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INTERCONVERSION OF SIDE-VALVE AND OVERHEAD-VALVE INTERNAL COMBUSTION ENGINES

Filed Nov. 1, 1938

Fig. 1

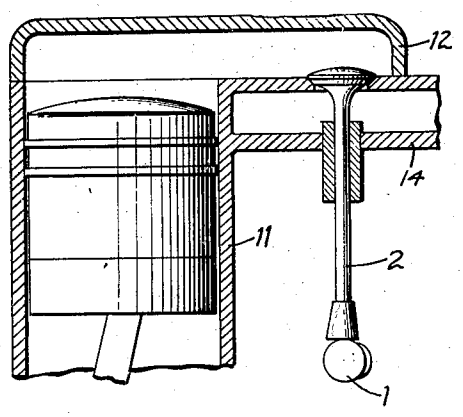


Fig. 2

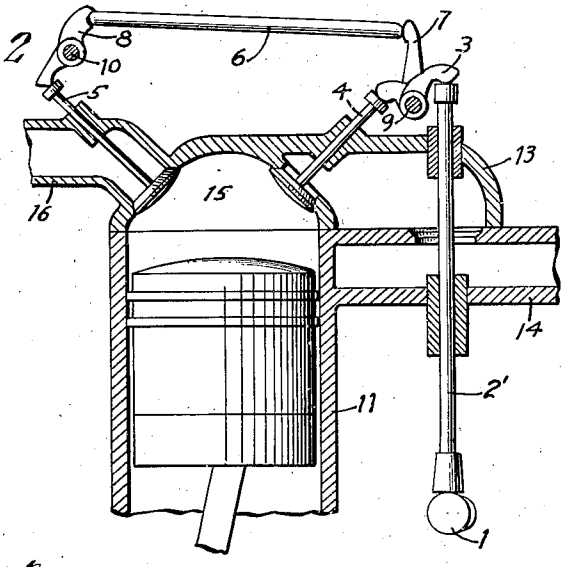
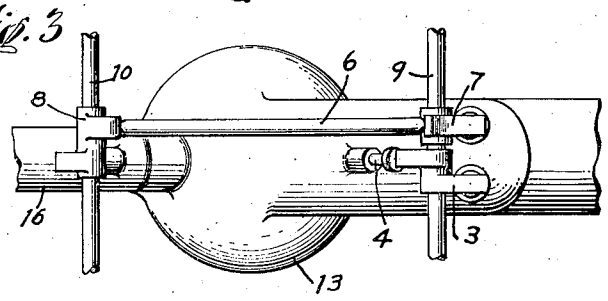


Fig. 3



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INTERCONVERSION OF SIDE-VALVE AND OVERHEAD-VALVE INTERNAL COMBUSTION ENGINES

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5 Claims. (Cl. 123—191)

This invention relates to the interconversion of side-valve and overhead-valve internal-combustion engines, and more particularly to an arrangement for replacing a side valve or L-head engine with an overhead valve cylinder head.

An object of this invention is to provide an arrangement in which an L-head engine may be quickly and simply converted into an engine having overhead valves.

Another object of this invention is to provide an arrangement in which an L-head engine may be quickly and simply converted into an engine having overhead valves, without changing the position of the cam shaft.

Still another object of this invention is the provision of an arrangement whereby an L-head engine having side-by-side valves operated by a laterally positioned cam shaft at the lower end of the engine casing may be converted into an engine with overhead poppet drop valves utilizing the same cam shaft for their actuation.

A further object of this invention consists of an arrangement whereby an ordinary L-head engine may be simply and quickly converted into an engine having a hemispherical combustion space with overhead valves.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed.

The invention has been illustrated in the preferred embodiment in the accompanying drawing, wherein:

Fig. 1 is a vertical cross-sectional view of an ordinary L-head engine;

Fig. 2 is a similar vertical cross-sectional view of the same engine shown in Fig. 1, provided with the arrangement according to this invention whereby it is converted into an overhead valve engine; and

Fig. 3 is a top view showing the valve actuating mechanism illustrated in Fig. 2.

For purposes of comparison, there has been shown in Fig. 1 a single cylinder engine 11 having an ordinary L-head 12, and a cam shaft 1 laterally displaced at the lower end of the engine casing and operating the valve rod 2 in the inlet 14.

Fig. 2 illustrates the same engine casing 11 with the similarly positioned cam shaft 1, adapted in this case to operate the overhead valves in a replacement cylinder head 13. As will be seen in Figs. 2 and 3, the valve rods 2 of Fig. 1 are replaced in this case by the longer push rods 2', but the lower end of the engine is otherwise identical with that of Fig. 1. Actuation of the valve 4 positioned upon one side of the hemispherical combustion space 15 of the new cylinder head 13 is brought about by engagement of one of the rods 2' with the bell crank lever 3. Actuation of the oppositely positioned valve 5 leading to exhaust passage 16 is effected through the other push rod 2', the bell crank lever 7, connecting link 6, and bell crank lever 8. The bell crank levers on one side of the engine are mounted upon a suitable pivot 9, while the bell crank lever 8 is mounted upon an oppositely positioned rod 10.

By means of the foregoing arrangement it will be noted that the change from a simple L-head engine to one with overhead valves can be accomplished very simply and easily, while no change whatsoever is necessary with regard to the basic engine construction, and more specifically, with respect to the position of the cam shaft. Up to the present time, such a conversion would necessitate the substantial rebuilding of the entire engine, which rebuilding has been entirely eliminated by the arrangement in accordance with the present invention. This is particularly true in the conversion of an L-head engine to one such as illustrated in which the overhead valves are positioned at an angle to one another upon opposite sides of a hemispherical combustion space. While, for the sake of simplicity, the principles of the present invention have been illustrated in connection with a single cylinder only, obviously, by mere duplication, the invention is applicable to an engine of any number of cylinders.

It will accordingly be seen that I have provided a construction which satisfies the objects enumerated above and one which constitutes a valuable advance in the art. While I have shown the invention in a certain physical embodiment, it is to be understood that modifications of the structure shown may be made by those skilled in this art without departing from my invention as expressed in the claims which follow.

I claim:

1. In an internal combustion engine having walls forming a cylinder space, a cam shaft mounted on one side of said engine, replaceable tappet rods actuated by said cam shaft, said rods being adapted to operate the side-by-side valves of a cooperating detachable L-head, and guide means for said tappet rods, the combination of a cylinder head adapted to replace the

L-head and having a substantially hemispherical combustion space cooperating with said cylinder space and provided with oppositely positioned valve openings, valves in said openings, and means for actuating said valves, including other similarly positioned tappet rods, passing through said guide means and actuated by said cam shaft, and a pair of co-axially pivoted bell-crank levers respectively engaged at one end by said other tappet rods.

2. The combination according to claim 1, in which said last means includes a linkage system connected to one of said valves, whereby the other ends of said bell-crank lever arms are adapted to respectively actuate one of said valves and said linkage systems.

3. In an internal combustion engine having walls forming a cylinder space, a cam shaft mounted on one side of said engine, and replaceable tappet rods actuated by said cam shaft, positioned on the same side of said engine as said cam shaft, the combination of a removable cylinder head formed with a hollow combustion space cooperating with said cylinder space and provided with a pair of valve openings, one of said openings being positioned on the same side of said engine as said cam shaft, and the other opening substantially directly opposite to the first opening, a valve mounted in each of said openings, and means for actuating said valve, including other similarly positioned tappet rods, a pair of bell-crank levers respectively engaged at one end by said other tappet rods, the other end of one of said levers extending into contact with the valve on the near side of the engine, a third bell-crank lever pivotally mounted on the opposite side of the engine and engaging the opposite valve at one end, and a link extending across the top of the cylinder head and pivotally interconnecting the other end of said third bell-crank lever with the other end of the other bell-crank lever.

4. In an internal combustion engine having a cylinder head including walls forming a hemispherical combustion space provided with oppositely positioned valve openings, in combination, valves in said openings, a pair of bell-crank levers pivotally connected on one side of said cylinder head in such a manner that one of said levers is in direct engagement with one of said valves, means for actuating the other of said valves from the other bell-crank lever, and a cam shaft positioned on the same side of said cylinder head as said pair of levers, and means for operating said levers from said cam shaft.

5. In an internal combustion engine having a cylinder head including walls forming a combustion space provided with oppositely positioned valve openings, in combination, valves in said openings, a pair of bell-crank levers pivotally connected on one side of said cylinder head in such a manner that one of said levers is in direct engagement with one of said valves, and means for actuating the other of said valves from the other bell-crank lever, said actuating means including a third bell-crank lever directly engaging said other valve, and a rod pivotally interconnecting said third bell-crank lever with the other bell-crank lever of said pair.

FRITZ FIEDLER.