J. J. STEINBRUNN.

BORING BAR.

APPLICATION FILED DEC. 3, 1910.

1,031,484.

Patented July 2, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

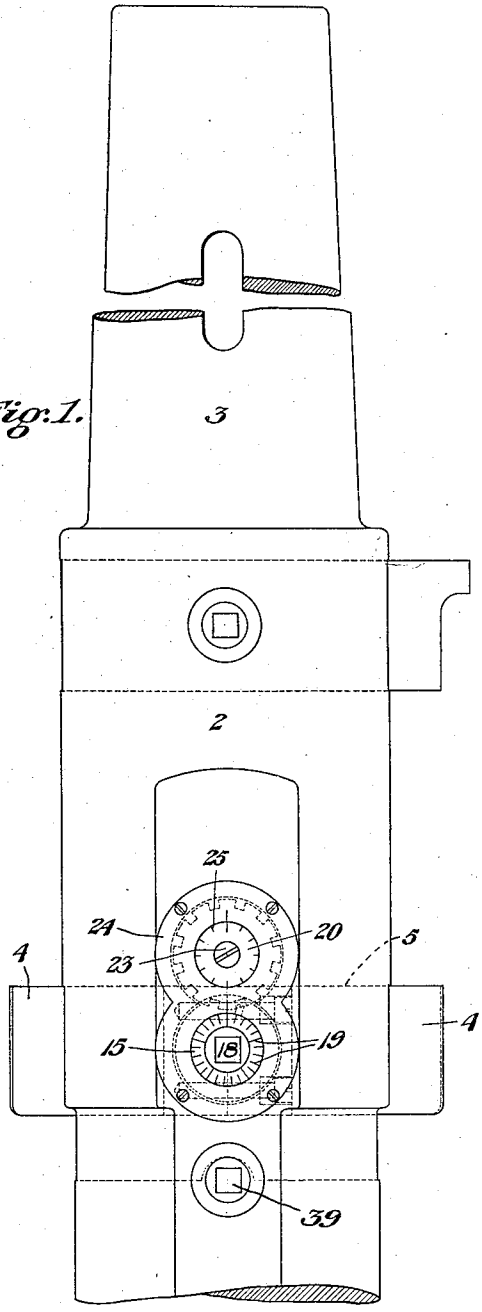


Fig. 3.

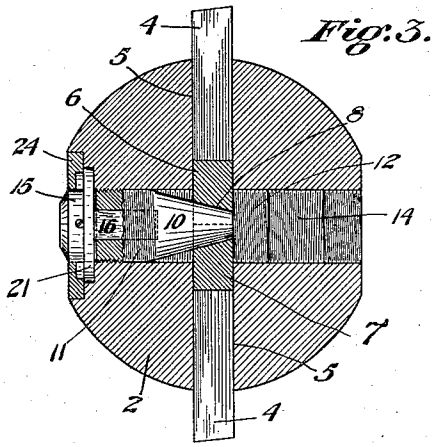
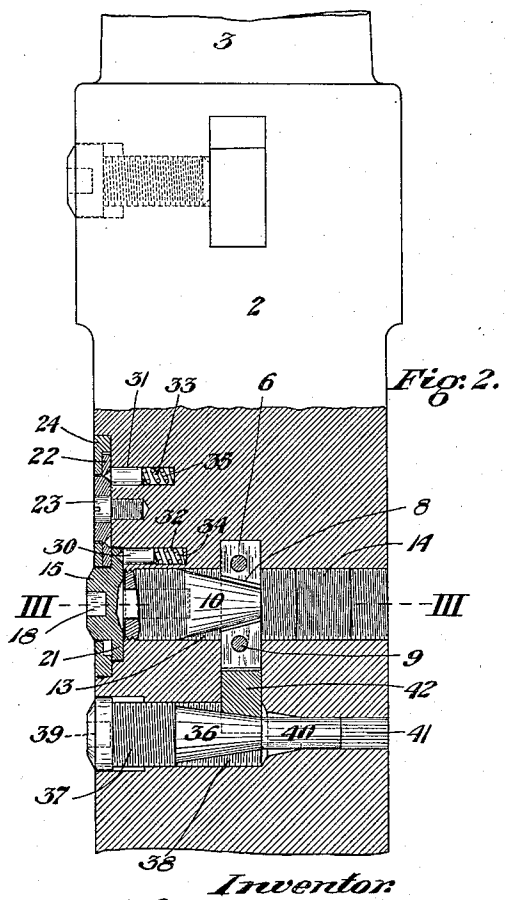


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 4.

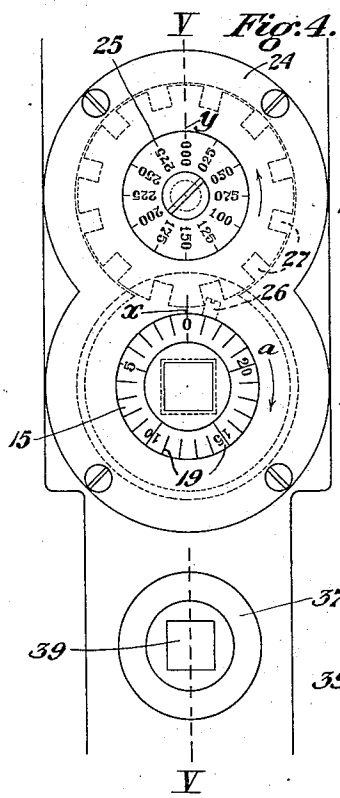


Fig. 5.

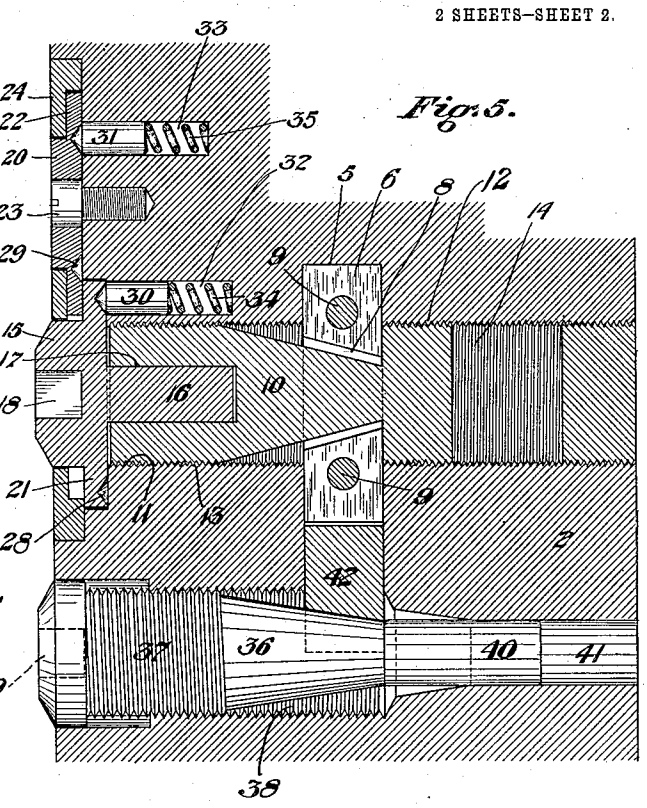


Fig. 6.

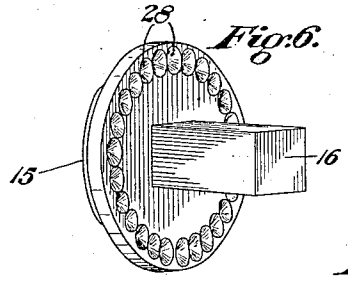


Fig. 7.

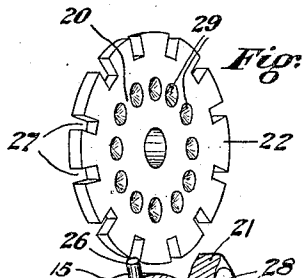
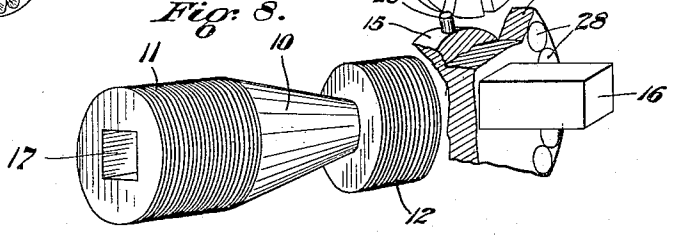


Fig. 8.



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UNITED STATES PATENT OFFICE.

JOHN J. STEINBRUNN, OF PITCAIRN, PENNSYLVANIA.

BORING-BAR.

1,031,484. Specification of Letters Patent. Patented July 2, 1912.

Application filed December 3, 1910. Serial No. 595,523.

To all whom it may concern:

Be it known that I, JOHN J. STEINBRUNN, a citizen of the United States, residing at Pitcairn, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Boring-Bars, of which the following is a specification.

My invention consists of an improvement in boring bars of the type employing a plurality of oppositely arranged and oppositely adjustable cutters mounted in a main shank, and the particular feature of the invention is an improved means for accurately adjusting the cutter adjusting mechanism, and for definitely registering the degree of adjustment, by a combination of visible coacting dials, coöperating with the adjusting mechanism, in the manner hereinafter more fully described.

The particular feature of the invention is an improvement, which may be termed a micrometer adjustment, in that type or class of boring bars disclosed in my prior patent of October 12th, 1909, No. 936955.

In the drawings: Figure 1 is a view of portions of a boring tool or bar provided with my invention. Fig. 2 is a view taken at right angles to that of Fig. 1 partly broken away, and in vertical section at the lower part, showing the operating mechanism assembled. Fig. 3 is a cross sectional view, partly in elevation, on the plane indicated by the section line III. III. of Fig. 2. Fig. 4 is an enlarged face view of the registering mechanism. Fig. 5 is a similarly enlarged vertical sectional view through a portion of the bar, similar to the sectional illustration of Fig. 2, and on the line V. V. of Fig. 4. Fig. 6 is an inner perspective view of the wedge adjusting stem and dial. Fig. 7 is a similar view of the upper registering dial in operative relation to said wedge adjusting dial. Fig. 8 is a perspective detail view on a slightly reduced scale, of the adjusting coni-form wedge.

In the drawings, 2 represents the main body portion of the bar which is generally cylindrical in form and provided at its upper portion with a reduced tapered extremity 3 for insertion in the actuating head of the boring mill or machine. At its upper extremity, the bar 2 is usually provided with radially arranged cutters for making the "rough" cut through the opening of the hub or other article, not shown herein, but generally similar in construction to that shown in my prior patent above referred to. Upwardly beyond such roughing cutters and located about midway of the length of the bar 2 are the finishing cutters 4, two in number, mounted radially across the middle central portion of the bar in receiving sockets 5. These finishing cutters are located a sufficient distance beyond the roughing cutters so that said roughing cutters will first make their cut and pass entirely through to the other side of the object being cut, before the finishing cutters commence their work, it being understood that the work may be advanced toward the bar or vice versa, and that the object being cut may be rotated or the bar may be rotated as desired.

As stated, the finishing cutters 4 are adjustably mounted within the sockets 5 of the bar and for the purpose of adjusting them outwardly therein, equally at each side, I provide the adjusting blocks 6 and 7 having their inner middle portions cut out or recessed semi-cylindrically as indicated at 8, and tapered to the same degree as the taper of the adjusting coni-form wedging screw. These blocks are assembled by means of bolts 9 extending through block 6 and screwed into block 7, or vice versa, sufficient play being provided to permit of the necessary separation of the blocks by the wedging screw, to effect the outward adjustment of the cutters.

10 represents the wedging screw having its end portions provided with threads 11 and 12 as shown, engaging receiving threads 13 and 14 in the bar 2, which threaded portions are preferably of uniform diameter, whereby to insure accurateness and ease of tapping and positive engagement and feed of the wedging screw at each end.

The middle portion of the bolt 10 is tapered in truncated coni-form as indicated, engaging the similarly shaped recesses 8 of the blocks 6 and 7, to accomplish the outward adjustment thereof upon inward movement of the screw. Such adjustment is accomplished by means of a disk 15 set in a suitable recess in the front portion of the bar having an inner square or otherwise polygonal shaped stud or key 16, which enters and engages a similarly shaped recess 17 in the center of the adjusting screw 10. The outer center of disk 15 is also provided with a recessed socket 18 square or otherwise shaped for the insertion of a turning wrench or key, by

which means it will be seen that the adjusting screw may be set to any desired degree. In boring bars of this type, it is important to provide not only for accurate adjustment of the cutters, but to permanently register the relative adjustment so as to determine the expansion and diameter of the cutters and the hole being bored, at all times. For such purpose, the face of disk 15 is provided with a series of radial index divisions 19 and appropriate inscriptions, depending upon the gage of the thread, so as to determine exactly the amount of adjustment, as to one one-thousandth of an inch. Located above and adjacent to the disk 15 is an additional registering disk 20 set in a similar recess or receiving cavity in the bar, each of said disks having inner flanges 21 and 22 respectively, overlapping each other as shown, for compact assemblage. The upper disk is centrally mounted by a stud 23 as shown, and both of said disks are maintained in operative position by a housing plate 24 screwed upon the face of the bar, which face is planed off or flattened, as indicated in Fig. 3, whereby to provide a good bearing surface for the disks and their associated parts.

The face of upper disk 20 is, like face of disk 15, provided with graduation marks or divisions 25, each division corresponding to the total number of divisions on face of disk 15, and intended to register, when disk 20 is rotated for one of its divisions, the whole amount of adjustment represented by an entire rotation of disk 15. Each of said disks is provided with a zero point x and y respectively, whereby to read said dials, as will be readily understood.

In order to actuate disk 20 by disk 15, at each revolution of said latter disk, it is provided with a pin 26 adapted to engage one of a series of recesses 27 in flange 22 of disk 20, whereby to shift the disk the desired distance. For the purpose of positively locking each of said disks in their adjusted position, each disk is provided on its inner side with a series of recesses or cavities 28 and 29 respectively, corresponding in number and location to the several annular divisions 19 and 25 respectively. 30 and 31 are locking studs having blunt points adapted to enter said recesses when in register, and to be forced backwardly therefrom when either disk is shifted, said pins being mounted in sockets 32 and 33 respectively with outwardly pressing springs 34 and 35 respectively, whereby to effect interlocking engagement to hold the disks against accidental movement in either direction.

36 is a coni-form or tapered wedging key similar to key 10, mounted by its threaded portion 37 in a threaded socket 38 in the bar, having a recess or socket 39 in its head and an extended guide terminal pin 40 entering a receiving socket 41 in the bar. The rounded portion 36 of said screw bears against and binds to tighten block 42 against the edge portions of blocks 6 and 7, whereby they may be positively locked in position at any time.

The operation of the invention will be readily understood from the foregoing description. Adjustments to one one-thousandth of an inch may be made by setting the disk 15 beyond the zero mark in the direction of the arrow a and upon said disk being rotated an entire revolution, pin 26 will have actuated disk 20 one space, thereby registering the entire feed, to wit, 25 thousandths of an inch, the disk 15 then commencing to register an additional distance of feed by its specific subdivisions. Thus at any time, the exact gage of the finishing cutters may be ascertained without the necessity of calculation, calipering, etc., thereby greatly facilitating the use and adaptation of the boring bar to accurate work.

Having described my invention, what I claim is:—

1. In a boring tool, the combination of a main bar having transverse cutter sockets and a transverse threaded key socket at right angles thereto, cutters mounted in the cutter sockets, a threaded adjusting key mounted in the key socket and provided with a tapered portion engaging the inner ends of the cutters, a tightening block adapted to bind against the cutters, and a screw having a tapered portion engaging said block.

2. In a boring tool, the combination of a main bar having transverse cutter sockets and a transverse threaded key socket at right angles thereto, cutters mounted in the cutter sockets, a threaded adjusting key mounted in the key socket and provided with a tapered portion engaging the inner ends of the cutters, and a rotatably mounted socketed adjusting key telescoping with and operative to turn said adjusting key.

3. In a boring tool having adjustable cutters, the combination of a tapered rotatable adjusting screw for the cutters having a central key socket, a telescoping actuating key therefor provided with an indicating dial and having an annular series of coniform sockets, and a slidingly mounted spring-actuated locking pin adapted to engage said sockets successively.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

JOHN J. STEINBRUNN.

Witnesses:
C. M. CLARKE,
CHAS. S. LEPLEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."