Feb. 26, 1924. 1,485,128

F. E. SMALL

PISTON PACKING RING

Filed June 14, 1923

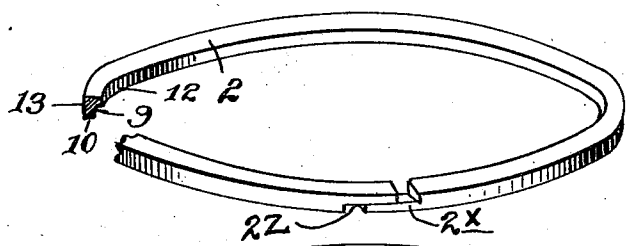


Fig. 1.

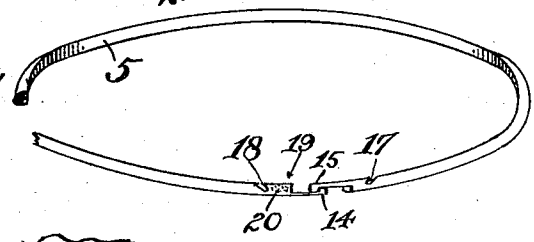


Fig. 2.

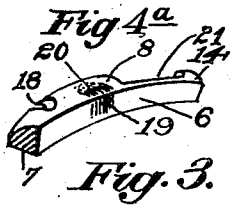
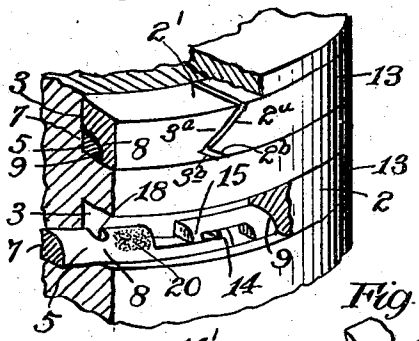


Fig. 3.



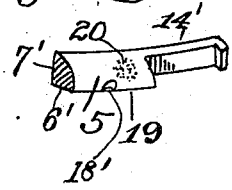
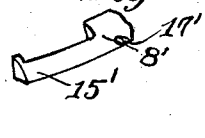


Fig. 5.



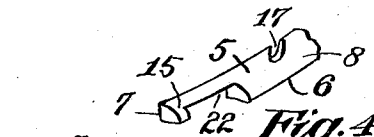
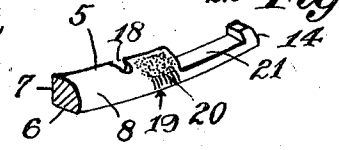


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANK E. SMALL, OF JAMAICA, NEW YORK.

PISTON PACKING RING.

Application filed June 14, 1923. Serial No. 645,361.

To all whom it may concern:

Be it known that I, FRANK E. SMALL, a citizen of the United States, and a resident of Jamaica, L. I., in the county of Queens and State of New York, have invented certain new and useful Improvements in Piston Packing Rings, of which the following is a specification.

The present invention relates to packing rings for pistons, especially designed for the use in internal combustion engines. The packing is of the type of a split metal ring placed in a groove in the piston and pressed outwardly to engage the wall of the cylinder, with means for maintaining such engagement notwithstanding wear of both the wall of the cylinder and of the ring itself.

The object of the present invention is to provide a split ring of this character, that has inter-locking end portions, with means such as a notch on each end portion, preferably back of the inter-locking portions, that can each be readily engaged by a suitable tool having jaw members for engaging the notches respectively, or by two separate implements, with each engaging one of such notches, whereby the inter-locking ends can be caused to approach from their separated, expanded position, and thereby be brought to inter-engage; which operation can be affected by inserting the said ring at the bottom of the piston groove, to cause the ring to remain in the bottom of the groove by locking of these end portions.

In the accompanying drawing showing embodiments of my invention, Figure 1, shows the outer ring.

Fig. 2 shows the inner spring ring.

Fig. 3 is a perspective view, broken, enlarged.

Fig. 4 shows enlarged the locking ends of the inner ring.

Fig. 4ª is an inside view of one end of the locking ring shown in Figure 4.

Fig. 5 shows another form of inter-locking ends, provided with notches.

In the drawing I show an outer ring 2 that has split ends of any desired form of lap. This ring 2 is shown approximately rectangular in general outline, of a size to fit in a groove 3 in a piston wall 4, see Fig. 3. For the purpose of pressing this main ring outwardly in the groove to hold it in engagement with the wall of the cylinder not shown, I provide a spring expander ring 5, that is split and is made substantially quadrant shape in section, see Fig. 4. This ring comprises a straight side wall 6, and an inner wall 7 that is cylindrical. The curved wall 8 of this ring corresponds to a quadrant in section.

The main ring 2 has an inner corner portion cut away to form a curved wall 9, extending from an intermediate portion of the side wall 10 of this ring to an intermediate part of the inner wall 12 of the main ring, see Fig. 3. This curved wall 9 corresponds to the curved wall 8 of the ring 5, so that when the rings are brought together, as indicated in Fig. 3, they will closely engage. This will bring the side face 6 of the split ring to engage the side wall 10 of the main ring; and also the inner wall 7 of the spring ring will register with the inner wall 12 of the main ring, as shown. These two rings are placed in the piston groove 3 as indicated in Fig. 3 and the engagement of the curved walls of the two rings will result in the inner spring ring forcing the main ring outwardly and it will hold it engaging the wall of the cylinder at its outer face.

I further provide means for interlocking the end portions of the split ring 5, and in Figs. 3, 4 and 5 I show the ends portions of these rings provided with integral hook portions 14 and 15 on the respective ends, that engage each other as indicated in Fig. 2.

These hook portions are preferably formed in the side walls 6 and 8 of the ring 5, with a considerable space at 21 and 22 so that when this ring is first inserted in the groove and pressed down to the bottom wall 3, the hook portions will overlap, and then as the ring is released it will spring outwardly a short distance in the groove until the hook portions engage and interlock. This will obviously retain this ring in the bottom of the groove. The outer ring 2 is then inserted and the curved wall 9 thereof will engage the quadrant wall 8 of the inner ring and the piston is just placed in the cylinder engaging the outer ring will hold it in the groove and force the inner ring inwardly to disengage the meeting walls of the hook portions. Obviously the latter should so fit that this inner ring can expand sufficiently to hold the outer ring engaging the cylinder wall to take up wear on the ring and the cylinder wall, before the hook portions will engage to interlock.

Where it is needed to insert the inner spring ring 5 in the bottom of a piston

groove, where grooves are comparatively narrow, as is the present tendency, it has been very difficult to cause the engagement of the inner-locking ends. To facilitate this, I provide each of the end portions of this ring with means for ready engagement with the suitable implement or tool, such as one having jaws; or which portions can be engaged by two implements or devices, which are caused to approach, that will tend to draw these ends together and permit them to inter-lock. As shown in Figs. 2, 3 and 4, I provide notches 17 and 18 in the end portions of the ring 5, that are located back of the interlocking portions, that are reduced in size from the normal shape of the ring between these end portions. These notches preferably are in the side which is outermost when the ring is inserted in the groove, and may be slightly inclined downwardly and forwardly toward that end portion of the ring, as clearly shown. It will be readily understood that an implement having jaws can be brought to engage these notches by the jaws respectively, and then as the jaws approach these ends will be drawn to permit the inter-locking of the ends at the bottom of the groove 3, when released by these implements. But these notches can be engaged by a separate implement, such as the file end, and which are moved to approach and produce the same result.

In Fig. 5, I show a slight modification in which the rings 7′ and 8′ have inter-locking end portions 14′ and have the locking portions at the side walls of the groove. These ring ends are provided with notches 17′ and 18′ that correspond with the notches 17 and 18 as shown in Fig. 4, and can be engaged by suitable implement, or two of them in the same manner set forth.

A device of this character is very simple and easily produced, it being merely necessary to make proper notches in the desired edge or face of the ring. The inner ring, that is of a resilient structure, is so designed for the size of the piston and its groove, that when inserted it will practically or almost close when brought to the position of inter-lock, and then when released, it will spring outwardly a very small distance or amount. It will be further understood that when the outer or packing ring is applied, this inner ring can not expand and force the packing ring outwardly in the piston groove, which will permit easy insertion of the packed piston into its cylinder. In such case the outer ring is forced inwardly a small amount, and the inter-locking heads of the inner spring ring will permit slight approach of such ends, in case the inner ring is forced down to the bottom of the piston groove. It will also be understood that in use, the inner spring ring is permitted by its inter-locking heads to expand sufficiently to force the outer ring outwardly against the wall of the cylinder.

What I claim is:—

1. A piston packing ring comprising an outer split ring, and an inner split ring of resilient material, said rings having cooperating faces whereby the inner ring will press the outer ring outwardly in the piston groove, said inner ring being provided with interlocking end portions adapted to engage on insertion to permit a limited outward movement of the ring, said inner ring being also provided with a notch at each end forming shoulders adapted to each be pressed toward the other end to effect the engagement of the said interlocking end portions in the piston ring.

2. A piston packing ring comprising a split ring provided with interlocking end portions adapted to engage on insertion to permit a limited outward movement of the ring, said ring being also provided with notch portions forming shoulders adapted to each be pressed toward the other end to effect the engagement of the said interlocking end portions in the piston ring.

Signed at New York, N. Y., on June 11th, 1923.

FRANK E. SMALL.