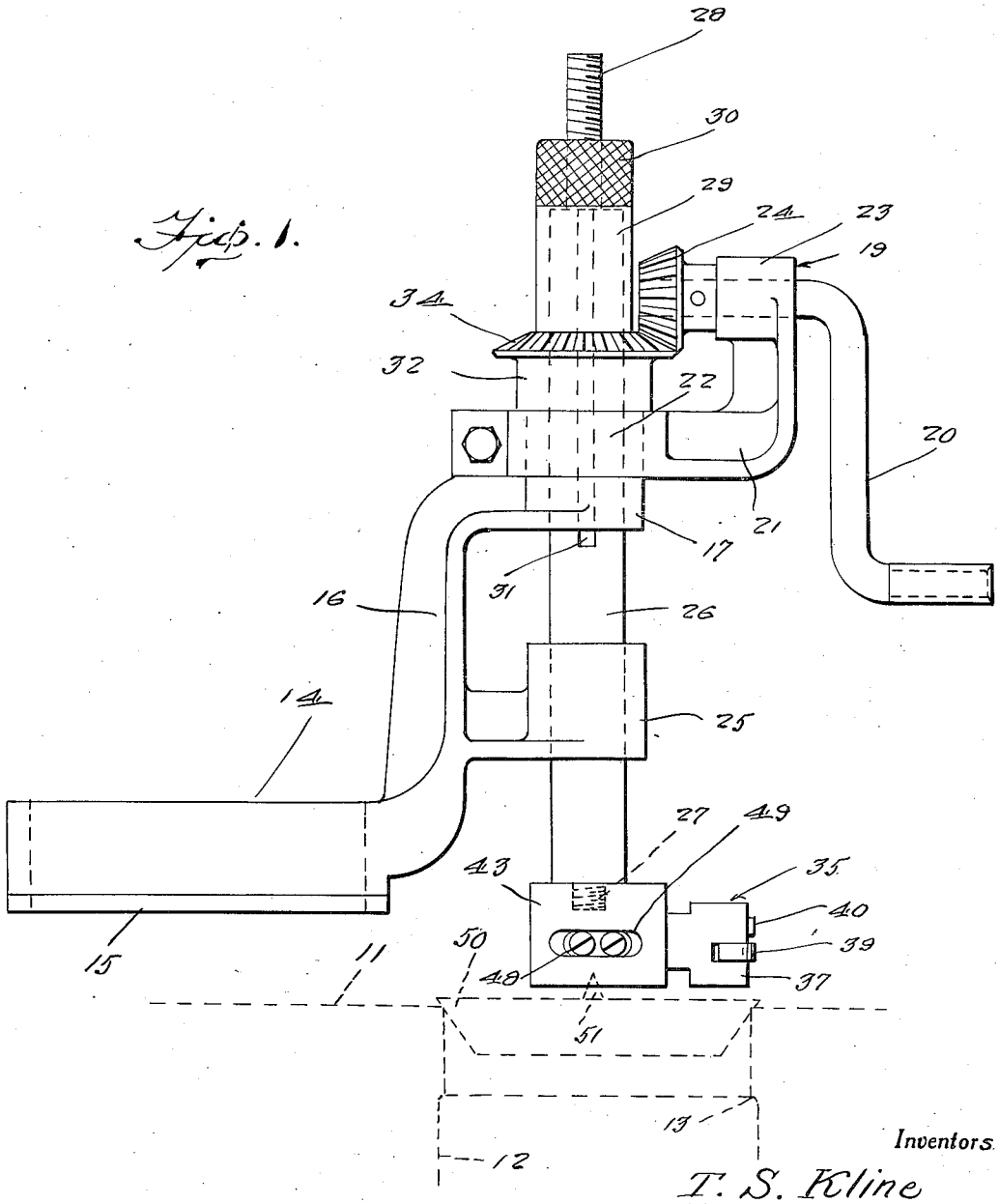
May 5, 1936. T. S. KLINE ET AL 2,039,719

CYLINDER BLOCK REAMER

Filed March 20, 1934 4 Sheets-Sheet 1

Fig. 1.



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CYLINDER BLOCK REAMER

Filed March 20, 1934 4 Sheets-Sheet 2

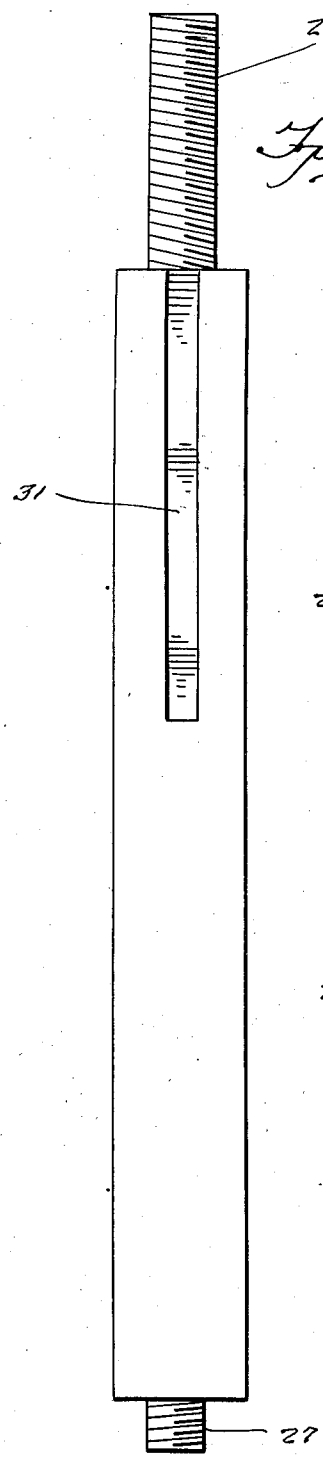


Fig. 3.

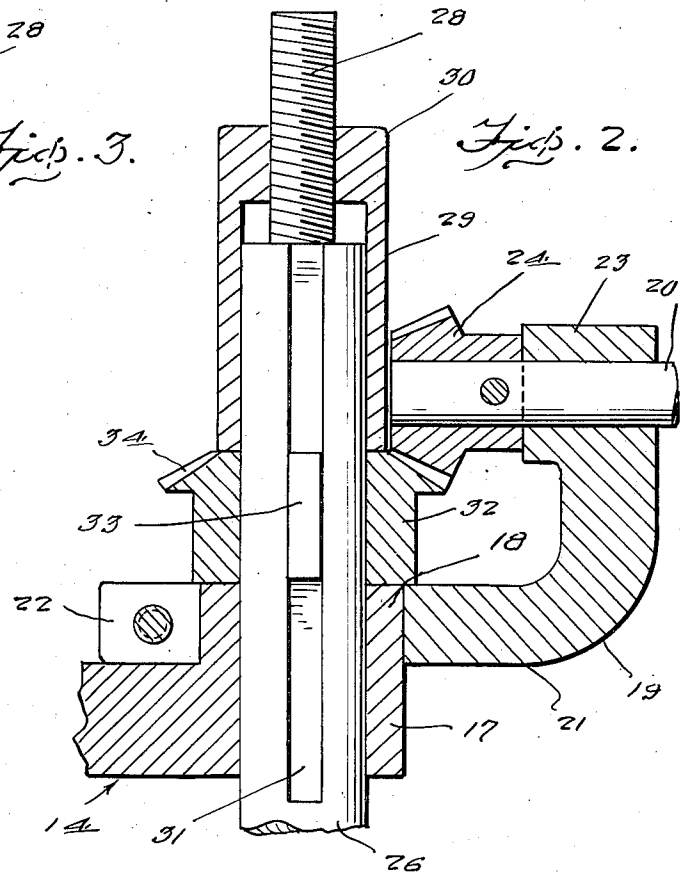


Fig. 2.

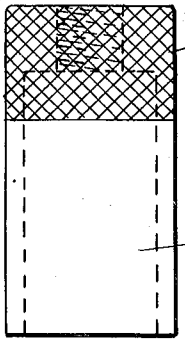


Fig. 9.

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CYLINDER BLOCK REAMER

Filed March 20, 1934 4 Sheets-Sheet 3

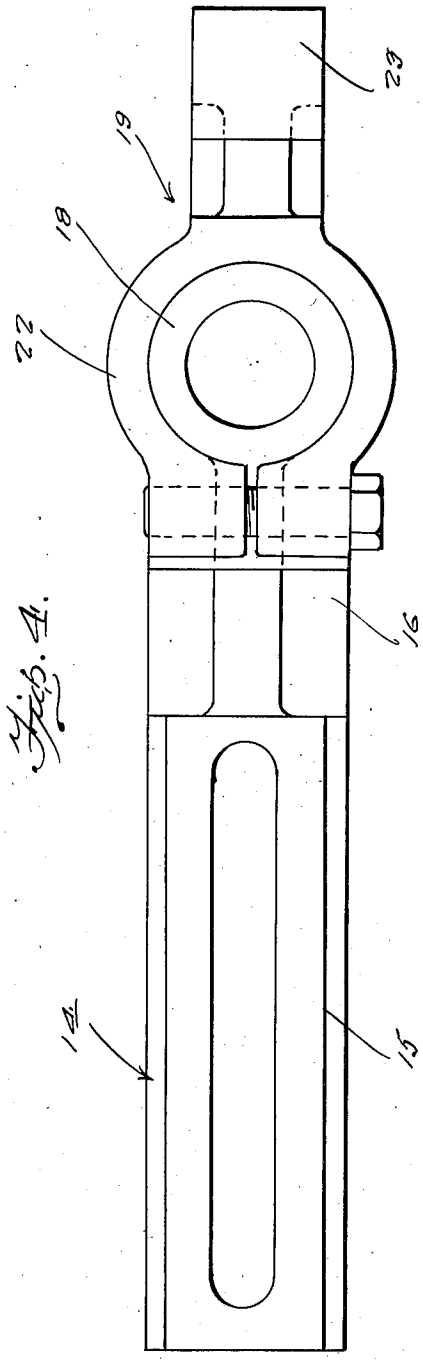


Fig. 4.

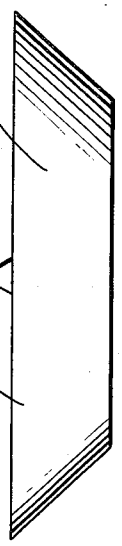


Fig. 10.

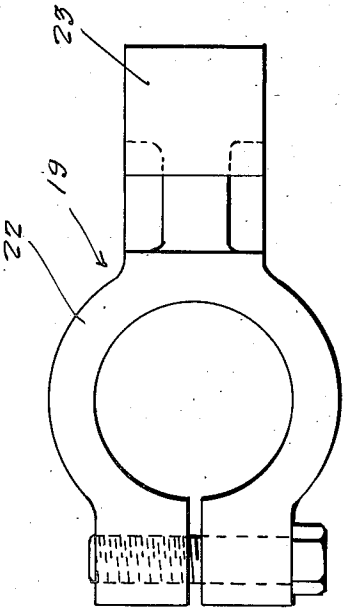


Fig. 5.

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CYLINDER BLOCK REAMER

Filed March 20, 1934 4 Sheets-Sheet 4

Fig. 6.

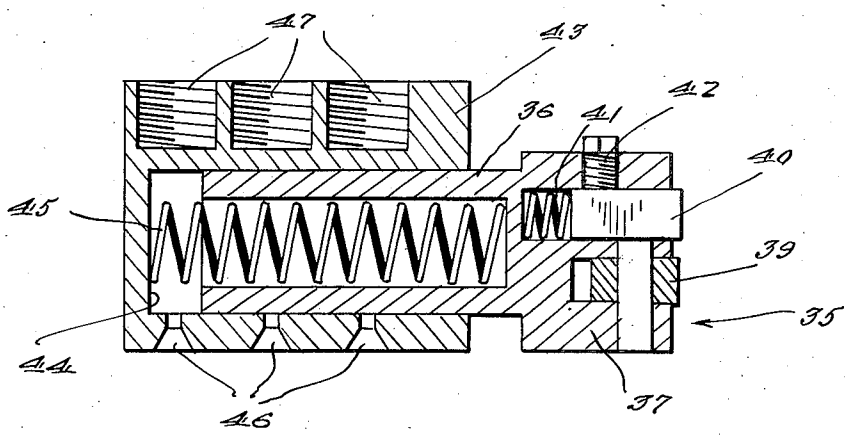


Fig. 7.

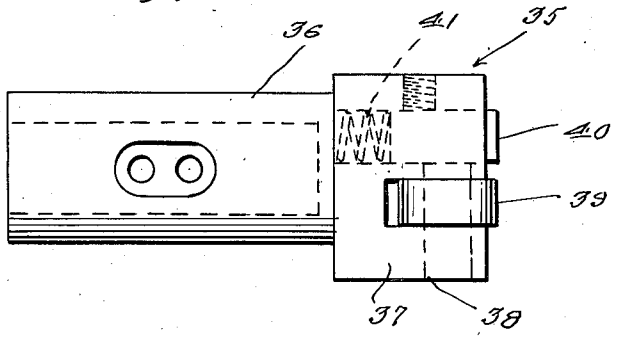
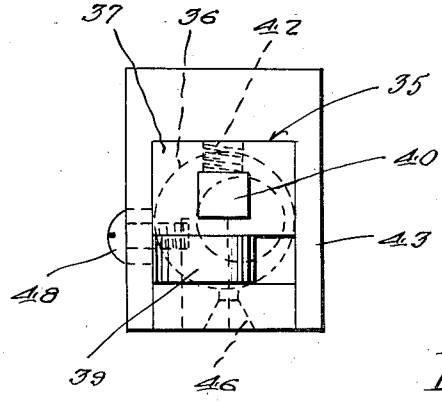


Fig. 8.



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Patented May 5, 1936 2,039,719

UNITED STATES PATENT OFFICE

2,039,719

CYLINDER BLOCK REAMER

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Sacramento, Calif.

Application March 20, 1934, Serial No. 716,520

1 Claim. (Cl. 77—2)

This invention relates to reaming and boring tools and appliances and has more particular reference to a structure such as is primarily adapted for refinishing and dressing the upper end portion of cylinders of an internal combustion engine such as is used in automobiles, aeroplanes and the like.

It is a matter of common knowledge to those skilled in the matter of repairing and reconditioning engine structures that as the ring equipped piston reciprocates back and forth in the cylinder the ring gradually wears the cylinder wall. The uppermost ring on the piston does not travel to a point flush with the top of the block and as this wear takes place an overhanging bead or flange is formed such as must be ultimately removed by boring or reaming.

Our principal aim is to provide a portable reamer such as will satisfactorily accomplish this result in that it is characterized by a careful selection and coordination of features aptly fitted to serve the intended purposes in a satisfactory and dependable manner.

One feature of the invention is predicated upon the portable nature thereof. In this connection attention is invited to the adoption and use of a supporting and stabilizing frame for the rotary driven tool shaft wherein said frame is adapted to be clamped or secured on the motor block and is constructed to include a novel separable adapter bracket or fixture serving as a carrier for a gear equipped hand crank.

A further feature of construction is predicated upon the adoption and use of simple and effective means for raising and lowering the tool shaft and its appurtenances so as to permit the tool to be lowered into the cylinder and thereafter gradually raised as the reaming is completed in order to insure practicable and uniform results.

Particular emphasis is placed upon the adoption and use of a centering plate or disk having a beveled marginal wall such as is adaptable for reception in cylinders of varying diameters, said disk having a central conical point which serves as a pilot or finder for properly positioning the cutting means of the tool preparatory to lowering it into the cylinder.

Of greatest importance is the adoption and use of a unique self-adjusting and compensating cutter device or tool means which is detachably and adjustably connected to the lower end of the rotary tool shaft and which includes a special tool and a holder therefor wherein the tool is slidably mounted in the holder and continually influenced into yieldable cutting action through the instrumentality of spring means whereby to render the tool radially expansible and contractible.

In the accompanying drawings wherein like numerals are employed to designate like parts throughout the same:

Figure 1 is an elevational view showing the complete assemblage and illustrating, in dotted lines, the approximate manner in which it is used.

Figure 2 is a view in section and elevation disclosing the gear drive and the manner in which it is associated with the rotary tool shaft and supporting and adjusting means therefor.

Figure 3 is a detail view of the tool shaft per se.

Figure 4 is a top plan view of the frame structure which renders the device adaptable for mounting directly on the cylinder block so as to permit the operation to be performed in an expeditious and a successive manner without requiring disassembling of the motor.

Figure 5 is a top plan view of the substantially L-shaped hand crank adapter or carrier fixture.

Figure 6 is a sectional and elevational view detailing the construction and assemblage of the tool and tool holder.

Figure 7 is an elevational view of the expansible and retractible cutter tool itself.

Figure 8 is an end view of Figure 7 observing it in a direction from right to left.

Figure 9 is a detail view of the shaft lifting and lowering nut.

Figure 10 is an elevational view of the center finder or so called pilot disk.

Directing attention first to Figure 1 wherein the complete assemblage and method of operation is depicted it will be observed that the conventional cylinder block is denoted by the numeral 11 while the cylinder is indicated at 12. The overhanging bead which is worn in cylinder in constant use is differentiated by the numeral 13 and it is this feature that we desire to remove through the instrumentality of our improved reamer or boring device. The device comprises a supporting structure which includes a part 14 conveniently designated as a frame. This embodies a horizontal base 15 longitudinally slotted and otherwise fashioned to permit it to be bolted or otherwise mounted directly on the cylinder block 11. Rising from one end of this and assuming a perpendicular position is a suitably formed upright 16. At its upper end this terminates in a laterally or horizontally directed guide 17 whose upper portion 18 (see Figure 2) constitutes a mounting for the L-shaped adapter 19. This adapter is in the nature of a fixture suitably formed to support or accommodate the hand crank 20. It includes a

horizontal portion 21 formed with a clamp 22 detachably secured to the attaching or mounting collar 18. It is also provided with an upstanding bearing 23 to accommodate the shaft portion of a hand crank. This portion of the hand crank is provided with a beveled gear or pinion 24. It will be observed that the frame 14 also includes a guide 25 located directly beneath the guide 17 and these two guides serve to accommodate the rotary tool shaft 26. This may be of any appropriate proportion. As shown in Figure 3 the lower end of the shaft is provided with a screw threaded tool attaching stud 27 and the upper end of the shaft is formed with a screw threaded stem 28 to accommodate a hood or sleeve nut 29. This nut is externally knurled or otherwise roughened as indicated at 30 so that it may be conveniently grasped with the fingers and turned as occasion requires. The remaining feature of the shaft may be described as a longitudinal keyway or groove 31.

We direct attention at this time to Figure 2 wherein it will be observed that the numeral 32 designates an annulus or ring which surrounds the tool shaft, rests rotatably upon the collar 18, is keyed as at 33 to the shaft and provided with a beveled motion transmitting gear 34 with which the aforesaid driving pinion or gear 24 meshes. Thus this gear 34 has slidable operating connection with a shaft 36 and the shaft 26 receives its motion from the cooperation of the gears 24 and 34 actuated by the hand crank 20.

We call attention at this time to Figure 7 wherein it will be observed that numeral 35 designates the cutting or reaming tool. This comprises a cylindrical socketed or hollow stem 36 formed with an integrated head 37. Mounted in a notch and attached to said head by a pin 38 is the wall contacting and guiding roller 39 forming a feature of the cutter head. The cutter blade itself is denoted by the numeral 40 and is slidably mounted in an accommodation socket and pressed outwardly in contact with the work by way of a coil spring 41. The cutter is held in adjusted position by a set screw 42.

We next call attention to the numeral 43 which designates the tool holder (see Figure 6 in particular). This part may be described as block like form and it will be observed that it is provided with a socket 44 to slidably receive and accommodate the stem or shank 36 of the tool. In fact the socket also serves to accommodate an expansion coiled spring 45 which is located partly therein and also telescoped into the socket portion of the shank 36. Obviously this serves to force the cutting element 40 into constant yieldable contact with the work. Likewise it keeps the guide roller 39 in true guiding or running contact with the cylinder wall to assure positive equalizing action.

The numerals 46 designate conical recesses formed in the bottom of the tool holder which serves the purpose to be hereinafter described. The numerals 47 designate screw threaded sockets formed in the top of the block which is selectively engageable with the attaching stud 27 of the tool shaft. This provides the desirable adjustable detachable connection between the tool holder and tool shaft. The numerals 48 in Figure 1 designate connecting or fastening screws operable in a guide slot 49 in the tool holding block to keep the tool and tool holder properly assembled and to at the same time allow the requisite radial expansion and contractible sliding action of the tool in its holder.

The numeral 50 designates a centering disk or plate having a centralized conical pilot point 51 for selective reception in the keeper recesses 46 formed in the bottom of the tool holding block. It is through the instrumentality of these features 46, 51 and 50 that the center of the cylinder is found for properly adjusting the tube preparatory to starting the reaming or boring operation. Obviously it is necessary to find the exact center in order to insure proper disposition of the tool with relation to the surface to be reamed. It will be noticed that the edge or marginal portion of this plate is beveled as indicated at 52 in Figure 10 and the purpose of this is to render the disk adaptable to fit cylinders of varying diameters. This is an important feature of the invention.

It is obvious in operation that after the cutting tool is properly centered in relation to the cylinder it is lowered into the cylinder below the ridge or beam 13. It is then raised up by adjustment of the sleeve nut 30 on the threaded stem 28 and as the cutting operation continues this nut 30 is slowly turned by the finger to progressively accomplish the desired reaming result.

Some of the features of the invention to be emphasized are these. First, we are especially concerned over the practicability and features of adaption of the tool holder and substantially self-adjusting and compensating tool associated therewith. That is to say the tool 35 shown in Figure 7 is especially adapted and coordinated with the block like tool holder illustrated in Figure 6. Here we find the unique cooperation of a cylindrical pocketed stem or shank 36 of the tool slidably mounted in the block 43 wherein a spring 45 is interposed between the parts to force the guide roller and cutter on the tool head 37 into yieldable and constant contact with the work. Secondly the adjustable connection between the tool shaft 26 and the block or tool holder 43 is important. Stated otherwise the block 43 having selectively usable screw threaded sockets 47 to accommodate the attaching stud 27 on the tool shaft together with the co-related pilot pin keeper holes 46, the centering disk 50, with its beveled accommodation edge 52 and centralized pilot pin 51 exemplifies a special continuity and coordination of features.

Additional novelty is predicated upon the support comprising the frame 14 appropriately adapted for portable usage and constructed for accommodation of the separable adapter 19 provides an advantageous assemblage. In fact all of the parts, including the sleeve nut 29 capping over the tool shaft and adjustably connected with the stem 28 have been carefully selected to promote efficiency and dependability, as well as accuracy and precision.

It is thought that persons skilled in the art to which the invention relates will be able to obtain a clear understanding of the invention after considering the description in connection with the drawings. Therefore, a more lengthy description is regarded as unnecessary.

Minor changes in shape, size, and rearrangement of details coming within the field of invention claimed may be resorted to in actual practice, if desired.

Having thus described our invention, what we claim as new is:

A cylinder block reamer, comprising a supporting member, a shaft rotatably supported by said member, means for rotating the shaft, means for moving the shaft longitudinally, said shaft being vertically arranged, a reduced threaded portion

at the lower end of the shaft, an elongated holder block having a longitudinally extending row of threaded sockets in its upper face, any one of which is adapted to receive the threaded reduced part of the shaft for connecting the block to the shaft, the lower face of the block having a longitudinally extending row of recesses therein, each recess being in alignment with the center of each socket, a substantially frusto-conical centering device fitting in a cylinder and having a centrally arranged centering pin for engaging a recess, said holder block having a longitudinally extending socket therein opening out through one end of the block, a head having a tubular stem sliding in the last mentioned socket, an elongated spring having one end bearing against the bottom or closed end of the elongated socket and its other end against the closed end of the bore of the tubular stem, said head having a non-circular socket therein opening out through the outer face of the head, a non-circular cutter slidably arranged in the last mentioned socket, a set screw carried by the head for holding the cutter in adjusted position, and a roller carried by the head and having a portion slightly projecting from the outer face of the head.

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