H. C. DOAN AND C. J. MARSON.

METHOD OF MAKING PISTON RINGS.

APPLICATION FILED MAR. 11, 1920.

1,435,592. Patented Nov. 14, 1922.

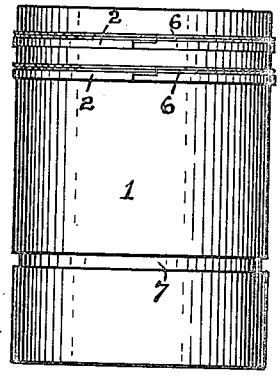


Fig. 1.

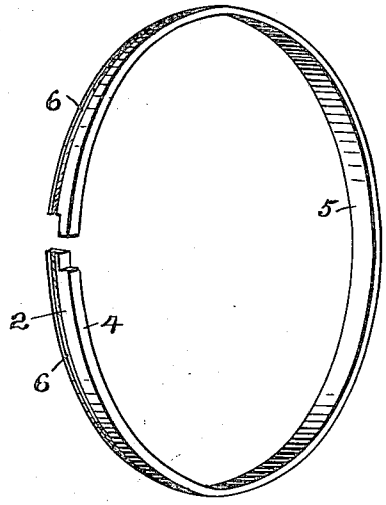


Fig. 2.

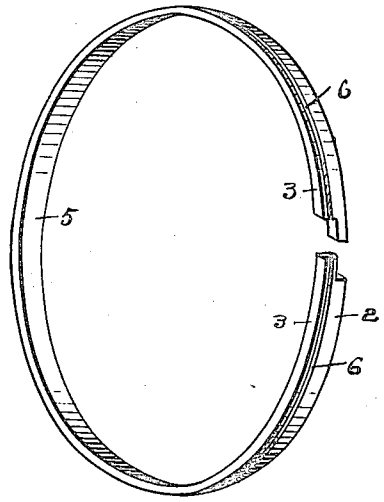


Fig. 3.

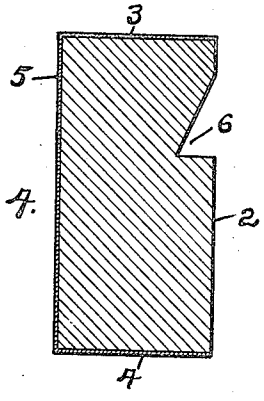


Fig. 4.

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UNITED STATES PATENT OFFICE.

HARRY C. DOAN AND CLIFFORD J. MARSON, OF RICHMOND, INDIANA, ASSIGNORS TO D & M AUTOPARTS CO., OF RICHMOND, INDIANA, A CORPORATION OF INDIANA.

METHOD OF MAKING PISTON RINGS.

Application filed March 11, 1920. Serial No. 364,965.

To all whom it may concern:

Be it known that we, HARRY C. DOAN and CLIFFORD J. MARSON, both citizens of the United States, residing in the city of Richmond, in the county of Wayne and State of Indiana, have invented new and useful Improvements in Methods of Making Piston Rings; of which the following is a full, clear, and accurate specification, being such as will enable others to make and use the same.

The object of our invention, broadly stated, is to provide a piston-ring in which the wear thereof will be reduced to a minimum, in which the life of the ring will be greatly increased, and in which its resiliency will be constantly maintained, and which can be manufactured and sold at a comparatively low price.

It is a well known fact that piston rings are usually formed of porous metal, such as gray-iron, and that in a short time the pores thereof become saturated or filled with oil, thereby causing the ring to become dead and deteriorate, whereby its resiliency gradually diminishes until it has to be replaced with a new ring. Therefore, the primal object of our present invention is to overcome these objections, thereby at least greatly prolonging the usefulness and the efficiency of the ring.

The preferred manner of carrying out the objects of our invention in a practical and economical manner is shown in the accompanying drawings, in which Figure 1 shows a side elevation of a piston with two of our rings in connection therewith. Figure 2 is a perspective view of one of our piston rings. Figure 3 is also a perspective view of our ring, the same being taken at an angle different from that shown in Fig. 2. And Figure 4 is a cross section of one of our rings, as taken on a greatly enlarged scale.

Similar indices denote like parts throughout the several views.

In order that the construction and the advantages of our invention may be more fully understood and appreciated we will now take up a detailed description thereof.

Referring now to the drawings in detail: Numeral 1 denotes a piston which is adapted to reciprocate in a cylinder (not shown). Formed around in the peripheral wall of the piston are a plurality of channels, each being adapted to receive one of our rings.

Each of our rings comprises a body portion 2, which is formed of any suitable material, such for instance as "gray iron," the same being formed substantially square in cross section.

Covering one edge of the body 2 is the plating 3, covering the other edge of the body 2 is the plating 4, and covering the inner periphery of the body 2 is the plating 5. The said plating 3, 4 and 5 is formed of metal different in character from that of the body 2, the same being formed, preferably, of "copper" or an alloy.

The body 2 is usually formed of porous metal, such as cast or gray iron, having the proper degree of resiliency, while the plating is formed of a dense metal, such as copper or the like which is adapted to be carried in suspension in liquid form until it is applied to the body 2, which is usually done electrically.

Formed in the face or periphery of the body 2 is an oil groove 6 which, when the piston is in operative position, is closed by the wall of the cylinder in which the piston operates.

Thus it will be seen that the outer periphery of the ring is adapted to slide in contact with the wall of a cylinder, while the plating 3 and 4 contacts with the upper and the lower walls of the channel 7 in which the ring is located in the usual manner.

The method or process of forming our piston rings consists in forming the body 2 in the usual manner, but slightly less in dimensions, after being dressed or machined the body is then subjected to a plating treatment, usually by means of an electro bath, whereby the body becomes covered with the copper plating, during which the copper also penetrates the interstices of the body 2 and is absorbed thereby, thus causing the body to become dense without loosing its resiliency and therefore making it impervious to oil. After the above the outer periphery of the body is dressed or machined, which removes the copper plating therefrom and also adapts the ring to fit the wall of a cylinder, thereby completing the ring and making it ready for use in the usual manner.

We have found in practice that by reason

of the body of the ring being formed non-porous by the injection of copper that the iron will be preserved from deterioration and the resiliency of the ring will be permanently maintained.

It is to be understood that we do not limit the body of the ring to gray-iron or even to any kind of iron, neither do we limit the plating to copper, as other materials may be employed under certain conditions, but we do claim that the materials mentioned are the best found thus far.

Having now fully shown and described our invention what we claim, and desire to secure by Letters Patent of the United States, is—

The herein described method of forming piston rings, which consists of forming the body of the ring of porous gray-iron cast to the desired shape, machining the surfaces of the body whereby the size of the ring in cross section will be less than the required size of the completed ring, covering the edges and the inner periphery of the body with non-porous copper which metal is distinctively different from the metal of the body, and finally machining the edges and the periphery of the ring to produce a true and smooth surface and whereby the ring will be reduced to the proper dimensions required, all substantially as shown and described.

In testimony whereof we have hereunto subscribed our names to this specification in the presence of two subscribing witnesses.

HARRY C. DOAN.
CLIFFORD J. MARSON.

Witnesses:
ROBT. W. RANDLE,
R. E. RANDLE.