

J. J. STEINBRUNN.
BORING BAR.
APPLICATION FILED MAR. 16, 1909.

936,955.

Patented Oct. 12, 1909.
2 SHEETS—SHEET 1.

Fig. 1.

Fig. 2.

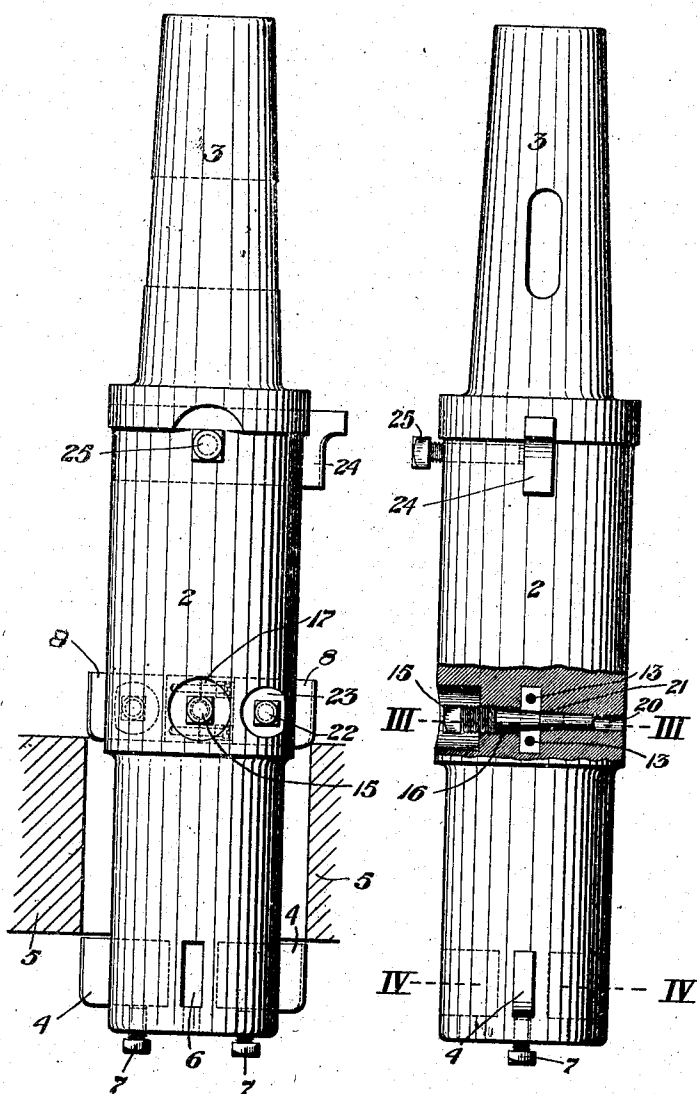


Fig. 3.

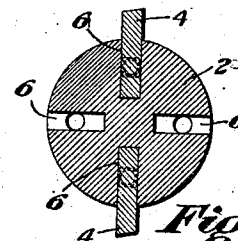
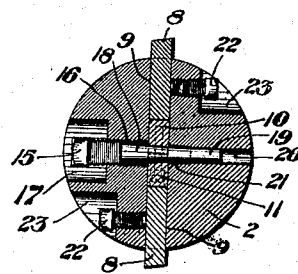


Fig. 4.

Witnesses:
Chas. S. Lefley
Henry Jones

Inventor:
John J. Steinbrunn
by C. M. Charles
his attorney

J. J. STEINBRUNN.
BORING BAR.
APPLICATION FILED MAR. 16, 1909.

936,955.

Patented Oct. 12, 1909.

2 SHEETS—SHEET 2.

Fig. 5.

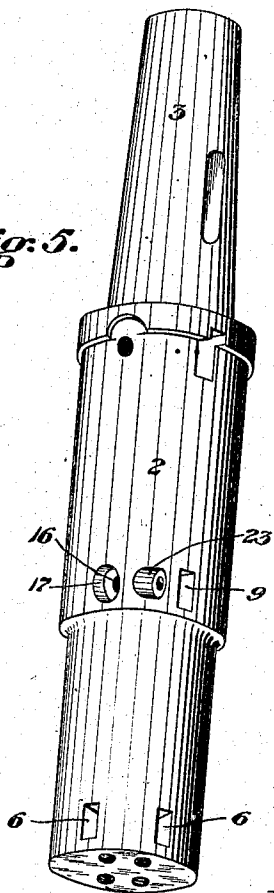


Fig. 6.

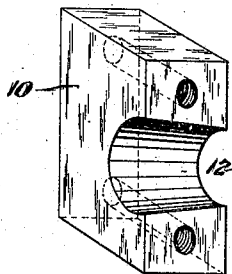


Fig. 7.

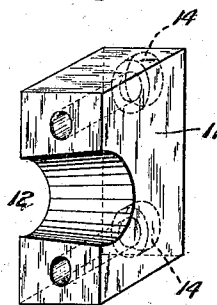
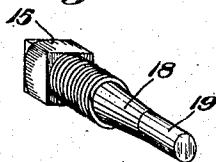


Fig. 8.



Witnesses:

Chas. S. Lively
Henry True

Inventor:

John J. Steinbrunn
by C. M. Clarke
his attorney

UNITED STATES PATENT OFFICE.

JOHN J. STEINBRUNN, OF PITCAIRN, PENNSYLVANIA.

BORING-BAR.

936,955.

Specification of Letters Patent.

Patented Oct. 12, 1909.

Application filed March 16, 1909. Serial No. 493,856.

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, reference being had therein to the accompanying drawing.

My invention consists of an improvement in boring bars and has for its object to provide a bar having a plurality of sets of cutters arranged longitudinally of its length located at intervals, adapted to cut successively through a piece of metal continuously, each cut performing its functions successively and independently of the preceding cut.

The particular feature of the invention is in the bar of this character, the provision of means for accurately adjusting the finishing cutters, in combination with the complete structure, as more fully hereinafter described.

Referring to the drawings:—Figure 1 is a view of the complete device in vertical elevation illustrating it in position within the hub of the wheel or other article being bored. Fig. 2 is a similar view at right angles to Fig. 1, partly broken away to show the adjusting mechanism for the finishing cutters. Figs. 3 and 4 are cross sectional views indicated by the lines III. III. and IV. IV. of Fig. 2. Fig. 5 is a perspective detail view of the bar without its parts. Figs. 6 and 7 are detail views in perspective of the adjusting blocks for the finishing cutters. Fig. 8 is a similar view of the wedging screw.

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 other extremity, the bar 2 is provided with radially arranged cutters 4 for making the "rough" cut through the opening in a hub or other article 5, said cutters being of any desired number, as four, mounted within suitable receiving sockets 6 and held therein by set screws 7 or other suitable means. The rough cutters 4 are designed to cut away the principal part of the metal and are not adjustable, being sharpened or renewed from time to time as may be desired and as is the common practice. Beyond the series of rough cutters and located about midway of

the length of the bar 2 are the finishing cutters 8, two in number, mounted radially across the middle central portion of the bar in receiving sockets 9. These finishing cutters are located a sufficient distance beyond the cutters 4 so that said cutters will first make their cut and pass entirely through to the other side of the article being cut, before the finishing cutters commence their work, it being understood that the work is advanced toward the bar or vice versa, and that the work may be rotated or the bar may be rotated as desired. The object of this relative arrangement of the sets of cutters 4 and 8 is that, the bar 2 being originally set centrally of the desired hole to be finished, any inaccuracies of alinement arising during or resulting from the first cutting operation, are not necessarily repeated by the next following series of cutters 8, but that said cutters and the bar will re-assume their central arrangement with relation to the article as soon as the cutters 4 have passed beyond it and before the finishing cutters have commenced their work.

As stated, the cutters 8 are adjustably mounted within the sockets 9 of the bar, and for the purpose of adjusting them outwardly therein, equally at each side, I provide the adjustable blocks 10 and 11 having their inner middle portions cut out or recessed semi-cylindrically as indicated at 12, 12, and tapered to the same degree as the taper of the adjusting wedging screw. These blocks are loosely assembled by means of bolts 13 extending through block 11 and screwed into block 10, the heads of the bolts engaging elongated recesses 14 in the outer sides of block 11, 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. The adjusting blocks are of a height corresponding to the height of cutters 8, which abut by their inner ends directly against the outer faces of said blocks, providing a solid contacting bearing for each cutter.

15 represents the wedging screw having its inner shank provided with threads as shown, engaging receiving threads 16 in the bar 2, which is recessed at one side as indicated at 17 for clearance of the bolt head and the necessary adjusting wrench. The middle portion of the bolt 15 is tapered in truncated cone form as indicated at 18, while beyond such tapered portion it ex-

tends by a reduced terminal 19 into a receiving opening 20 in the opposite side of the bar, as clearly shown in Fig. 3. The inner terminal of said opening 20 is flared outwardly as indicated at 21 to provide clearance for the oncoming tapered wedge portion 18 as the bolt is advanced in adjusting the blocks 10 and 11, and it will be understood that the curvature of the openings 12 therein is of a radius to snugly receive the tapered wedge 19 and provide a bearing therein when it has been adjusted inwardly to the limit of its movement.

22 represent adjusting set screws set in against the sides of cutters 8 through the body portion of the bar, which is cut out at 23 for clearance of the screw head and adjusting wrench.

In operation, the finishing cutters 8 which are of equal length are set inwardly against blocks 10 and 11 at their innermost position, and may be of the length desired to extend slightly beyond the terminal cutting edges of cutters 4. As desired, the cutters 8 are adjusted outwardly by screwing bolt 15 inwardly, its tapered wedge section 18 separating blocks 10 and 11 and likewise the cutters 18 equally at each side until extended to the desired extent, when they may be positively set by screws 22. As the cutters wear or for any reason desired, they may be very accurately adjusted by the screws 15, and it will be seen that the extent of adjustment may be very minute and accurate, depending upon the turning of the screw.

A particular advantage of the terminal extension 19 of the screw and its engagement in opening 20, in exact alinement with the threaded opening 16 at the opposite side of the center, is that the adjusting screw is thus always maintained in perfect alinement, rendering it impossible to adjust either cutter in advance of the other.

Upwardly beyond the series of cutters 8 is preferably provided an additional series of finishing cutters 24 of any desired form

as that shown, for the purpose of finishing the upper edge of the hub opening by a rounding or filleting cut. Said cutter or cutters are in other respects similar to the round cutters 4 and are secured in place by the usual set screw 25.

The advantages of the invention reside in its adaptability to making a continuous cut through the hub, *i. e.*, following one cut immediately with the other without any necessary change or adjustment in the bar or substitution of one cutting tool for another. Also in the facility for making an accurate adjustment for the finishing cutters; the correction of lateral errors, and the inclusion within a single tool of the several series of cutters adapted to operate in the manner described.

The invention may be changed or varied in its design, or details of construction by the skilled mechanic, but all such changes are to be considered as within the scope of the following claim.

What I claim is:—

In a boring bar, the combination of a cylindrical bar having a continuous transverse socket, cutters located in the outermost portions thereof, set screws for securing said cutters, separable adjusting blocks located in the middle portion of said socket having outer abutting faces engaging the rear ends of said cutters and having inner adjacent semi-cylindrical tapered apertures, bolts loosely connecting said blocks, and a threaded adjusting bolt engaging a threaded socket in the bar having a tapered portion engaging the tapered apertures of the blocks and an extended terminal engaging a receiving bearing in the bar, substantially as set forth.

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

JOHN J. STEINBRUNN.

Witnesses:

O. M. CLARKE,
HARRY M. WILLIS.