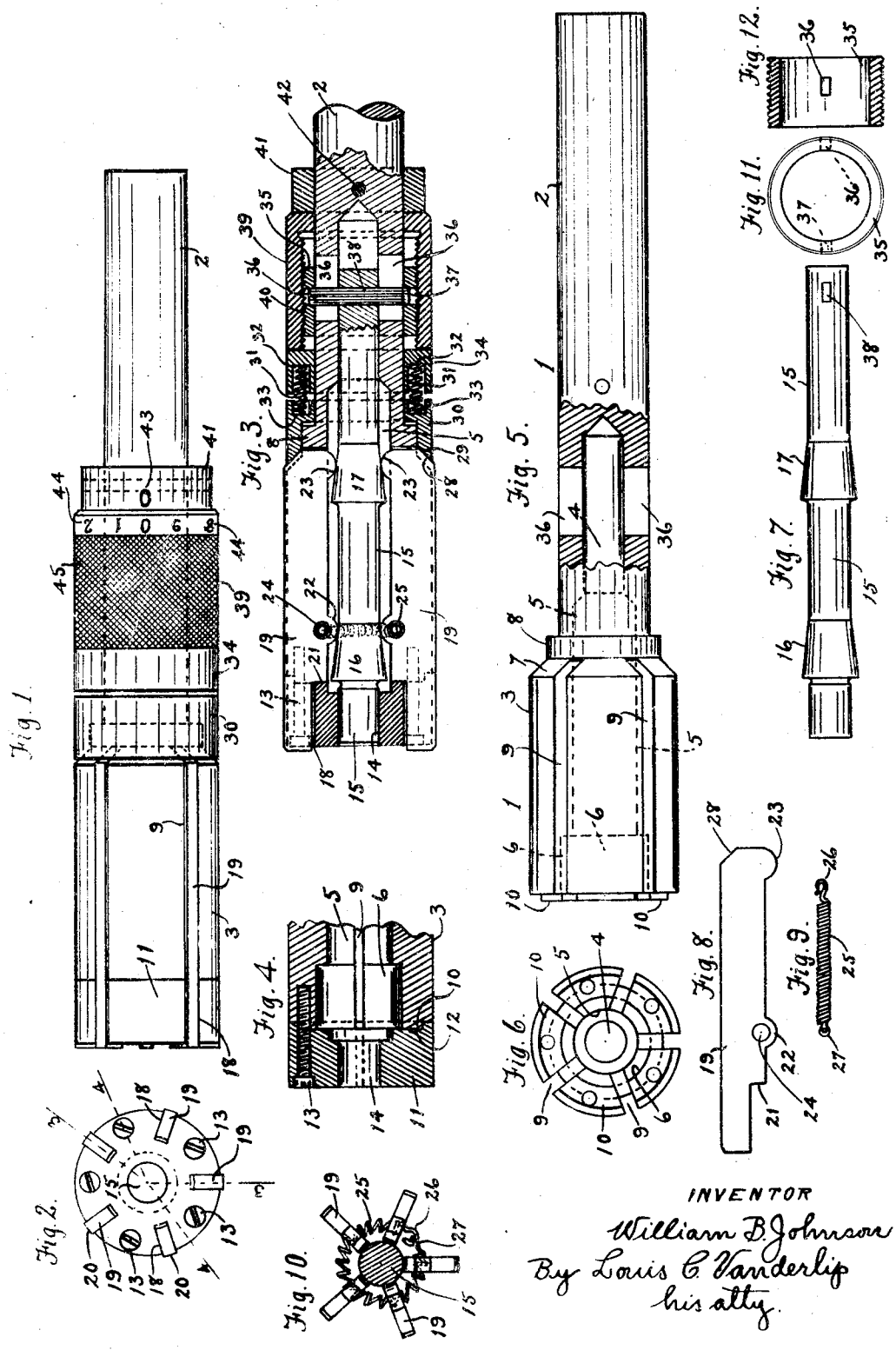
W. B. JOHNSON.

ADJUSTABLE REAMER.

APPLICATION FILED SEPT. 19, 1917.

1,345,929. Patented July 6, 1920.



INVENTOR

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By Louis C. Vanderlip

his atty.

UNITED STATES PATENT OFFICE.

WILLIAM B. JOHNSON, OF ELKHART, INDIANA, ASSIGNOR TO FOSTER-JOHNSON REAMER COMPANY, A CORPORATION OF INDIANA.

ADJUSTABLE REAMER.

1,345,929. Specification of Letters Patent. Patented July 6, 1920.

Application filed September 19, 1917. Serial No. 192,076.

To all whom it may concern:

Be it known that I, WILLIAM B. JOHNSON, a citizen of the United States, residing in the city of Elkhart, county of Elkhart, and State of Indiana, have invented certain new and useful Improvements in Adjustable Reamers, of which the following is a specification.

My invention relates to adjustable, or expansible, reamers adapted primarily for metal working but which may be used in other arts such as stone or marble working, or the like.

An object of my invention is the production of an expansible reamer in which the cutting blades may extend to or beyond the end of the reamer body. Another object of the invention is the production of a device of the character described in which the cutting blades are uniformly radially actuated by a sliding spindle which is manually operative. A third object of my invention is the production of improved means for resiliently confining the cutting blades of the reamer upon the blade actuation spindle. A still further object of my invention is the production of improved means for imparting the longitudinal movement to the blade actuation spindle. And yet another object is the adaptation of a measuring scale to my invention to accurately measure the extent of the cutter blade adjustment. Other objects of my invention will be mentioned and described herein.

The preferred embodiment of my invention is well illustrated in the accompanying drawings in which Figure 1 is a side elevation of a reamer embodying my invention; Fig. 2 is an end view of the blade carrier portion of the reamer; Fig. 3 is a section through the reamer taken on the line 3—3 of Fig. 2; Fig. 4 is a fragmentary sectional view showing the blade carrier cap and the end of the blade carrier; Fig. 5 is a view in side elevation showing the reamer body alone, whereof a fragment is in section; Fig. 6 is an end view of the blade carrier of the body member shown in Fig. 5; Fig. 7 is a view of the blade actuation spindle alone; Fig. 8 is a view of a cutter blade in side elevation; Fig. 9 is a view of the blade confining spring; Fig. 10 is an end view of an assembly of the cutter blades, blade spring and blade actuation spindle; Fig. 11 is a side elevation of the spindle driver nut; and Fig. 12 is an end elevation of the spindle driver nut.

Similar numerals of reference indicate like members and parts of members throughout the several views on the drawings.

A reference to the details of the drawings discloses that the numeral 1 indicates a body or holder member of the reamer which embodies the stem 2 and the enlarged blade carrier portion 3, said holder being provided with the longitudinal intercommunicating bores 4, 5 and 6 of different diameters extending from within the stem 2 to and open at the extremity of the blade carrier 3, said bores constituting a driver spindle chamber. The blade carrier portion 3 is beveled at 7 which beveled portion terminates at the edge of the collar 8, the latter being somewhat greater in diameter than the stem 2.

The blade carrier 3 is provided with a plurality of longitudinal and radially formed blade slots 9, 9, which are in communication with the bores 5 and 6, extending from the collar 8 to and through the extremity of the blade carrier, whereby said carrier is longitudinally furcated. Each furcated portion of the blade carrier 3 is provided with an end projection, or shoulder, 10, formed to a circle and upon which the annular cap, or carrier end member 11 is mounted, said cap being recessed at 12 to receive the projection 11 and being detachably secured to the carrier 3 by a plurality of screws 13, 13.

The cap 11 is provided with a centrally disposed spindle bearing aperture 14 which is in communication with the bores 4, 5 and 6 and is adapted to carry the outer end of the blade actuation spindle 15, the opposite end of said spindle being mounted in the bore 4, said spindle being adapted for a sliding longitudinal movement within said bearings by means hereinafter described. The spindle 15 is provided with a plurality of conical, or tapered, portions 16 and 17 which are arranged within the bores 5 and 6 of the carrier 3. Numerals 18, 18 indicate a plurality of longitudinal, radially formed blade slots in the carrier cap 11, said slots being open at both ends the inner of which register accurately with the slots 9, 9, said slots 18 extending inwardly of the

cap 11 to a point intermediate the aperture 14 and the outer periphery of said cap.

Numerals 19, 19 indicate a plurality of reamer blades movably arranged in the blade slots 9, 9 and 18, 18, each of which has a cutting edge 20 adapted to cut the metal of the bore to be reamed. Each blade 19 is provided with a shoulder 21 adapted to lightly engage the inner wall of the cap member 11, the opposite end of the blade being in movable engagement with the end wall of the slot, 9, adjacent the collar, 8, whereby longitudinal movement of the blade within said slots is prevented, radial movement thereof being alone contemplated and possible. Each blade 19 is provided also with curved, or semi circular, bearing portions 22 and 23, respectively, which are adapted to engage the tapered portions 16 and 17, respectively, of the spindle 15, whereby when said spindle tapers are longitudinally moved against said bearing portions, said blades are radially and outwardly projected.

The numeral 24 indicates an aperture formed in each blade 19 adjacent the portion 22 and adapted to contain the coil spring 25, the latter being adapted to be extended through all of said blade apertures and secured at its ends by the engagement of the spring hook 26 with the spring eye 27 (see Fig. 10) whereby the blades are yieldably confined in engagement with the spindle 15 adjacent the taper 16. The numeral 28 indicates a beveled rear end portion formed on each blade 19, said bevel being adapted to be engaged by the beveled undercut face 29 of a blade collar 30 slidably mounted upon the stem 2, said bevel 29 being adapted to overlie the stem collar 8, the latter being adapted to limit the forward movement of said collar. The blade collar is held in yieldable but permanent engagement with the blade bevels 28 by a plurality of coil springs 31, 31 which are seated in registering spring sockets 32 and 33 formed, respectively, in a spring thrust collar 34 and said blade collar 30, whereby the rear end of each blade is yieldably confined upon and in engagement with the spindle 15 and the taper 17.

The numeral 35 indicates a spindle driver nut exteriorly screw threaded and slidably sleeving the holder stem 2 adjacent and encompassing an elongated slot 36 formed longitudinally in said stem and extending radially thereof in opposite directions from the bore 4. The driver nut 35 is provided with oppositely disposed apertures 36 and 37 into which the opposite ends of a driver pin 38 project, said pin being rigidly mounted in a suitable aperture formed in the driver spindle 15 and adjacent the rear end thereof. Numeral 39 indicates an adjustment nut revolubly mounted upon the holder stem 2 and interiorly screw threaded at 40 for screw thread engagement with the exterior threads carried on the driver nut 35, and adapted to be rotated, manually or otherwise, for imparting longitudinal movement to the driver nut 35 and thereby effecting a longitudinal sliding movement of the blade actuation spindle 15.

Numeral 41 indicates a stop collar rigidly mounted upon the stem 2 by a pin 42, or otherwise in any suitable manner, and adapted to prevent longitudinal movement of the nut 39 when the latter is rotated. The numeral 43 indicates a measuring scale character (0) carried on the collar 41, and numerals 44, 44 indicate a plurality of characters, viz. numerals 1, 2, 3, 4, 5, 6, 7, 8, 9 and 0, arranged circumferentially of and around the adjustment nut 39 at even intervals each of which latter mentioned characters is adapted to be moved into registration with the character indicated by the numeral 43 to indicate the fractional part of an inch, the one thousandth part being most commonly used, traversed by the blades 19 when the nut 39 is rotated for the blade adjustment. The numeral 45 indicates the nurling on the exterior surface of the adjustment nut 39 to facilitate the operation thereof.

In operation, the blades 19 being retracted in their slots, the tool is placed within the bore to be reamed and the blades are thereupon outwardly projected into close engagement with the wall of the bore, the holder 1 being thereafter rotated to effect the reaming of the bore in the usual manner. Obviously the blades 19 may be extended beyond the outer end of the cap slots 18 whereby a bore having a bottom may be reamed for its full length.

I claim:

1. In a device of the character described, a holder provided with a driver spindle chamber and a plurality of longitudinal blade slots, said slots being in communication with said spindle chamber; blades arranged in said slots and adapted for radial movement, each of said blades being provided with a plurality of seats; a driver spindle movably arranged in said spindle chamber and provided with a plurality of cam members, said cam members being adapted to engage said blade seats when the spindle is longitudinally actuated; a spring pressed collar slidably mounted upon said holder and adapted to inwardly actuate said blades; and means for imparting a longitudinal movement to said spindle, whereby said blades are outwardly and radially actuated.

2. In a device of the character described, a holder provided with a driver spindle chamber and a plurality of longitudinal blade slots, said slots being in communication

with said spindle chamber; blades arranged in said slots and adapted for radial movement, each of said blades being provided with a plurality of seats and an aperture intermediate the blade extremities; a driver spindle movably arranged in said spindle chamber and provided with a plurality of cam members, said cam members being adapted to engage said blade seats when the spindle is longitudinally actuated; a coil spring arranged and secured within said blade apertures and adapted to inwardly urge said blades; and means for imparting a longtudinal movement to said spindle, whereby said blades are outwardly and radially actuated.

3. A device of the character described comprising a holder provided with a stem and a driver spindle chamber, and provided also with a plurality of longitudinal blade slots intersecting said spindle chamber; blades arranged in said blade slots and adapted for radial movement; a driver spindle slidably arranged in said spindle chamber and provided with a plurality of cam members adapted to actuate said blades when the spindle is longitudinally actuated; a spindle bearing bore formed in said holder stem and within which the spindle end is slidably arranged, said stem having a slot which intersects said bearing bore; a driver pin carried by the spindle end and projecting through said holder stem slot; a spindle driver nut slidably mounted upon the holder stem and operatively connected with said driver pin; a revoluble adjustment nut carried by the holder member and encompassing said driver nut; a complementary spiral connection between said driver and adjustment nuts; and means for preventing longitudinal movement of the adjusment nut when rotated.

In testimony whereof I have hereunto affixed my signature this 13th day of September, 1917.

WILLIAM B. JOHNSON