

Nov. 22, 1927.

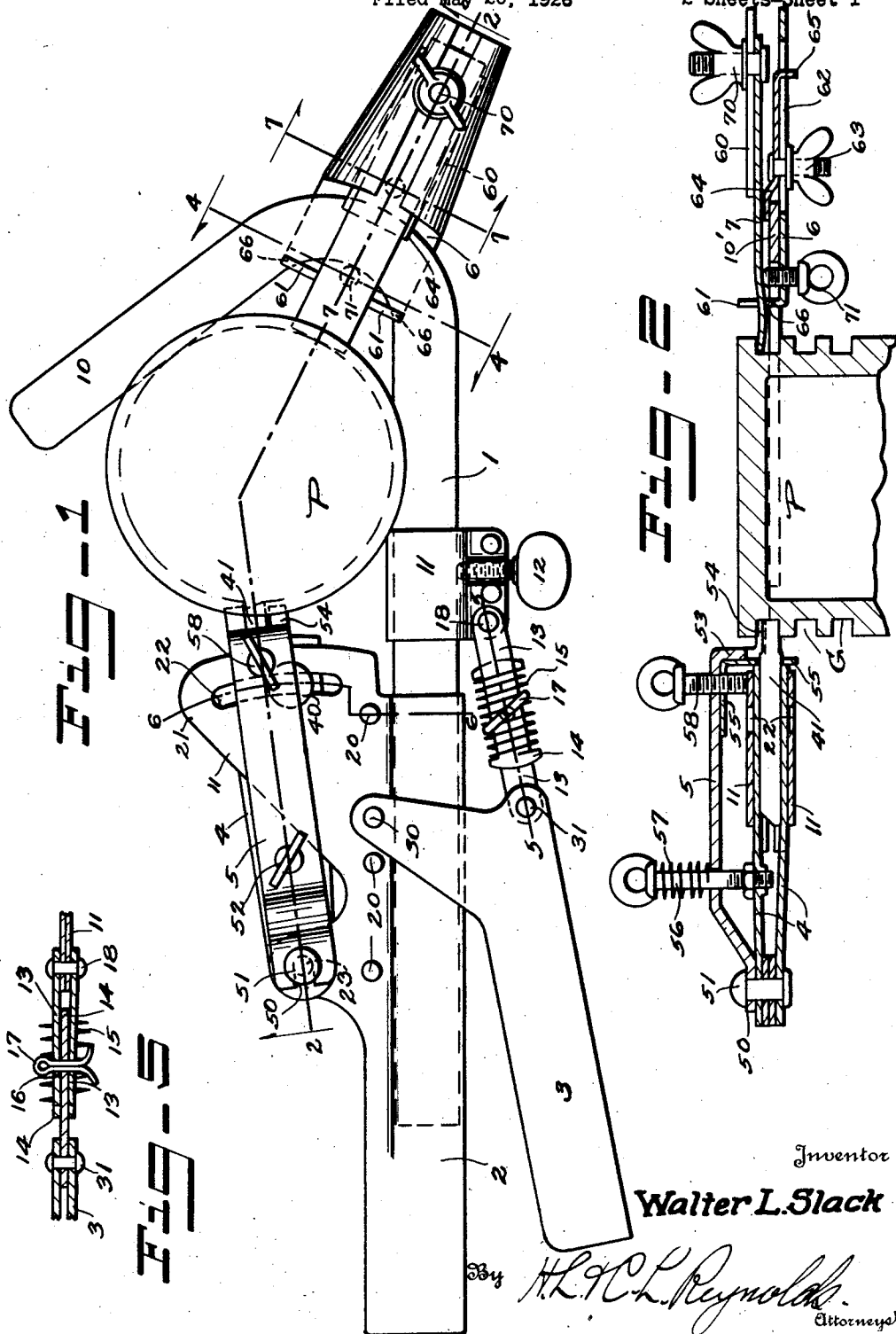
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DEVICE FOR OPERATING ON PISTON RING GROOVES

Filed May 20, 1926

2 Sheets-Sheet 1



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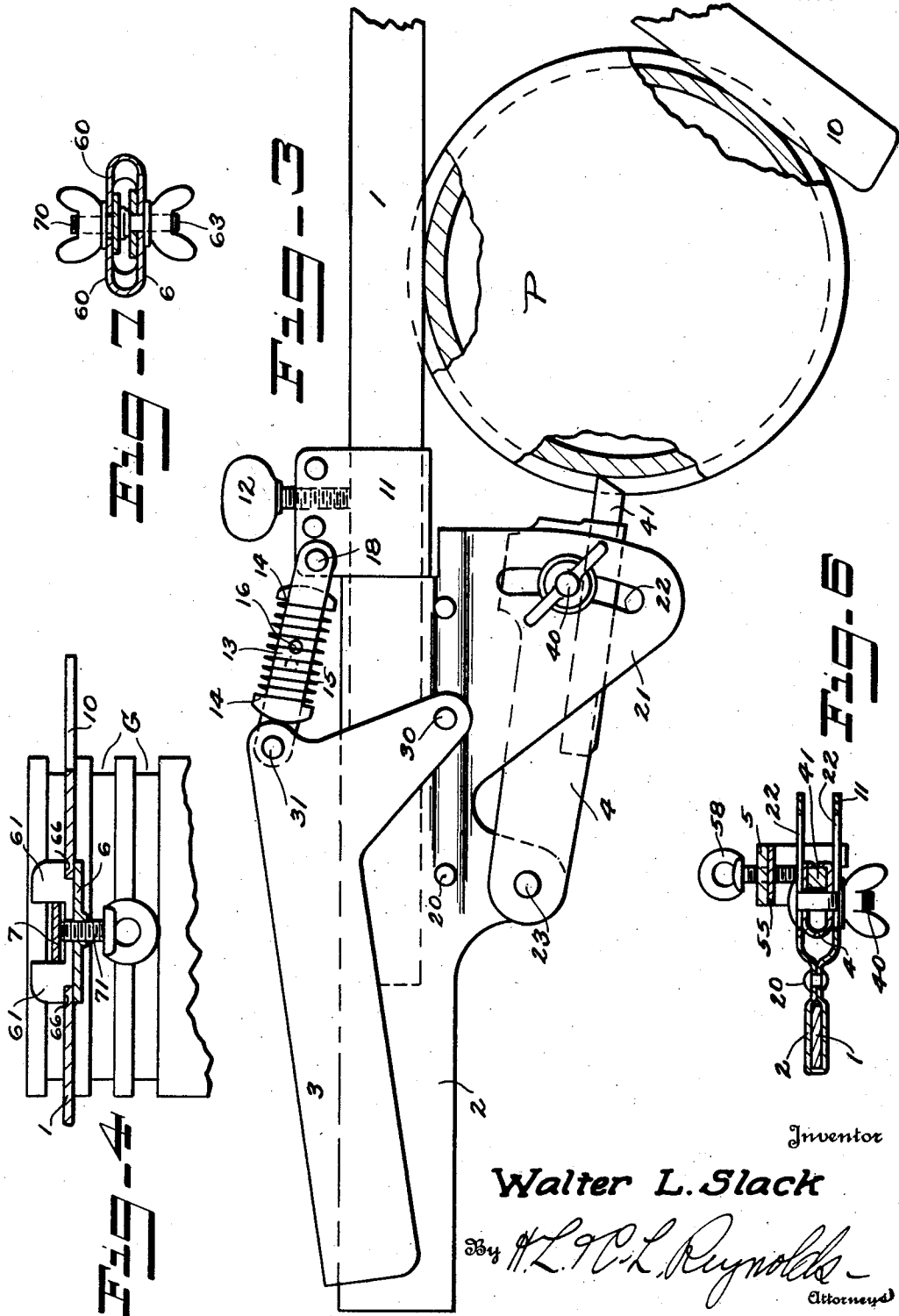
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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DEVICE FOR OPERATING ON PISTON-RING GROOVES.

Application filed May 20, 1926. Serial No. 110,439.

My invention concerns devices classified as hand tools designed for use upon pistons for the purpose of cleaning out, enlarging and modifying the ring receiving grooves.

5 The object of the invention is to provide a simple, convenient and efficient hand tool which may be applied to the various operations found necessary upon the ring grooves of pistons, connected with the proper fitting
10 of the rings thereto. Among these objects are, removal of carbon, deepening and widening the groove, chamfering an edge, and in fact, any of the simple operations of this character usually performed.

15 A chief object of my invention is to produce a tool for such work as mentioned, which is distinctly a hand tool and requires for its use, only a means for holding the piston while being operated upon.

20 The invention consists of a tool which has a V-shaped head engageable over the piston and fitting in the groove being operated upon, and a bit holder mounted so as to be movable towards and from the piston while
25 engaged by the V-head. It also comprises means for holding the groove entering members securely against the side faces of the groove to thereby secure action of the bit in planes which are truly normal to the piston axis, and means for adjusting said parts
30 for grooves of different widths.

The features of this invention which I believe to be novel and upon which I ask a patent will be defined by the claims terminating this specification.

35 The accompanying drawings show the preferred form of construction for my invention.

40 Figure 1 is a side face view of the device with its attachments mounted thereon and applied to a piston.

Figure 2 is a section taken on the planes indicated by the broken lines 2—2 of Figure 1.

45 Figure 3 is a view of the opposite face from that shown in Figure 1, the attachments being removed.

Figure 4 is a section on the line 4—4 of Figure 1.

50 Figure 5 is a section taken lengthwise of the links connecting the clamping lever with the clamping or holding head.

Figure 6 is a section on the line 6—6 of Figure 1, and

55 Figure 7 is a section on the line 7—7 of Figure 1.

The present invention is a development of the device shown in my Patent No. 1,603,361, issued Oct. 19, 1926 on a piston ring groove cleaner. The device of the said application
60 was limited in its use to cleaning piston ring grooves. The present invention performs the same function by substantially the same construction, but performs additional functions by means of attachments applied to a
65 substantially like tool.

The present device, adjusted and equipped to clean the grooves of carbon, is shown in Figure 3. The construction illustrated in this figure is in the main like that shown
70 and described in the said application. Like the device of the said application, it employs a handle 2 having a guide way in which may reciprocate the shank 1 of a piston clamping or holding head; the outer end of which
75 shank has a re-curved or backwardly bent end 10, forming a V-shaped recess or head adapted to be fitted over the piston with the inner edges of the V-shaped bars fitting in the ring receiving grooves of the piston.
80

As in said application, the handle or main frame member 2 has been made by bending a plate upon itself, securing the two halves, as by rivets 20, the plate being
85 shaped to form a socket or guide-way for the shank 1 of the hook or head member, and also having the wings 21 spaced apart to receive between its sides the bit-holding frame or member 4.

Unlike the former construction, the wings
90 21 are evenly spaced apart and have arcuate slots 22 and the bit holder 4 pivoted at 23 may swing towards and from the axis of the handle 2. A clamping bolt 40, passing through the bit holder 4 and the wings 21,
95 may be made to securely bind the bit holder in angularly adjusted position.

The bit holder 4 is of flat tubular construction, open or slit along one side, so that its sides may be clamped securely upon the
100 enclosed bit 41, and the wings 21 clamped securely upon the holder. By reason of this angular adjustment, the axis of the bit may be adjusted to bear the desired relation to the radius of the piston upon which the tool
105 is being used. This will vary with different sizes of pistons. Angular adjustment may also be desired because of different angles given the cutting surfaces of the bit.
110

The operating lever 3 is pivoted at 30 and has a link pivoted thereto at 31 by which

it is connected with the clamping head 1. This link is connected with the shank 1 of the clamping head in an adjustable manner, as through the adjustable clip 11, which may be clamped where desired upon the shank 1, as by the set screw 12.

The link connecting the handle and clip 11, is one which may be resilient or rigid, at will. This has been done by using two overlapping link members 13, one pivoted by one end to the handle at 31 and the other by one end to the clip 11 at 18. Enlarged or T-shaped heads 14 form thrust bearings for a coiled spring 15, while a hole 16 in each link may receive a locking pin 17 to thereby make the link rigid. With pin 17 removed, the link is resilient. This is the condition desired when cleaning the grooves of carbon, while a rigid link is desired when cutting the walls of the groove is desired.

In fitting new rings upon pistons, it is often necessary to deepen or widen the groove, and at times it is desired to chamfer one outer corner. This may be done, and quite accurately, by using the attachments to now be described.

To do such work accurately, it is necessary to confined the working parts to an exact and fixed position lengthwise of the piston. I, therefore, provide two attachments, one co-operating with the bit, and the other with the V-head. These attachments each provide a finger which engages a side face of the groove, one holding the cutting bit against the opposite side face of the groove and the other finger holding a side face of the bars forming the sides of the V against the same side face of the ring groove.

The finger used with the bit consists of a bar 5, having a slot 50 in one end adapted to fit over a pin or rivet shank 51, and having its other end offset, as at 53, and its tip 54 positioned to enter the ring groove along with the bit 41. Preferably this tip is slotted to closely embrace the bit, as is shown in Figure 1. An angle plate 55 secured to the finger is also slotted to span the bit body. A holding bolt 56, anchored on the part 4, holds the finger 5 to the bit holder 4, while spring 57 adds resiliency to the grip. Near the end 54, which enters the ring groove, is an adjusting bolt 58, by means of which the lateral spacing of the bearing points, corresponding with the width of the ring groove, may be secured.

The attachment at the opposite side of the piston embodies the same principles, but is different in construction. A plate 6 has edge sections which are bent over to form flanges 60. At one end two narrow flanges or ears 61 are turned up to extend across the plate. A slot 62 extends along the longitudinal axis of the plate and a clamping bolt 63 in said slot binds one end of a holding bar 64 upon the bend 10' at the apex of the angle between

the shank 1 and its hook extension 10. An ear 65 on bar 64 enters slot 62.

The ears 61 each have a notch 66 in their inner side edges, adapted to receive the inner edges of shank 1 and extension 10 to hold the plate on the clamping head. A finger bar 7 fits between ears 61 and is held by a clamping bolt 70 which passes through the slot which separates the edges of the two flanges 60. An adjusting bolt 71, screwing through plate 6, bears against bar 7 to control the relative lateral spacing of the end of this bar and the parts 1 and 10, to adjust for the width of the ring groove.

By the use of these attachments, the device is maintained in a plane truly normal to the piston axis, so that a cutting bit placed in the bit holder may be relied upon to make a true cut from the wall of the groove. As the groove is enlarged, adjustment by the bolt 71 will enable another cut to be made, until the desired width is secured.

When deepening the groove is desired, the compound link 13, 14, is made rigid by insertion of the locking pin 17, whereupon the clamping lever 3 may be used to force the cutting tool against the bottom of the groove to thereby deepen it.

What I claim as my invention is

1. A tool for cleaning out ring grooves of pistons comprising a frame member having a hook-like end, adapted to fit in the ring grooves at two angularly spaced positions, a bit carrying slide mounted to be reciprocated relative to the said frame member towards and from the piston to engage its bit in the ring groove at a point approximately opposite to the hook, and a guide finger carried by the bit carrier and adapted to engage a side face of the ring groove adjacent to the bit to hold the bit against the other side face of the ring groove.

2. A tool for cleaning out ring grooves of pistons comprising a frame member having a hook-like end adapted to fit in the ring grooves at two angularly spaced positions, a bit carrying slide mounted to be reciprocated relative to the said frame member towards and from the piston to engage its bit in the ring groove at a point approximately opposite to the hook, and a finger carried by the bit carrier and adapted to engage a side face of the ring groove adjacent to the bit to hold the bit against the other side face of the ring groove, and means for adjusting said finger to fit its application to grooves of different widths.

3. A device as in claim 1 having its guide finger slotted to embrace the bit.

4. A device as in claim 1 having a set bolt for adjusting the guide finger transversely with reference to the bit, and a spring holding said guide finger in opposition to the set bolt.

5. The combination with a tool having

two guide members and a bit holder and bit adapted to engage in the ring grooves of a piston to provide a three-point engagement therewith, of two guide fingers adapted to also enter the same ring groove, one in conjunction with the bit and the other with the first mentioned guide members, said guide fingers being adjustable transversely of the ring grooves to engage a side face of the groove and to hold the bit and the two guide members against the other face of the groove.

6. A tool for cleaning ring grooves in pistons, comprising a bar having one end bent backward to form a V-shaped head adapted to enter a ring groove at two angularly spaced points, a guide finger and holder therefor mounted upon said head at the apex of the V for adjustment towards and from the piston upon which it is applied, thereby to enter the finger in the ring groove, and a cutting tool supported from the bar to engage the ring groove at the opposite side of the piston from said guide finger.

7. A tool for cleaning ring grooves in pistons, a head having V-shaped edges adapted to enter a ring groove at two angularly spaced points, a guide finger and holder therefor adjustable towards and from the piston to engage the finger in the piston groove at a point which approximately bisects the angle between the sides of the V-head, and means for adjusting said finger relative to the holder in a direction which is transverse to the ring groove.

8. The combination with a tool of the class described having guide members adapted to enter the ring grooves of a piston at two angularly separated points and a bit holder adapted to engage the piston at an opposite position, and guide fingers removably attachable to said tool and adapted to also enter the ring grooves in cooperation with said other parts, and means for adjusting said guide fingers transversely of the grooves to thereby hold the bit in engagement with a side face of the ring groove.

9. In a tool for cleaning grooves of pistons, a head containing a V-shaped opening the inner edges thereof being adapted to be seated within the ring grooves of a piston, an attachment comprising a frame having at one end a transversely extending upstanding flange which is notched at its ends to fit over the edges of the V-shaped opening of the head, said attachment frame

having longitudinal guide ways, a finger slidable in said guide ways and adapted by its inner end to enter the ring groove, means for clamping the outer end of said finger to its frame, and means for lateral adjustment of the inner end of said finger to force it against a side face of the ring groove.

10. In a device for cleaning ring grooves of pistons, a handle frame, a piston centering bar slidably mounted on the handle frame and having a hooked outer end adapted to embrace and center the piston, a piston-groove-entering bit mounted upon said handle frame, an operating lever pivoted upon the handle frame, and means operatively connecting the centering bar and operating lever containing a spring adapted to yield under strain, and means for rigidly connecting said parts to eliminate the yielding action.

11. In a device for the purpose mentioned, a handle frame, a piston clamping bar slidably mounted on the handle frame and having a hooked outer end adapted to embrace and center the piston, a piston-groove-entering bit mounted upon said handle frame, an operating lever pivoted upon the handle frame, a compound link connecting the clamping lever and the clamping bar to produce relative movement between the handle frame and the clamping bar, said link comprising two overlapping links connected one with each of the said parts, and a spring surrounding both links and having strain connections at opposite ends with the respective links, said links also having registrable holes adapted to receive a connecting pin whereby to neutralize the spring action.

12. In a device for the purpose mentioned, a handle frame, a piston clamping bar slidably mounted on the handle frame and having a hooked outer end adapted to embrace and center the piston, a piston-groove-entering bit mounted upon said handle frame, an operating lever pivoted upon the handle frame, a slide adjustably securable on the piston clamping bar, two link members lying alongside each other, one pivoted to said adjustable slide and the other to the clamping handle, and a spring forming a strain connection between said link members whereby the bit may be yieldingly held against the bottom of the ring groove.

Signed at Seattle, King County, Washington this 8th day of May 1926.

WALTER L. SLACK.