J. B. DOUGLAS.

EXPANDING SCREW-TAP.

No. 189,889. Patented April 24, 1877.

Figure 1.

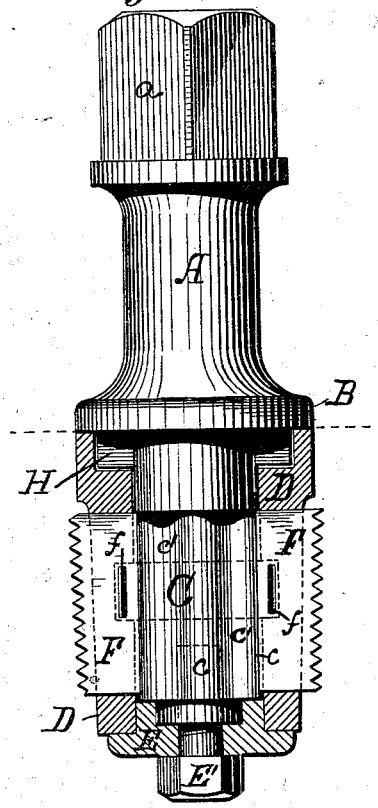


Figure 2.

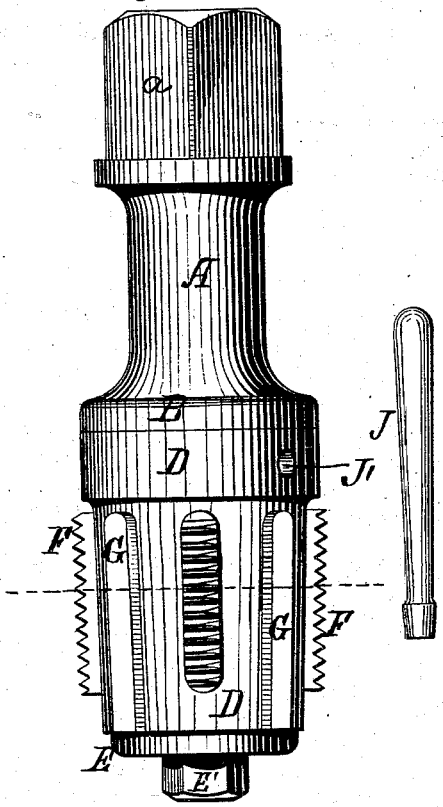


Figure 3.

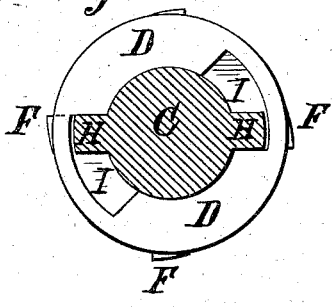


Figure 4.

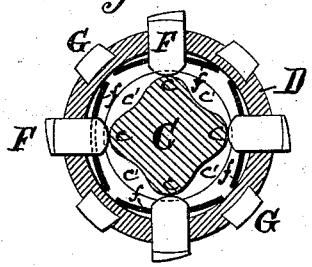
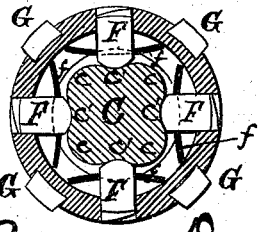


Figure 5



Witnesses:—
W. C. Shoebridge
John Jolley Jr

John Brown Douglas
By his Attorney J. Bonsall Taylor

UNITED STATES PATENT OFFICE.

JOHN BROWN DOUGLAS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO MORRIS, TASKER & CO., (LIMITED,) OF SAME PLACE.

IMPROVEMENT IN EXPANDING SCREW-TAPS.

Specification forming part of Letters Patent No. **189,889**, dated April 24, 1877; application filed March 3, 1877.

To all whom it may concern:

Be it known that I, JOHN BROWN DOUGLAS, of the city and county of Philadelphia, in the State of Pennsylvania, have invented a new and useful Expanding Screw-Tap, of which I do hereby declare the following specification to be a full, clear, and precise description, and sufficient to enable those skilled in the art to which my invention appertains to comprehend and construct it, reference being had to the accompanying drawings, which form part of this specification, and represent a tap embodying my invention—

Figure 1 being a central vertical section thereof; Fig. 2, a side elevation; Fig. 3, a cross-section on the line *a b* of Fig. 1; and Figs. 4 and 5, cross-sections on the line *c d* of Fig. 2, respectively, showing the tap-cutters expanded and retracted.

Similar letters of reference indicate corresponding parts in all the figures.

This invention belongs to the class of taps for cutting interior threads, which are termed "expanding" taps, and are so constructed that after the tap is entered, and the screw-thread cut, the thread-cutting jaws can be retracted inward out of the threads, so that the tool can be withdrawn at once without screwing it out.

My improvement is constructed as follows:

A is the stock, square-headed at *a* to facilitate attachment to a lathe or other spinning device, and flaring out to form a head, B. C is the eccentric stem of a stock, being, in effect, a cam-shaft formed with four longitudinal crests, *c c c c*, and four longitudinal hollows, *c' c' c' c'*, as clearly shown in the sectional views 4 and 5.

D is the shell, a slightly-tapered hollow cylinder surrounding the eccentric stem, abutting at top against the stock-head B, and retained in place by the cap E, which is itself secured by a screw, E', taking into the extremity of the eccentric stem.

The shell is provided with four longitudinal slots, in each of which is snugly but movably fitted a thread-cutting jaw, F.

f f are springs, fitted transversely through the inner portion of said jaws, and acting against the inside walls of the shell in such manner that, ordinarily, the cutting-surfaces of the jaws are held in, so as to project but slightly from the exterior of the shell; the tension is, however, such that sufficient force upon the backs of the jaws will compress the springs, and cause the jaws to project. The jaws are slightly tapered or inclined.

G G are reamer-cutters, rigidly fixed in the shell, and set to ream in a direction the reverse of the cutting of the tap-cutters. They project more than the jaws when the latter are retracted, and less than the same when expanded. They also are suitably tapered.

H H are lugs on the upper portion of the eccentric, which play in quadrant-shaped recesses I I in the top of the shell, as very clearly shown in Fig. 3, and serve to limit the throw of the shell, whereof hereafter. J is a handle to assist in throwing or rotating the shell. In use it fits into the socket J' in the shell.

Such being the detail of mechanical construction of my invention, by consulting Figs. 4 and 5 of the drawing it will be readily seen that the tap-cutting jaws are operated by the eccentric stem upon rotation of the shell to the extent of its throw in a right or left hand direction about said stem; that in the position represented in Fig. 4 the tap-cutters are expanded or forced out from the shell by the crests of the eccentric, over which the rotation forces them, the springs being compressed; while in that shown in Fig. 5 the cutters, resting in the hollows of the eccentric, are held in, or retracted by, the expanding action of their springs.

The studs limit the throw of the shell, and are adjusted so that in one position they bring the jaws upon the summits of the crests, and in the other over and (thence by the springs) into the hollows. They further hold the shell in fixed conjunction with the stock, enabling the reamers to work when one position has been assumed, and the thread-cutting jaws when the other.

Any number of jaws may, of course, be employed, the slots in the shell and crests and hollows on the eccentric being made correspondent, and any fit system of springs other than that represented.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a screw-threaded tap, thread-cutting jaws F, adapted to be both radially projected by an eccentric, C, and radially retracted by springs *f*.

2. In a screw-cutting tap, thread-cutting jaws F, set radially through the shell D, in combination with springs *f*, and with an eccentric, C, provided with crests *c* and hollows *c'*, as and for the purposes set forth.

3. In combination with the shell D, lugs H on the stock A to limit the throw of the shell, substantially as and for the purposes set forth.

4. In combination with the shell D reamer-cutters G, set so as to project beyond the thread-cutting jaws F when the latter are retracted, (and in such relation adapted to ream in a direction the reverse of the cutting of the jaws,) and to be within the cutting-line of said jaws when the latter are projected, substantially as specified.

5. A screw-cutting tap, provided with both fixed reamer-cutters and thread-cutting jaws, and thereby adapted to be used as both a tap and a reamer, substantially as shown and described.

6. The combination of the jaws F and their springs *f* with the stem C, having hollows *c'*, the springs adapted to retract the jaws into the hollows, and the hollows to receive the jaws, substantially as described.

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

JNO. B. DOUGLAS.

Witnesses:

J. BONSALL TAYLOR,

JOHN JOLLEY, Jr.