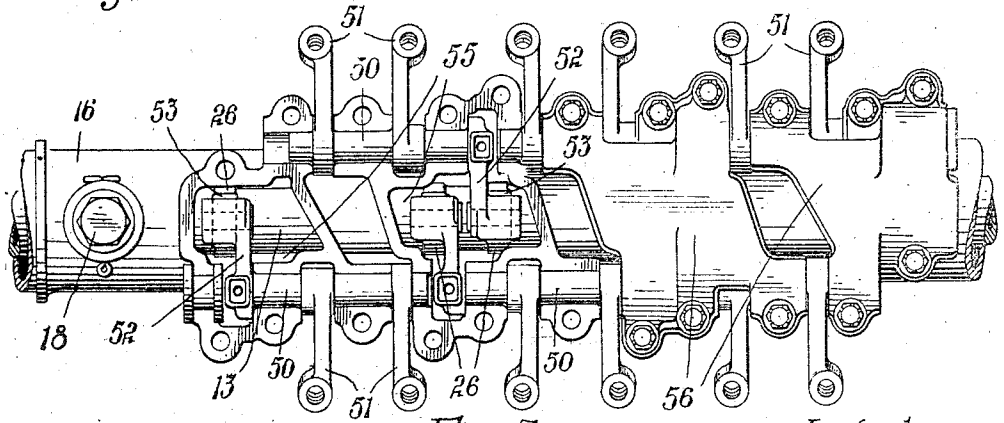


Fig. 4.

Witness:

J. C. L. Blackmore

Inventor:

Allen Loomis,

by Miller Tibbetts, Atty.

UNITED STATES PATENT OFFICE.

ALLEN LOOMIS, OF DETROIT, MICHIGAN, ASSIGNOR TO PACKARD MOTOR CAR COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

HYDROCARBON-MOTOR.

1,266,266. Specification of Letters Patent. Patented May 14, 1918.

Application filed October 4, 1916. Serial No. 125,709.

To all whom it may concern:

Be it known that I, ALLEN LOOMIS, a citizen of the United States, and resident of Detroit, Wayne county, State of Michigan, have invented certain new and useful Improvements in Hydrocarbon-Motors, of which the following is a specification.

This invention relates to hydrocarbon motors, and particularly to the valve operating mechanism thereof.

One of the objects of the invention is to provide an oil tight compartment or casing for a cam shaft and valve operating rock arms.

Another object of the invention is to provide a cam shaft casing with means for supporting one or a series of rock shafts for operating the motor valves, the parts being preferably so arranged that the interior of the casing may be readily accessible and the rock shafts readily removed and replaced.

Other objects of the invention will appear from the following description taken in connection with the drawings which form a part hereof, and in which:

Figure 1 is an elevation and part section of a hydrocarbon motor embodying one form of the invention;

Fig. 2 is a plan view of the valve operating mechanism shown in Fig. 1, some of the casing covers being removed in order to disclose the relation of the cam and rock shafts;

Fig. 3 is a side elevation and part section of the valve operating mechanism; and

Fig. 4 is a plan view similar to Fig. 2, of another form of the invention.

Referring to the drawings, the invention is shown as applied to a hydrocarbon motor of the V-type, but one of the cylinder blocks 10 being shown mounted on the crank case 11. The motor has overhead valves 12 with upwardly extending valve stems 12' operated by a cam shaft 13 mounted longitudinally of the cylinder block between said valve stems and driven from the crank shaft 14 in any suitable way. If desired, the gearing 15 shown diagrammatically in dotted lines in Fig. 1 may be employed.

A cam shaft casing 16, removably fixed on the cylinder block between the valve stems is provided with a plurality of bearings 17 for the cam shaft, which bearings are positioned by anchor screws 18. The bearings separate the casing 16 into compartments connected by conduits 17' at the base of the bearings. Above and at either side of the cam shaft are a plurality of rock shafts 19. Two rock shafts 19 are provided for each cylinder one to operate the exhaust and the other the intake valves. The rock shafts on each side of the cylinder block are longitudinally alined and rest in cradles 20 provided at suitable intervals in the casing 16.

One end of each rock shaft 19 projects from the casing 16 and is provided with a rock arm 21 which extends outwardly over a valve stem 12' to actuate it. The other end of each rock shaft lies within the casing and is provided with an inwardly extending forked arm 22 carrying a pin 23 on which a roller 24 is mounted between the forks of the arm. Since the rock shafts are arranged on opposite sides of the cam shaft and between the valve stems and the arms 22 extend inwardly to the cam shaft while the arms 21 extend outwardly to the valve stems, it follows that the arms 22 from the shafts on one side extend toward the arms 22 from the shafts on the other side while the arms 21 from the shafts on one side extend away from the arms 21 from the shafts on the other side. In that part of the casing 16 that is arranged over three of the cylinders there are provided four openings 25 which permit the installation and removal of the valve operating mechanism. These openings are alined in the casing above the cam shaft and are of two sizes, single and double, the former being for one valve operating mechanism and the latter for two.

Below the openings 25 are cams 26 on the cam shaft 13, the cams being arranged to cooperate with the rollers 24 to actuate the rock arms 21 through the arms 22 and rock shafts 19. The arms 21 and 22 are here shown as integral with their respective rock shafts 19 (see Fig. 2). Covers 27 are detachably secured over the openings 25 in the casing by bolts 28. The covers are of two sizes those which close the single openings and those which close the double openings. The covers of each size are interchangeable as will be obvious from a consideration of the drawing. In addition to closing the openings the covers are provided with channels 29 on the under side which coöperate with the cradles 20 to inclose the rock shafts 19.

Fig. 4 shows the invention as applied to a

hydrocarbon motor each cylinder of which is provided with two intake and two exhaust valves. Such a construction necessitates a duplication of the valve operating rock arms. Each of the rock shafts 50, which correspond to the rock shafts 19, is provided with two valve actuating rock arms 51. An inwardly extending forked arm 52 on each rock shaft carries a roller 53 which bears against and is actuated by a cam 26 on the cam shaft 13.

Closing the openings 55 through which the arms 52 extend are covers 56 which like the covers 27 fall into two classes, those of each class being interchangeable. The covers besides closing the openings 55 coöperate with the casing 16 to position the rock shaft 50. This embodiment is in other respects the same as that shown in Figs. 1, 2 and 3.

Other embodiments may be used which will fall within the spirit and scope of the invention as defined in the annexed claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. In a hydrocarbon motor, in combination, a casing, a cam shaft therein, a rock shaft mounted in a bearing in the casing, one end of said rock shaft being in the casing and the other end projecting therefrom, and an arm on each end of said rock shaft.

2. In a hydrocarbon motor, in combination, a casing, a cam shaft therein, a rock shaft mounted in a bearing in the casing, an arm on said rock shaft on one side of said bearing and inside of said casing, and an arm outside of the casing connected to said rock shaft on the other side of said bearing.

3. In a hydrocarbon motor, in combination, a casing, a cam shaft therein, a rock shaft mounted in a bearing in the casing, and having the part on one side of the bearing outside of the casing, means for operating said rock shaft from the cam shaft, and an arm on the outside part of said rock shaft.

4. In a hydrocarbon motor, in combination, a casing, a cam shaft therein, a rock shaft mounted in a bearing in the casing, one end of said rock shaft being in the casing and the other end projecting therefrom, an arm on said rock shaft inside the casing and adapted to be operated by the cam shaft, and an arm on the rock shaft outside the casing.

5. In a hydrocarbon motor, in combination, a casing, a cam shaft therein, said casing having an opening above the cam shaft, a detachable cover for said opening, a rock shaft mounted in a bearing between said casing and cover, and arms on said rock shaft.

6. In a hydrocarbon motor, in combination, a casing, a cam shaft therein, said casing having an opening above the cam shaft, a detachable cover for said opening, a rock shaft mounted in a bearing between said casing and cover, and an arm on each end of the rock shaft.

7. In a hydrocarbon motor, in combination, a casing, a cam shaft therein, said casing having an opening above the cam shaft, a detachable cover for said opening, a rock shaft mounted in a bearing between said casing and cover, and means for operating the rock shaft from the cam shaft.

8. In a hydrocarbon motor, in combination, a casing, a cam shaft therein, said casing having an opening above the cam shaft, a detachable cover for said opening, two rock shafts mounted in bearings between the casing and cover, one at either side of said cam shaft, arms on said rock shafts extending toward each other and adapted to be operated by said cam shaft, and operating arms on the rock shafts outside of said casing.

9. In a hydrocarbon motor, in combination, a casing having a series of openings in its upper wall, a cam shaft in said casing below said openings, a pair of rock shafts for each opening and having arms operating in said openings, a cover for each said opening between which and the casing bearings are formed for said rock shafts, and arms on said rock shafts outside of said casing.

10. In a hydrocarbon motor, in combination, a cylinder, a casing at the top thereof, a valve in the cylinder on each side of said casing and having its stem extending upwardly, a cam shaft mounted in the casing, a pair of rock shafts one on each side of the cam shaft and having a bearing in the casing with one end extending through the casing, means on one side of said bearing of each rock shaft for operating the rock shafts from the cam shaft, and an arm on each of said rock shafts on the other side of said bearing for operating one of said valves.

11. In a hydrocarbon motor, in combination, a cylinder, a casing at the top thereof, a valve in the cylinder on each side of said casing and having its stem extending upwardly, a cam shaft mounted in the casing, a pair of rock shafts one on each side of the cam shaft and having a bearing in the casing with one end extending through the casing, means for operating the rock shafts from the cam shaft, and arms on the extended ends of said rock shafts for operating said valves.

12. In a hydrocarbon motor, in combination, a casing having openings some of one size and some of another size, a cam shaft therein, cams on said shaft arranged beneath said openings, rock shafts mounted in said casing, arms extending from said rock shafts at said openings, rollers on said arms contacting with said cams, and detachable

covers for said openings the covers for openings of the same size being interchangeable.

13. In a hydrocarbon motor, in combination, a casing, a cam shaft therein, a rock shaft mounted in the casing, an inwardly extending rock arm at one end of said rock shaft, an outwardly extending rock arm at the other end of said rock shaft, and an outwardly extending rock arm on said rock shaft intermediate the ends thereof.

14. In a hydrocarbon motor, in combination, a casing, a cam shaft therein, a rock shaft mounted in separated bearings in the casing, an inwardly extending rock arm at one end of said rock shaft, an outwardly extending rock arm at the other end of said rock shaft, and an outwardly extending rock arm intermediate the ends of said rock shaft between said separated bearings.

15. In a hydrocarbon motor, in combination, a casing, a cam shaft therein, rock shafts mounted in bearings in the casing, an inwardly extending rock arm at one end of each of said rock shafts, an outwardly extending rock arm at the other end of each of said rock shafts, and an outwardly extending rock arm on each of said rock shafts intermediate the ends thereof.

In testimony whereof I affix my signature.

ALLEN LOOMIS.