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

PISTON RING FINISHING ASSEMBLY.

APPLICATION FILED APR. 2, 1920.

1,380,136. Patented May 31, 1921.

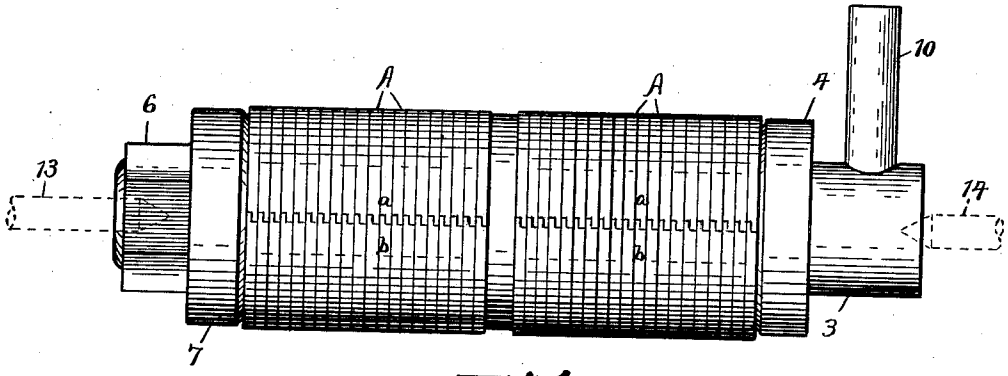


Fig. 1.

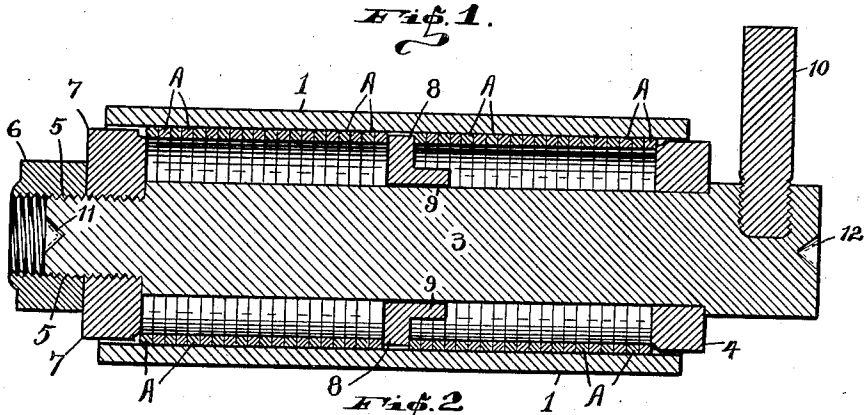


Fig. 2.

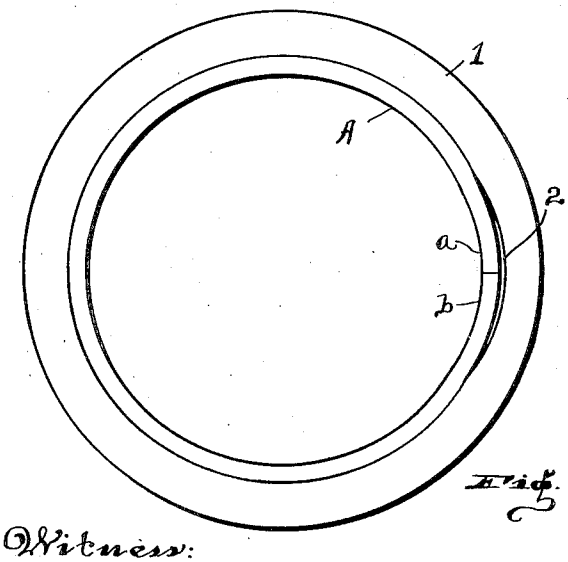


Fig. 3.

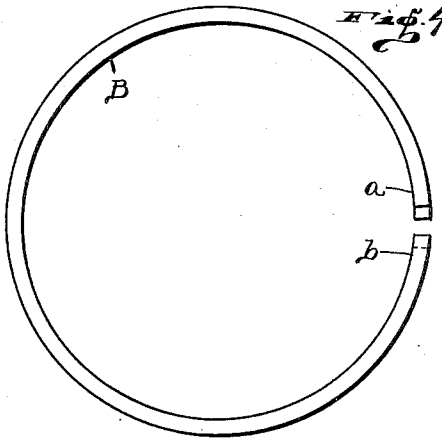


Fig. 4.

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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.

PISTON-RING-FINISHING ASSEMBLY.

1,380,136. Specification of Letters Patent. Patented May 31, 1921.

Application filed April 2, 1920. Serial No. 370,632.

To all whom it may concern:

Be it known that we, HARRY C. DOAN and CLIFFORD J. MARSON, citizens of the United States, residing in the city of Richmond, in the county of Wayne, State of Indiana, have invented a new and useful Piston-Ring-Finishing Assembly, of which the following is a full, clear, and comprehensive specification, the same being such as will enable others to make and use the same with exactitude.

In the production of piston rings it is necessary, in order to insure the best results, that when the ring is completed and in its normal expanded position, that the end portions of the ring shall not project out beyond the true circle of the ring, which manifestly would be the result if the ring was finished in closed position, that is with the end portions of the ring contacting with each other without the employment of our invention, therefore to insure the ring forming a true circle when in its normal and finished condition is the paramount object of our invention.

Broadly stated, our object is to provide a piston ring finishing assembly whereby a quantity of unfinished piston rings may be arranged in proper relations and clamped together whereby the entire lot may be placed in a lathe for the purpose of dressing or machining the peripheries of all of the rings at one operation, and whereby the rings after being machined will each assume an absolutely true circle when released from the assembly and when they are in operative condition in a cylinder.

Other objects and particular advantages of our invention will suggest themselves to an expert in the course of the following description.

The preferred means for carrying out the principles of our invention in a practical and efficient manner is shown in the accompanying drawings, in which—Figure 1 is a side elevation of a portion of our device, showing a plurality of piston rings clamped together by our device as the same would appear when placed in a machine lathe preparatory for finishing or machining the peripheries of the rings. Fig. 2 is a central longitudinal section as taken through the parts shown in Fig. 1, but in addition thereto showing the pot or container in which the rings are assembled whereby they are sprung together to be clamped. Fig. 3 is an end elevation of the pot, showing one of the rings positioned therein. And Fig. 4 shows one of the completed rings alone.

Similar indices denote like parts throughout the several views.

In order that the construction, the operation, and the principles of our invention may be more fully understood and appreciated we will now take up a detailed description thereof in which we will set forth the several features as fully and as comprehensively as we may.

Referring now to the drawings in detail: Numeral 1 denotes the shaping pot, the same being in the nature of a heavy tube, whose bore is the same in cross section throughout its length, the bore or interior of the pot being round in cross section except at one point where it is slightly enlarged by reason of the segment or crescent 2 formed therein as shown in Fig. 3. The interior of the pot is, therefore, such that all parts of the inner wall thereof are concentric with the center, except the crescent 2 formed in one side thereof substantially as shown.

Numeral 3 denotes the arbor, which is of considerably less diameter than is the interior of the pot 2. Secured on one end portion of the arbor 3 is the permanent collar or supporting head 4, the diameter of said head being such as to permit it to enter the interior of the pot 1. The other end of the arbor 3 is reduced in diameter and the reduced portion thereof is provided with the threads 5 which are adapted to receive the nut 6.

Numeral 7 denotes the movable head or supporting collar, the same being adapted to slide on the arbor 3 and to fit the interior of the pot 1, the same as does the head 4.

Numeral 8 denotes the central or floating collar, this being of the same diameter as the heads 4 and 7, and like the latter being slidable on the arbor 3. The collar 8 has a hub or flange 9 which is only for the purpose of retaining the collar 8 at right-angles to the arbor 3, that is giving it a larger bearing.

Letter A denotes each of the unfinished piston-rings. Letter B denotes one of the finished piston rings after it has been removed from the clamp. The end portions of each of the rings are denoted by the letters *a* and *b*.

Numeral 10 denotes the driving arm which is secured in one end portion of the arbor 3 and it projects out at right-angles therefrom, to be engaged by the lathe-head whereby the arbor will be revolved with the lathe head.

Formed centrally in the ends of the arbor 3 are the sockets 11 and 12 which are adapted to receive the pointed ends of the respective lathe centers 13 and 14, as shown in dotted lines in Fig. 1.

Modus operandi:—In practice the arbor is first inserted in the pot 1, bringing the head 4 to approximately the position shown in Fig. 2. We now insert a plurality of rings A into the pot 1 until the pot is approximately one-half filled, with the rings contacting with the head 4. We then insert the collar 8 in the pot, contacting it with the said rings, after which the remainder of the rings are inserted in the pot until the combined thickness of all of the rings in the pot, plus the collar 8, is slightly more than the distance from the head 4 to the shoulder at the inner end of the threads 5. The head 7 is then brought to position and contacted with the outermost ring in the pot, after which the nut 6 is run on the threads 5 and tightened with considerable force, that is sufficient to clamp the rings together with such force that they are absolutely rigid.

In placing the rings in the pot it is necessary to slightly compress each ring until its ends are near together; also in placing the rings in the pot the ends of the rings must be located in the center of the crescent 2, thereby leaving the end portions of the rings free to expand slightly beyond the main circle of the interior of the pot.

After the nut has been tightened then the pot 1 may be slipped off endwise, thereby uncovering the rings but they will be retained in the position to which they have been brought by the pot.

Next the arbor containing the rings is located in a lathe, being centered therein and suspended by the lathe centers 13 and 14.

Now as the rings are revolved by the lathe their peripheries may be machined by a lathe bit in the usual manner, after which they are removed from the lathe, the nut 6 may then be loosened and the rings removed reversely to their placement on the arbor.

It is evident that by reason of the end portions *a* and *b* being free to project into the crescent 2 that in the operation of machining the rings the peripheries of the parts *a* and *b* will be the first engaged by the drill bit, and therefore the rings will be turned to a true circle in their compressed condition, therefore when they are released and the ring expands it is manifest that the end portions *a* and *b* will not project out beyond the true circle line of the finished ring, thereby attaining the paramount object of our invention.

It is to be understood that various changes may be made in the specific construction, shape, and arrangement of parts herein shown without departing from the spirit of the invention and without sacrificing any of the advantages thereof.

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

1. In a piston ring finishing assembly, a pot having a tubular aperture extending therethrough and such as to receive a compressed ring therein, there being a crescent enlargement in one portion of the inner wall of the pot, with the ends of the ring located centrally of the crescent, substantially as set forth.

2. A piston ring finishing assembly comprising a tubular pot having a bore extending therethrough adapted to receive a plurality of cut piston rings, said bore being such as to compress the rings and hold the ends of the rings in close relation to each other, one portion of the longitudinal length of the inner wall of said pot being slightly enlarged out of true circle of the wall whereby when the rings are placed in the pot the end portions of the rings may project outward beyond the main circular line of said wall, all substantially as shown and described.

3. A piston ring finishing assembly comprising a tubular forming pot, the same having an aperture therethrough adapted to receive a plurality of contracted piston rings, there being one portion of the wall of said aperture which is slightly enlarged, said enlargement being crescent shaped and extending from end to end of the pot, the ends of the rings contained in the pot being located centrally of said enlargement of the interior wall whereby the end portions of the rings may project out beyond the line of said central aperture, all substantially as shown and described.

4. A piston ring finishing assembly, comprising a tube having a bore therethrough longitudinally thereof which bore is of a diameter such as to receive compressed rings therein, said tube being enlarged at one place in its interior wall and extending from end to end thereof with the end portions of the rings contained in the tube located centrally of said enlargement, means for clamping together all of the rings located in the tube whereby when the rings are assembled and removed from the tube they will retain their compressed positions, all substantially as shown and described.

5. A piston ring forming assembly including a tubular pot having a circular bore

therethrough with one portion of said bore enlarged from end to end of the pot, heads for closing the ends of the pot, a collar located centrally of the pot and dividing the rings contained in the pot, an arbor extending centrally through the pot and through said heads and collar, and means for clamping said heads upon piston rings located in the pot and in such manner as to permit the pot to be removed after the rings are secured in clamped condition, all substantially as shown and described.

6. That improvement in finishing piston rings which consists in inclosing a plurality of rings in compressed condition with the end portions of the rings free to spring outward, then clamping the rings together in the shape to which they have been formed by the inclosing means, then removing the inclosing means, next machining the peripheries of the rings while in their clamped condition, and then releasing the rings whereby they will assume their normal position each forming a true circle, substantially as set forth and for the purposes specified.

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:
ROBERT W. RANDLE,
M. E. RANDLE.