(No Model.)

J. A. LITTLE.

EXPANSIBLE SHELL REAMER.

No. 555,905. Patented Mar. 3, 1896.

Fig:1.

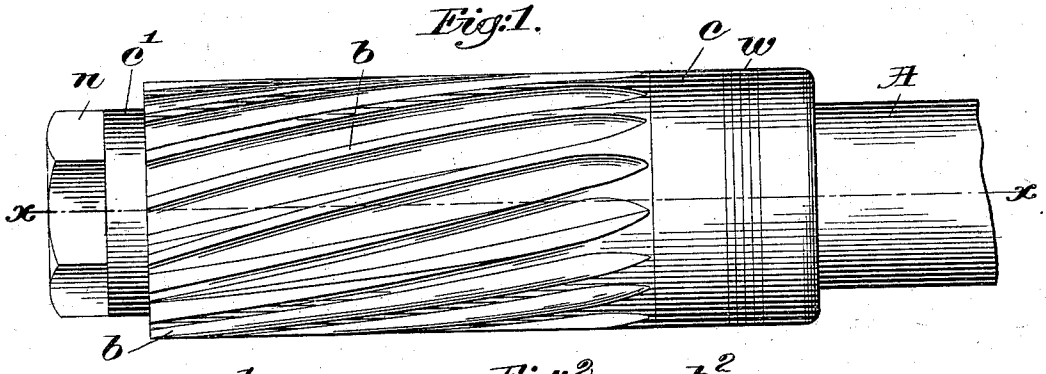


Fig:2.

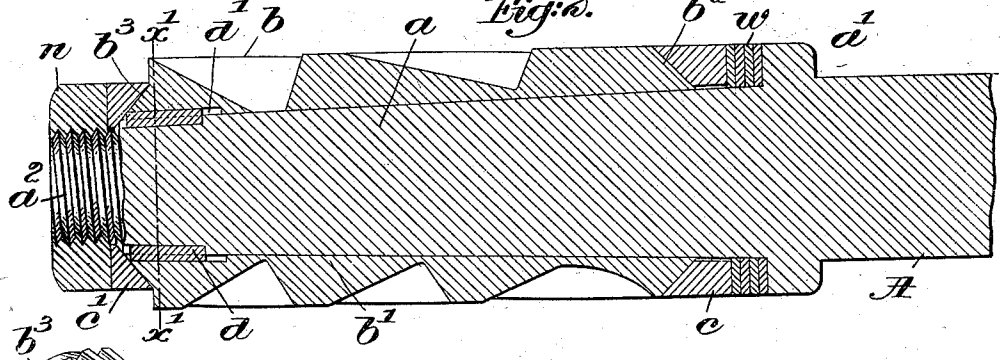


Fig:3.

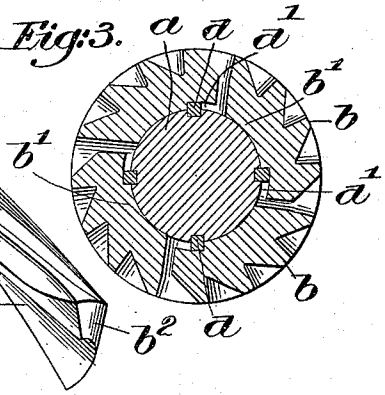
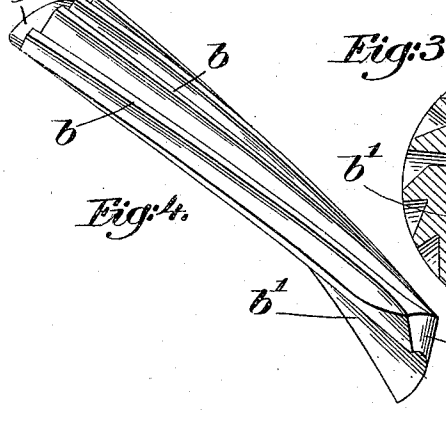


Fig:4.



Witnesses
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UNITED STATES PATENT OFFICE.

JOSEPH A. LITTLE, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO HUGH P. SIMPSON, OF SAME PLACE.

EXPANSIBLE SHELL-REAMER.

SPECIFICATION forming part of Letters Patent No. 555,905, dated March 3, 1896.

Application filed October 22, 1894. Serial No. 526,603. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. LITTLE, of Lawrence, county of Essex, State of Massachusetts, have invented an Improvement in Expansible Shell-Reamers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In the use of reamers in metal working the cutting-blades wear down and frequently nick or break, and, except in case of breakage, the reamer may be ground to attain the desired sharpness of blade or to obliterate the nicks. Such grinding, however, reduces the diameter of the tool, so that thereafter it can only be used in reaming out smaller holes, decreasing the useful life of the tool and necessitating constant renewal of the larger diameters. To obviate this reamers having straight cutting-blades have been made in sections, the longitudinal base of each blade being provided with a tongue to fit in a suitable groove having a tapering bottom made in the seat of the shank, the blades being driven home from the outer end of the seat, and as the blades become worn or are ground down they are forced inward upon the tapering bottoms of the grooves until the standard diameter of the tool is regained. So, too, straight cylinder-segments, having each a plurality of straight blades thereon, have been mounted on a tapering shank. These constructions, however, are limited to straight blades running parallel to the longitudinal axis of the tool, and in the former construction but a few blades can be employed, as each blade is mounted in its particular groove. Straight blades, moreover, act singly upon any one point with a series of blows, as it were, and in reaming out holes having a key-seat or other slot it is difficult to do good work, because the blows delivered by the blades tend to chip or round the corners of the slot.

My invention has for its object the production of a sectional shell-like reamer readily adjustable in diameter to compensate for wear or grinding, and so constructed that a large number of blades, each making a gradual cut, may be used, broken blades being readily replaced, so that the life of the tool is greatly lengthened.

In accordance therewith my invention consists in various details of construction, hereinafter described at length in the specification and particularly pointed out in the claims.

Figure 1, in side elevation, represents a reamer embodying my invention, the shank being broken off to save space. Fig. 2 is a longitudinal section thereof on the line $x\,x$. Fig. 3 is a transverse sectional view on the line $x'\,x'$, Fig. 1. Fig. 4 is a detached perspective view of one of the blade carriers or segments.

The shank A is tapered or made conical at its outer end to form a seat a tapering outwardly from a shoulder or abutment a', and, as herein shown, threaded at its extremity a^2 for a purpose to be described.

As herein shown, the blades b are spiral relative to the longitudinal axis of the tool and mounted in series upon blade carriers or segments b', four of such segments being herein shown, though a different number may be employed if desired, the spiral form of blade giving an easy shearing cut, one blade coming into operation before the preceding blade has completed its work.

Referring to Fig. 4, each segmental carrier is shown as twisted slightly, or oblique to the longitudinal axis, to correspond to the spiral trend of the blades, the inner surfaces of the segments tapering from the outer to the inner ends thereof. When the segments are placed upon the tapering seat a of the shank the cutting-edges of the blades b will form a cylinder, as shown in Figs. 1 and 3; or, if desired, they may taper slightly to facilitate the entrance of the reamer. The ends of the segments are preferably beveled at b^2 and b^3 to receive thereon or to enter suitably-beveled retaining bands or holders c and c', respectively, surrounding the seat a and capable of longitudinal movement thereon to firmly hold the blade-segments upon the seat. The holder c' is smaller in diameter than the blades to avoid interference therewith, and it is held in place by a set-nut n screwed on the threaded

end a^2 of the shank, so that longitudinal movement of the blades is prevented.

In Figs. 1 and 2 I have shown a series of thin washers w interposed between the shoulder or abutment a' and the holder c. Supposing that by reason of wear or grinding the working diameter of the tool has been decreased to less than the standard diameter, the nut n is unscrewed, and the holders c and c' and the blade-segments b are removed, so that one or more of the washers w can be removed. The holder c is then replaced nearer the abutment a' and thereby on a portion of the seat a of greater diameter, and when the blade segments or carriers b are replaced they will be so expanded by their new longitudinal position on the tapering seat that the working diameter of the blades b will have been increased the proper extent. The holder c' and the nut n are then replaced and the blades will be rigidly held in their adjusted position. This operation can be repeated from time to time until the holder c abuts against the shoulder a' of the shank and the limit of adjustment has been reached.

In order to prevent any lateral displacement of the outer ends of the blade-segments I have provided the outer end of the seat with short longitudinal splines or feathers d to enter cut-away portions or recesses d' in the blade-segments, preferably one for each segment, as clearly shown in Figs. 2 and 3, the width of the recesses d' being sufficient to allow the necessary movement of the outer ends of the segments as they are spread apart from time to time in adjusting them.

So far as I am aware I am the first to devise an expansible shell-reamer having a series of oblique segmental blade-carriers mounted upon a tapering seat and provided with spiral blades.

I claim—

1. In an expansible shell-reamer, a shank having a seat, a series of removable segmental blade-carriers mounted obliquely to the trend of the shank and having integral spiral blades corresponding substantially to the trend of the carriers, and means to expand said carriers to increase the working diameter of said blades, substantially as described.

2. In an expansible reamer, a shank having a tapering seat, provided with a shoulder at its base, a series of blades mounted on said seat and longitudinally movable to vary their working diameter, holders to engage the ends of the blades and retain them on the seat, and a series of movable washers between the shoulder and the adjacent holder, and a retaining-nut adjustable on the outer end of the seat, to maintain said holders in adjusted position, substantially as described.

3. In a reamer, a shank having a tapering seat provided with a shoulder at its base, a series of separable spiral blades mounted thereon, and having outwardly-beveled ends, cup-shaped annular holders to embrace the ends of the blades, to retain them in place, and a series of removable washers between the shoulder and the adjacent holder to adjust said holders on the seat, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH A. LITTLE.

Witnesses:

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