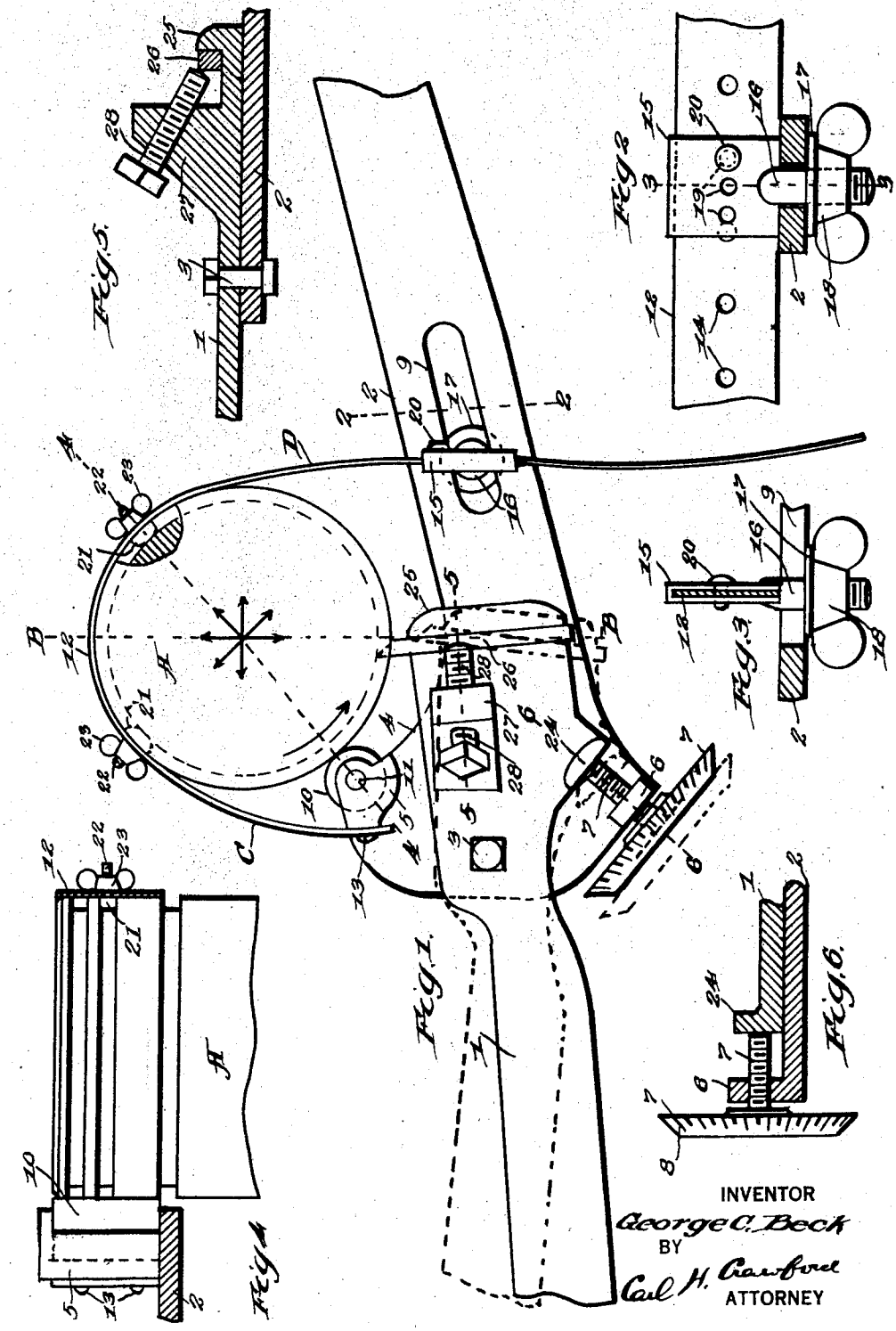
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PISTON GROOVE CLEANER AND DEEPENER

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PISTON-GROOVE CLEANER AND DEEPENER.

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The object of this invention is to provide a device for either cleaning out carbon or deepening the ring grooves of pistons of explosion engines.

One of the features of this invention is that the piston is floatingly held in such a manner that the piston may be turned by hand to effect the cleaning or deepening of the grooves.

A further feature resides in a moving fulcrum which is preferably in the form of a roller against which the piston is yieldingly held, the roller facilitating the manual turning of the piston.

A further feature consists in disposing a cutting tool in such a novel relation with the rolling fulcrum and the yieldingly held piston that the latter will fulcrum on both and will be free to take such a position during the cutting operation as to avoid gouging the groove.

A further feature consists in so disposing the cutting tool that instead of the latter performing its function by a dragging cut, the same will perform its function by a leading cut.

The invention includes various means of adjustments and feeding mechanism all of which will be more fully described in connection with the accompanying drawing and which will be more particularly pointed out in and by the appended claims.

In the drawing:

Fig. 1 is a plan view of the device adjusted to clean or deepen a piston groove, the device being shown in dotted lines to illustrate the manner in which a piston can be released,

Fig. 2 is a sectional view on line 2—2 of Fig. 1,

Fig. 3 is a sectional view on line 3—3 of Fig. 2,

Fig. 4 is a sectional view on line 4—4 of Fig. 1,

Fig. 5 is a sectional view on line 5—5 of Fig. 1, and

Fig. 6 is a sectional view on line 6—6 of Fig. 1.

Like characters of reference designate similar parts throughout the different figures of the drawing.

In the form shown, the device includes pivotally united levers and for distinctive convenience in the further description, I will designate lever 1 as the cutting lever because it carries the cutting tool, and I will designate lever 2 as the holding lever because it carries the means for holding the piston A in position. These levers 1 and 2 are pivotally connected at 3 to afford relative movement thereof as shown in dotted lines.

I will first specifically describe the holding lever 2.

Said lever 2 is concavely arcuate at 4, to afford room for operating on the largest size piston and I have provided said lever with an anchoring lug 5, the purpose of which will presently appear. A lug 6 serves to support a tool feeding device which consists, as shown, of a threaded rod 7, having threaded engagement with lug 6, and provided with a manually operable feed wheel 7, which may, if desired, be provided with suitable graduations 8. An adjusting slot 9 is provided in said lever 2, which will be presently described.

Reference will next be made to the manner and means of floatingly and yieldingly holding the piston A.

I shape the anchoring lug 5 to form a journal and partial housing for a fulcrum roller 10, the same having a spindle 11 for rotatively supporting the roller in the position shown. A strip spring 12 has one end anchored at 13 to lug 5 and is of sufficient length to extend across lever 2 to provide for lengthwise adjustment of said spring to accommodate pistons of different diameter. Said spring is tempered to normally seek a straight position and must be flexed against such tendency in order to be disposed in the operative position shown. Said spring 12, is shown provided with equidistantly spaced holding openings 14 which perform various functions that will presently be described.

The means shown for adjustably holding the free end of spring 12 comprises an inverted U-shaped holder 15, which may be a slotted holder, as shown, to envelope the top edge and both sides of the spring 12. A threaded stud 16 is suitably secured to the lower edges of said holder and said stud 16 extends downwardly through slot 9 and is provided with a washer 17 and a winged nut 18, whereby tension may be applied to frictionally hold the free end of the spring 12 in the desired position. It will now be clear that the spring 12 is adjustable lengthwise through the holder 15 and that the holder is also longitudinally adjustable in slot 9, thereby providing ample range of adjustment for pistons of different diameter.

For a larger piston than that shown, the spring 12 would not only be let out but the holder would be adjusted to the right of the position shown. While I might rely upon frictionally holding the free end of the spring in the holder I preferably provide means for positively performing this function which I will next describe in detail.

Said holder 15 is shown provided with three openings 19 extending through both sides of the holder as will be clear from Fig. 3. These openings 19 are spaced a different distance apart from the openings 14, and by reason of the holder having a plurality of openings 19, it will be seen that the lengthwise adjustment of spring 12 may be made in very limited graduations. I employ fastening means such as a screw 20 for extending through the openings to positively hold the spring 12 in its adjusted position.

In order to prevent the piston A from slipping downwardly out of relation with spring 12, I provide the following means.

Said means consists, as shown, of one or more studs 21 adapted for insertion in the groove of the piston as clearly shown in Figs. 1 and 4, the studs 21 having a greater cross section in one direction than the other, whereby they may be used for grooves of different sizes thereby greatly reducing the total number of studs necessary for each tool to meet the requirements. Each stud has a threaded stem 22, adapted to project through one of the holes 14, and a thumbnut 23, whereby the stud may be tightened into position. In practice, I find it advisable to employ at least two studs, as clearly shown in Fig. 1, the spacing of the studs being such as to engage the piston nearest the points where the spring 12 begins to spread away from the piston.

I will next describe lever 1, and the means thereon for coaction with lever 2.

Lever 1 has a feed abutment lug 24, so that when feed screw 7 is advanced, the levers 1 and 2 will be relatively displaced and the cutting tool, to be described, will be advanced to its work. It will be noted that the feeding means actuates the relatively movable levers near their overlapping juncture in such relation as to move the levers into or toward an alined relation. I have shown lever 1 provided with a ledge 25 against which a cutting tool 26 abuts. A lug 27, on lever 1, affords stock for a tool holding screw 28 for frictionally holding the tool 26 in a fixed position with a sufficient projection of the cutting end to insure entry of the latter into the piston groove.

The operation of my device is as follows:

The spring 12 is adjusted in accordance with the diameter of piston to be operated upon so that there will be enough frictional tension on the piston A, together with the coaction of the studs 21 and the roller 10, to hold the piston in position in a loose manner. Then the wheel 7 is turned to impart feeding movement to the tool 26 to feed the latter into slight cleaning or cutting engagement with the base of the groove. Now it will be seen that when the tool is advanced, the piston will slightly retract toward the spring 12, tightening the latter. The parts are so arranged and proportioned that the cutting tool 26 will engage the piston A, in advance of line B—B, so that the cutting tool will not have a "drag" engagement such as would gouge deep cuts, but will have a "rolling" engagement with the groove by reason of the fact that the tool is positioned as shown, in advance of line B—B, as regards the cutting edge. With the parts as shown in full lines in Fig. 1, the piston A fulcrums on roller 10 and on the edge of tool 26 and because of the resiliency of spring 12, a piston A can automatically shift its position sufficiently so that if the tool should be cutting too deeply, the piston can move away from the tool to reduce the cut. The piston will be manually rotated in the contra-clockwise direction indicated by the arrow in Fig. 1, and the roller 10 will greatly facilitate rotation of the piston and will afford the main point of fulcrum as the piston seeks to adjust its position responsive to the action of the cutting tool, the latter forming a secondary fulcrum.

It will now be clear that by reason of the bend C and the bend D, in the spring 12, and the close proximity of the roller 10 and cutting tool 26, the piston A will be yieldingly and floatingly held in such a manner that it can automatically shift its position in any direction laterally of its longitudinal axis.

I have successfully deepened the grooves of cast iron and also aluminum pistons, the latter being easily turned by hand by reason of the novel means whereby friction is reduced to a minimum.

It is believed that the device of my invention will be fully understood from the foregoing description and while I have herein shown one specific form of my invention, I do not wish to be limited thereto except for such limitations as the claims may impart.

I claim:

1. In a piston groove cleaner and deepener, pivotally united cutting and holding levers and the former having a cutting tool rigidly held thereon, a strip spring adapted to be looped peripherally about the piston and having its ends secured to said holding lever laterally of said tool, said holding lever having a roller piston fulcrum between the ends of said spring and in advance of said tool with respect to the direction of rotation of the piston, and means for relatively shifting said levers to feed said tool into the groove of the piston.

2. In a piston groove cleaner and deepener, pivotally united cutting and holding levers, said holding lever having a roller piston fulcrum, a strip spring adapted to be looped about a piston to floatingly hold the latter against said fulcrum, said cutting lever having a cutting tool adjustably fixed thereon, and means for relatively shifting said levers to advance said cutting tool into one of the piston grooves.

3. In a piston groove cleaner and deepener, a holding member having a roller piston fulcrum, a spring strip adapted to be looped about a piston to floatingly hold the latter against said fulcrum, and cutting means for engagement with a groove of the piston to clean or deepen the groove as the piston is manually rotated.

4. In a piston groove cleaner and deepener, a holding member having a roller fulcrum, means connected with said member for floatingly and yielding holding a piston against said roller and permit the piston to be manually turned, and cutting means for engagement with a groove in the piston to clean or deepen the said groove as said piston is turned.

5. In a piston groove cleaner and deepener, a holding member provided with a piston fulcrum, a piston holding strip spring flexed to embrace and hold a piston against said fulcrum, one end of said spring being anchored to said member and the remaining end of said spring extending across said member, means for connecting the latter end of said spring to said member in different longitudinal positions with respect to said spring to accommodate pistons of different sizes, and cutting means engaging a groove in the piston.

6. In a piston groove cleaner and deepener, a holding member provided with a piston fulcrum, a piston holding strip spring flexed to embrace and hold a piston against said fulcrum, one end of said spring being anchored to said member and the remaining end extending across said member, means adjustable to various positions on said member and longitudinally adjustable on the extending end of said spring for holding the latter in position to accommodate pistons of different diameter, and cutting means for engagement with the groove of the piston.

7. In a piston groove cleaner and deepener, a holding member, a piston holding strip spring secured to said member and being flexed to embrace and hold a piston against said member, means coacting with a groove in the piston and said spring for holding one thereof against movement with respect to the other, and cutting means for engagement with a groove in the piston.

8. In a piston groove cleaner and deepener, a holding member, a strip spring flexed to embrace and hold a piston against said member and one end of said spring being anchored to said member, said spring having spaced openings extending longitudinally thereof, an adjustable anchorage device adjustable on said member to increase or reduce the flexure of said spring to accommodate pistons of different diameter, said device having openings therein spaced at different distances from centers with respect to the spacing of the openings in said spring, said device having a pin for selective engagement with the openings in said device and spring to alter the size of the loop formed by said flexed spring, and cutting means for engagement with a groove in the piston.

In witness whereof, I hereby affix my signature.

GEORGE C. BECK.