

(No Model.)

F. H. RICHARDS.
BORING TOOL.

No. 525,116.

Patented Aug. 28, 1894.

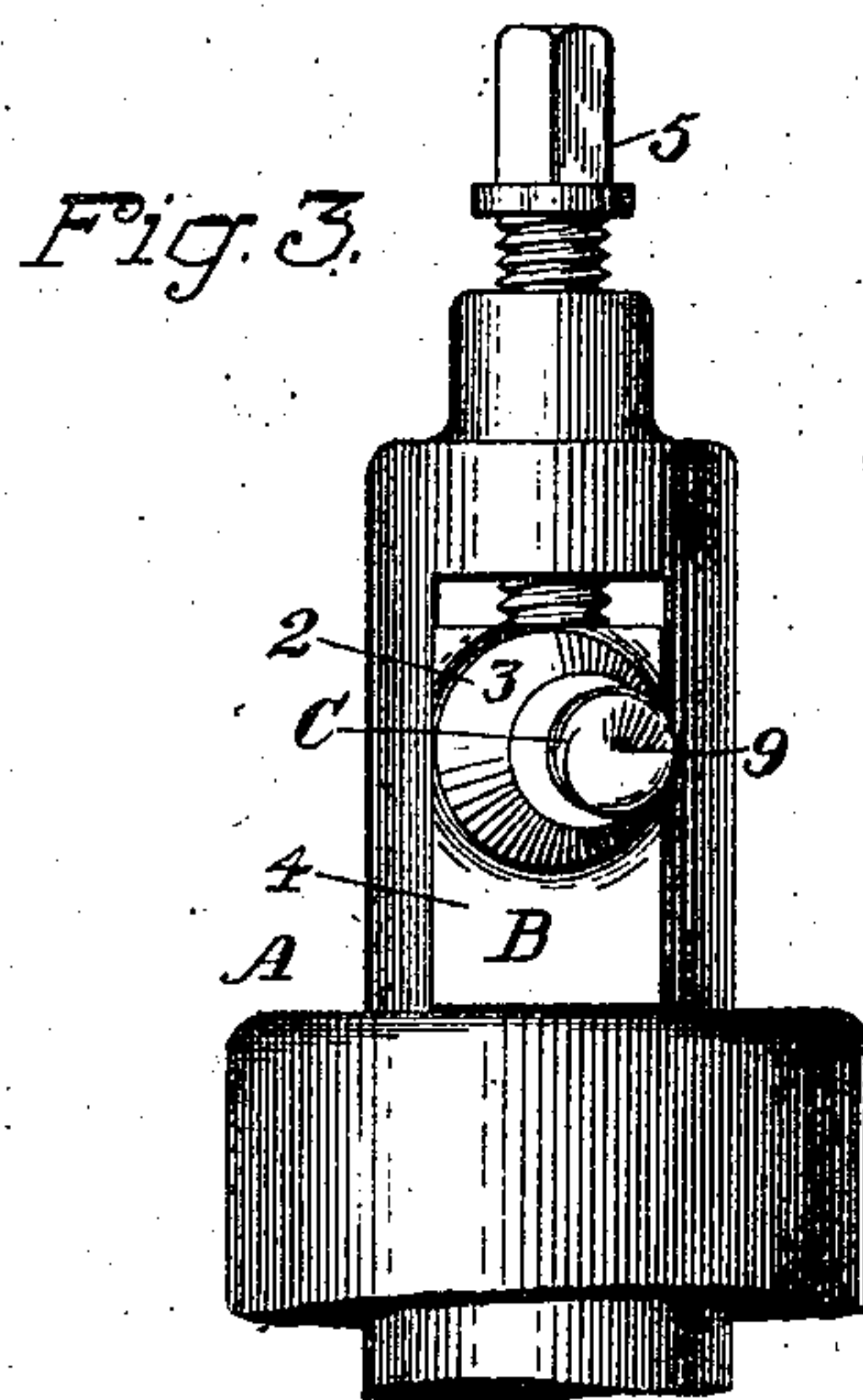
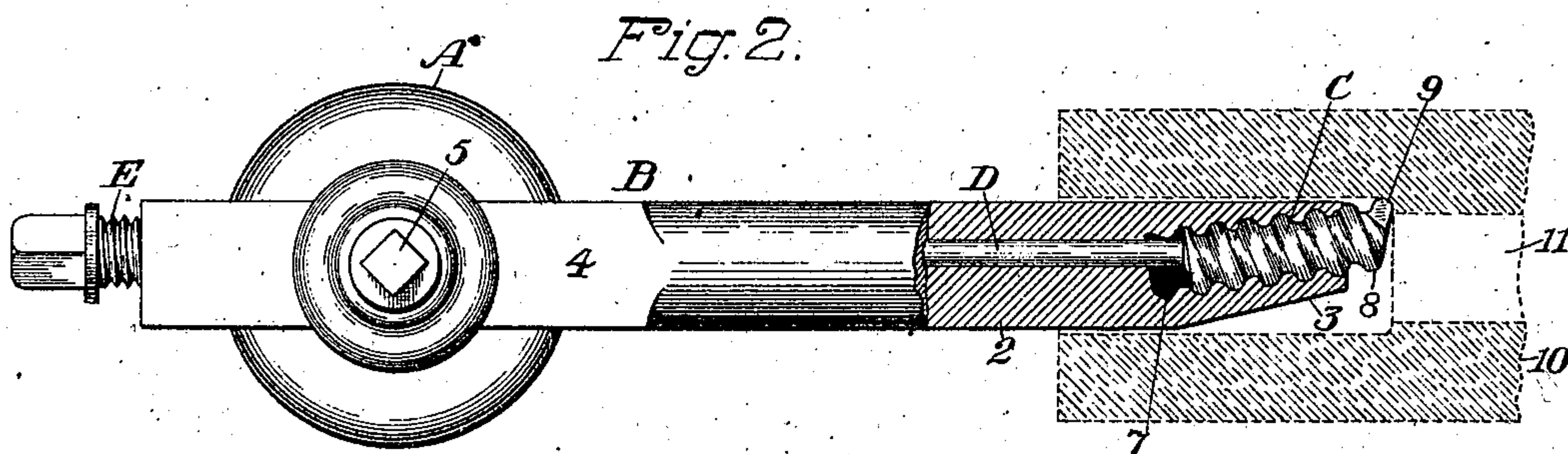
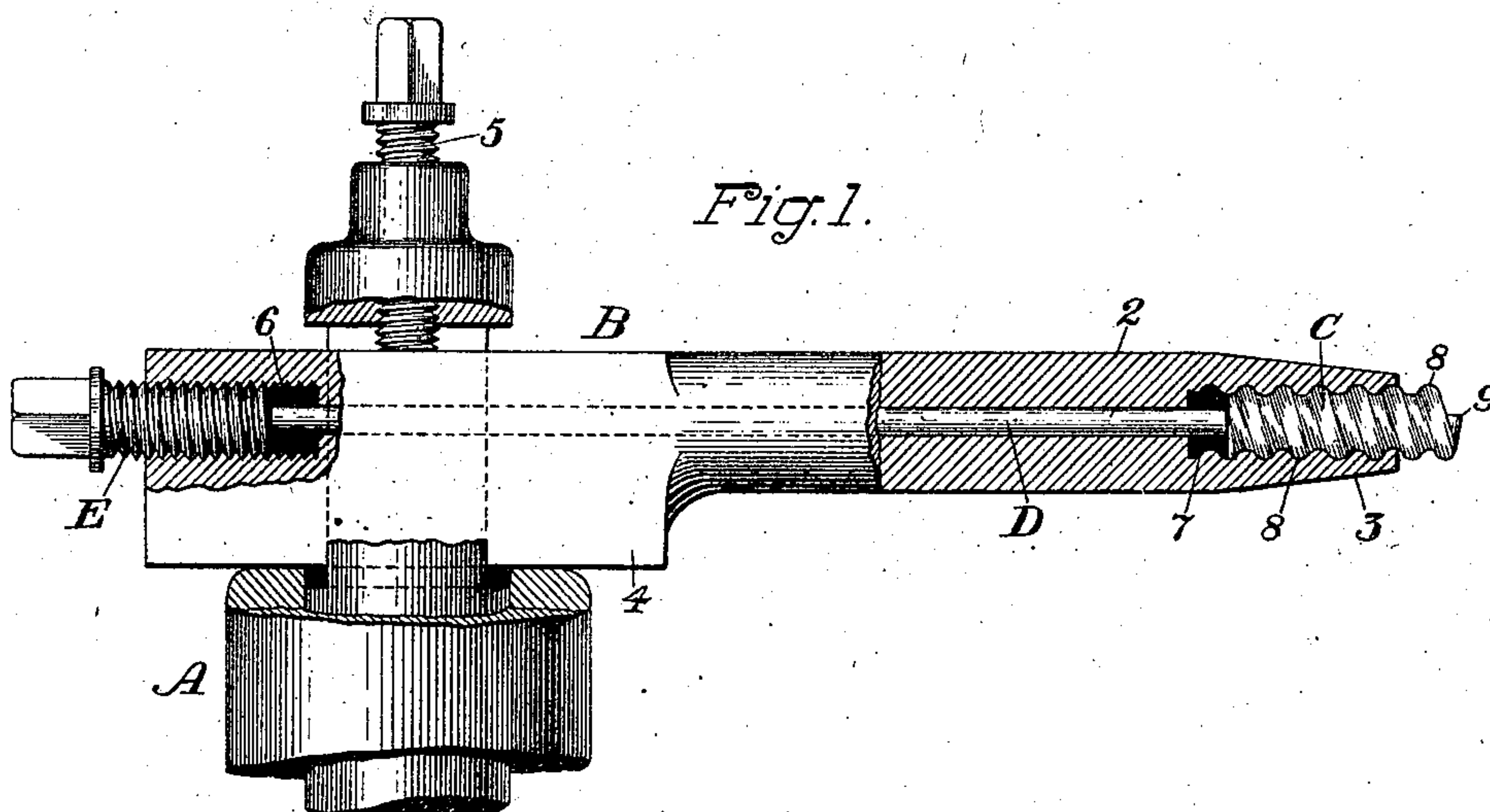


Fig. 4.



Fig. 5.



Witnesses:

J. L. Edwards Jr.
Fred. J. Dole.

Inventor:

F. H. Richards

UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

BORING-TOOL.

SPECIFICATION forming part of Letters Patent No. 525,116, dated August 28, 1894.

Application filed December 23, 1893. Serial No. 494,671. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Boring-Tools, of which the following is a specification.

This invention relates to boring-tools for lathes; the object of the invention being to furnish a boring-tool adapted for finishing relatively small bores in metal work, and to provide, in connection therewith, an improved cutting-tool or bit which may be readily sharpened and re-sharpened successively and indefinitely, as it becomes worn, without reshaping said bit; to thereby enable the cutting-tool or bit to be used nearly its entire length; also to provide means whereby the cutting-tool or bit may be adjustably fixed and properly set for operation in the tool-body or holder, irrespective of its length; and whereby said cutting-tool may be quickly and readily removed and replaced and adjusted laterally at its cutting-end with relation to the axis of the bore being finished, to provide for the different degrees of relief required for finishing bores of varying diameters, as will be hereinafter fully explained.

In the drawings accompanying and forming a part of this specification, Figure 1 is a side elevation, partially in vertical longitudinal section of a boring-tool embodying my invention. Fig. 2 is a plan view, partially in horizontal cross-section, of said boring-tool. Fig. 3 is a front elevation of the same. Fig. 4 is a side view of the cutting-tool, or bit, having a cutting-lip at one end; and Fig. 5 is a side view of the cutting-tool having a cutting-lip at both ends.

Similar characters designate like parts in all the figures.

My improved boring-tool comprises essentially a tool-body or holder, designated in a general way by B, and adapted to be supported in the usual tool-post A; a cutting-tool or bit, C, and a cutting-tool-adjusting device, consisting essentially of a thrust-rod, D, and an adjusting-screw, E; the construction and organization of which elements will be hereinafter fully described.

The tool-post A is or may be of any suit-

able construction adapted for supporting the tool-holder and holding the same up to the work to be operated upon.

The tool-body, or cutting-tool holder, in the preferred form thereof herein shown, consists of the cylindrical bit-carrying portion 2, preferably conically tapered at its extreme forward end as shown at 3, and a suitable body-portion, 4, (usually rectangular in section) shown clamped in the tool-post by means of the clamp-screw 5. This tool-holder is bored longitudinally, and preferably centrally with relation to its width, from end to end, to receive a thrust-rod, D, of small diameter, which is fitted for free longitudinal movement in said bore. The rear end of said tool-body has an enlarged bore, 6, formed therein, in alignment with the thrust-rod-receiving bore, which enlarged bore is tapped to receive an adjusting-screw, E, adapted to bear at its rear end against the rear end of the thrust-rod, as clearly shown in Fig. 1 of the drawings.

Formed in the forward end of the bit-carrying portion 2 of the tool-body B, is a spirally-grooved bore, or cutting-tool-receiving socket, 7, which socket communicates at its rear end with the thrust-rod-receiving bore, but lies in a plane divergent to the axial line of the thrust-rod, and preferably in parallelism with one of the inclined side-faces of the cone-shaped end, 3, of the tool-holder, as shown in Fig. 2. This spirally-grooved bore 7 is adapted for receiving the cutting-tool or bit C, which is spirally flanged as shown at 8, to correspond with and fit the spiral groove in the bore 7.

This cutting-tool, or bit C, will preferably be constructed from a cylindrical rod or bar forged to form a cylindrical body-portion of substantially uniform diameter from end to end, having upon its periphery a spiral flange or rib 8, which extends from end to end thereof and terminates at one or both ends in a cutting-lip, or face, 9, transverse to said flange, as clearly shown in Figs. 4 and 5 of the drawings. This flange will be of such construction and of such pitch as to preclude, when the same is supported in its holder, any possibility of displacement by longitudinal or end-pressure, but on the contrary will be more

firmly secured in place in its holder if subjected to pressure at either end thereof. As shown in the drawings, the angle of this spiral flange 8 is very slight, thus enabling it to have a firm bearing in the plane of its axis within the spiral groove in the tool-holder; said flange constitutes a retaining and cutting-lip-forming flange for the tool. The cutting-tool, or bit C, will be symmetrical in section its entire length to thereby permit the same to be ground off at one or both ends thereof for forming the cutting face 9, which cutting face lies in a plane transverse to the flange 8. The peripheries of the body-portion of the cutting-tool and the spiral flange are concentric with relation to each other and with relation to the axis of said tool, as will be fully understood by reference to Figs. 4 and 5 of the drawings.

By the construction of cutting-tool-holder and cutting-tool hereinbefore described, it will be seen that the said holder and cutting-tool have coinciding and intermeshing spiral flanges, the abutting faces of which act one upon the other to bind and prevent longitudinal displacement of the cutting-tool when subjected to endwise pressure.

In Fig. 5 I have shown a reversible cutting-bit in which the spiral rib terminates in a cutting-face at both ends of the bit, either end of which is thereby adapted for use. In some cases, a bit of this construction is advantageous, as it enables the tool to be reversed in its holder and the opposite end used when one end becomes worn, without the necessity of providing a new bit.

By means of the described construction of cutting-tool and cutting-tool holder, the cutting-tool may be quickly adjusted by screwing the same into or out of the bore 7 of the holder, to bring its cutting-end into proper position to project more or less as may be required to bring the cutting-edge of the bit a greater or lesser distance beyond the outer face of the holder and secure the requisite degree of relief according to the diameter of the bore being finished. As a means for adjustably holding in place the bit or cutting-tool, and for preventing longitudinal as well as rotary movement thereof, I have provided a thrust-rod, D, capable of longitudinal movement in the holder, which thrust-rod bears at its forward end against the rear end of the bit, and at its rear end against the forward end of the adjusting-screw, E, screwed into the rear end of the holder, as shown in Fig. 1. When it is desired to adjust the bit, it is simply necessary to release the screw E from binding contact with the thrust-rod, rotate the bit to move it outward or inward as desired, shift the thrust-rod forward or backward until its forward end contacts with the bit, and then screw in the set-screw E until the thrust-rod is tightly impinged between the ends of the bit and set-screw, when the tool is ready for operation.

To illustrate the operative relation of the cutting-tool to a piece of work, I have shown, in Fig. 2, a piece of work, 10, (represented by dotted lines,) with a bore, 11, being finished or enlarged by the cutting-tool. In said figure it will be noticed that the cutting-tool is set in its holder at an inclination to the axis of the bore being finished, and that the cutting-lip 9 extends but a short distance beyond the side-edge of the holder. By this arrangement I am enabled to use a bit of uniform diameter from end to end, (its diameter being less than the diameter of the bore being finished,) and also to secure longitudinal, circumferential and end relief, thus obviating the necessity of spreading or diametrically enlarging the cutting-end of the tool to secure the requisite relief.

Having thus described my invention, I claim—

1. The herein-described boring tool, it consisting of the longitudinally-recessed cutting-tool-holder having the cutting-tool-receiving socket at one end thereof, with the inwardly projecting spiral tool-binding rib or flange adapted for engaging the spiral flange of the cutting-tool, a cutting-tool adjustably-secured in said socket and having a combined retaining and lip-forming flange extending spirally from end to end thereof in engagement with the spiral flange of the tool-holder and terminating at one or both ends in a cutting-lip transverse to said flange, and an adjusting-device located in the recess of the tool-holder and bearing at one end against the end of said cutting-tool, substantially as described and for the purpose set forth.

2. The herein-described cutting-tool, or bit, it consisting of a cylindrical body-portion substantially uniform diameter from end to end and having upon its periphery the combined retaining and lip-forming rib or flange extending spirally from end to end of the body-portion and terminating at one or both ends in the cutting-lip having its face transverse to said rib, substantially as described.

3. The herein-described cutting-tool, or bit, it consisting of a cylindrical body-portion of uniform diameter from end to end and having upon its periphery a combined retaining and lip-forming rib or flange extending spirally from end to end thereof and terminating at its opposite ends in oppositely-disposed cutting-lips whose faces are in parallel planes transverse to the said rib or flange, substantially as described.

4. In a boring-tool of the class specified, the bit-holder bored longitudinally and having a spirally grooved bit-receiving socket formed in one end thereof at an inclination to the axis of said holder, in combination with a spirally flanged cutting-tool adjustably fixed in said socket, a thrust-rod adjustably carried in the bit-holder and bearing at one end against the inner end of the bit, and means for moving said rod longitudinally and secur-

ing the same in its adjusted position, substantially as described and for the purpose set forth.

5. In a boring-tool of the class specified, the combination with the bit-holder bored longitudinally and having a spirally grooved bit-receiving socket formed in one end thereof, of a bit having a cylindrical body-portion of uniform diameter from end to end and having upon the periphery of said body-portion a combined retaining and lip-forming flange extending spirally from end to end thereof and terminating at one or both ends in a transverse cutting-lip or face, and an adjusting device adapted for engagement with said bit and operable from the opposite end of the tool-holder, substantially as described and for the purpose set forth.

6. The herein-described boring-tool, comprising the longitudinally-bored cutting-tool holder having the spirally-grooved tool-receiving socket 7 at one end thereof and the screw-threaded hole at the opposite end of said holder; the spirally-ribbed cutting-tool adjustably seated in said socket, a longitudinally-adjustable thrust-rod bearing against said tool, and the adjusting-screw bearing against the opposite end of the thrust-rod, substantially as described and for the purpose set forth.

7. In a boring-tool of the class specified, the combination of the cutting-tool holder B bored longitudinally from end to end and having the spirally-grooved tool-socket formed in one end thereof at an inclination to its face, the cutting-tool having the continuous spiral rib terminating at its end in a cutting-lip, substan-

tially as described, a thrust-rod seated for longitudinal movement in the bore of the holder and bearing at one end against the cutting-tool, and the adjusting-screw screwed into the rear end of the holder and adapted to bear against the thrust-rod, substantially as and for the purpose set forth.

8. In a boring-tool of the class specified, the longitudinally-recessed cutting-tool holder B having the spirally-grooved inclined cutting-tool-receiving socket at one end thereof (which socket is cross-sectionally symmetrical from end to end), in combination with a cutting-tool seated in said socket and having a continuous spiral flange of uniform diameter from end to end which terminates at one or both ends in a transverse cutting-lip, and an adjusting-device adapted for engagement with said cutting-tool and operable from the opposite end of the tool-holder, substantially as described and for the purpose set forth.

9. The herein-described boring-tool, it consisting of a longitudinally recessed cutting-tool holder having an inwardly projecting spiral cutting-tool-binding flange, and a cutting-tool having a spiral combined retaining and lip-forming flange in intermeshing engagement with the inwardly projecting binding-flange of the tool-holder and terminating at one or both ends in a cutting-lip having its face transverse to said flange and longitudinal to the axis of the cutting-tool, substantially as described.

FRANCIS H. RICHARDS.

Witnesses:

FRED. J. DOLE,
N. E. C. WHITNEY.