A. E. CLAUDON.

BORING TOOL.

APPLICATION FILED APR. 12, 1918.

1,359,965. **Patented Nov. 23, 1920.**

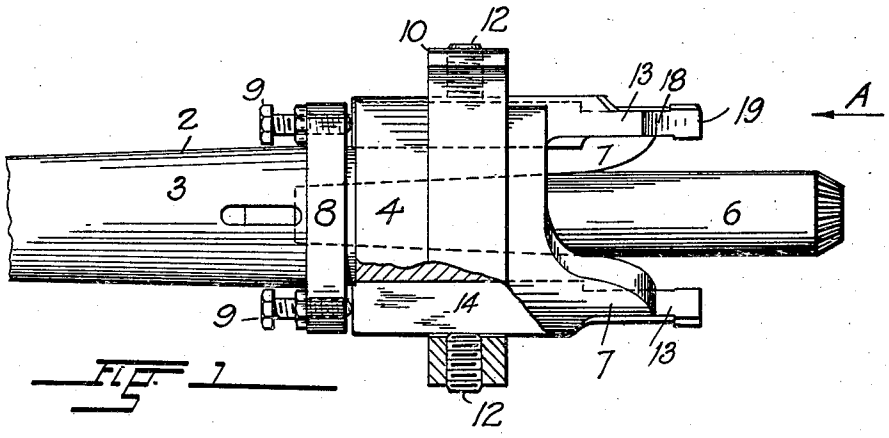


FIG. 1

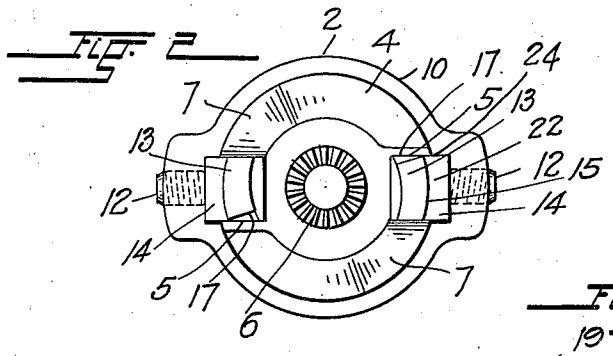


FIG. 2

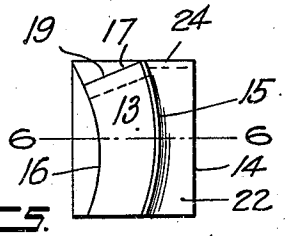


FIG. 5.

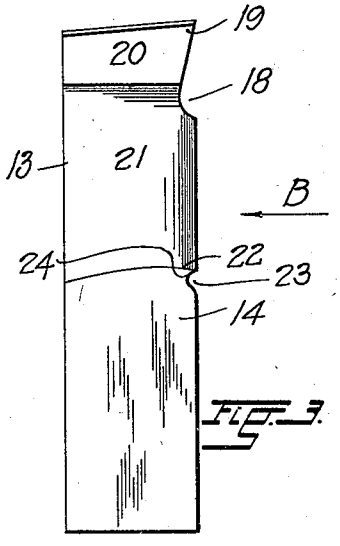


FIG. 3.

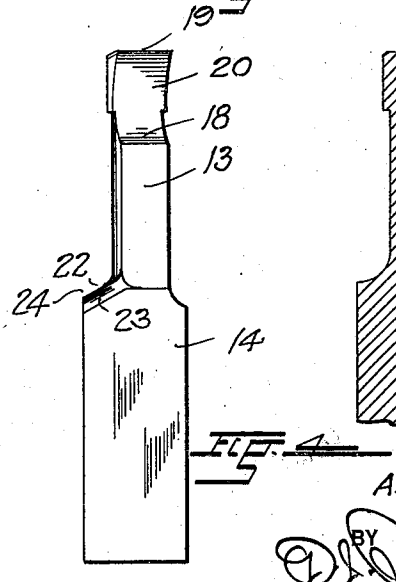


FIG. 4.

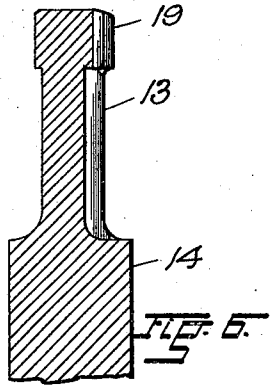


FIG. 6.

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BORING-TOOL.

1,359,965. Specification of Letters Patent. Patented Nov. 23, 1920.

Application filed April 12, 1918. Serial No. 228,130.

To all whom it may concern:

Be it known that I, AUGUSTE E. CLAUDON, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Boring-Tools, of which the following is a specification.

This invention relates to boring tools and more particularly to the class of tools used for cutting large holes in metal plates around smaller holes previously made for the guidance of the tool.

It is the primary object of the present invention to provide a boring tool of the character mentioned which has certain features of construction by which its cutting action is facilitated and its strength and durability materially increased.

My improved tool is particularly adapted for boring holes in the flue sheets of boilers and with this in view it has in addition to the features of construction hereinabove referred to, a novel means for chamfering the edges of the holes for the purposes of preventing injury to the flues expanded therein and of providing a recess for the reception of the beads produced by upsetting the ends of the flues.

An embodiment of my invention is shown in the accompanying drawings in which similar characters of reference designate corresponding parts throughout the several views and in which—

Figure 1 represents a partially sectional side elevation of my improved boring tool,

Fig. 2, an end view of the same looking in the direction of the arrow A, Fig. 1,

Fig. 3, a face view of one of the cutters or bits of the tool drawn to an exaggerated scale,

Fig. 4 an edge view of the same looking in the direction of the arrow B, Fig. 3,

Fig. 5, a top view of the bit or cutter shown in Fig. 3, and

Fig. 6, a section taken along the line 6—6, Fig. 5.

In the drawings the reference character 2 designates the stock which holds the bits of cutting tools and which has a tapering shank 3 for its connection with a boring machine of conventional construction.

The head 4 of the stock has diametrically opposite longitudinal channels 5 for the reception of the bits hereinafter to be described, and a central tapering socket within which is fitted the forwardly projecting rose-reamer 6 which in the operation enters the hole previously made in the metal plate and serves as a pilot and a support for the cutting tool proper.

The head of the stock has in alinement with the edges of its channels, rearward with relation to the direction of rotation, forwardly projecting bosses 7 which support the backs of the portions of the bits projecting from the channels and prevent their displacement or breakage when they are driven through the metal by rotation of the stock.

An annular flange 8 on the stock back of its head carries two adjusting screws 9 which engage the ends of the bits supported in the channels and provide a ready means to aline the cutting edges at the opposite ends of the same.

A collar 10 surrounding the head of the stock provides a support for set screws 12 which by engagement with the outer faces of the bits secure them in their adjusted positions.

The bits which in the operation of the tool, bore a hole in a metal plate by cutting an annular channel around the previously made smaller hole through which the reamer 6 extends, have been shown in detail in Figs. 3 to 6 of the drawings.

It is in the construction of these bits that the more important improvements of my invention reside, and I desire it understood that while the improved bits are particularly adapted for use in a stock of the construction shown and herein described, they may be employed in connection with holders of different design within the scope of my invention.

The bits which are formed on a lathe by means of a specially constructed mandrel, have a cutting blade 13 of curved and tapering section, at the end of a shank 14 of rectangular section which fits within the channels of the bit stock.

The outer face 15 of the cutting blade of

the bit is curved in an arc of the circle in which it moves by rotation of the stock and the opposite inner face 16 of the same is curved in the arc of a circle eccentric to that of the outer face.

As a result of this arrangement of its curved sides, the cutting blade of the bit diminishes gradually in thickness from its forward cutting edge 17 rearward to provide a clearance in the direction of its circular movement, and its outer face rests evenly upon the surface of the hole produced by the cutting action of the tool.

The end of the blade is beveled toward the edge 17 and a transverse groove 18 cut in said edge adjoining its beveled end, provides a cutting lip 19 of acute angular form and immediately rearward thereof, a passage through which the cuttings may freely move out of the hole produced by the operation of the tool.

By reducing the part of the blade adjoining the shank, in thickness, a cutting head 20 is formed which in the operation of the tool cuts into the metal and provides a clearance by which the major portion of the blade is permitted to move freely into and through the opening produced by action of the bits.

All undue friction between the cutting blades of the tool and the metal is thus eliminated and the possibilities of breaking or bending the bits within the hole, are reduced to the minimum.

The cutting blade of each bit is offset with relation to the axis of its shank to provide at its juncture with the shank, a rounded shoulder 22, and the shank is grooved immediately beneath this shoulder as shown at 23 in Figs. 3 and 4, to form a cutting edge 24 at the end of the shoulder corresponding with the forward edge 17 of the cutting blade 13.

The cutting edges 24 of the bits in the boring-tool engage the edge of the hole produced by the cutting blades of the same and thereby produce a chamfer which prevents injury to the flue expanded in the hole and at the same time provides a recess around the hole to admit the bead formed by upsetting the end of the flue for the purpose of securing it in air-tight connection with the sheet in which the hole is bored.

In the operation of my improved tool the reamer 6 is inserted in one of a series of holes which are punched in the flue-sheet before its being bored.

The bits which are alined by adjustment of the screws, bite with their sharp-edged lips into the metal of the sheet and cut a circular groove around the hole through which a reamer extends.

The cuttings move out of the groove through the passages 18 of the bits without in any way interfering with the cutting action, and the tapering form of the cutting heads together with the reduced width of the necks by which they are connected with their respective shanks, give ample clearance to prevent binding and to avoid all undue friction during the combined rotary and longitudinal movements of the tool.

After the hole is completed the front edge thereof is countersunk by the action of the cutting edges at the junctures of the cutting blades of the bits with their respective shanks for the purposes hereinbefore explained.

Having thus described my invention what I claim and desire to secure by Letters-Patent is:

1. In a boring tool, a head, a central guide projecting beyond the head, and a bit carried by the head radially beyond said guide, said bit having a shank and a blade extending from the shank, said blade being reduced on its inner and outer sides to provide clearances, said inner and outer sides being curved, shoulders formed between the shank and reduced inner and outer sides of said blade, and a cutting edge formed at the end of one of said shoulders.

2. In a boring tool, a head, a central guide carried by said head, and a bit fitted in said head radially beyond said guide, said bit composed of a shank and a blade, said blade having its inner and outer sides reduced forming shoulders with the shank and clearance spaces beyond the shoulders, the outer reduced side of the blade being curved on the same center with said guide, the inner side curved eccentric to the curvature of the outer side whereby the blade tapers from the front to the rear with respect to its direction of rotation, one of said shoulders being curved, and a cutting edge formed at the end of said curved shoulder.

3. In a boring tool, a head, a central guide on the head, and bits on the head radially beyond said guide, each bit composed of a shank and a blade, the blade being reduced along its inner and outer sides to provide clearance spaces and such sides being curved and tapered rearwardly with respect to the direction of rotation to provide further clearance, the outer free edge of the blade being beveled and the blade notched adjacent the beveled edge to provide a passage for the borings, shoulders at the base of the blade, and an inclined cutting edge at the end of one of the shoulders.

4. In a device of the class described, a bit comprising a shank, a cutting blade integral therewith, same being curved and tapered toward one side edge, a cutting head formed at the outer end of said blade, the tapering of said blade affording clearance spaces be-

tween said head and the shank, the outer free edge of the blade being beveled and said blade notched adjacent the beveled edge to provide a passage for the boring.

5. In a device of the class described, a bit comprising a shank, a cutting blade formed integral therewith and offset to provide a shoulder therebetween, one end of said shoulder being provided with a cutting edge, and a cutting head formed on said shank.

In testimony whereof I have affixed my signature.

AUGUSTE E. CLAUDON.