S. A. MAXWELL.

REAMER.

APPLICATION FILED FEB. 19, 1920.

1,407,560.

Patented Feb. 21, 1922.

2 SHEETS—SHEET 1.

Fig. 1.

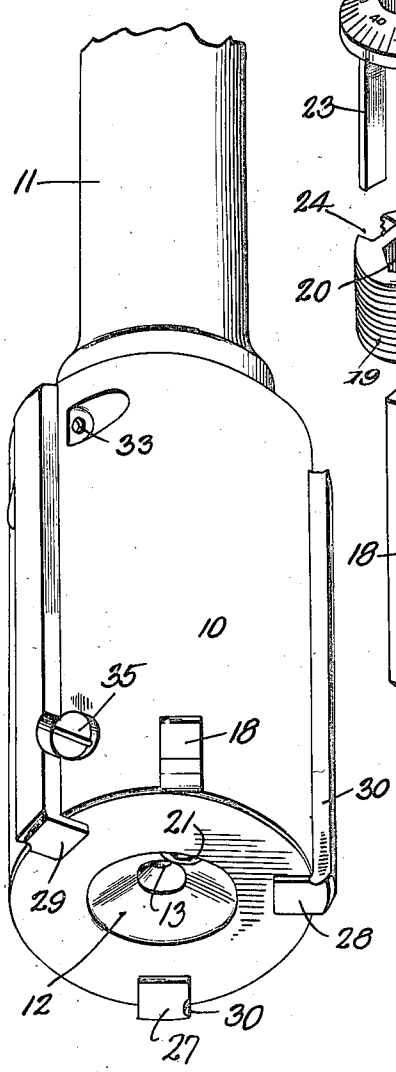


Fig. 3.

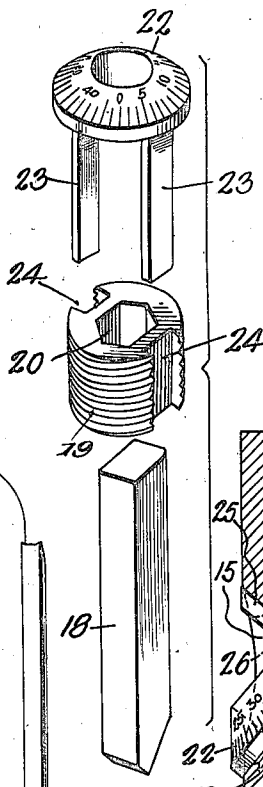
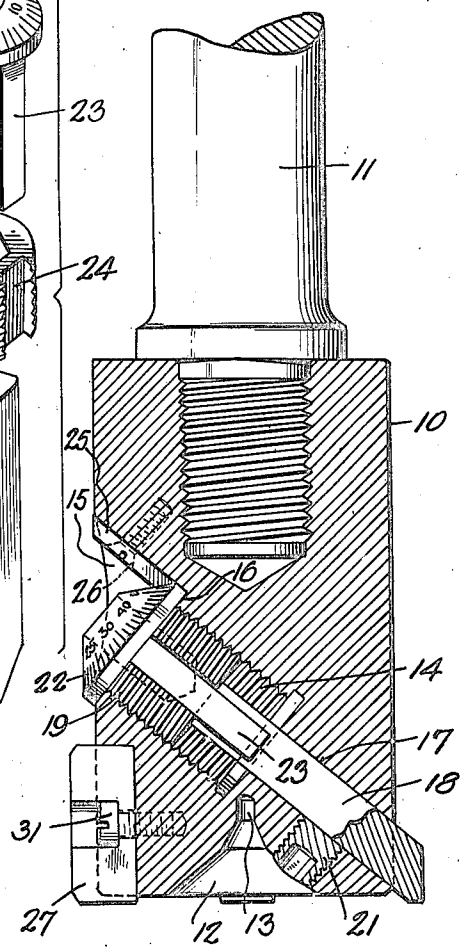


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 4.

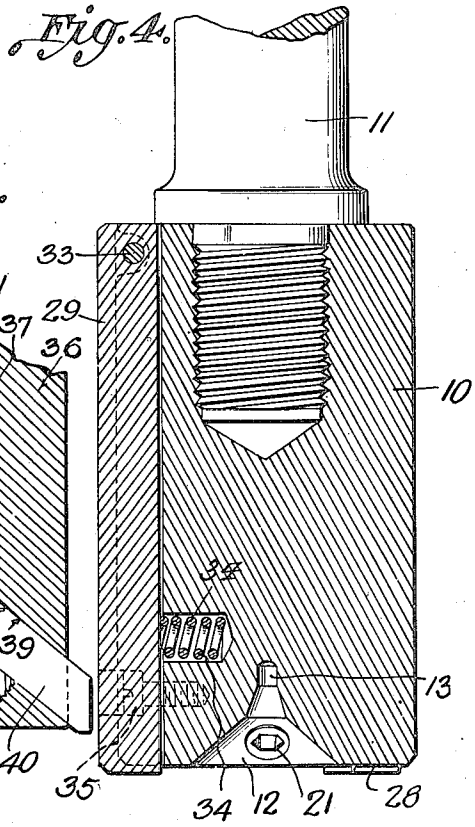


Fig. 7.

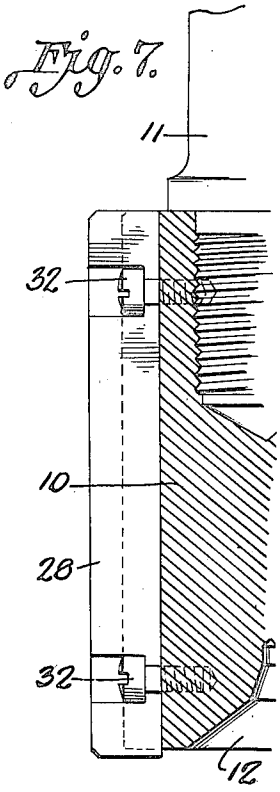


Fig. 8.

Fig. 5.

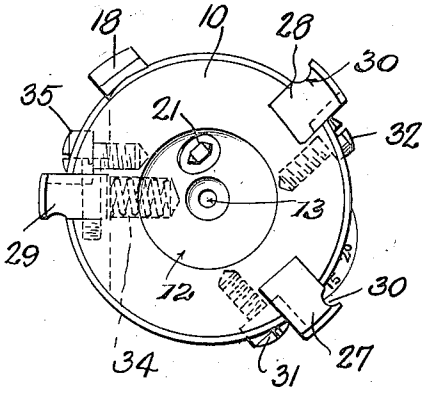
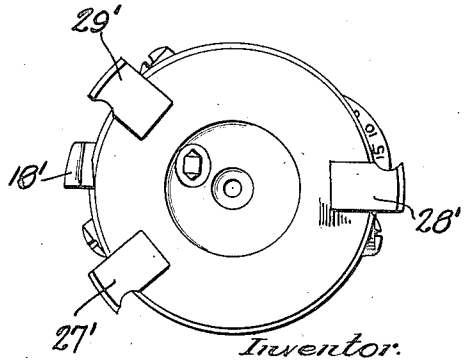


Fig. 6.



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UNITED STATES PATENT OFFICE.

SINGLETON A. MAXWELL, OF MONTOUR FALLS, NEW YORK, ASSIGNOR OF ONE-HALF TO FOREST J. SEELEY, OF WELLSVILLE, NEW YORK.

REAMER.

1,407,560. Specification of Letters Patent. Patented Feb. 21, 1922.

Application filed February 19, 1920. Serial No. 360,019.

To all whom it may concern:

Be it known that I, SINGLETON A. MAXWELL, citizen of the United States, residing at Montour Falls, in the county of Schuyler and State of New York, have invented certain new and useful Improvements in Reamers, of which the following is a specification.

This invention relates to an improved reamer and has as one of its principal objects to provide a device of this character employing a single radially inclined cutter.

The invention has as a further object to provide a reamer wherein the reamer body will be accurately centered and wherein the cutter will be firmly held to the work so as to prevent chattering as well as what is generally termed "hogging in."

And the invention has as a still further object to provide a reamer wherein the cutter may be accurately adjusted with facility and locked in adjusted position, and wherein an improved indicator will be provided for registering the adjustment of the cutter.

Other and incidental objects will appear hereinafter.

In the drawings:

Figure 1 is a perspective view of my improved reamer, the reamer being shown in connection with an arbor,

Figure 2 is a vertical sectional view taken centrally through the reamer body and particularly illustrating the mounting of the cutter employed,

Figure 3 is a detail perspective view of the cutter, its adjusting nut, and the indicator associated with the cutter,

Figure 4 is a sectional view taken through one of the centering guides of the reamer body,

Figure 5 is a bottom plan view of the device,

Figure 6 is a bottom plan view showing a slight modification,

Figure 7 is a fragmentary vertical section similar to Figure 4, and

Figure 8 is a fragmentary sectional view showing a further modification of the invention.

In carrying the invention into effect, I employ a cylindrical reamer body 10 counterbored at its inner end to provide a socket for the stud of an arbor, conventionally shown at 11. At its opposite or forward end, the reamer body is also counterbored or recessed as indicated at 12. This recess terminates in a center 13 by means of which, in connection with its arbor, the reamer may be mounted on centers. Formed in the body is a radially disposed threaded bore 14, at the outer end of which is provided a chamber 15 opening through the body at one side thereof and at a point substantially midway between the ends of the body. At the junction between the chamber and the bore is formed an annular seat 16 and leading from the inner end of the bore in axial alinement therewith is a squared channel 17 opening through the opposite side of the body near its lower end. Slidably mounted in said channel is a radially disposed inclined cutter 18 and threaded into the bore 14 at the rear of the cutter is a follower screw 19. As particularly shown in Figure 3 of the drawings, the screw is provided preferably with a hexagonal wrench receiving socket 20 so that the screw may thus be readily adjusted for advancing the cutter, and threaded through the intervening portion of the reamer body between the recess 12 and channel 17 is a set screw 21 for securing the cutter in adjusted position, the recess 12 providing, of course, free access to said screw.

Associated with the follower screw 19 is an indicator for registering the adjustment of the screw and consequently the adjustment of the cutter. This indicator includes an annular head 22 which is freely received within the chamber 15 of the reamer body to rest against the seat 16 and extending from said head are spaced parallel arms 23 which are freely received within slots 24 formed in opposite sides of the follower screw. The outer surface of the head of the indicator is suitably calibrated and coacting with the head for retaining it in engagement with said seat is a gib 25. As particularly shown in Figure 2, this gib is received within the chamber 15 to lie against the wall thereof at its upper side and securing the gib is a screw 26. Either the gib or the wall of the chamber may be provided with a zero mark which, in conjunction with the calibrations upon the head of the indicator, will provide a means whereby the extent of rotation of the indicator may be readily determined and preferably, the calibrations upon the indicator head will be such as to

provide readings in thousandths of an inch. As will be noted, the center opening through the indicator head registers with the socket 20 of the follower screw so that when it is desired to rotate the screw, a wrench may be inserted through the head of the indicator and engaged in said socket. The arms 23 will, of course, couple the indicator to the follower screw to turn therewith while, at the same time, endwise movement of the screw will be permitted. Consequently, as the screw is adjusted, the indicator head will ride against the seat 16 as the screw is advanced or retracted for either advancing or permitting retraction of the cutter.

Spaced around the periphery of the reamer body is a plurality of longitudinally extending centering guides which, for convenience, have been indicated at 27, 28, and 29 respectively. These guides are seated in suitable channels therefor and, as will be observed upon reference to Figures 1, 2 and 4, the guide 27 is relatively short while the guides 28 and 29 extend the full length of the reamer body, all of the guides, however, projecting slightly beyond the forward end of the body. The outer edges of the guides are curved in concentric relation to the axis of the reamer body and formed in the forward side faces of said guides are longitudinal grooves 30 for the discharge of shavings, these grooves tending to prevent the entrance of shavings between the outer faces of the guides and the wall of the hole being reamed and thus interfering with the proper work of the tool, the sharp curved edges of the guides tending to prevent chips being dragged under the guides. As particularly brought out in Figure 5, the guide 27 lies almost diametrically opposite the cutter, a plane extending parallel to the forward side face of the outer end of the cutter and passing through the axis of the reamer body, cutting medially through said guide. Thus, the cutter can be set by means of a micrometer caliper to any size within the range of the tool. The guide 28 lies practically midway between the guide 27 and the cutter, while the guide 29 is spaced more closely to the cutter in advance thereof. The purpose in thus arranging the guides will presently appear.

Securing the guide 27 is a single clamping screw 31, the head of which engages a suitable ledge formed in the adjacent side of the guide and similarly securing the guide 28 is a pair of clamping screws 32 arranged adjacent opposite ends of this latter guide. The guides 27 and 28 are thus rigidly fixed upon the reamer body. On the other hand, the guide 29 is freely mounted in its receiving channel and swingingly supporting the guide is a pivot pin 33 extending through the inner end portion of the guide and journaled through the side walls of said channel. Seated in a suitable bore beneath the forward end portion of the guide is a preferably helical spring 34 acting to project the guide or swing the free end portion thereof radially outward and limiting the free end of the guide in its outward movement is a stop screw 35, the head of which coacts with a suitable ledge formed in the adjacent side of the guide. As will be best observed upon reference to Figure 4, clearance between the forward end portion of the guide and the bottom wall of its receiving channel is thus normally present, the forward end portion of the guide being held slightly eccentric to the axis of the reamer body. Consequently, when the reamer is inserted in a bore of normal size, the several guides 27, 28 and 29 will engage the wall of said bore for centering the reamer body therein, the forward end portion of the guide 29 being depressed so that this guide will thus be resiliently held to frictionally coact with the wall of the bore. The reamer body will thus be effectually supported for firmly holding the cutter to the work and, as will be seen, the spaced centering guides will coact for guiding the reamer in a straight course regardless of whether or not the bore or hole being reamed is straight. In this connection, the purpose of arranging the centering guides, as previously described, becomes apparent. The guide 27 which is arranged substantially opposite the cutter will, since it is relatively short, influence the cutting tool in minimum degree should the machine or drill press on which the reamer is being used be out of line. On the other hand, the centering guide 28, in being arranged substantially midway between the guide 27 and the cutter, will not, in extending the full length of the reamer body, influence the cutting tool materially while said guide will serve to greatly facilitate the reaming of holes where the center is cored out, in that it will, in most instances, guide the reamer from one reamed portion to the other, as well as provide a maximum wearing surface behind the cutter where most needed. The spring-pressed guide 29, in being arranged immediately in advance of the cutter, will serve to steady the reamer body to prevent chattering as well as the common fault of what is generally termed "hogging in." The rear end portion of the guide 29 is ground off or reduced in width so that the guide will not bind in a bore or hole which is somewhat smaller than normal and the free end portion of the guide will be permitted sufficient inward movement to prevent binding of the free end of the guide against the bottom wall of its channel when the reamer is inserted in a bore or hole under normal size. In order that the reamer may be employed as a boring tool, the outer lower corners of the guides are beveled off so that the

square outer end of the cutter may thus enter the work slighly in advance of the guides, the beveled faces of the guides intersecting the plane of the bottom flat face of the cutter at its outer end. As will be seen, this feature of the present invention provides a very advantageous arrangement since the device may be employed either as a reamer or as a boring tool.

In Figure 6 of the drawings, I have illustrated a slight modification of the invention which pertains particularly to the arrangement of the centering guides of the reamer body with respect to the cutter. In this modification, the cutter is indicated at 18′ and the several guides at 27′, 28′ and 29′, these parts corresponding to similar parts of the preferred construction and being mounted in like manner. The guide 28′ is mounted in the same position with respect to the cutter as the guide 28 of the preferred construction. However, the guides 27′ and 29′ are closely spaced in advance and at the rear respectively of the cutter. This arrangement of the centering guides is more desirable when the device is being used as a boring tool, the disposition of said guides with respect to the cutter tending to effectually prevent "hogging in" of the tool. Otherwise, the modified form of the invention is identical with the preferred construction and a further description of the modification is accordingly believed unnecessary.

In Figure 8, I have illustrated a further slight modification of the invention. In this figure, the reamer body is indicated at 36. Formed in the body is a threaded bore 37 at the outer end of which is a chamber 38 and leading from the inner end of said bore is a channel 39, in which is mounted a cutter 40 as in the preferred construction. Threaded in said bore is a follower nut 41, through which is axially formed a square opening 42 and slidably engaging in said opening is the square shank 43 of an indicator, the shank being provided at its outer end with an annular head 44 resting against the seat formed at the junction between the bore 37 and chamber 38. The head is provided with a screw-driver slot 44 and coacting with the head for rotatably securing the indicator in position is a gib 45, this gib corresponding to the gib of the preferred construction. Thus, a screw driver or other tool may be engaged in the slot 44 for rotating the indicator which, in turn, will serve to rotate the follower screw for advancing the cutter. The head of the indicator is suitably calibrated so that the cutter may accordingly be accurately adjusted. As will be seen, this modified construction provides an arrangement wherein the indicator head will close the bore 37 at its outer end so as to prevent the entrance of shavings into said bore to possibly interfere with the adjustment of the follower screw. With the exception as just described, this modified construction is otherwise identical with the preferred form of the invention.

Having thus described the invention, what is claimed as new is:

1. A reamer including a reamer body, a cutter carried thereby, and a plurality of centering guides for the reamer body projecting beyond the periphery thereof, one of said guides being yieldably sustained.

2. A reamer including a reamer body, a cutter carried thereby, a plurality of centering guides for the reamer body projecting beyond the periphery thereof, one of said guides being swingingly mounted, and yieldable means acting to project said guide.

3. A reamer including a reamer body, a cutter carried thereby, fixed and movable centering guides for the reamer body projecting beyond the periphery thereof, and yieldable means acting to project the movable guide.

4. A reamer including a reamer body, a cutter carried thereby, centering guides for the reamer body extending beyond the periphery thereof, one of said guides being hinged another being fixed and a third being also fixed but shorter than the first guides and arranged substantially diametrically opposite the working end of the cutter, and yieldable means acting to project the hinged guide.

5. A reamer including a reamer body, a radially disposed cutter carried thereby and inclining to project beyond the forward end of the body, and a plurality of centering guides for the body and one of which is yieldable projecting beyond the periphery thereof and also extending beyond the forward end of the body, the forward ends of said guides having beveled faces intersecting the plane of the foremost face of the working end of the cutter whereby said end of the cutter may enter the work in advance of the guides.

6. A reamer including a reamer body, a cutter carried thereby, a follower screw adjustable upon the body behind the cutter for advancing the cutter and provided with a slot, and an indicator having a head rotatable against the reamer body and provided with an arm freely engaging in said slot whereby the head will be rotated upon rotation of the screw.

7. A reamer including a reamer body provided in one side thereof with a chamber forming a seat and having a threaded bore extending therefrom and communicating with a channel opening through the opposite side of the body, a cutter slidable in said channel, a follower screw adjustable in said bore behind the cutter for advancing the cutter, and an indicator having a head rotatable against said seat and provided

with an arm slidably engaged with the screw whereby rotation of the screw will serve to turn said head.

8. A reamer including a reamer body, a cutter carried thereby, a screw adjustable upon the body behind the cutter for advancing the cutter and provided with a wrench receiving socket, and an indicator having a head overlying the outer end of the screw and coupled thereto whereby said head will be rotated with the screw, the head being provided with an opening therethrough registering with said socket whereby a wrench may be inserted through the head and engaged in the socket for rotating the screw.

In testimony whereof I affix my signature.

SINGLETON A. MAXWELL. [L. S.].