E. P. MERTES.

EXPANSION BORING BAR.

APPLICATION FILED FEB. 19, 1917.

1,233,683. Patented July 17, 1917.

FIG. 1.

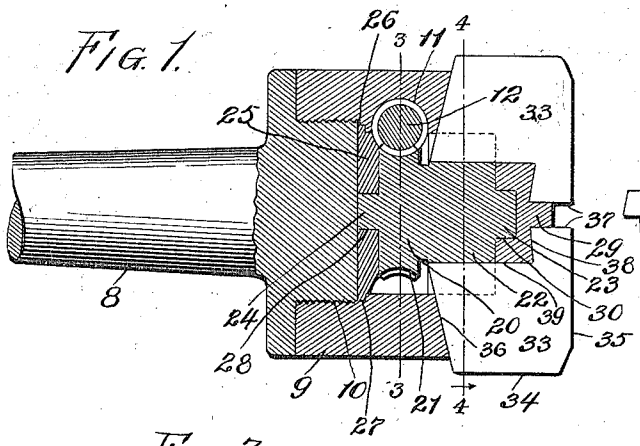


FIG. 2.

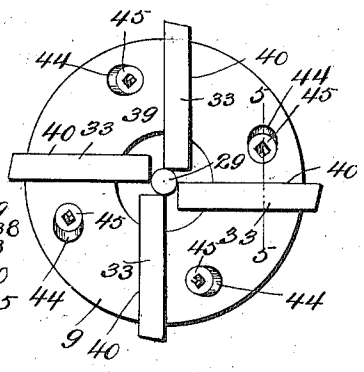


FIG. 3.

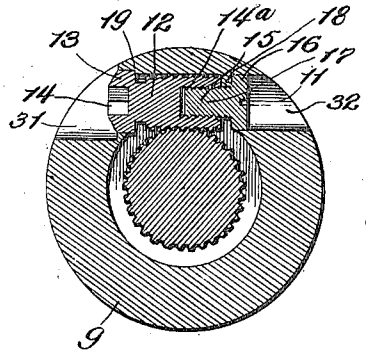


FIG. 4.

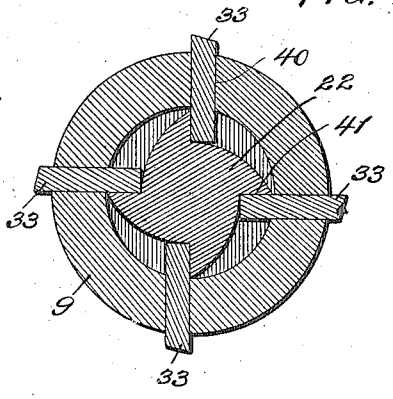


FIG. 5.

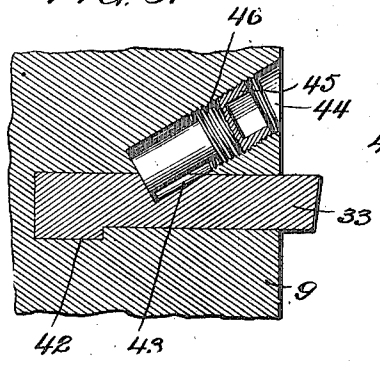


FIG. 7.

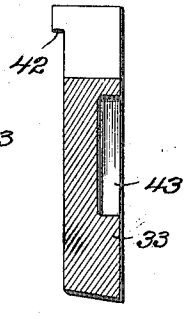
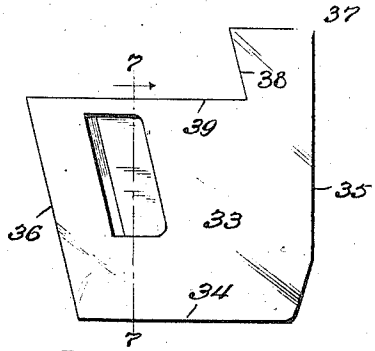


FIG. 6



INVENTOR EDWIN P. MERTES

BY Arthur C. Eckert ATTY.

UNITED STATES PATENT OFFICE.

EDWIN PHILLIP MERTES, OF ST. LOUIS, MISSOURI

EXPANSION BORING-BAR.

1,233,683. Specification of Letters Patent. Patented July 17, 1917.

Application filed February 19, 1917. Serial No. 149,611.

To all whom it may concern:

Be it known that I, EDWIN PHILLIP MERTES, a citizen of the United States, and resident of St. Louis, Missouri, have invented certain new and useful Improvements in Expansion Boring-Bars, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

The objects of my invention are to construct a simple and compact boring bar of the expansion type. In the conventional boring bar, cutters of varying sizes must be provided in order to bore holes of different sizes. This requires a set of cutters of large numbers, at increased cost, and also necessitates the entire removal of a particular size cutter to accommodate the cutter to a hole of different dimensions with a consequent loss of time.

With my device but one set of cutters is necessary for any size hole, the changing to different sizes being accomplished by an adjustment of the cutters. Any number of cutters may be used with my device. I have shown four, but the tool can be designed for any greater or lesser number. I do not desire to be limited to four, the number I have taken as being illustrative of any number of blades.

My tool is capable of boring or reaming holes with extreme accuracy owing to the delicacy of adjustment made possible by my structure; it can be made to fit any style tool post, or spindle on any lathe, boring mill, radial drill, etc.; it can bore square to the shoulder of a piece of work, without interference from set screws or lock screws contained in the bar; such set screw preventing this in a large number of the boring tools now in the art.

With the above and other objects in view, my invention has relation to certain novel features of construction and operation, examples of which are described in the following specification and illustrated in the accompanying drawing in which—

Figure 1 is a sectional longitudinal elevation of my device.

Fig. 2 is an end view of my device.

Fig. 3 is a cross section on the line 3—3 of Fig. 1.

Fig. 4 is a cross section on the line 4—4 of Fig. 1.

Fig. 5 is a segmental cross-section on the line 5—5 of Fig. 2.

Fig. 6 is an elevation of one of the cutters.

Fig. 7 is cross section on the line 7—7 of Fig. 6.

Referring to these figures, numeral 8 designates a portion of a shank by which my tool is secured to a source of rotation such as a lathe, boring mill, etc. To the shank 8, the tool body 9, is secured by means of the threads 10. In the tool body 9 is formed a cylindrical aperture of circular section 11. In aperture 11 is located the worm gear 12, having formed on its one extremity the head 13, with a wrench hole 14, formed on its top. The shaft end of the worm gear 12, is countersunk with a threaded hole 14^a; 15 designates a bolt with a head 16 and the threaded shaft 17. Numeral 18 designates a shoulder on the tool body 9 in the aperture 11; 19 likewise represents a second shoulder on the tool body 9. When the worm gear is placed in the position shown in Figs. 1 and 2, the head rests on the shoulder 19. The bolt 15 is screwed into the threaded hole 14 until the head 16 rests on the shoulder 18. By these means the worm gear 12 is rotatively secured in the cylindrical aperture 11; 20 designates a casting consisting of the worm wheel 21, the cam wheel 22 and the projecting studs 23 and 24 respectively, all made integral. 25 designates a circular plate having the shoulder 26 which rests against the offset 27 of the tool body 9 and flush with the end of the shank 8 as shown in Fig. 1. In the center of plate 25 is punched the hole 28. In the tool body, in the portion designated 29 is formed the hole 30. The casting 20 is positioned as shown in Fig. 1 so that stud 23 is rotatably secured in hole 28 of plate 25 and stud 24 is rotatably secured in hole 30 of the tool body portion 29. The tool body 9 is cut away as shown in Fig. 3 at 31 and 32 to give easy access to the worm gear 12.

From the portion of my device described, it will be seen that when the worm gear 12 is rotated the casting 20 likewise rotates on the studs 23 and 24, causing the cam wheel 22 to rotate. The wrench hole 14 conduces to facility in worm gear rotation.

33 designates a cutter blade which has its cutting edges indicated by 34 and 35 re-

spectively. The edge 36, it is to be noted is tapered toward the edge 34.

To demonstrate the positioning of the cutter shown in Fig. 6, in Fig. 1 I have designated the remainder edges 37—38 and 39 respectively. The cutters are arranged as shown in Fig. 4 in slots 40. It will be observed when the cam wheel 22 is rotated in an anticlockwise direction, the blades will be forced radially outward. The curves of the cams that I have shown are circles with their centers non-coincident with the center of the casting. It will be seen by observing Fig. 4 that the displacement of any cutter radially equals the length of the face designated by the numeral 41, *i. e.*, the diametrical displacement of two diametrically opposed blades will be twice the length of the face 41, this distance then represents the range in the diameter of hole that can be bored with the cutter. The notch 42 on the cutter represents the means I have devised for preventing lateral displacement of the cutter. For the purpose of holding a cutter in a predetermined position I have formed an angular depression 43 in one of its sides and an opening 44 in the tool body 9 into which a bolt 45 is rotatively secured by the threads 46.

What I claim and mean to secure by Letters Patent is:

In a device of the character described, in combination with a tool body, and means for rotating said device, said tool body secured to said last named means, a set of cutter blades, a worm gear, and a cam wheel, said worm gear and said cam wheel rotatively secured to said body, the cam face of said cam wheel in frictional contact with a dull edge of each cutter blade, means for rotating said worm gear so as to produce radial movement of said blades, means for securing adjustably said blades to the tool body in determined positions, consisting of a bolt passing through the tool body and into depressions in said blades, substantially as and for the purposes described.

In testimony whereof, I have signed my name to this specification, in presence of two subscribing witnesses.

EDWIN PHILLIP MERTES.

Witnesses:

LEONA PRICE,

HARRY V. LOVE.