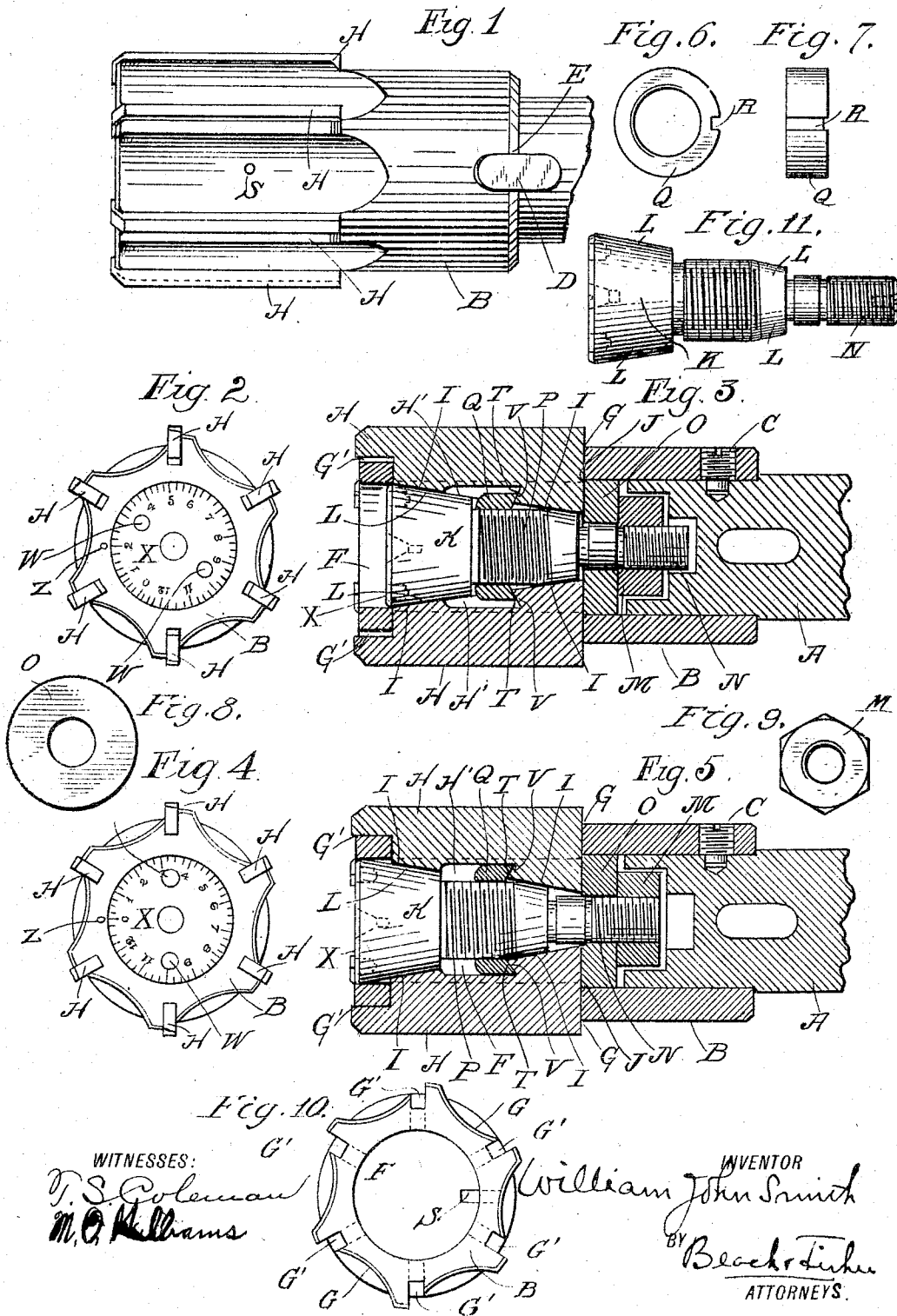


995,102.

Patented June 13, 1911.



WITNESSES:
 D. S. Coleman
 M. O. Williams

INVENTOR
 William John Smith
 BY Black & Fisher
 ATTORNEYS.

UNITED STATES PATENT OFFICE.

WILLIAM JOHN SMITH, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO VICKERS SONS & MAXIM LIMITED, OF WESTMINSTER, ENGLAND.

REAMER.

995,102.

Specification of Letters Patent. Patented June 13, 1911.

Application filed October 15, 1909. Serial No. 522,835.

To all whom it may concern:

Be it known that I, WILLIAM J. SMITH, a citizen of the United States, and resident of the city and county of New Haven and State of Connecticut, have invented new and useful Improvements in Reamers, of which the following is a full, clear, and exact description when taken in connection with the accompanying drawings, which form a part thereof.

This invention relates to reamers, and more particularly to that class in which are provided cutters adjustable radially, and has for its object the production of a reamer having simple and efficient means for adjusting the cutters and clamping them in their adjusted position.

To this end, the invention consists in the improvements and combinations of parts set forth and claimed hereinafter.

Referring to the drawings, Figure 1 represents a side elevation of a reamer embodying the invention, Fig. 2, an end view of the reamer, Fig. 3, a longitudinal central vertical section, Fig. 4, an end view corresponding to Fig. 2, the cutters being shown in their inner position, Fig. 5, a section similar to Fig. 3, the cutters being shown in the same position as Fig. 4, Figs. 6 and 7, end and side views of the clamping nut or ring shown in detail, Fig. 8, a detail view of a supplementary ring, Fig. 9, a detail view of the adjusting nut, Fig. 10, an end view of the stock alone, and Fig. 11, a side view in detail of the cam piece.

In all figures, similar letters of reference represent like parts.

In the drawings, the parts designated by the letter A represent the shank of the reamer which is separable from the stock B. The forward end of the shank is adapted to take into the stock B, as shown more particularly in Figs. 3 and 5, and is secured therein by a screw C or other means. The shank A is provided with a key D the ends of which are adapted to take into a slot E in the stock B to prevent independent rotary movement of either the shank or stock when the two are assembled together. The stock B is provided with a central longitudinal perforation F and a series of radial slots G, which slots are adapted to receive cutters H. There are provided forwardly extending slots G' from the radial slots G to permit the cutters H to extend

forwardly to and slightly beyond the end of the stock B.

The cutters H are provided on the inner edges with one or more longitudinally inclined faces I which are adapted to bear when the parts are assembled on a central rotary cam piece K, which is provided with surfaces L correspondingly longitudinally inclined.

As shown more particularly in Figs. 3 and 5, when the parts are assembled the rearward longitudinal movement of the cam piece K will force outward the cutters H bearing with their inclined faces I, on the inclined faces L of the cam piece K. This longitudinal movement of the cam piece may be effected by means of a nut M adapted to be screwed to the inner end N of the cam piece. The nut M is shown bearing against a ring O located within the hollow interior of the stock B, which ring may as shown be forced into the stock against a shoulder J therein (Figs. 3 and 5).

Near the middle of the cam piece K is external screw threading P adapted to carry or mesh with the internal thread on a ring or nut Q mounted on said cam piece K. The ring Q is provided with a longitudinal external slot R for the reception of the inner end of a stationary pin S adapted to extend radially through from the outside of the stock B, so that when the pin S is in place it will prevent the rotation of the ring Q with the cam piece K. The ring Q is provided with an undercut inclined face T adapted to engage a correspondingly inclined face V on each of the cutters H, so that the cutters H may be held from outward movement by the engagement with the ring or nut Q.

The operation of the reamer is as follows: When it is desired to adjust the cutters (as, for example, from their inner positions shown in Figs. 4 and 5 to their outer positions shown in Figs. 2 and 3), the stock B is removed from the shank A by loosening the screw C. The nut M is then turned slightly to give the cam piece slack room enough for adjustment. The cam piece is rotated as far as desired by any suitable means (as a spanner which may take into holes W in the forward end of the cam piece), and as the ring or nut Q is held from rotation the cam piece will be gradually drawn rearwardly so that its inclined surface L by contact with

the inclined surface I on the cutters will force the cutters outwardly. The rotation of the cam piece which moves it rearward does not move the ring Q correspondingly rearward because of the engagement by screw threading between the ring Q and cam piece and therefore the inclined face T on the under side of the ring Q will permit of the slight outward movement of the cutters.

10 The amount of rotation of the cam piece may be indicated by means of a dial X on the front end of the cam piece, and an indicator or zero point Z on the end of the stock. When the proper adjustment has been made, the tightening of the nut M locks the parts in their adjusted position, because the cutters are held by the inclined surface T of the ring Q and L of the cam piece K against the rear ends of the radial slots of the stock B. The independent movement of the ring Q on the cam piece K allows the rearward movement of the inclined surfaces of the cam piece to force the cutters outward without any longitudinal movement of the cutters in the stock.

25 To adjust the cutters inwardly, the operation is reversed. To remove the cutters from the stock it is only necessary to turn the nut M sufficiently to allow of sufficient forward movement of the cam piece with the ring Q to clear the inclined surfaces V of the cutters H from engagement with the ring Q. This forward movement is permissible because there is a slot H' on the inner edge of each of the cutters which is considerably wider than the ring Q.

Having now described my invention, what I claim and desire to secure by Letters Patent, is:—

1. In a reamer having a hollow central stock and adjustable blades, a central cone upon which the cutters bear, having free rotary and longitudinal movement in said stock, a nut threaded on said cone and held from rotation but allowed free longitudinal movement with respect to the stock, said nut having one face which when in locking position engages a portion of the blades and is adapted to prevent outward movement

of the blades, and means to move together, without rotation of either, said cone and nut longitudinally into said locking engagement with said blades.

2. In a reamer having a hollow central stock and adjustable blades, a central cone with bearing surfaces spaced apart upon which the cutters bear, and a cylindrical threaded section interposed between said bearing surfaces, said cone member having free rotary and longitudinal movement in said stock, a nut threaded on said intermediate cylindrical section and held from rotation but allowed free longitudinal movement with respect to the stock, said nut having one face which when in locking position engages a portion of the blades and is adapted to prevent outward movement of the blades, and means to move together, without rotation of either, said cone and nut longitudinally into said locking engagement with said blades.

3. In a reamer having a hollow central stock and adjustable blades, a central cone upon which the cutters bear, having free rotary and longitudinal movement in said stock, a nut threaded on said cone and held from rotation but allowed free longitudinal movement with respect to the stock, said nut having one face which when in locking position engages a portion of the blades and is adapted to prevent outward movement of the blades, and means to move together, without rotation of either, said cone and nut longitudinally into said locking engagement with said blades, said means comprising an inwardly extending threaded shank on said cone member and a binding nut threaded on said extension and bearing against an inwardly projecting shoulder on said hollow stock, substantially as described.

In witness whereof I have hereunto set my hand on the 8th day of October, 1909.

WILLIAM JOHN SMITH.

Witnesses:

FREDERICK H. WIGGIN, Jr.,
SAMUEL H. FISHER.