July 18, 1933. E. A. HALL 1,918,642

CYLINDER REAMER

Filed Feb. 25, 1932

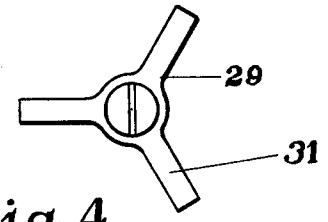


Fig. 4

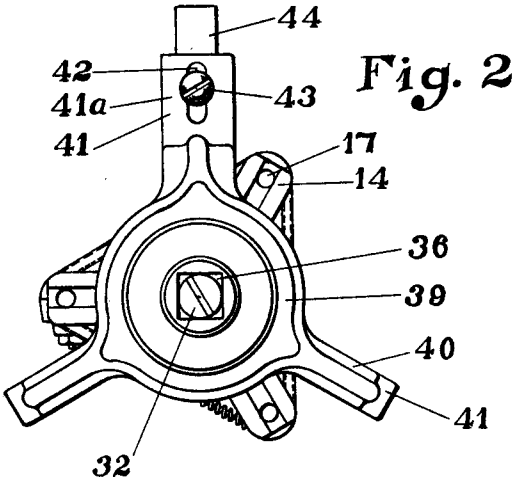


Fig. 2

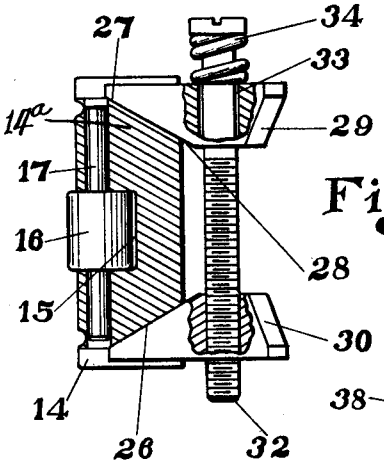


Fig. 3

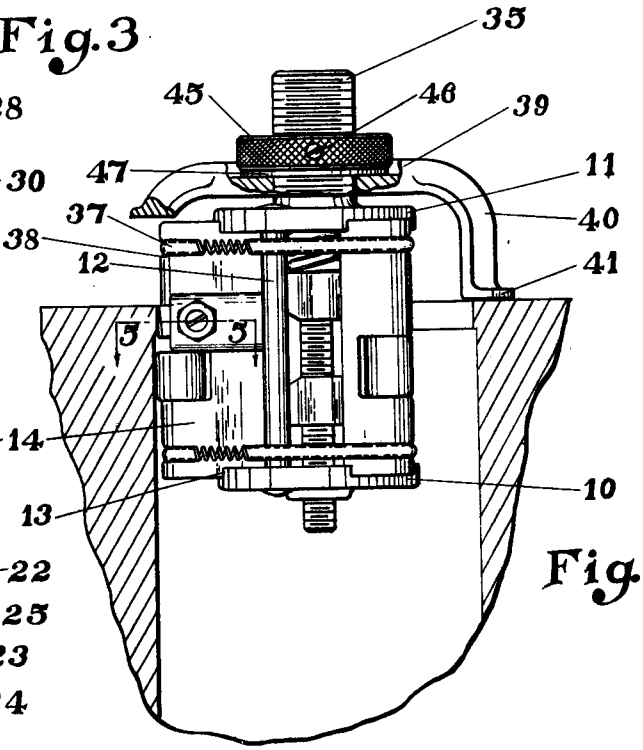


Fig. 1

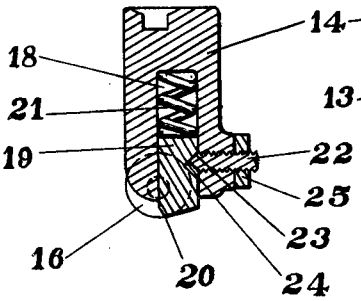


Fig. 5

INVENTOR.
Ernest A. Hall

BY Owen & Owen

ATTORNEYS

Patented July 18, 1933 1,918,642

UNITED STATES PATENT OFFICE

ERNEST A. HALL, OF TOLEDO, OHIO, ASSIGNOR TO THE HALL MANUFACTURING COMPANY, OF TOLEDO, OHIO, A CORPORATION OF OHIO

CYLINDER REAMER

Application filed February 25, 1932. Serial No. 595,138.

This invention relates to cylinder working tools, but more particularly to cylinder reamers adapted for cutting ridges from cylinder walls to enable the fitting of oversized pistons or piston rings, or for other purposes, and an object is to produce a simple and efficient tool of this character which may readily and conveniently be adjusted in such manner that the cutters operate at the desired region below the mouth of the cylinder.

Other objects are to produce a cylinder reamer having the new and improved features of construction, arrangement and operation hereinafter described, and, for purposes of illustration, but not of limitation, an embodiment of the invention is shown on the accompanying drawing, in which:

Figure 1 is a side elevation partly in section of a cylinder reamer showing in dotted lines the cylinder on which the tool is mounted;

Figure 2 is a top plan view of the cylinder reamer shown in Figure 1;

Figure 3 is a fragmentary sectional elevation of a portion of the tool showing the relation between the spiders and the tool and roller carriers;

Figure 4 is a top plan view of one of the spiders; and

Figure 5 is a sectional view taken substantially on the line 5—5 of Figure 1.

The illustrated embodiment of the invention comprises a cylinder reamer having end plates 10 and 11 which are held in longitudinally spaced relation by rods 12. In the inner side of each of the plates 10 and 11 is a series of equidistantly spaced radially arranged grooves or guides 13, in which carriers 14 are slidable.

The carriers 14 are each provided with a recess 15, in which is disposed a roller 16, which is rotatable on a pin 17 socketed in the respective carrier.

Formed in one carrier is a socket 18, which opens outwardly thereof, and slidable within the socket is a cutter 19 having a cutting edge 20. The cutter 19 is urged outwardly of the socket 18 by a coil spring 21, but this movement is limited by a set screw 22 having a tapered head 23, which engages a tapered surface 24 in the cutter 19. The set screw 22 may be secured in adjusted position by a nut 25.

In practice, the cutting blade 20 should be substantially flush with the outer periphery of the roller 16, or, in other words, the blade should not extend outwardly beyond the roller. It is apparent that adjustment of the set screw 22 enables the position of the cutter to be readily and conveniently adjusted. The remaining carriers 14^a are provided with rollers 16, but do not have cutters, the cutter in the carrier being sufficient for the purpose.

Formed adjacent opposite ends of each of the carriers 14 and 14^a are oppositely tapered surfaces 26 and 27, which are engaged by correspondingly tapered surfaces 28 formed on spiders 29 and 30, respectively. Each spider is provided with three arms 31, which extend equidistantly from a hub, and the spider 30 has a screw-threaded opening to receive a screw 32 which passes freely through an opening 33 in the spider 29. A coil spring 34 on the bolt urges the spiders into engagement with the tapered surfaces on the carriers.

It is manifest that adjustment of the screw 32 moves the spiders toward and away from each other to adjust the position of the carriers, in accordance with the size of the cylinder upon which work is being done. The carriers are retained in their respective guides by means of resilient rings 37 disposed in notches 38 in each of the carriers adjacent opposite ends thereof.

Integral with the end plate 11 and projecting outwardly therefrom is an externally screw-threaded sleeve 35. The sleeve 35 is concentric with the axis of rotation of the tool, and is provided with a square socket 36 to receive a suitable driving spindle (not shown), such as may be driven from an electric motor. Mounted loosely on the sleeve 35 is a support having a plate 39, which is adapted to abut against the upper end plate 11, and, in this instance, the plate is provided with three outwardly and downwardly extending legs 40 having feet 41 adapted to

rest on the cylinder block where work is being done.

As shown, one of the feet 41 is provided with as extension 41ª having an elongate slot 42 into which extends a screw 43 on a plate 44 so that the latter may be moved inwardly or outwardly as desired. On some cylinder blocks it is necessary to provide an extension piece of this sort in order properly to support the tool. The support 39 is retained in the desired position by a nut 45, which is in screw-threaded engagement with the sleeve 35, a set screw 46 enabling the nut to be locked in the adjusted position. Interposed between the nut 45 and plate 39 is a fiber washer 47.

From the above description it is manifest that the tool may be raised or lowered with respect to the support so that a cylinder may be reamed accurately in any desired position away from the upper end. Since the tool is supported on the cylinder block, it is manifest that accurate cutting will be secured, which could not be conveniently accomplished in case the tool were held by hand.

In operation the tool rotates relatively to the support 39, and, under some conditions, it may be desirable to allow one of the legs to bear against a stud bolt on the cylinder, or other abutment, to hold it against turning, but it has been found that under ordinary conditions the weight of the tool and the frictional engagement of the legs with the cylinder are sufficient to hold the support against rotation.

It is apparent that each carrier 14 is guided in its radial movement with respect to the mounting, and due to the oppositely tapered surfaces on the spiders and carriers, a positive uniform adjustment of the carriers may be effected without difficulty by merely adjusting the screw 32. The rollers 16 engage the walls of the cylinder and insure proper cutting by the cutting blade 20.

It it to be understood that numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention, especially as defined in the appended claim.

What I claim as new and desire to secure by Letters Patent is:

A cylinder reamer comprising a pair of end plates, means securing said plates rigidly in spaced relation, said plates having a plurality of opposed grooves, carriers slidable in said grooves, oppositely tapered surfaces on said carriers, a pair of spiders adjacent said end plates respectively, oppositely tapered surfaces of said spiders respectively engaging the tapered surfaces on said carriers, means to adjust said spiders relatively to each other, a cutting tool slidable in one of said carriers, spring means urging said tool to cutting position, a tapered surface on an intermediate portion of said cutting tool, and a screw in said tool carrier having a tapered surface coacting with the tapered surface on the tool for adjusting the tool with respect to the carrier.

ERNEST A. HALL.