Dec. 18, 1928. 1,695,787

E. M. WILLIAMS

METHOD OF MAKING PISTON RINGS

Filed Feb. 28, 1925

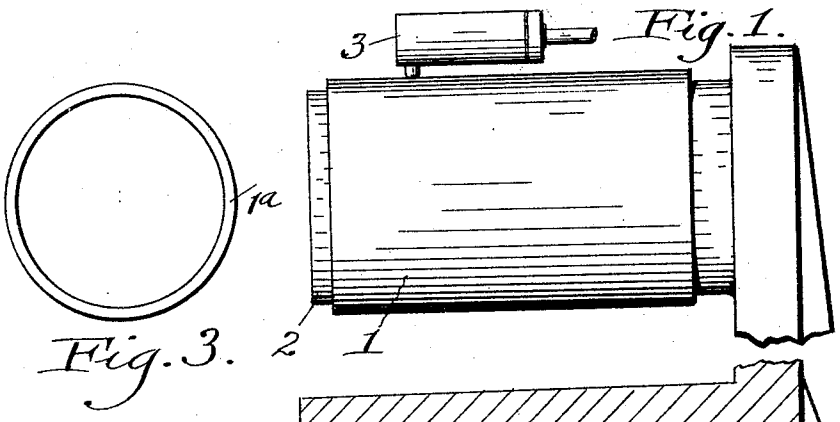


Fig. 1.

Fig. 3.

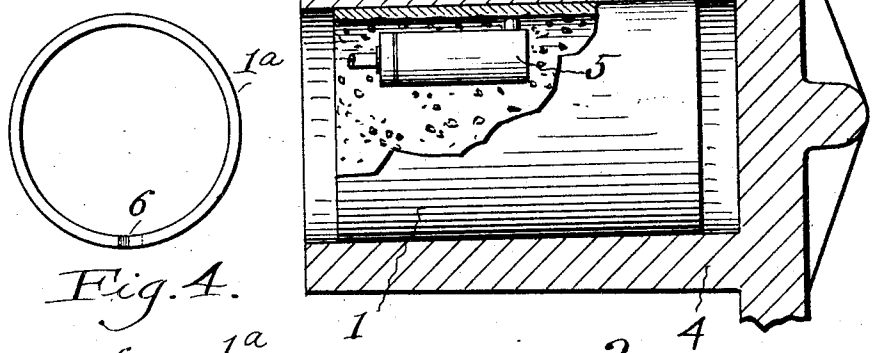


Fig. 4.

Fig. 2.

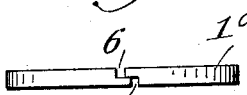


Fig. 5.

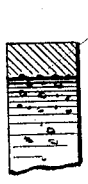


Fig. 6.

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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING PISTON RINGS.

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The present invention relates to a method for manufacturing rings to be used as piston rings, and the invention further concerns certain novelty in the ring itself.

The object of the invention is to produce a piston ring which in the course of its manufacture has the metal thereof condensed and an inherent tension or springiness produced in the metal which causes the ring to spring open in an open position in its normal condition.

Reference should be had to the accompanying drawings forming a part of this specification, in which Fig. 1 shows a cylinder out of which rings are made in one step of the method in manufacturing the same; Fig. 2 shows the same cylinder under a second step in the treatment thereof; Fig. 3 is an end elevation of the cylinder out of which the rings are made; Fig. 4 is a top plan view of the finished ring; Fig. 5 is an elevational view of the ring illustrated by Fig. 4; Fig. 6 is an enlarged section showing the appearance of the inner surface of the ring.

In manufacturing piston rings according to the method herein disclosed, there is first formed a cast cylinder of appropriate length and thickness out of which there may be formed a plurality of piston rings. This cylinder is formed of an appropriate bearing metal which is made of metal that is susceptible of being condensed. Preferably it is made out of an alloy which is nonferrous and containing softer metals than iron, which under impact may be condensed. This cylinder, which is indicated at 1, is placed upon a mandrel 2 which mandrel is arranged to be turned. It may conveniently be chucked in a lathe. When the cylinder 1 is so mounted the same is caused to turn and the outer surface of the cylinder 1 is subjected to the impacts of a hammering apparatus which is generally represented at 3. This may be any suitable form of hammering apparatus which is high speed in its action, that is to say, it will impart a high number of impacts upon the surface of the cylinder in a short interval of time.

While the cylinder 1 is being rotated the impact mechanism 3 is brought into operation, preferably moving transversely across the outer surface of the cylinder 1, and delivering a great number of impacts. This operation compacts the metal giving it a finer and firmer texture. After this operation is completed then a lathe tool is moved across the surface of the cylinder 1, and suitable cuts are taken to remove the hammer marks, and to give to the cylinder a final surface finish.

In the next step the cylinder is removed from the mandrel 2, and is placed inside of a cylindrical member 4. The opening in the cylindrical member 4 is of substantially the same diameter as the outside diameter of the cylinder 1, so that the two fit very snugly when the cylinder is pushed within the opening in the member 4. This member 4 is mounted in a lathe so that it will turn and a hammering mechanism 5 is introduced to the inside surface of the cylinder 1, the hammering action taking place as the cylinder 1 is rotated, and in this operation the metal is compacted upon the inner surface of the cylinder 1, again compacting and giving a firm texture to the metal. It has been found that by hammering the cylinder 1 upon the inside surface as indicated that it impacts an initial outward spring to the piston rings when they are cut, as will be subsequently described.

After the cylinder 1 has been hammered upon the inside as explained, a cutting tool is brought against the surface and sufficient metal removed to reduce the thickness of the metal of the cylinder to the proper thickness for the finished piston ring.

The cylinder is then removed from the member 4 and it is cut into a plurality of rings, such as indicated at 1^a in Fig. 3, the width of the rings being the proper and determined width for the finished piston ring. In the next operation the piston ring is severed at two points, as indicated at 6 and 7 in Fig. 5, which permits the inherent expansion to force the ends of the ring apart. This inherent expansion is produced by the hammering operation upon the inner surface of the cylinder 1 before the piston rings are formed therefrom, and in this connection it will be noted that the cylinder 1 is finished as to the outside diameter and inside diameter which the finished piston rings are to have before the severing action takes place.

When, therefore, a piston ring manufactured in the method described is mounted on a piston, and the same is inserted within the cylinder, the piston ring will have an inherent outward expansion which will make it unnecessary to have a spring behind a piston ring to force it out. Furthermore the piston

ring will be substantially round in shape when it is in engagement with the inner surface of the bore of a cylinder because of the fact that the piston ring is made finished size and round before it is cut, as shown in Fig. 5.

Having described my invention, I claim:

The method of manufacturing piston rings which consists in forming a metal cylinder, mounting the same for rotation, hammering the outer surface of the cylinder by imparting rapid blows to the cylinder while it is rotating upon the entire surface thereof, then taking the cylinder and mounting it for rotation so that the inside surface is exposed and subjecting the inside surface to a rapid hammering action over the entire surface while the cylinder is rotated, then removing the cylinder of metal and cutting it into individual rings and splitting the individual rings transversely of the ring.

In testimony whereof, I hereunto affix my signature.

EDWARD M. WILLIAMS.