Nov. 19, 1929. L. H. SWANSON 1,736,469

AIR COMPRESSOR

Filed May 18. 1927

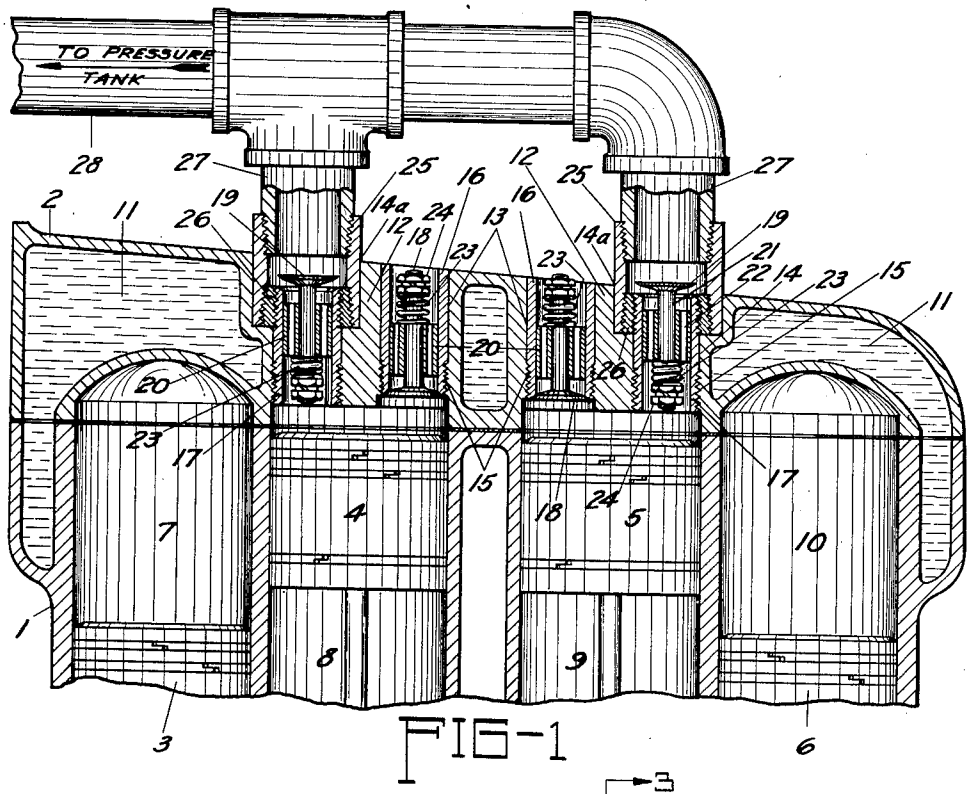


FIG-1

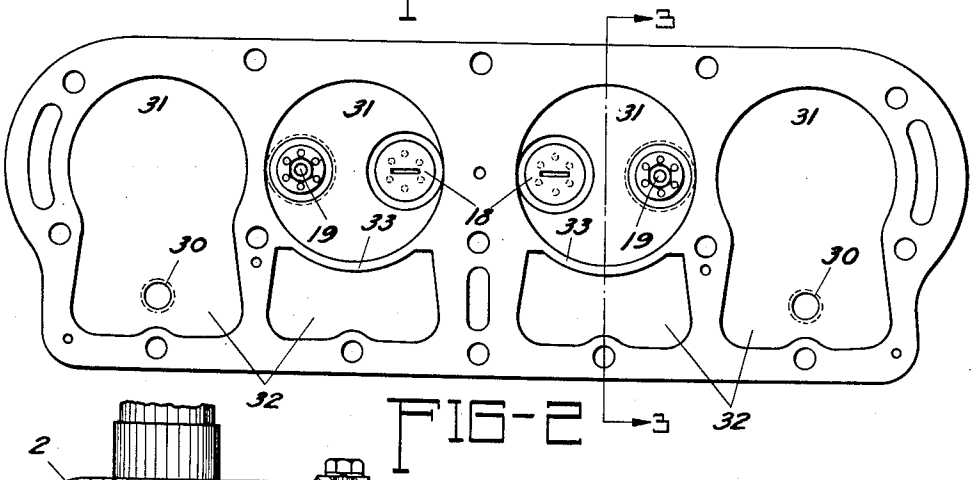


FIG-2

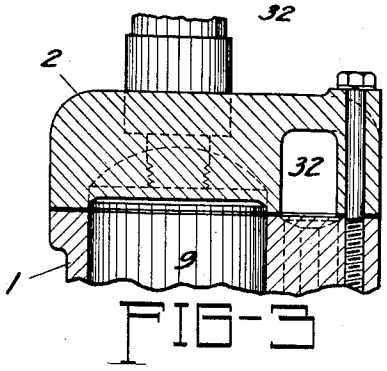


FIG-3

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UNITED STATES PATENT OFFICE

LEONFORD H. SWANSON, OF MOLINE, ILLINOIS

AIR COMPRESSOR

Application filed May 18, 1927. Serial No. 192,191.

My present invention pertains to motor driven devices for compressing air but more particularly to a modified internal combustion engine or a modified head for such an engine whereby air can be pumped into a suitable reservoir provided for the reception thereof. It will of course be understood that such a construction can be used for the pumping of other substances than air and, therefore, that this disclosure is to be interpreted as illustrative only.

Among the objects of my invention are to provide a simple satisfactory construction for the purpose indicated; to provide a modified engine head which may be substituted for the ordinary head of an internal combustion motor to convert the same into a fluid pump; to provide an improved combined motor and pump; and such further objects, advantages and capabilities as will hereafter appear and as are inherent in the construction disclosed. My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawing and, while I have shown therein what is now considered the preferred embodiment of my construction, I desire the same to be understood as illustrative only and not as limiting said invention.

In the annexed drawing Fig. 1 is a fragmentary longitudinal vertical section of a motor having my improvement applied thereto; Fig. 2 is a bottom plan view of a motor head constructed in accordance with this invention; Fig. 3 is a vertical transverse section through Fig. 1 substantially along the plane indicated by the line 3—3, Fig. 2.

Referring more in detail to the annexed drawing, numeral 1 denotes in general the engine block and 2 the engine head. Numerals 3, 4, 5 and 6 denote the pistons located, respectively, in the cylinders 7, 8, 9 and 10. These cylinders and pistons are of ordinary construction and therefore no further disclosure thereof will be given.

The head 2 is provided with a water jacket 11 which communicates with the corresponding water jacket in the engine block, in accordance with prevailing custom. In the central portion of this head there is somewhat of a modification however, as cylindrical or oval portions are cast integral with the walls of the head and extend therethrough to furnish entrance and exit means for the air being pumped. These portions are provided with openings for the passage of the air, said openings being controlled by suitable valves. This construction will now be described in detail. Since the two are similar, a description of one will suffice.

The blocks or bodies 12 connecting the upper and lower faces of the head 2 are provided with perforations 13 and 14 screw-threaded, respectively, at 15. Tubes 16 and 17 are screwed into the perforations 13 and 14 and have valve seats against which the valves 18 and 19 are seated. Perforated blocks 20, provided with perforations 21 for reception of the valve stem and 22 for the passage of air, are mounted in the tubes 16 and 17. It will of course be understood that these blocks must be rigidly fixed in the tubes in order that they will not become displaced on account of air pressure. Springs 23 are provided to maintain the valves normally closed, the springs being held in place by suitable means 24 such as nuts. Tubes 25 are held in the openings 14^a by reason of their screw-threaded connection with the internally and externally screw-threaded rings 26 mounted upon the outer ends of the tubes 17. Suitable pipes 27 connect the tubes 25 with the pipe 28 leading to the pressure tank. Any suitable means such as a coupling or right and left-hand threads may be provided to enable the parts to be assembled.

Referring now more particularly to Figs. 2 and 3, numeral 30 designates the spark plug holes through the engine head, in which the spark plugs for cylinders 7 and 10 are mounted. On the under face of the head are depressions corresponding to the various cylinders of the engine. These depressions comprise two parts 31 and 32 more or less completely separated from each other. The part 31 is that part which covers the normal operating cylinders of the engine and the part 32 is the valve and firing chamber of the engine. This latter part provides a space intc which the engine valves may move when they

are unseated from their seats in the engine block. This space also furnishes a space into which the spark plugs may reach for the firing of a combustible mixture. In my new construction, no spark plug opening is provided in connection with the chambers 32 of cylinders 8 and 9, as these two cylinders are used for pumps to compress the air or other fluid being pumped. The valves in connection with these two cylinders are not removed or otherwise interfered with. But these valves are prevented from interfering with the operation of the pump by reason of the fact that a flange or web 33 is formed on the under side of the head to separate parts 31 and 32 of the depressions corresponding to the cylinders 8 and 9. Instead of the usual gasket, it is necessary to use a gasket having bars across these two openings corresponding in shape and location to the webs or flanges 33. It will therefore be seen that the intake and outlet valves of these two cylinders can not communicate with the cylinders themselves but only with the parts 32 of the head depressions. They therefore do not interfere with the functioning of the apparatus in any way. Therefore, when either piston 4 or 5 moves downwardly, air is drawn through the respective valve 18 into the cylinder and when the piston moves upwardly the air lifts the valve 19 and is forced out through the pipes 27 and 28 into the storage tank or reservoir. Springs 23 normally hold the valves 18 and 19 closed.

From the foregoing it will be understood that part of the cylinders act as compression cylinders for the operation of the engine while the rest act as compressors to force the pumped fluid into the storage tank. The various parts of the engine head serve as cylinder caps or closures for the various cylinders of the engine. The device may be used in somewhat modified forms with any ordinary internal combustion engine, the one shown being designed for use with the engine of a Ford automobile. The fluid pumped by this compressor may be used for any purpose to which such a fluid is adapted, such as operating air paint brushes, filling automobile tires, etc.

With the present construction it is only necessary to remove the usual head and gasket and substitute therefor the new head and gasket of my invention. The engine is then ready to be used as a compressor for any purpose to which it is adapted.

While I have shown and described herein what is now considered the preferred embodiment of my invention, I desire it understood that various changes in the construction and operation thereof may be made without departing from the spirit of said invention, said disclosure being intended as illustrative only and not as limiting this invention to the particular structure disclosed.

Having now described my invention, I claim:

1. A cylinder head for converting an internal combustion engine into a motor driven pump, said head being outwardly similar to the usual head of the engine but having a flange on the face thereof adjacent the engine block to isolate the valve compartment for one of the cylinders from the piston compartment thereof, said head being provided with inlet and outlet valves cooperating with the said cylinder to enable it to function as a pump.

2. An engine cylinder head in which part of the cylinder caps have openings, tubes extending through the openings of the head, intake and outlet valves being mounted in the tubes, each of said cylinder caps having such tubes being divided into two compartments corresponding respectively to the normal cylinder and valve compartments of the head.

3. In a structure of the character described, a cylinder head having depressions on its under face corresponding to the compression and firing chambers of an engine head, some of said depressions having openings leading therefrom to the upper surface of the head, inlet and outlet valves controlling said openings and means separating the engine valve chambers from the head valve chambers.

4. In an engine, a cylinder head for closing the upper ends of the cylinders, said head having separate inlet and outlet openings extending therethrough from some of the cylinders to the exterior face of the head, said openings being independent of the normal inlet and outlet openings of the cylinders, and inlet and outlet valves controlling said separate inlet and outlet openings.

5. A modified engine cylinder head to cover the cylinders of an internal combustion engine, said head having depressions therein corresponding to the normal compression chambers of the engine and other depressions corresponding to the valves of said engine, some of the latter being separated structurally from the former so that in use fuel can not reach the corresponding cylinders, means admitting air to said cylinders, and means for exhausting air therefrom, common means to carry said air forced out of said cylinders, to a storage reservoir.

6. A cylinder head for a motor having some of the compression and valve chambers of normal form and some provided with means separating the compression from the valve chambers, said head having inlet and outlet ports opening through the head between the air and the compression chambers which are separated from their respective valve chambers.

7. A cylinder head for a motor having

some of the compression and valve chambers of normal form and some provided with means separating the compression from the valve chambers, the compression-chamber head-walls of the last mentioned compression-chambers being shaped and positioned to reduce the capacity of said compression-chambers to a minimum volume, the head being provided with separate inlet and outlet ports and spring actuated valves controlling said ports, said ports forming a controlled means of communication between the air and the second mentioned compression chambers.

In witness whereof, I hereunto subscribe my name to this specification.

LEONFORD H. SWANSON.