

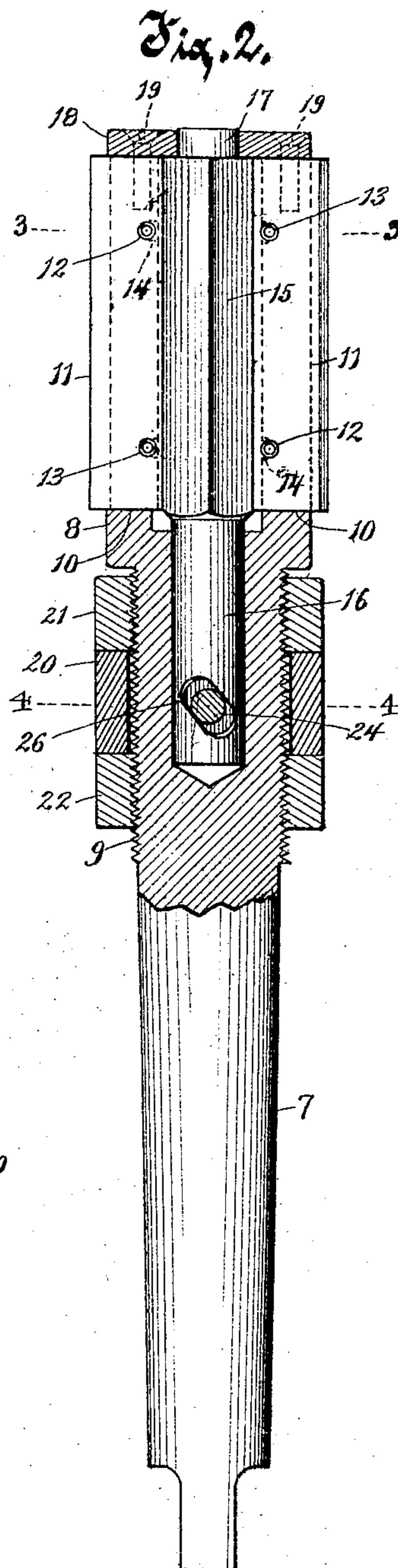
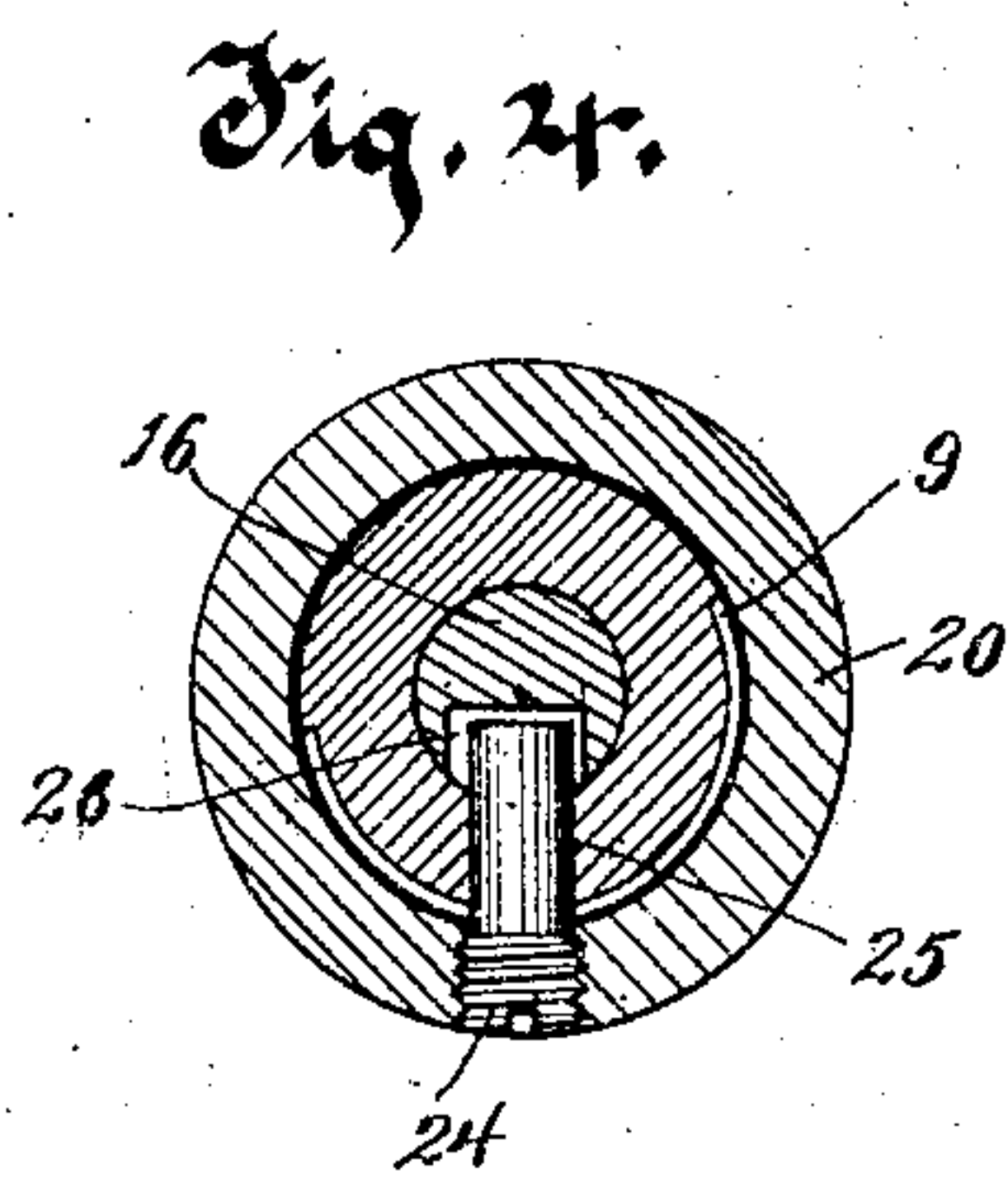
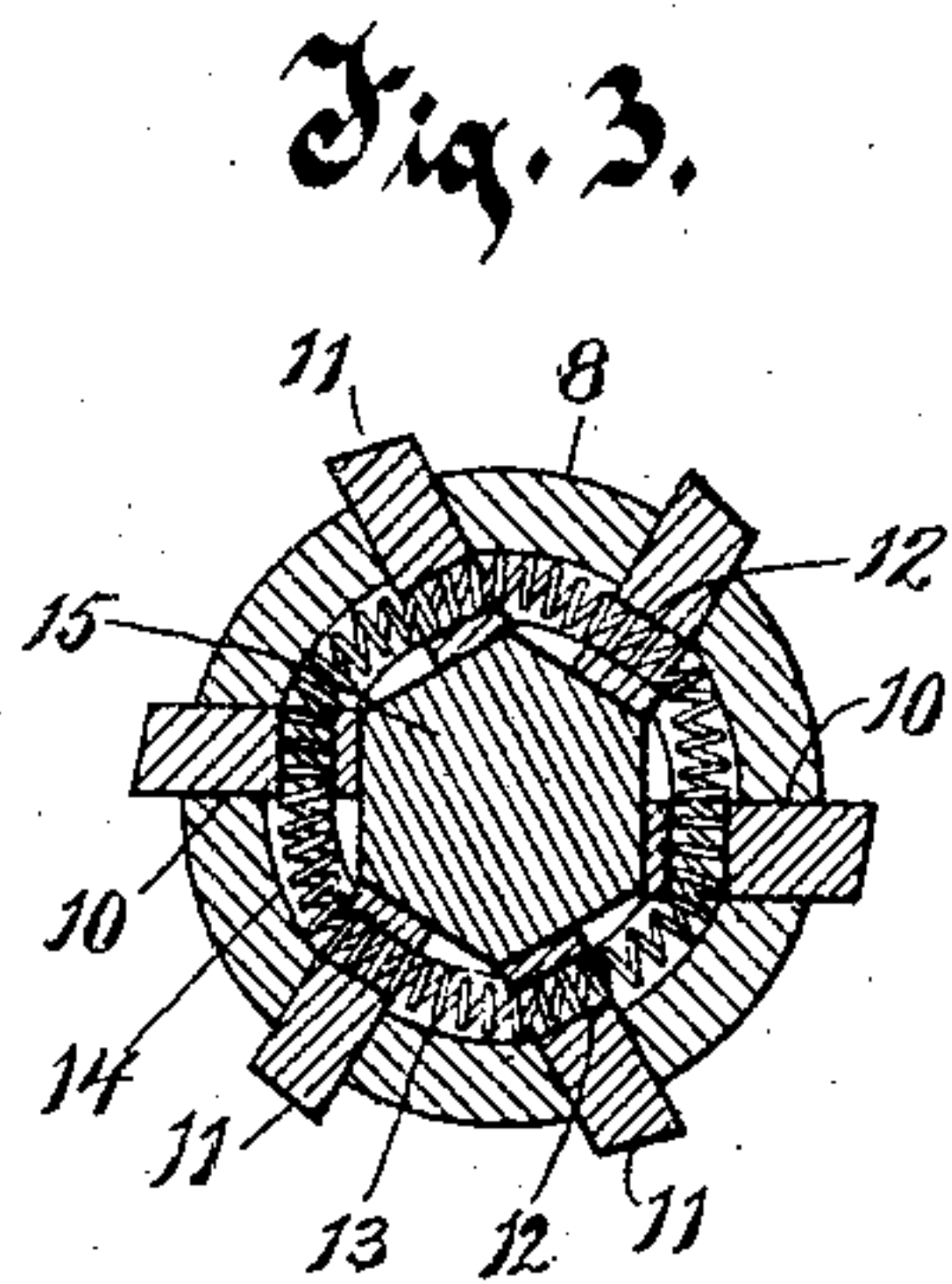
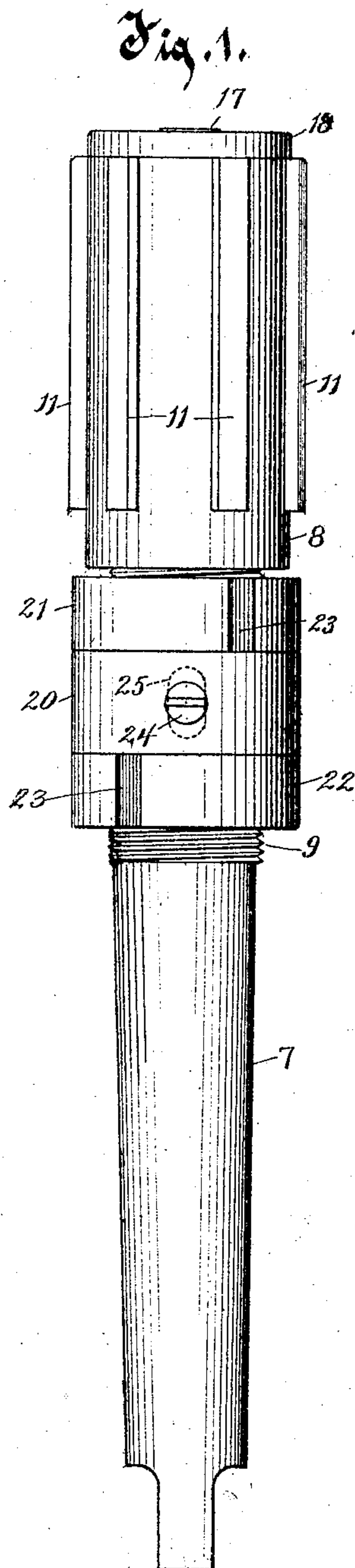
No. 765,222.

PATENTED JULY 19, 1904.

C. A. AST.  
REAMER.

APPLICATION FILED NOV. 2, 1903.

NO MODEL.



Witnesses.

*C. H. Conroy.*

*R. S. Caldwell.*

Inventor.

*Charles A. Ast.*

*By Benedict Morrell.*

*Attorney.*



# UNITED STATES PATENT OFFICE.

CHARLES A. AST, OF LAKE, WISCONSIN.

## REAMER.

SPECIFICATION forming part of Letters Patent No. 765,222, dated July 19, 1904.

Application filed November 2, 1903. Serial No. 179,547. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. AST, residing in the town of Lake, in the county of Milwaukee and State of Wisconsin, have invented a new and useful Improvement in Reamers, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

My invention relates to certain new and useful improvements in reamers, and has for its object to provide a reamer or similar device with adjustable cutters in order that compensation may be made for wear and to provide for altering the size of the reamer.

With the above primary and other incidental objects in view the invention consists of the devices and parts or their equivalents, as hereinafter more fully set forth.

Referring to the accompanying drawings, in which like characters of reference indicate the same parts in the several views, Figure 1 is an elevation of a reamer constructed in accordance with my invention. Fig. 2 is a longitudinal section thereof. Fig. 3 is a transverse section on the line 3 3 of Fig. 2, and Fig. 4 is a transverse section on the line 4 4 of Fig. 2.

In the drawings, 7 represents the tapering shank, having a tubular or hollow cylindrical head 8 on its end with a threaded neck 9 next thereto. The tubular head 8 is provided with a series of regularly-spaced longitudinal slots 10 with parallel walls and a corresponding wall of each slot preferably being radial to the tubular head. Cutter-blades 11 have a tight working fit in the slots 10 and are provided with beveled outer edges, as usual, and near each end of their inner edges they are provided with perforations 12, through which pass coiled spring-bands 13, seated in annular grooves 14 in the bore of the tubular head 8, said coiled spring-bands 13 having the tendency to draw the cutter-blades 11 inwardly.

A cam-arbor 15, whose cross-section is preferably in the form of an equilateral polygon with as many sides as there are cutter-blades, has a rounded stem 16 closely fitting the reduced bore of the tool within the neck portion and has its several sides or faces forming cam-bearings for the respective cutter-

blades, which are pressed against said sides of the cam-arbor, near the edges thereof, by the action of the spring-bands 13. At its outer end the cam-arbor 15 is provided with a round boss 17, which tightly fits in a central opening of a circular plate 18, which is secured to the end of the tubular head 8 by means of screws 19, entering perforations in said plate and threaded in the tubular head between the slots 10.

Loosely mounted on the threaded neck portion of the tool is a ring 20, which is confined between two nuts 21 and 22, threaded on said neck portion, so that ring 20 is capable of being moved longitudinally of the tool by the nuts 21 and 22 when said nuts are turned on their threads, preferably by means of a spanner engaging spanner-grooves 23 in said nuts. A screw-pin 24 has its head threaded in the ring 20 and its unthreaded end projecting through an elongated longitudinal slot 25 in the neck portion of the tool and into the inclined groove 26 in the stem of the arbor 15. By this means the longitudinal movement of the ring 20 on the neck portion produced by the turning of the nuts, as above mentioned, causes the end of screw-pin 24 to move longitudinally of the tool without turning, inasmuch as said pin is guided by the straight slot 25, and the end of said pin 24, riding in the inclined groove 26, causes the cam-arbor 15 to turn on the stem 16 and boss 17 and force all of the cutter-blades 11 outward to the same extent by the faces of the arbor acting thereon as cams. The outward movement of the cutter-blades 11 is against the pressure of the spring-bands 13, which always serves to hold said cutter-blades firmly in position against the cam-faces of the arbor 15 and prevent said cutter-blades falling out of the slots 10 during the handling of the tool.

By the adjustment of the cutter-blades above described the tool may be adapted to cut openings of various sizes; but the prime object of such adjustment is to enable the cutter-blades to be forced outward slightly when dull in order that they may be reground to the original size.

A further advantage in the construction described is that the cutter-blades, being separated



rate from the remainder of the tool, may be tempered separately and may be replaced with new cutter-blades when worn out.

Inasmuch as the principles of this invention are equally applicable to other tools—such as expandible mandrels, expandible taps, &c.—the term “mandrel” used in the specification and claims is to be understood as including such other tools and the term “cutter-blades” is to be understood as including corresponding blades of such other tools.

What I claim as my invention is—

1. In a reamer, a slotted tubular head, cutter-blades slidable in the slots of the tubular head, an arbor mounted in the tubular head and having a series of cam-faces, a stem on the arbor seated in a bore of the neck portion of the tool, means for holding the cutter-blades against the cam-faces of the arbor, and a pin slidable in a longitudinal slot of the tool-neck and in an inclined groove of the arbor-stem for turning said arbor, and having means for adjusting it longitudinally of the tool-neck and for locking it in its adjusted positions.

2. In a reamer, a slotted tubular head, cutter-blades slidable in the slots of the tubular head, an arbor mounted in the tubular head and having a series of cam-faces, a stem on the arbor seated in a bore on the neck portion of the tool, means for holding the cutter-blades against the cam-faces of the arbor, a ring slidable on the neck of the tool, a pin carried by the ring and slidable in a longitudinal slot of the tool-neck and in an inclined groove of the arbor-stem for turning said arbor-stem, and a nut threaded on the tool-neck and bearing on the ring for adjusting said ring longitudinally of the tool-neck.

3. In a reamer, a slotted tubular head, cutter-blades slidable in the slots of the tubular head, an arbor mounted in the tubular head and having a series of cam-faces, a stem on the arbor seated in a bore of the neck portion of the tool, a plate secured to the end of the tubular head, a boss on the arbor seated in an opening in the plate, means for holding the cutter-blades against the cam-faces of the arbor, a ring slidable on the neck of the tool, a pin carried by the ring and slidable in a longitudinal slot of the tool-neck and in an in-

clined groove of the arbor-stem for turning said arbor-stem, and a pair of nuts threaded on the neck of the tool for moving and locking the ring.

4. In a reamer, a tubular head having a series of radial slots extending longitudinally thereof, an arbor journaled in the tubular head and having a series of cam-faces, a series of cutter-blades slidably mounted in the slots of the tubular head, a spring-band within the tubular head and surrounding the arbor and passing through perforations in the inner edges of the cutter-blades, and means for turning the arbor.

5. In a reamer, a tubular head having radial slots extending longitudinally thereof, an arbor journaled within the tubular head and provided with a series of cam-faces, a series of cutter-blades slidably mounted in the slots of the tubular head, a pair of coiled spring-bands within the tubular head and surrounding the arbor, said spring-bands passing through perforations in the inner edges of the cutter-blades and through grooves in the tubular head and serving to hold said cutter-blades against the cam-faces of the arbor, and means for turning the arbor.

6. In a reamer, a slotted tubular head, cutter-blades slidable in the slots of the tubular head, an arbor mounted in the tubular head and having a series of cam-faces, a stem on the arbor seated in a bore of the neck portion of the tool, a plate secured to the end of the tubular head, a boss on the arbor seated in an opening in the plate, means for holding the cutter-blades against the cam-faces of the arbor, a ring slidable on the neck of the tool, a pin threaded in the ring and extending into a longitudinal slot of the tool-neck and in an inclined groove of the arbor-stem for turning said arbor-stem, and means for adjusting the ring longitudinally of the tool-neck and for locking it in its adjustments.

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

CHARLES A. AST.

Witnesses:

ANNA F. SCHMIDTBAUER,  
A. L. MORSELL.