

June 13, 1950

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2,511,650

EXPANDING REAMER

Filed Oct. 22, 1948

FIG. 1.

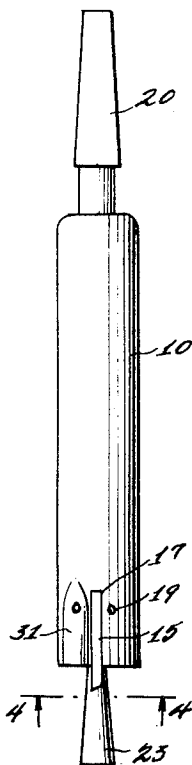


FIG. 2.

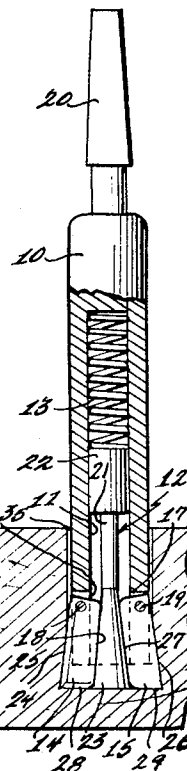
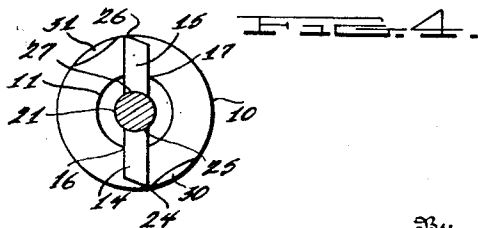
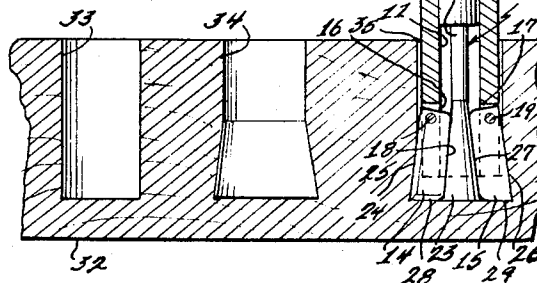
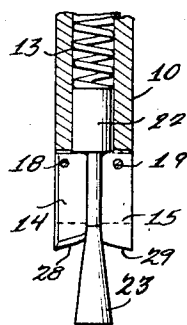


FIG. 3.



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2,511,650

EXPANDING REAMER

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Application October 22, 1948, Serial No. 55,929

2 Claims. (Cl. 145-124)

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This invention relates to reamers and has more particular reference to reamers adapted to form undercut openings in the bottom of holes.

One object of the invention is to provide a reamer having one or more pivoted cutters adapted to be swung outwardly by a wedge member to form a frusto-conical undercut at the bottom of a hole.

Another object of the invention is to provide a reamer, as above characterized, wherein the body of the reamer is hollowed to form a housing for the wedge member.

Another object of the invention is to provide a reamer, as above characterized, wherein the cutters are readily removable for sharpening or replacement.

Another object of the invention is to provide a reamer, as above characterized, wherein the wedge member is normally held in a protracted position by resilient means.

A further object of the invention is to provide a reamer, as above characterized, which is simple and rugged in construction, economical in manufacture and efficient in operation.

Other objects and advantages of the invention will appear in the following specification when considered in connection with the accompanying drawing, wherein:

Fig. 1 is a front elevational view of a reamer constructed in accordance with the present invention;

Fig. 2 is a side elevational view with parts broken away, of the reamer shown in Fig. 1, and showing the manner in which it is operated;

Fig. 3 is a partial side elevational view, similar to Fig. 2, with parts broken away, and showing the wedge member in protracted position; and

Fig. 4 is an enlarged horizontal sectional view taken on the line 4-4 of Fig. 1.

Referring now to the several figures of the drawing, there is shown a reamer comprising a mandril 10 provided with a central chamber 11, which extends longitudinally thereof, a slidable wedge member 12, and a coiled spring 13 mounted in the chamber, and a pair of cutters 14, 15 pivotally mounted on the mandril adjacent the open end of the chamber.

The lower portion of the mandril 10 is provided with an oppositely disposed pair of slots 16, 17, in which the cutter members 14, 15 are pivotally mounted on pins 18, 19 extending across the respective slots 16, 17. The upper end of the mandril is provided with a squared shoulder or head 20 adapted to engage the socket of any ordinary bit stock or similar boring device.

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The wedge member 12 comprises a cylindrical stem 21 having a piston-like shoulder 22 formed on its upper end and a frusto-conical shoulder 23 formed on its lower end. The upper shoulder 22 is of less diameter than the internal diameter of the cylindrical chamber 11 to permit the wedge member to freely slide therein. The frusto-conical shoulder 23 forms the wedge for engaging the inner edges of the cutters to force them outwardly.

The cutter member 14 is generally rectangular in outline and cross section. Its outer side wall is cut away to form a longitudinally extending cutting edge 24 and its inner side wall is provided with a longitudinally extending rounded groove 25 which normally engages the stem 21 of the wedge member. The cutter member 15 is similar in construction to the cutter member 14 and has an outer longitudinally extending cutting edge 26 and a longitudinally extending rounded groove 27 formed on its inner wall.

The bottom edges or walls of the two cutter members 14, 15 are tapered downwardly and outwardly, as indicated at 28, 29, respectively, so that when the bottoms of the cutter members engage the bottom of the hole which is being undercut, they will lie flat on the bottom of the hole, as shown in Fig. 2.

The normal position of the cutters and the wedge member is shown in Fig. 3. As there shown, the cutters are housed in their respective slots with their cutting edges even with the edges of the slot. The wedge member is protracted by the spring with the bottom edge of the upper shoulder 22 resting on the inner upper edges of the cutter members. In this position the spring 13 is not tensioned.

The coiled spring 13 is loosely mounted in the upper end of the chamber 11 with its top end engaging the top of the chamber and with its bottom end engaging the top end of the shoulder 22 of the wedge member 12. The spring normally holds the wedge member in a protracted position with the bottom edge of the shoulder 22 engaging the top inner edges of the cutter members.

It will be noted that the cutter members extend well below the bottom of the mandril (see Figs. 1, 2 and 3). This allows the shavings or chips created by the reaming process to collect between the exposed ends of the cutter members at the bottom of the hole. In addition, a pair of elongated rounded recesses 30, 31 are formed on the outer surface of the mandril, each posi-

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tioned circumferentially in front of the cutting edges of the cutter members.

The manner in which the reamer is operated is believed to be obvious. It is inserted in a pre-bored hole in a piece of wood or other suitable material, the hole being of slightly larger diameter than the diameter of the reamer, until the bottom of the wedge member rests in the bottom of the hole. As pressure is applied on the mandril with the reamer rotating, the cutter members will be forced increasingly outward to form a frusto-conical undercut extending upwardly from the bottom of the hole. This is illustrated in Fig. 2, where there is shown in cross section a block of wood 32 having three semi-cylindrical holes 33, 34 and 35 formed therein. The hole 33 has not been undercut, the hole 34 has been undercut, while the reamer is shown (partly in cross section) in hole 35 completing an undercut therein.

From the foregoing, it readily will be seen that there has been provided a reamer for forming undercuts in the bottom of holes which is simple and rugged in construction, economical in manufacture, and efficient in operation, and having cutters which may readily be removed for sharpening or replacement.

What is claimed is:

1. An expanding reamer for forming a frusto-conical undercut at the bottom of a bored hole comprising a cylindrical mandrel adapted to be inserted in the hole and having a cylindrical axial bore extending through its lower end, and terminating short of its upper end; the lower end por-

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tion of the mandrel having longitudinally extending and circumferentially spaced, radial slots; longitudinally extending cutting blades pivotally mounted at their upper ends in said slots and projecting below the lower end of said mandrel with their upper inner end portions extending slightly into the bore; a frusto-conical wedge member coacting with the inner edges of said blades and having a stem projecting into said bore; a piston-like shoulder member on the upper end of said stem slidably mounted in said bore and confined therein by the inwardly projecting upper ends of said blades; a compression coil spring loosely mounted in the bore and abutting the upper end of said piston-like shoulder normally projecting the frusto-conical wedge below the lower ends of said blades.

2. An expanding reamer, as set forth in claim 1, wherein the mandrel has longitudinally extending recesses in its outer wall in front of the cutting edges of the blades to receive shavings.

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