

June 17, 1930.

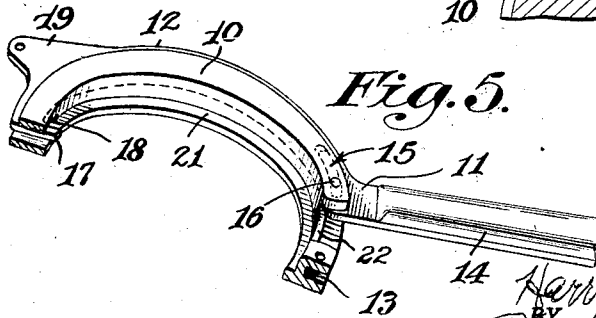
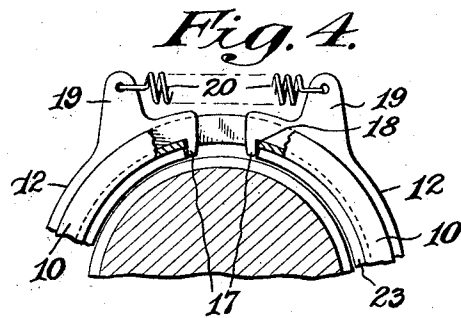
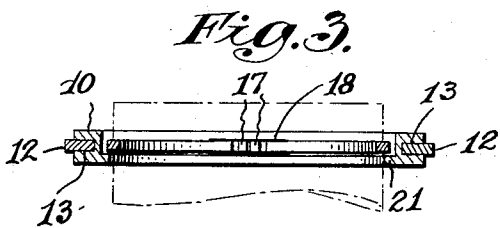
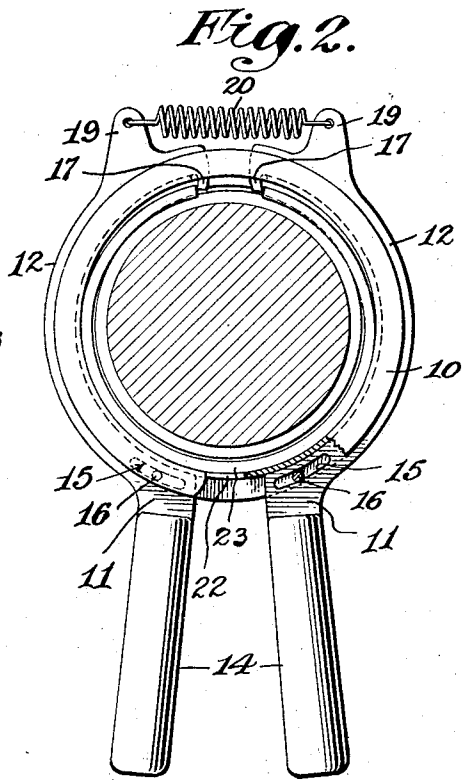
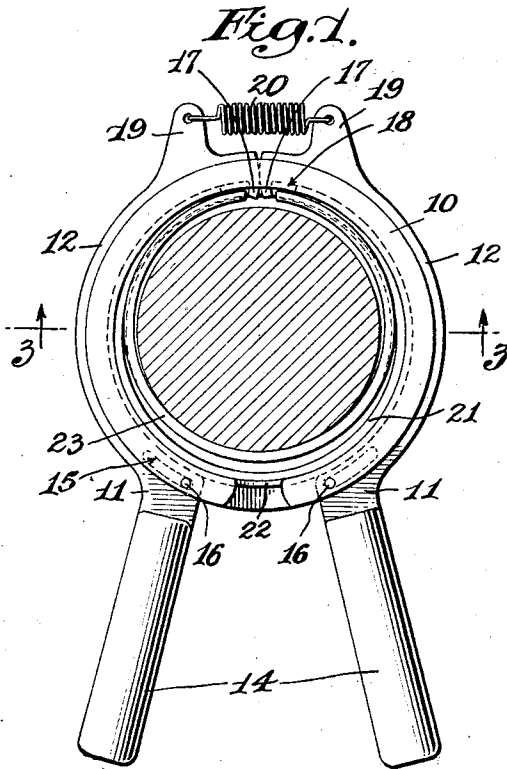
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1,764,146

RING TOOL

Filed May 14, 1927

3 Sheets-Sheet 1



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3 Sheets-Sheet 3

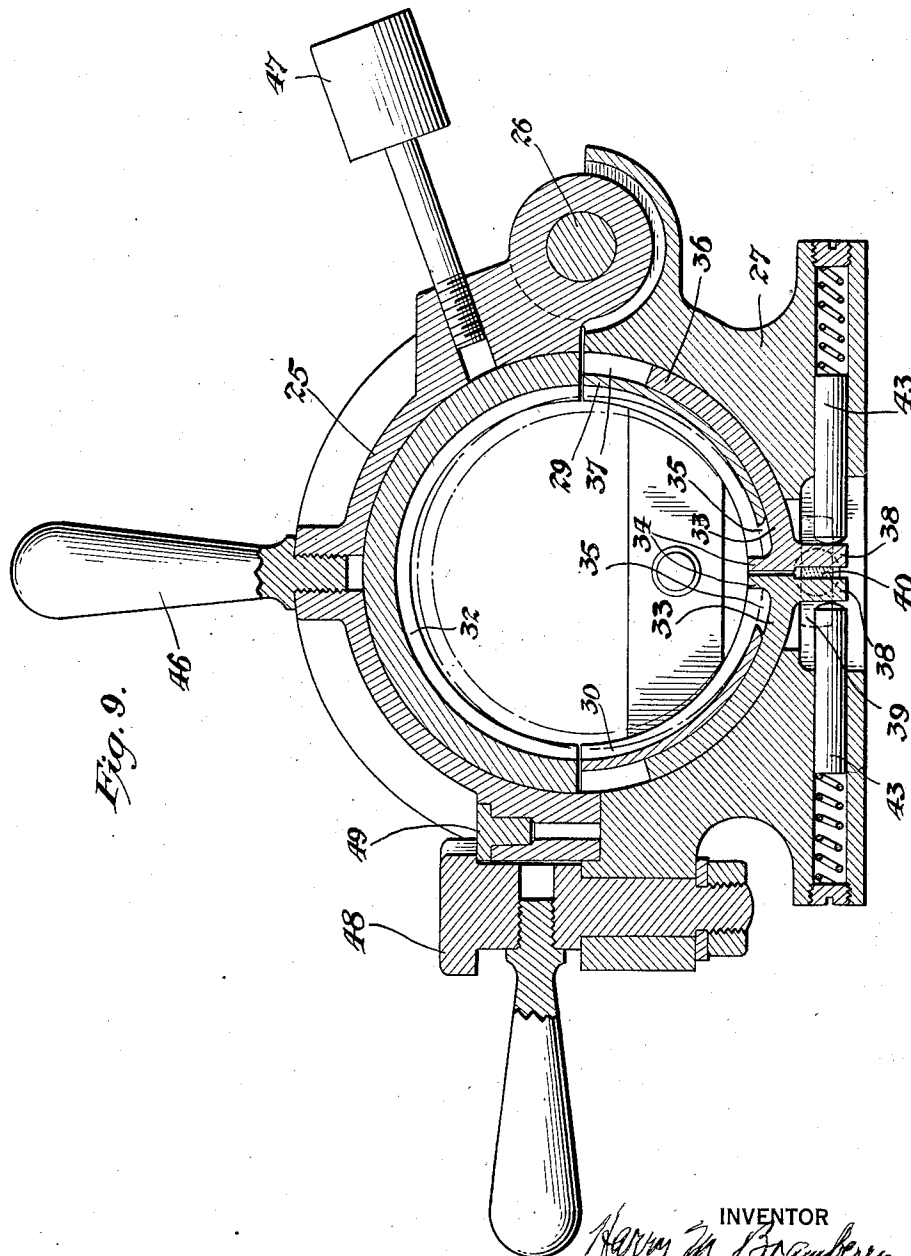


Fig. 9.

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RING TOOL

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This invention relates to a ring tool for use in applying piston rings to the ring grooves of a piston and in removing the rings from the piston.

5 Piston rings are made with their inner diameters smaller than the outer diameter of the piston on which they are to be used in order that they may fit properly into the ring grooves. It is therefore necessary to expand
10 the rings beyond their normal diameter in order to slip them over the piston and place them in the ring grooves. This is done in ordinary practice by merely spreading the ring laterally, so that the bending action is
15 limited to a small section of the ring directly opposite the cut, and as a result the metal of this section is often stretched beyond its elastic limit and the ring is thereby permanently deformed.

20 In order to overcome these defects the present invention provides a form which is placed around the ring and in which the ring is expanded into substantially circular shape. The tool therefore provides a definite limit
25 to the amount of expansion permitted, and insures that the bending will be distributed practically uniformly around the ring, thereby eliminating distortion.

30 Fig. 1 is a plan view of the tool being applied to remove a ring from a piston groove;

Fig. 2 is a view similar to Fig. 1 after the ring has been partly expanded;

Fig. 3 is a section on line 3—3 of Fig. 1;

35 Fig. 4 is a fragmentary view similar to Fig. 1 showing the ring fully expanded, parts being broken away; and

Fig. 5 is a fragmentary perspective showing details of construction.

40 Fig. 6 is a plan view partly in section of a ring tool for expanding a complete set of rings at one operation.

Fig. 7 is a section on line 7—7 of Figure 6.

Fig. 8 is a section on line 8—8 of Figure 6.

Fig. 9 is a section on line 9—9 of Figure 7.

45 Referring to the drawings more specifically, the tool is composed chiefly of the grooved collar 10 and the two operating levers 11. The main part 12 of each operating lever is semi-circular in shape and is of a
50 thickness permitting it to fit slidably within

a groove 13 formed in the outer face of the collar 10. The lower end of the semi-circular part 12 carries a projecting handle 14 and is formed with a slot 15 just above the base
55 of the handle. A rivet or set screw 16 passes through the slot 15 and is stationarily secured to collar 10.

The upper end of the part 12 is provided with a finger 17 adapted to extend inwardly through a slot 18 formed in the bottom of the groove 13. An outwardly projecting ear
60 19 is formed on the upper end of the part 12, and a tension spring 20 is secured to each of the ears 19 and holds the operating levers in the position shown in Fig. 1 with the
65 fingers 17 in contact, with the handles 14 separated. The face of each finger directly opposite the other finger is the operating face, and these operating faces are formed at an
70 angle to each other, so that they are closer together at their roots than at their free ends.

The lower part of the collar 10 carries an inwardly projecting flange 21 upon which the ring is adapted to lie.

75 A notch 22 is formed in the upper rim of the collar 10 at a point between the handles to permit insertion of a finger to lift the ring into engagement with the fingers 17 when removing the ring from a piston.

80 Fig. 1 illustrates the use of a tool in removing a ring from a piston. The tool is placed over the piston in the position shown, and since the fingers 17 lie outside the piston diameter, it is necessary to insert a finger into notch 22 and lift the ring until the
85 fingers 17 extend into the gap of the ring as shown in Fig. 1. Pressure is then applied to handles 14, thereby spreading the fingers 17 and expanding the ring to the position illustrated in Fig. 2. In this position the
90 major portion of the ring is in contact with the inner circular wall of the collar 10, but the extreme ends of the ring are still curved inwardly away from the collar. With the
95 application of slight additional pressure upon the handles the ends of the ring are forced to ride up the inclined faces of the fingers 17 and the ring is forced into contact with the collar as indicated in Fig. 4. The
100

ring is now free of the groove and may be slipped over the piston.

It will be obvious that the operations are merely reversed in placing a ring on the piston. The invention is not limited to a device for handling a single ring, as duplicate sets of operating levers may be provided and operated simultaneously to remove or apply a plurality of rings.

By expanding the ring into contact with a circular, or substantially circular form the amount of bending given the ring is reduced to a minimum and is evenly distributed around the ring, while the form provides a positive stop and prevents careless workmen from opening the ring beyond the necessary minimum.

In the species of Figs. 6-9, the ring tool comprises a cylindrical form, the upper part 25 of which is hinged at 26 to the lower half 27. Near its forward end the lower half 27 is cut away to form a groove 28, and a semi-circular guide-piece 29 is fitted into the groove. The inner face of the guide-piece 25 is formed with grooves 30 arranged to mate with the ring grooves of the piston 31, and the hinged section 25 carries similar grooves 32. The pair of expanding members 33 are mounted between the guide-piece 29 and the groove 28 and are adapted to be spread apart circumferentially to expand the rings. For this purpose they carry fingers 34 projecting inwardly through the slots 35 formed in the bottom of each ring groove 30 and have portions 36 arranged to slide in guideways 37 formed in the guide-piece 29. An operating ear 38 extends downwardly from each expanding member 33 and a cam wedge 39 is mounted in the base 27 and adapted to slide between the ears 38. The forward part of cam 39 carries a narrow flat portion 40 that remains between the ears 38 at all times and acts as a stop to hold the ears in neutral position, while the wide part of the cam is formed with flats 41 that act as stops to hold the members 33 in expanding position. Handle 42 provides means for operating the cam 39. Spring-pressed plungers 43 are mounted in the base 27 transversely of its axis and engage the ears 38 to normally press them toward each other.

A transverse bar 44 extends across the front end of the base 27 and an adjustable stop screw 45 provides means for accurately positioning the piston in the holder.

The hinged section 25 is provided with an operating handle 46 and a counterweight 47 serves to hold the section back when it is in opened position. The gate section 25 is locked shut by means of a cam lock 48 mounted on the base engaging a shoulder 49 on the gate.

In operating this device a ring is placed in each of the grooves 30 with its gap spanning the fingers 34. The gate 25 is then closed

and locked and the wedge 39 is moved to spread the ears 38 and expand the rings into the form. A piston is then inserted in the form to the position of Fig. 7, and upon releasing the wedge, the rings will be permitted to seat in the ring grooves of the piston.

I claim:

1. A ring tool comprising a grooved collar adapted to surround a split ring, a pair of operating levers mounted in the groove of the collar, each lever having an outwardly projecting handle and an inwardly extending finger adapted to extend into the gap of the ring.

2. A ring tool comprising a collar, there being a slot formed radially through the wall of the collar, and an operating lever mounted for sliding movement about the collar, said lever having a part projecting inwardly through the slot.

3. A ring tool comprising a collar, adapted to surround a split ring, a finger projecting inwardly from the collar and adapted to engage one end of the ring, a second finger projecting inwardly from the collar and adapted to engage the other end of the ring, means for moving the second finger away from the first finger to thereby expand the ring into contact with the collar, and resilient means normally pressing the fingers toward each other.

4. A ring tool comprising a collar, there being a slot formed radially through the wall of the collar, a groove formed in the outer wall of the collar, a pair of operating levers mounted for sliding movement in the groove, a handle formed on each operating lever, and a finger formed on each operating lever and projecting inwardly through the slot.

5. A ring tool comprising a collar, there being a slot formed radially through the wall of the collar, a groove formed in the outer wall of the collar, a flange extending inwardly through the lower edge of the collar, a pair of operating levers mounted for sliding movement in the groove, a handle formed on each operating lever, a finger formed on each operating lever and projecting inwardly through the slot, an ear projecting outwardly from each of the operating levers, a spring having its opposite ends attached to each ear, and there being a notch formed in the upper side of the collar.

6. A ring tool comprising a collar adapted to surround a split ring, a finger projecting inwardly from the collar and adapted to engage one end of the ring, a second finger projecting inwardly from the collar and adapted to engage the other end of the ring, the face of each finger which engages the ring being inclined away from the other finger when the tool is in its initial operating position.

7. A ring tool comprising a body of a hollow cylindrical form adapted to receive a plurality of piston rings, a single means oper-

able to expand the rings simultaneously into contact with the body, and means for locating a piston within said body.

5 8. A ring tool comprising a rigid collar adapted to surround a split ring, a finger projecting inwardly from the collar and adapted to engage one end of the ring, a second finger projecting inwardly from the collar and adapted to engage the other end of the ring,
10 a handle extending outwardly from the collar, said handle being secured in fixed relation to the first finger, and a second handle extending outwardly from the collar and connected to the second finger, the parts being so
15 arranged that when the two handles are pressed together the fingers are separated to expand the ring into contact with the collar.

9. A ring tool comprising a rigid collar adapted to surround a split ring, a finger
20 projecting inwardly from the collar and adapted to engage one end of the ring, a second finger projecting inwardly from the collar and adapted to engage the other end of the ring, a handle extending outwardly
25 from the collar, said handle being secured in fixed relation to the first finger, and a second handle extending outwardly from the collar and connected to the second finger, a spring member normally pressing the fingers toward
30 each other, the parts being so arranged that when the two handles are pressed together the fingers are separated to expand the ring into contact with the collar.

10. A ring tool comprising a rigid collar
35 adapted to surround a split ring, a pair of semi-circular members adapted to slide about the collar, each of the semi-circular members carrying at one end a handle and at the opposite end a finger adapted to extend within the
40 collar to engage a split ring, and a resilient member normally pressing the fingers toward each other, the handles lying in close proximity to each other so that the operator can compress them with one hand to expand the ring
45 into contact with the collar.

11. A ring tool comprising a rigid collar adapted to surround a split ring, a pair of fingers adapted to extend within the collar to engage the ends of the ring, means to separate
50 the fingers to expand the ring into contact with the collar, the collar having a portion cut away at a point opposite the fingers to permit the operator to move the ring into engagement with the fingers.

55 In testimony whereof I affix my signature.
HARRY M. BRAMBERRY.