

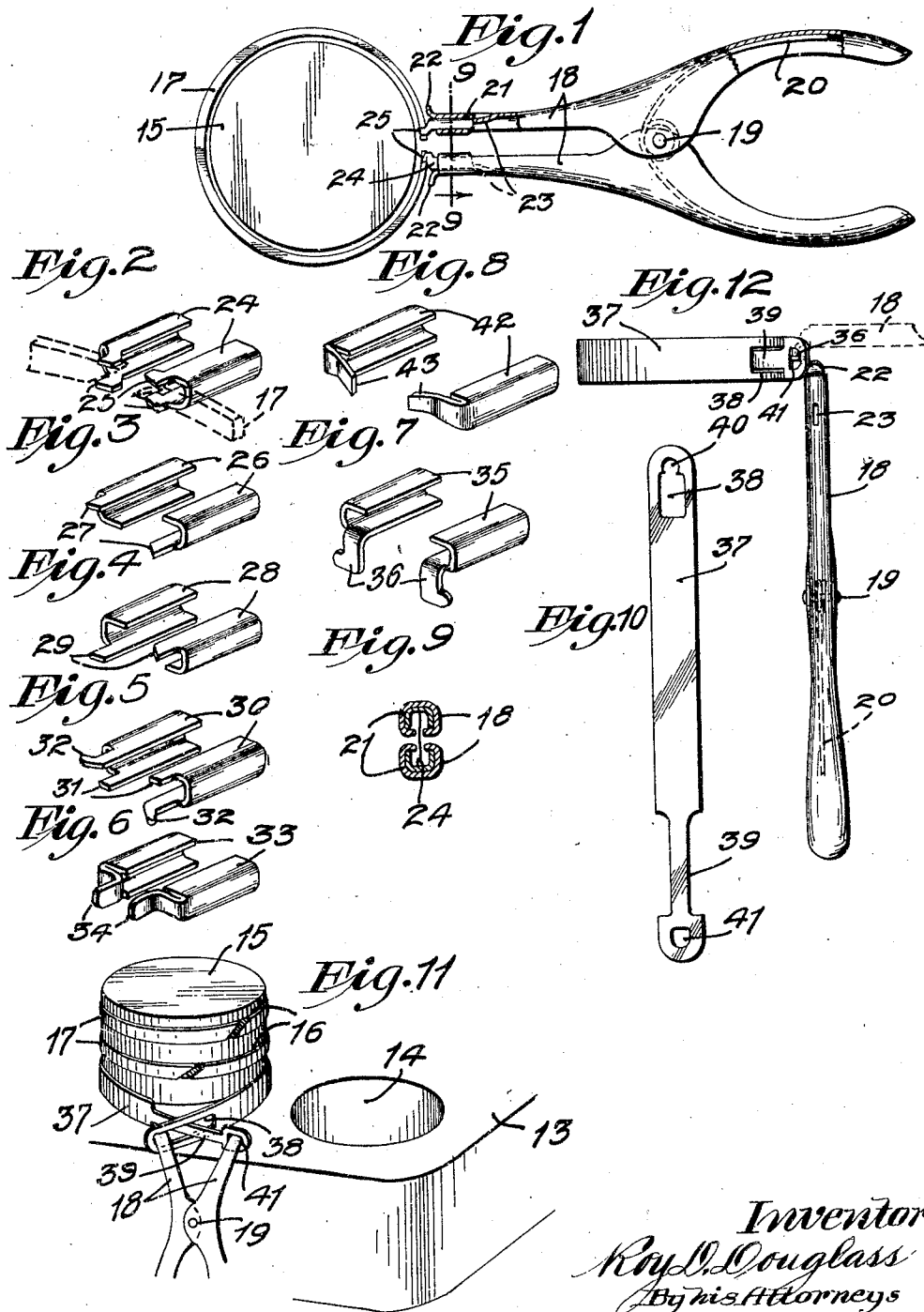
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PISTON RING EXPANDING AND CONTRACTING PLIERS

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UNITED STATES PATENT OFFICE.

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PISTON-RING EXPANDING AND CONTRACTING PLIERS.

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My present invention has for its object to provide an extremely simple and highly efficient tool kit for use in connection with cylinder pistons and their rings, and includes a pair of pliers having interchangeably usable tips with work-engaging lips of different shapes for use in holding and expanding piston rings of various makes, shapes and designs while inserting the same over pistons and into their ring grooves or in removing the same therefrom, and for use in removing carbon from the ring grooves before placing the piston rings therein.

The kit further provides contractible bands of different lengths adapted to be contracted by said pliers around pistons, to hold the pistons while inserting the same into cylinders, at either end thereof, for successively contracting their rings in the grooves to cause the same to enter the cylinders with the pistons.

To the above end, generally stated, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a plan view of the pliers as used in expanding a piston ring in respect to a piston;

Figs. 2 to 8, inclusive, are perspective views of the interchangeably usable tips for the pliers;

Fig. 9 is a detail view in section taken on the line 9—9 of Fig. 1;

Fig. 10 is a plan view of one of the contracting bands spread out flat;

Fig. 11 is a perspective view showing the pliers as used in contracting one of the bands around a piston for holding the same and contracting its rings to cause the same to enter a cylinder with the piston; and

Fig. 12 is a side view of one of the contracting bands and pliers having a different set of tips from that shown in Fig. 11, some parts being shown in different positions by means of broken lines.

For the purpose of illustrating certain of the different uses of the improved tool kit, there is illustrated in the drawings, a cylinder block 13 having a plurality of cylinders 14 and pistons 15, only one of which

is shown. This piston 15 is provided with a plurality of ring grooves 16, in each of which is mounted a piston ring 17, the ends of which are obliquely cut.

As previously stated, the improved tool kit includes a pair of pliers comprising a pair of handle-equipped jaws 18 pivotally connected at 19 to open when the handles are pressed toward each other. A spring 20, held by the pivot 19 and reacting against the handles of the pliers, is under strain to yieldingly close the jaws 18. The free ends of the jaws 18 have sleeve-like holders 21 which, at their outer ends, have integral retaining lips 22 which project away from each other at the outer faces of said holders. Cut and pressed from the outer faces of the jaws 18, at the inner ends of the holders 21, are inset stops 23.

Co-operating pairs of interchangeably usable tips are removably mounted in the holders 21, and which tips have work-engaging lips of different shapes, as shown in Figs. 2 to 8, inclusive. The bodies of the different tips are all alike, to wit: channel-shaped in cross section, and are of such size as to freely enter the holders 21 by an end-wise sliding movement until positioned by the stops 23.

Referring now in detail to the different tips, as shown in Figs. 2 to 8, inclusive, the pair of tips shown in Fig. 2 are indicated by the numeral 24, and each thereof, on its sides, is provided with a pair of forwardly projecting work-engaging lips 25. These work-engaging lips 25 are arranged to engage the obliquely cut ends of the piston rings 17, as shown by full lines in Fig. 1 and by dotted lines in Fig. 2, and securely hold the same while expanding the ring by means of the pliers. To permit this type of tips to be interlocked with the obliquely cut ends of the piston ring 17, when removing said ring from its ring groove in a piston, it is only necessary to press the ring into the ring groove, at a point diametrically opposite the ends of said ring to cause said ends to be projected outward of the ring groove.

In Fig. 3 the pair of tips is indicated by the numeral 26, and each thereof has integrally formed with its sides a pair of laterally spaced work-engaging lips 27 having obliquely cut ends. This type of tips is designed for use in holding and expanding piston rings known as having a "right

step cut" to form the overlapping ends thereof.

Fig. 4 shows a pair of tips 28 having work-engaging lips 29 that are identical with the work-engaging lips 27 with the exception that they are arranged to hold and expand a piston ring having a "left step cut" to form the overlapping ends thereof.

The tips 30 shown in Fig. 5 are each provided with a pair of work-engaging lips 31 and 32, the former of which are straight and the latter of which are in the form of outstanding hooks. Each pair of work-engaging lips 31 and 32 are reversely formed from the other pair thereof. These work-engaging lips 31 and 32 are especially designed for holding and expanding piston rings of the type known as Gill, Kelly and Burd.

In Fig. 6 the tips 33 have forwardly projecting work-engaging lips 34, the outer faces of which are slightly concave for holding and expanding piston rings of the type known as Hess and Panyard.

In Fig. 7 is shown a pair of tips 35 having hook-like work-engaging lips 36, especially designed for a purpose that will presently appear.

The improved tool kit is also provided with a plurality of contracting bands identical the one with the other except as to length, and only one of which is shown in the drawings. This contracting band 37 has at one end a longitudinal slot 38, and at its other end a contracted neck portion 39. In the outer end of the slot 38 is formed an aperture 40, and in the other end of said band, outward of the neck 39, is formed an aperture 41. The band 37 is adapted to be held in annular formation by inserting its neck portion 39 through the slot 38 which permits the band to be contracted onto a piston by separating the ends thereof. To thus contract the band 37, the pliers are used, and when room permits, the retaining lips 22 thereof are inserted into the apertures 40 and 41, as shown in Fig. 11, and the band contracted by pressing the handles of the pliers together. When placing a piston in the lower end of a cylinder or when working in any other inaccessible place, the tips 35 may be inserted into the holder 21

of the pliers, and the angle work-engaging lips 36 inserted into the apertures 40 and 41 while the pliers are held, as shown by full and broken lines in Fig. 12, or in any other intermediate position.

Obviously, when the pliers have their jaws interlocked with the ends of the band 37, said band may be very tightly contracted around a piston to hold the same while inserting the piston into a cylinder and for contracting the piston rings in their ring grooves to permit the same to freely enter the cylinder with the piston.

It is, of course, understood that the tips may be formed with different work-engaging lips, depending upon the kind of piston ring to be held and expanded.

For the purpose of removing carbon from a ring groove before inserting a ring therein, I provide a pair of tips 42 having work-engaging lips 43 which project outwardly and toward each other for scraping the bottom and sides of said groove while the jaws of the pliers are held open and by either rotating the piston or moving the pliers so that the work-engaging lips 43 will move circumferentially over the bottom of the groove or sides thereof.

The above described invention has been put into extensive commercial use, and has proven highly efficient for the purpose had in view.

What I claim is:

1. A pair of pliers, the jaws of which are channel-shaped in cross section and having on their outer ends sleeve-like holders, and tips removably telescoped in said sleeve-like holders and having work-engaging lips.

2. The structure defined in claim 1 in which said tips are channel-shaped in cross section.

3. The structure defined in claim 1 in further combination with stops pressed from said jaws back of their holders and arranged to be engaged by the tips to limit their movement into the holders.

4. The structure defined in claim 1 in which said holders have integral outturned lips.

In testimony whereof I affix my signature.

ROY D. DOUGLASS.