Aug. 2, 1927. 1,637,611

J. T. HISCOCK

BORING MECHANISM

Filed Jan. 12, 1925 4 Sheets-Sheet 1.

Fig. 1.

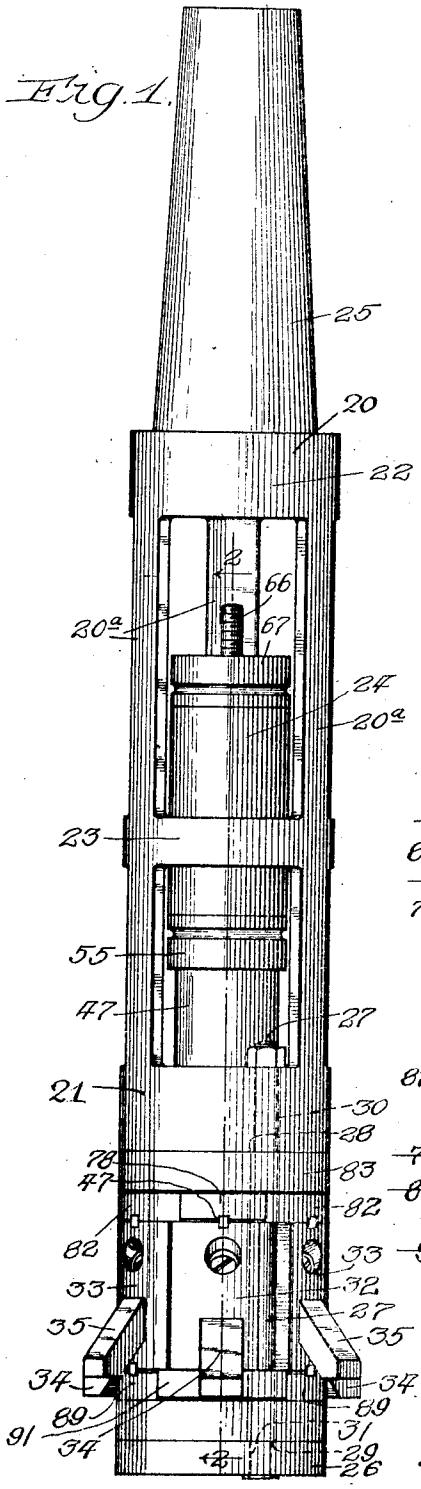
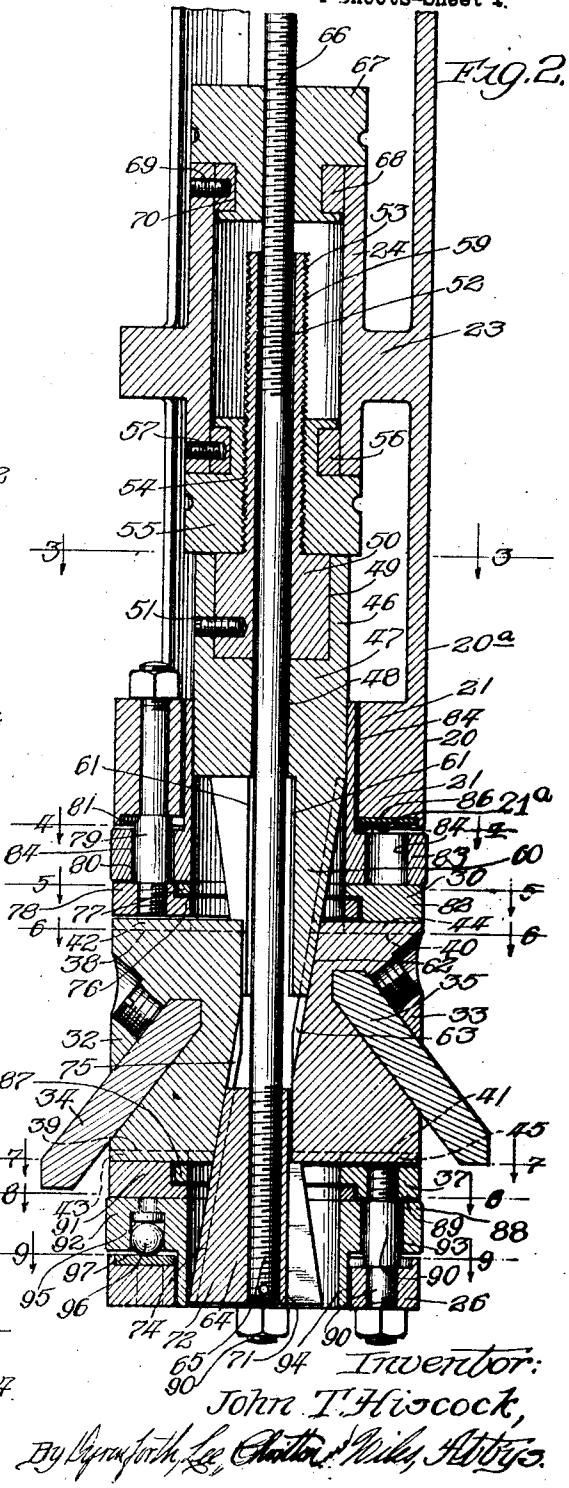


Fig. 2.



Inventor:
John T. Hiscock,
By Cromwell, Lee, Chatton & Ruby, Attys.

Aug. 2, 1927. 1,637,611

J. T. HISCOCK

BORING MECHANISM

Filed Jan. 12, 1925 4 Sheets-Sheet 2

Fig. 3.

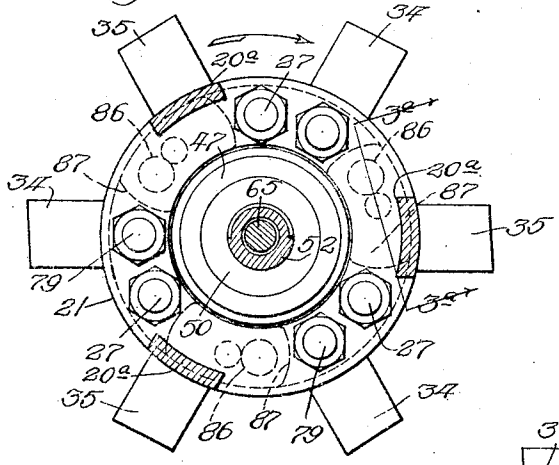


Fig. 3a.

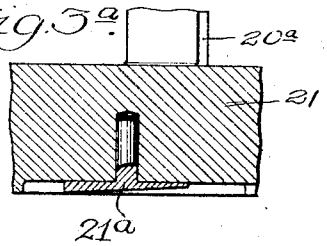


Fig. 6.

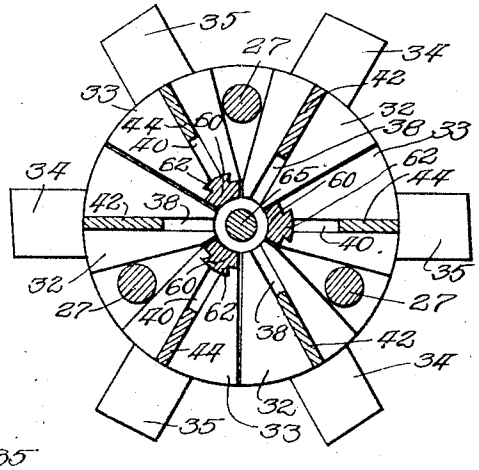


Fig. 4.

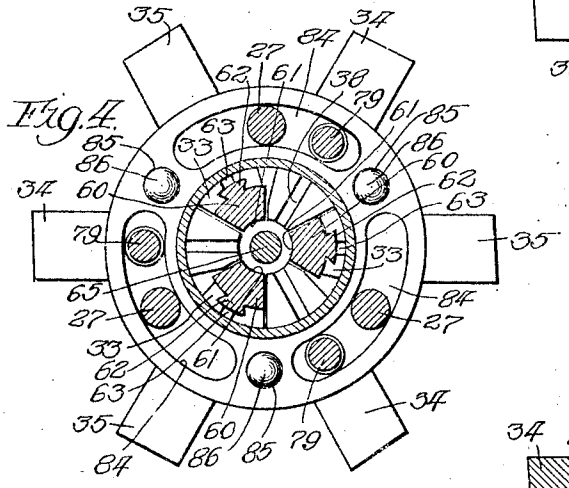


Fig. 7.

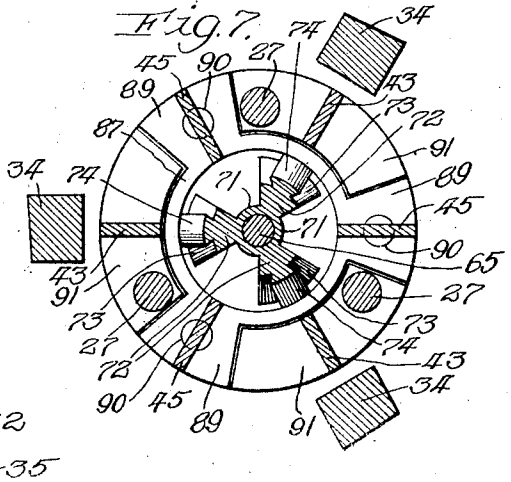
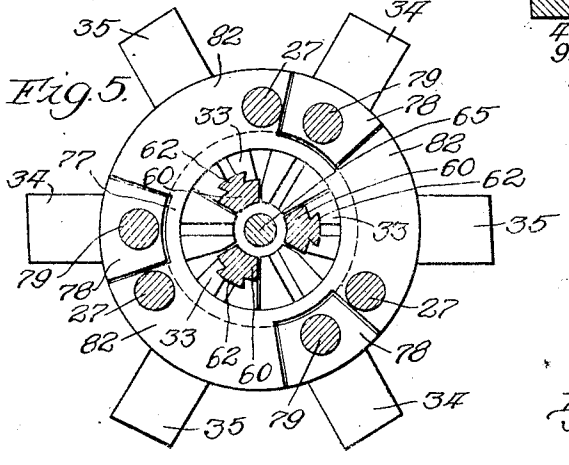


Fig. 5.



Inventor:
John T. Hiscock,
By Dyrenforth, Lee, Chritton & Wiles,
Attys.

Aug. 2, 1927. 1,637,611

J. T. HISCOCK

BORING MECHANISM

Filed Jan. 12, 1925 4 Sheets-Sheet 3

Fig. 8.

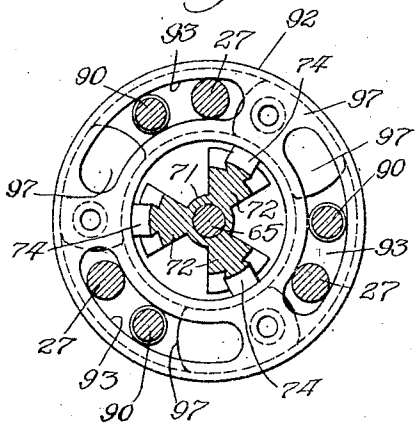


Fig. 9.

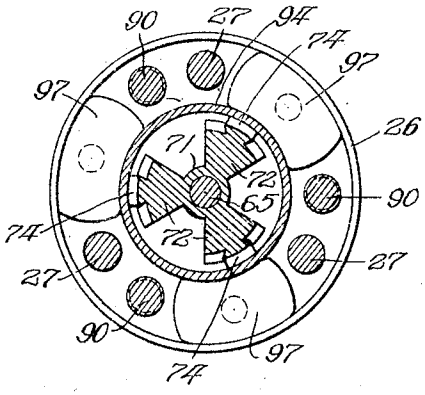


Fig. 10.

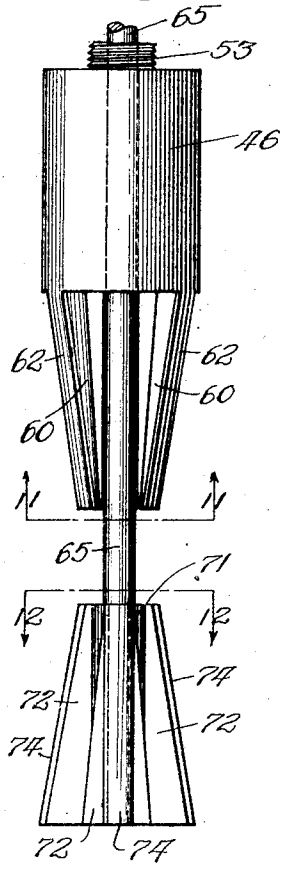


Fig. 11.

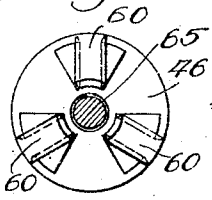


Fig. 12.

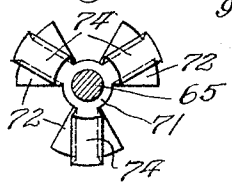
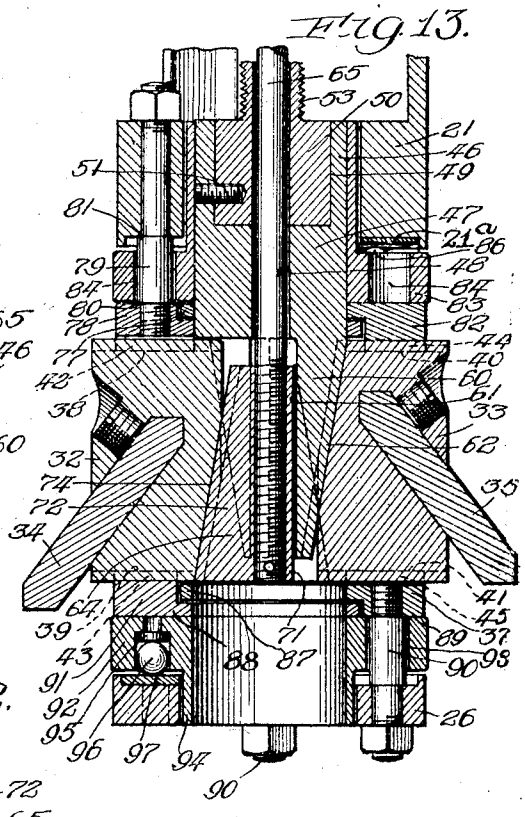


Fig. 13.



Inventor.
John T. Hiscock,
By Dyer, Tompkins, Lee, Clinton & Miles,
Attys

Aug. 2, 1927. 1,637,611

J. T. HISCOCK

BORING MECHANISM

Filed Jan. 12, 1925 4 Sheets-Sheet 4

Fig. 14.

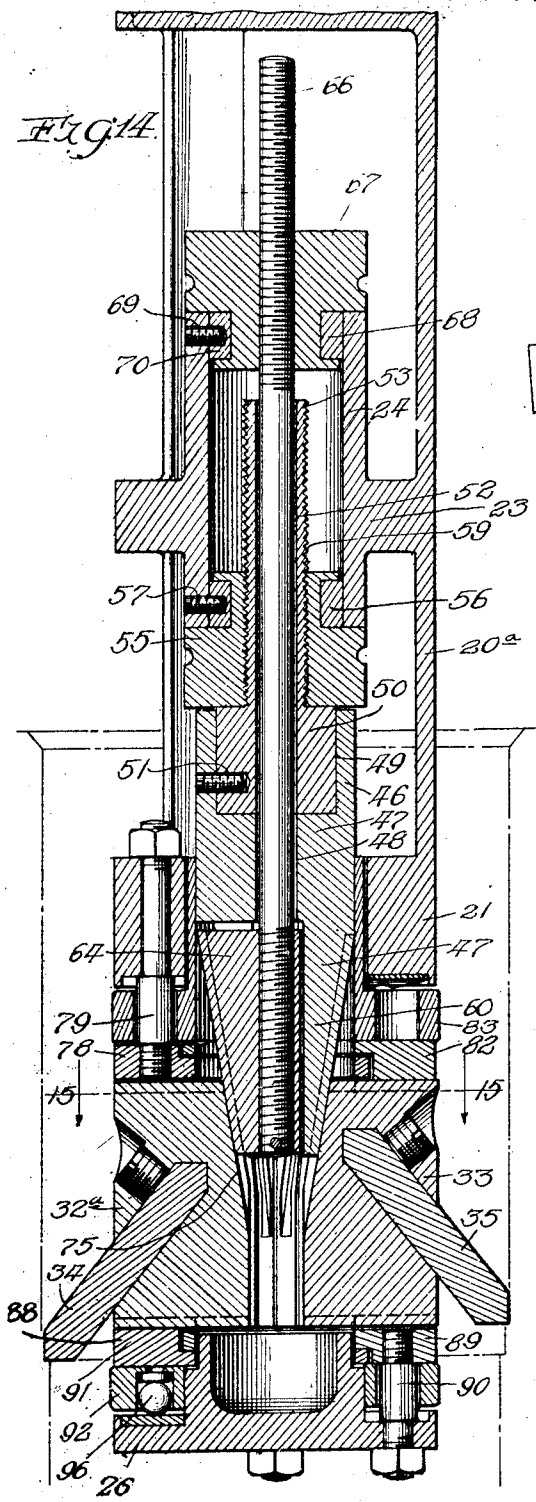


Fig. 15.

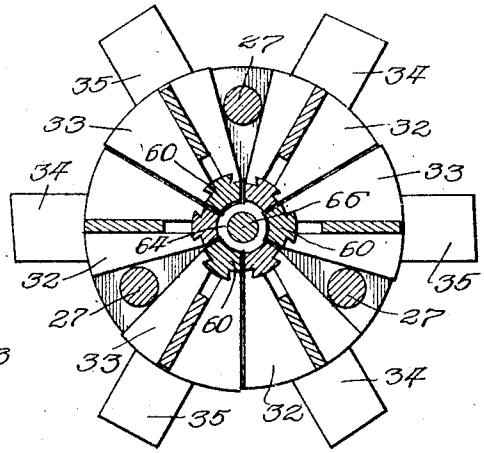


Fig. 16.

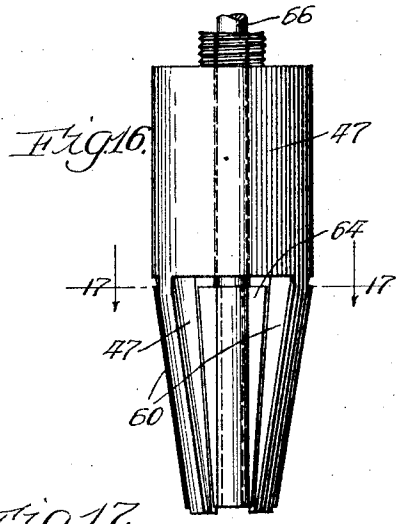
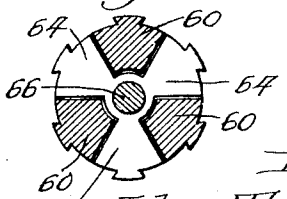


Fig. 17.



Inventor:
John T. Hiscock,
By Dyer, Horth, Lee, Chandler & Wiles,
Attys.

Patented Aug. 2, 1927. 1,637,611

UNITED STATES PATENT OFFICE.

JOHN T. HISCOCK, OF CHICAGO, ILLINOIS.

BORING MECHANISM.

Application filed January 12, 1925. Serial No. 1,867.

My invention relates, more particularly, to boring tools provided for reboring the cylinders of engines.

It is desirable that such devices be provided with roughing and finishing cutters and that these cutters be adapted for adjustment relative to each other to vary the amount of cutting performed by each.

One of my objects is to provide a device whereby the cutters may be adjusted as above referred to, and which shall be of comparatively simple construction, positive in operation and of such construction that adjustment when made may be maintained.

Referring to the accompanying drawings:

Figure 1 is a view in side elevation of a boring tool embodying my invention. Figure 2 is an enlarged, broken, section taken at the line 2—2 on Fig. 1 and viewed in the direction of the arrows, this view showing the cutting tools adjusted inwardly to the extreme position. Figure 3 is a section taken at the line 3—3 on Fig. 2 and viewed in the direction of the arrows. Figure 3^a is a broken section taken at the line 3^a—3^a on Fig. 3 and viewed in the direction of the arrows. Figures 4, 5, 6, 7, 8 and 9, are sections taken at lines correspondingly numbered on Fig. 2 and viewed in the direction of the arrows. Figure 10 is a broken view in elevation of a detail of the devices for adjusting the cutters. Figure 11 is a section taken at the line 11—11 on Fig. 10 and viewed in the direction of the arrows. Figure 12 is a section taken at the line 12—12 on Fig. 10 and viewed in the direction of the arrows. Figure 13 is a broken view, like Fig. 2 and of parts therein shown, the cutting tools being adjusted outwardly to the extreme limit. Figure 14 is a view like Fig. 2 of a modification of the structure therein shown. Figure 15 is a section taken at the line 15—15 on Fig. 14 and viewed in the direction of the arrows. Figure 16 is a view like Fig. 10 of the cutter-adjusting means of the structure shown in Figs. 14 and 15; and Figure 17, a section taken at the line 17—17 on Fig. 16 and viewed in the direction of the arrows.

Referring to the structure shown in Figs. 1 to 13, inclusive, the device which is adapted to be introduced into, and held in, the chuck of a drill-press, is formed of a hollow cylindrical member 20 with its cylindrical side wall 20^a cut away at intervals as shown, the member 20 presenting ring portions 21 and 22 at its ends, and between its ends a ring portion 23 supporting a sleeve-like member 24 which is shown as integral with the ring 23 and is disposed concentrically with the side wall 20^a of the member 20, the upper end of the member 20 terminating in a tapered shank-portion 25 at which the device is adapted to be clamped in a chuck.

The device also comprises a ring 26 located below the ring 21 and in spaced relation thereto, the ring 26 being rigidly secured in such spaced condition by bolts 27 which are of enlarged diameter between their ends to afford shoulders 28 and 29. The bolts 27 extend at their upper, reduced ends 30 through openings in the ring 21 and abut at their upper shoulders 28 against the underside of this ring. The bolts 27 at their lower, reduced, ends 31 extend through openings in the ring 26 and abut at their lower shoulders 29 against the underside of this ring, these bolts thus serving to securely clamp these rings together in spaced relation.

The device also comprises radially adjustable blocks 32 and 33 located in the space between the rings 21 and 26 and provided in sets grouped about the longitudinal axis of the device. The blocks 32 and 33 alternate with each other, as shown, and are provided for the purpose of holding the roughing and finishing cutter tools 34 and 35, respectively, which are shown as inclining downwardly and outwardly beyond the body of the device.

Located between the sets of blocks 32 and 33 and the rings 21 and 26 are mechanism, represented generally at 36 and 37, respectively, and provided for independently clamping the sets of blocks 32 and 33 in radially adjusted position, as hereinafter described, the blocks 32 and 33 being guided for radial movement at grooves 38 and 39 and 40 and 41, respectively, in their top and bottom surfaces and into which grooves tongues 42, 43, 44 and 45, on the clamping mechanisms referred to, respectively extend.

Means are provided for independently

radially adjusting the blocks 32 and 33 to vary the extent to which the cutting devices thereon radially protrude. The means for adjusting the blocks 33 for the finishing cutters, comprises a head 46 located in the body member 20 and formed of a lower member 47 containing an opening 48 therethrough communicating with an upwardly-opening socket 49 in its top, and a member 50 located in the socket 49 and secured to the member 47 by a set-screw 51 and provided with an upwardly extending tubular portion 52 externally threaded, as represented at 53 at which it engages the internal threads 54 of a knurled nut 55 carried by, and rotatable on, the sleeve 24 as by the connection shown and comprising a collar 56 secured in the lower end of the sleeve 24 by a set-screw 57 and extending into an annular groove 58 in the periphery of the upper portion of the nut 55 at which portion the nut extends upwardly into this sleeve, the member 55 containing an opening 59 therethrough of the same diameter as the opening 48 and forming a continuation thereof. The lower end of the member 47 is provided with depending downwardly tapering segmental fingers 60 of a number corresponding with the number of blocks 33 employed, three being shown in the illustrated construction. The segmental fingers 60 are equidistantly spaced apart and oppose the inner surfaces of the blocks 33 the inner surfaces of these fingers represented at 61 being preferably outwardly offset relative to the opening 48 in the member 47, as shown in Figs. 2, 4, 5 and 6. The segmental fingers 60 are provided, on their outer inclined faces with dovetail ribs 62 which thus incline downwardly toward the axis of the device, these ribs slidingly interfitting the walls of dovetailed grooves 63 provided in the correspondingly tapered inner surfaces of the blocks 33. By this arrangement the shifting of the head 46 up or down, by rotating the nut 55, causes the blocks 33 to be moved radially in or out depending on the direction in which this nut is rotated.

The means for effecting radial adjustment of the blocks 32 comprises a head 64 mounted on the lower end of a rod 65 which extends upwardly in the space between the blocks 32 and 33 at the center of the device and upwardly through the opening 48—59 in the head 46. The upper, threaded, extremity 66 of the rod 65 engages with a nut 67 located at the top of the sleeve 24 and rotatably confined thereon by a collar 68 which is secured in the sleeve 24 by a set-screw 69, this collar extending into an annular groove 70 in the periphery of the lower, reduced, portion of the nut 67 at which the latter extends into the sleeve 24. The head 64 is formed of a central sleeve-like portion 71 at which it surrounds the rod 65 and from which radiate segmental ribs 72 having upwardly and inwardly inclined outer faces 73, these ribs being equidistantly spaced apart and staggered relative to the fingers 60. The inclined outer faces of the ribs 72 are provided with dovetailed rib portions 74 which slidingly interfit with the walls of dovetailed grooves 75 provided in the correspondingly tapering opposed inner faces of the blocks 32. By this arrangement the shifting of the head 64 up or down by rotating the nut 67 causes the blocks 32 to be moved radially in or out depending on the direction in which this nut is rotated.

In this connection it may be stated that the grouping of the fingers 60 about the axis of the device, with the offsetting of their inner surfaces, as hereinbefore described, it for the purpose of permitting the sleeve portion 71 of the head 65 to pass freely upwardly therein as for example to the position shown in Fig. 13 by rotating either of the nuts 55 and 67, or both of them in a direction to move the cutters controlled thereby radially outwardly, in which movement the fingers 60 and the ribs 72, by reason of their staggered relationship slide relative to each other into intermeshing relation as shown in this figure, this feature of the device rendering the latter very compact, while permitting of a wide range of radial adjustment of the blocks 32 and 33 independently of each other to vary the depths of cut produced by the roughing and finishing cutters, respectively.

The means for independently clamping the blocks 32 and 33 in radially adjusted position comprise a pair of superposed rings 76 and 77 which surround the grouped wedge fingers 60 and extend in spaced relation thereto. The ring 76 is provided with equidistantly spaced radiating segments 78 the under surfaces of which are flush with the underside of the ring 76, but the upper surfaces of which extend above the upper surfaces of this ring, as shown, the tongues 42, hereinbefore referred to, and which extend into the grooves 38 in the blocks 32, being provided on these segments. Segments 78 connect with the lower end of screw bolts 79 having lower shoulders 80 bearing against the upper faces of the segments 78, the bolts 79 extending upwardly into the ring 21 and bearing at shoulders 81 thereon against the underside of this ring. The arrangement just described rigidly secures the rings 76 in spaced relation to the ring 21.

The ring 77 is provided with equidistantly spaced segments 82 the upper surfaces of which extend flush with the upper surface of the ring 77, but the under-surfaces of which extend below the under-surface of this ring, as shown, the bolts 27 extending through the segments 82 as shown in Fig. 5, and the segments 82 carrying the tongues 44 herein-

before described and extending into the grooves 40 in the blocks 33. The segments 82 which alternate with the segments 78 and interfit therewith, as shown, are thicker than the segments 78 for the purpose herein set forth.

Superposing the ring 77 is a knurled ring 83 containing arc-shaped slots 84 through which the bolts 27 and 79 extend, these slots permitting the ring 83 to be rotated through a partial revolution for a purpose hereinafter described. The ring 83 which is freely slidable up and down is provided with an upwardly extending sleeve-portion which extends into the space between the member 47 and the ring 21, the spacing of the ring 78 from the ring 21 being such as to permit of the above referred to up and down movement of the ring 83. The upper surface of the ring 83 contains seats 85 for balls 86 which cooperate with cam-surfaces 87 provided on the underside of the ring 21 and disposed in a circular series about the axis of the device, these cam surfaces inclining in the same direction and operating, in the engagement of the balls 86 therewith in the rotation of the ring 83 in one direction, to force the ring 83 downwardly against the segments 82 which latter, in turn, are forced against the upper surfaces of the blocks 33.

The clamping mechanism further comprises rings 87 and 88 flatwise opposed below the blocks 32 and 33. The ring 87 is provided with radiating equidistantly spaced segments 89 which extend at their upper surfaces flush with the upper surface of the ring 87, but extend at their under sides below the under-surface of this ring, as shown, these segments carrying the upwardly extending tongues 45 hereinbefore described and extending into the grooves 41 in the blocks 33. The ring 87 is held in spaced relation to the fixed ring 26 by means of shouldered screw bolts 90, as explained of the connection between the rings 78 and 21. The ring 88 is provided with equidistantly spaced segments 91 which alternate with the segments 89 and interfit therewith, as shown. The segments 91 extend at their under-surfaces flush with the under-surface of the ring 88, but extend at their upper surfaces above the upper surfaces of this ring, as shown, the segments 91 being thicker than the segments 89 for the purpose hereinafter described, the segments 91 carrying the upwardly extending tongues 43 hereinbefore referred to and which extend into the grooves 39 in the blocks 32.

Located between the ring 26 and the ring 88 is a knurled ring 92 containing arc-shaped slots 93 as provided in the ring 83, as above described, through which slots the bolts 27 and 90 extend, the slots 93 permitting partial rotation of the ring 92. The ring 92 which is freely slidable up and down is provided with a depending sleeve portion 94 which slidingly extends into the space in the ring 26, the spacing of the ring 87 from the ring 26 being such as to permit of the above referred to up and down movement of the ring 92. The under-surface of the ring 92 contains seats 95 for balls 96 which cooperate with cam-surfaces 97 provided on the upper surface of the ring 26, as explained of the cam-surfaces 21^a on the ring 21, and operating when the ring 92 is rotated in one direction, to force the ring 92 upwardly against the segments 91.

It will be understood from the foregoing that when the ring 83 is forced down against the segments 82, by rotating the ring 83 in one direction as stated the blocks 33 will be rigidly clamped between the segments 82 and the tongues 45 on the segments 89, and that when the ring 92 is forced upwardly against the segments 91 by rotating the ring 92 in one direction as stated, the blocks 32 will be rigidly clamped between the segments 91 and the tongues 42 on the segments 78. Thus the mechanism provided and described permits of the separate clamping of the blocks 32 and 33 whereby either set of blocks may be released for radial adjustment without disturbing the clamping means for the other set of blocks.

Referring to the device shown in Figs. 14, 15, 16 and 17, this device is of the same general construction as the device of the preceding figures, except for the positioning of the adjusting device for the blocks carrying the roughing cutters and the direction of inclination of the groove-equipped inner inclined surfaces of these blocks, the same numbers representing corresponding parts in the two constructions. In this device the wedging member 64 for the blocks 32 is reversely positioned on the rod 65 and is telescoped at all times, in the particular arrangement shown, with the wedging member 47 for the blocks 33, the spaced arrangement of the fingers 60 permitting of such telescoping. The inner surfaces of the blocks 32 instead of inclining downwardly and outwardly as in the structure of the preceding figures, incline downwardly and inwardly as shown and as in the case of the inclined inner surfaces of the blocks 33 to parallel the tongues 74 of the wedge-device which extend into the grooves 75 on the inclined surfaces of the blocks 32. In this arrangement the separate adjustment of the blocks 32 and 33 in the outward direction, is effected by rotation of the nuts 67 and 55 in the same direction instead of in opposite direction as in the case of the device of the preceding figures. Otherwise the operation of the device now being described is the same as that of the preceding figures.

A device in accordance with Figs. 14, 15, 16 and 17, presents an advantage over the

other device, in that that portion of the tool which extends below the blocks 32 and 33 may be made somewhat thinner permitting the cutters to penetrate to a greater depth into a socket to be bored.

It will be manifest from the foregoing that not only are the sets of cutting devices independently adjustable for regulating the depth of cut and mechanism is provided for independently clamping these sets of devices, but the device is very compact and positive in operation.

While I have illustrated and described a particular construction embodying my invention, I do not wish to be understood as intending to limit it thereto, as the same may be variously modified and altered without departing from the spirit of my invention.

What I have described as new, and desire to secure by Letters Patent, is:

1. A boring tool comprising a supporting member, cutting-edge-equipped devices adjustable thereon for regulating the depth of cut, and devices for separately adjusting said first named devices, said last named devices being movable toward and away from each other and one thereof being formed of fingers spaced apart and the other thereof formed of a member having ribs thereon alternately disposed relative to said fingers and adapted to intermesh therewith, said parts being so constructed and arranged that said last referred to member may extend into the space surrounded by said fingers in the intermeshed condition of said ribs and fingers.

2. A boring tool comprising a supporting member, cutting-edge-equipped blocks adjustable thereon for regulating the depth of cut, and devices for separately adjusting said blocks, one of said devices comprising fingers spaced apart and having an operating portion projecting therefrom, and the other of said devices comprising a member having ribs thereon and provided with an operating portion, said operating portions being arranged one within the other, and means engaging said portions for moving said devices.

3. A boring tool comprising a supporting member, cutting-edge-equipped blocks adjustable thereon for regulating the depth of cut, means clamping said blocks independently of each other in adjusted position and involving sets of intermeshed segment-equipped rings at opposite ends of said blocks and between which said blocks are clamped, and rotary means for applying clamping pressure against said rings.

4. A boring tool comprising a supporting member, cutting-edge-equipped blocks adjustable thereon for regulating the depth of cut, means clamping said blocks independently of each other in adjusted position and involving sets of members at opposite ends of said blocks relatively movable lengthwise of the tool, one of said members in each set being so constructed and arranged as to clamp one of said blocks therebetween, and ferred to up and down movement of the structed and arranged as to clamp another of said blocks therebetween.

5. A boring tool comprising a supporting member, cutting-edge-equipped blocks adjustable thereon for regulating the depth of cut, means clamping said blocks independently of each other in adjusted position and involving sets of intermeshing segment-equipped rings at opposite ends of blocks relatively movable lengthwise of the tool, one of said ring devices of each set being so constructed and arranged as to clamp one of said blocks therebetween, and the other ring devices of said sets being so constructed and arranged as to clamp another of said blocks therebetween.

6. A boring tool comprising a supporting member, cutting-edge-equipped blocks adjustable thereon for regulating the depth of cut, means clamping said blocks independently of each other in adjusted position and involving sets of members at opposite ends of said blocks, one of said members of each set being held against movement and the other members of said sets being movable lengthwise of the tool, and means for forcing said last referred to members towards said blocks, one of said movable members having a portion between which and one of said stationary members one of said blocks is clamped, and the other of said movable members having a portion between which and the other of said stationary members the other of said blocks is clamped.

7. A boring tool comprising a supporting member, cutting-edge-equipped blocks adjustable thereon for regulating the depth of cut, means clamping said blocks independently of each other in adjusted position, and involving sets of members at opposite ends of said blocks, one of said members of each set being held against movement and the other members of said sets being movable lengthwise of the tool, and rotary means for forcing said last referred to members towards said block, one of said movable members having a portion between which and one of said stationary members one of said blocks is clamped, and the other of said movable members having a portion between which and the other of said stationary members the other of said blocks is clamped.

8. A boring tool comprising a supporting member, cutting-edge-equipped blocks adjustable thereon for regulating the depth of cut, means clamping said blocks independently of each other in adjusted position and involving sets of segment-equipped intermeshing ring devices at opposite ends of said first named blocks, one of said segment-

equipped devices of each set thereof being held against movement and the other members of said sets being movable lengthwise of the tool, and means for forcing said last referred to segment-equipped device toward said blocks, one of said segment-equipped devices having a portion between which and one of said stationary segment-equipped devices one of said blocks is clamped, and the other of said segment-equipped devices having a portion between which and the other of said stationary members the other of said blocks is clamped.

JOHN T. HISCOCK.