

E. R. HEWITT & A. H. LEIPERT.
MOTOR.

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1,282,831.

Patented Oct. 29, 1918.

Fig. 1.

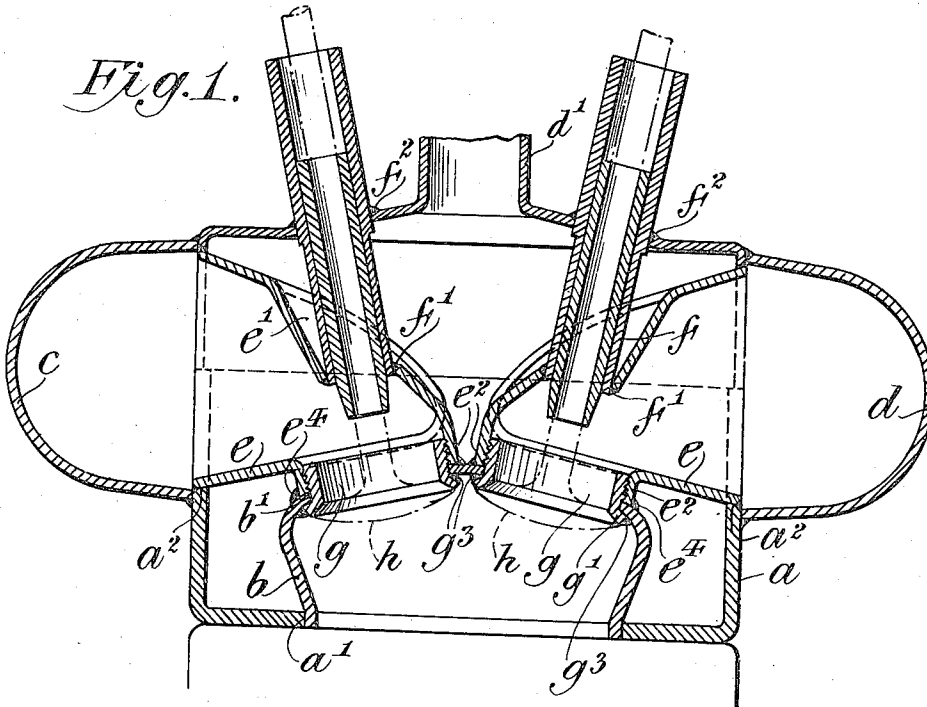


Fig. 2.

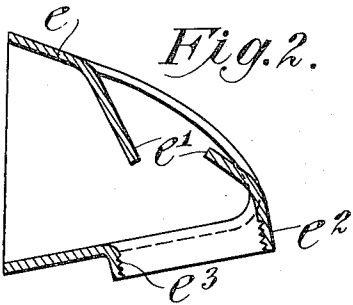


Fig. 3.

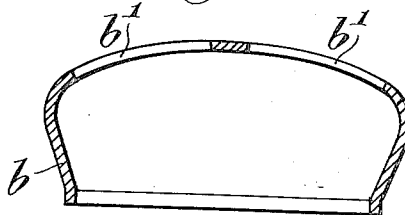


Fig. 5.

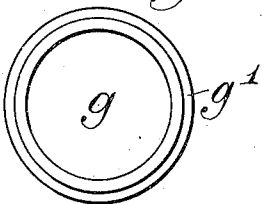
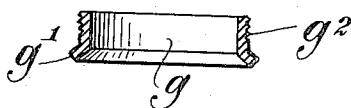


Fig. 4.



WITNESS:
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UNITED STATES PATENT OFFICE.

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MOTOR.

1,282,831.

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To all whom it may concern:

Be it known that we, EDWARD R. HEWITT and AUGUST H. LEIPERT, citizens of the United States, residing, respectively, at Midvale, in the State of New Jersey, and in the borough of Brooklyn of the city of New York, in the State of New York, have invented certain new and useful Improvements in Motors, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

The use of forged steel, sheet steel or pressed steel in the construction of internal combustion engines has long received attention, but as yet motors constructed of such material have not found their way on the market in large numbers and have not proved satisfactory under conditions of actual operation. Cylinder heads, which carry inlet and exhaust valves and their seats, although very desirable have not been satisfactory in use, when constructed of such material, because such material, when of the proper grade of steel for its purpose, does not make a satisfactory, durable valve-seat. In fact, there is no steel, workable at a reasonable expense for such purpose which will make a good valve-seat and cylinder heads made of such material quickly become useless because of trouble with the valve-seats. It is known, however, that cast iron makes a good valve-seat and that the higher the proportion of combined carbon in the cast iron the harder and the more durable the seat becomes. It is further known that the amount of combined carbon which remains in cast iron, in the cold state, is dependent largely upon the rate of cooling, as well as upon chemical characteristics of the iron. The object of this invention is to make it possible to use forged steel, sheet steel or pressed steel in the construction of cylinder heads by combining therewith cast iron valve-seats in such manner that the content of combined carbon in the cast iron valve-seat is very high. In accordance with the invention rings of cast iron are welded upon the steel head and are thereafter machined to form the valve-seats. The seats thus formed have perfect conductivity and a high content of combined carbon, with consequent great durability, since the welding of the cast iron ring takes place directly on

a sheet of steel which readily conducts the heat away as soon as the welding arc or flame is removed, so that the chilling of the cast iron is very rapid and, as pointed out above, the content of combined carbon is high. The invention will be more fully described hereinafter with reference to the accompanying drawing in which it is illustrated and in which,—

Figure 1 is a view, in transverse section, through a cylinder head of suitable construction which is provided with cast iron valve-seats.

Fig. 2 is a detail view, in section, through one of the knees with which the valve-seat is combined.

Fig. 3 is a detail view, in section, of another part of the head with which the valve-seats are combined.

Fig. 4 is a detail view, in section, of one of the cast iron valve-seats.

Fig. 5 is an end view of the valve-seat shown in Fig. 4.

The cylinder head, to which the invention is applied, is constructed of sheet steel or pressed steel or forged steel, made of any suitable configuration. The head indicated in the drawing has a body *a* which is substantially rectangular in cross-section, with an opening at *a'* to receive a dome *b* which constitutes the compression chamber or a part of the compression chamber for the corresponding cylinder, openings at *a²* for communication with the inlet manifold *c* and the outlet manifold *d* respectively and for the knees which carry the valves, and, at a suitable point, with a connection *d'* for the water-circulating pipe. In each opening *a²* is seated and secured, preferably by welding, a knee *e* which, in the construction shown, supports the valve-stem guide as well as the valve-seat and places each valve-seat in communication with the corresponding inlet or exhaust manifold, as the case may be. Each knee *e* is punched out, as at *e'*, to receive the corresponding valve-stem guide *f*, which passes through the top wall of the head and is preferably welded in place, as indicated at *f'* and *f²*. Each knee, which is made of pressed steel or sheet steel, is formed with a flange *e²* which is preferably threaded interiorly, as indicated at *e³*. Each dome *b*, welded in its seat in the bottom wall of the head, has formed therein

openings b' for registration with the corresponding knee c or d , as the case may be.

Each valve-seat is formed by a ring g of cast iron, which is flanged as at g' and is preferably threaded exteriorly, as indicated at g^2 .

When the knees e have been introduced through the openings in the sides of the head, the cast iron rings g are introduced through the dome b and are threaded into the flanges of the knees e , drawing the flanges snugly against the outer surface of the dome through the coaction of the flanges g' with the under side of the dome.

Thereafter, by means of acetylene flame or electric arc, the cast iron ring is fused or welded in place, as indicated at g^3 , and the flange e^2 may also be welded to the dome, as indicated at e^4 .

The cast iron valve-seats are formed approximately to the desired shape before they are inserted and welded in place and after being so inserted and welded they are machined so as to form proper valve-seats for coaction with the valves indicated at A by broken lines.

By reason of the high conductivity of the steel walls of the head, including the domes and the knees, the cast iron rings g are cooled off quickly when the flame or arc has been removed and thereby the content of combined carbon is increased and the valve-seat made thereby more durable.

It will be understood that the form, proportion and arrangement of the several parts of the head may be varied to suit the requirements of each case and that the invention, therefore, except as pointed out in the claim, is not limited to the particular construction and arrangement shown.

We claim as our invention:

The method of making valve-seats in pressed steel cylinder heads which consists in welding a cast iron valve-seat ring in place, permitting the ring to cool quickly after welding in order to increase the content of combined carbon, and thereafter finishing the valve-seat.

This specification signed this 23 day of February, 1918.

EDWARD R. HEWITT.
AUGUST H. LEIPERT.