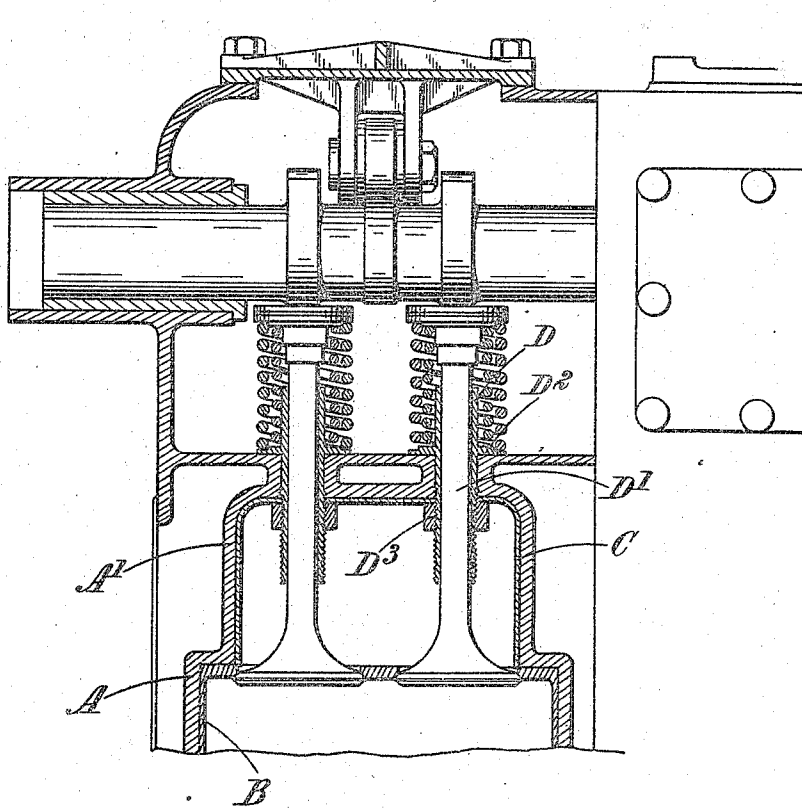


T. C. W. PULLINGER.
 ALUMINIUM OR OTHER LIGHT METAL CASTING FOR INTERNAL COMBUSTION ENGINES;
 APPLICATION FILED SEPT. 5, 1916.

1,226,595.

Patented May 15, 1917.



Witnesses
 Frank Roth
 W. E. Lyon

Inventor.
 T. C. W. Pullinger,
 by Bakewell, Byrnes & Carmichael,
 Attys.

UNITED STATES PATENT OFFICE.

THOMAS CHARLES WILLIS PULLINGER, OF NEAR DUMFRIES, SCOTLAND, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO AMERICAN B. H. P. AERO ENGINE CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ALUMINIUM OR OTHER LIGHT METAL CASTING FOR INTERNAL-COMBUSTION ENGINES.

1,226,595.

Specification of Letters Patent.

Patented May 15, 1917.

Application filed September 5, 1916. Serial No. 118,332.

To all whom it may concern:

Be it known that I, THOMAS CHARLES WILLIS PULLINGER, a subject of the King of England, residing at The Brae, near Dumfries, Scotland, have invented certain new and useful Improvements in Aluminium or other Light Metal Castings for Internal-Combustion Engines, of which the following is a specification.

This invention is for improvements in or relating to aluminium or other light-metal castings for internal combustion engines and has for its object to provide means to prevent corrosion of the interior walls of the chamber for the exhaust valves.

It is common practice to provide light-metal water-jackets for these engines and to insert steel cylinders therein to provide a proper working surface for the piston of the engine and withstand the bursting thrust of the working charge. In these engines the chamber leading from the exhaust valve or valves is commonly cast in one with the light-metal water-jacket and it is found that its walls tend to become corroded by the action of the exhaust gases.

According to this invention, the chamber leading from the exhaust valve or valves of an internal combustion engine and formed in a casting of light metal is provided with a liner of steel or other metal which is less easily corroded by the exhaust gases than would be the case with the casting itself.

The invention further relates to a process of securing such liners in place, consisting in mounting the liner in position in the mold prior to casting the part which is to be lined by the said liner and then pouring in the aluminium or other light metal around the liner so that it is secured in place by the setting of the metal.

In some instances it may be preferred to secure the liner in place by engaging it with parts which serve the double purpose of securing the liner and holding some other portion of the engine construction in position.

In the accompanying drawing, the aluminium water-jacket A has the valve-chamber A¹ cast in one with it. The steel cylinder B is secured into the water-jacket by any desired means, of which various are already in use. The valve-chamber A¹ shown, is domed, but may be of any other shape, and

it is provided with a stamped steel liner C which accurately fits it.

The liner C may be secured in position in the mold before the water-jacket is cast, so that when the metal is poured in it is brought into intimate contact with and surrounds the liner, and when set firmly holds the same in place. In the example shown in the drawing, however, the liner is stamped to accurately fit the valve-chamber and is held in place by the means which fasten the guides D for the valve-stems D¹. These guides are in the form of tubes each having a flange D² which butts against one side of the wall of the valve-chamber, and a nut D³ which butts against the liner on the other side of the wall of the valve-chamber and thus clamps the liner C firmly against the wall.

The liner preserves the wall of the valve-chamber from corrosion which otherwise is found to take place to a considerable extent when aluminium castings are thus used for parts through which the exhaust gases pass. Obviously any passages leading from the valve-chamber and formed also in the aluminium or other light-metal casting could similarly be lined and for the purpose of this invention such passages are considered as forming part of the chamber leading from the exhaust valves. Where such passages are cylindrical a sleeve can be driven in or otherwise fastened within them, but no claim is made in this specification for the lining of cylinders which are cast in aluminium as it is common practice to line these to give a proper wearing surface and also to give them the necessary strength.

Any metal can be used other than steel provided it will withstand the corrosive effect of the fluid passing through the part so lined, and such lines may be cast instead of stamped.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In an internal-combustion engine, the combination of, a light-metal casting provided with a chamber communicating with the engine-cylinder by a port to be controlled by an exhaust-valve, a liner for said chamber which does not extend into the engine-cylinder and is made of material less easily corroded by exhaust gases than light

metal, and a tubular guide for the stem of the exhaust-valve which guide extends through the liner and the wall of the valve-chamber and is secured by butting portions 5 carried on it which butting portions clamp the wall and liner between them and thus secure the liner in place, substantially as set forth.

2. In an internal-combustion engine, the 10 combination of, a light-metal casting provided with a chamber communicating with the engine-cylinder by a port to be controlled by an exhaust-valve, a liner for said chamber which does not extend into the en- 15 gine-cylinder and is made of material less easily corroded by exhaust gases than light metal, a tubular guide for the stem of the exhaust-valve which guide extends through the liner and the wall of the valve-chamber, the said guide being shouldered to bear 20 against one of these parts and screw-threaded at that end which projects from the shouldered portion through the said parts, and a nut on the screw-threaded end so that 25 the liner is clamped against the wall of the

chamber between the said shouldered portion and the nut, substantially as set forth.

3. In an internal-combustion engine, the combination with a light-metal casting provided with a domed chamber which commu- 30 nicates by a port opposite the domed end with the engine-cylinder which port is to be controlled by an exhaust-valve, a liner of material less easily corroded by the exhaust gases than the light metal, shaped to fit into 35 the domed chamber, and a tubular guide for the stem of the exhaust-valve which guide extends through the domed end of the liner and valve-chamber and is secured by butting portions on the guide which butting 40 portions clamp the wall of the chamber and the liner between them and thus secure the liner in place, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of 45 two subscribing witnesses.

THOMAS CHARLES WILLIS PULLINGER.

Witnesses:

R. T. NICOL,

W. LOWE.