O. A. SMITH.

DOUBLE ENDED TAP.

APPLICATION FILED JAN. 24, 1913.

1,111,413. Patented Sept. 22, 1914.

Fig 1.

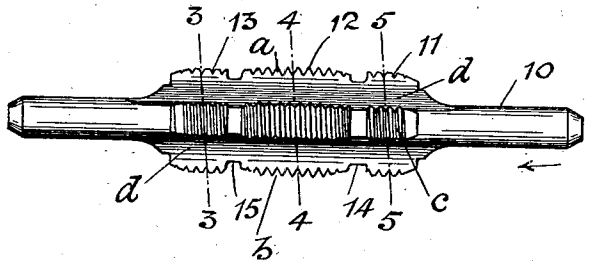


Fig 2.

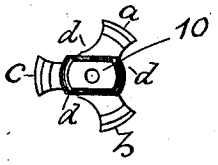


Fig 3.

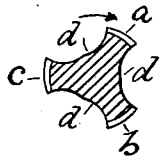


Fig 4.

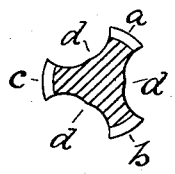
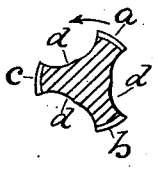


Fig 5.



Witnesses:

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By his Attorney

UNITED STATES PATENT OFFICE.

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DOUBLE-ENDED TAP.

1,111,413. Specification of Letters Patent. Patented Sept. 22, 1914.

Application filed January 24, 1913. Serial No. 743,921.

To all whom it may concern:

Be it known that I, OSCAR A. SMITH, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Double-Ended Taps, of which the following is a specification.

This invention relates to thread cutting tools, the object thereof being to provide an improved double ended tap by means of which the same thread may be cut from either end and which tap is provided toward each end with one or more roughing sections separated by a middle or finishing section whereby the greater part of the stock may be removed by the roughing sections, thus making it easier for and the life longer of the finishing section.

In the drawings accompanying and forming part of this specification, Figure 1 is a view of this improved tap; Fig. 2 is an end view thereof; Fig. 3 is a cross-sectional view taken in line 3—3, Fig. 1; Fig. 4 is a cross-sectional view thereof taken in line 4—4, Fig. 1; and Fig. 5 is a cross-sectional view taken in line 5—5, Fig. 1, all of said Figs. 3, 4 and 5 looking from right to left in said Fig. 1.

Similar characters of reference indicate corresponding parts in the several figures of the drawings.

This improved tap comprises a double ended shank 10 provided with a circular series of longitudinally extending cutter members, such series in the present instance comprising three in number, *a*, *b* and *c* separated by flutes *d*, and this circular series of cutter members is divided transversely thereof into three sections 11, 12 and 13 by means of two clearance grooves 14 and 15, the end sections 11 and 13 being formed as roughing sections while the middle or separating section 12 is formed as a finishing section and is in practice about twice the length of one of the end roughing sections, that is to say an end roughing section should be about half the length of the finishing portion of the tap. The first two or three threads of each roughing section 11 and 13 and of each end of the finishing section 12 are backed or tapered, one end of the tap in one direction, (see Fig. 5), and the opposite end in the opposite direction, (see Fig. 3), which said Figs. 3 and 5 illustrate this feature of the roughing sections, each end of the finishing section corresponding with the adjacent roughing section in this respect, so that the cutting members of one roughing section and of one end of the finishing section are given a rake different from that of the other roughing section and the opposite end of the finishing section; in other words, the rake of the two ends extends in opposite directions.

In the present improvement each longitudinal series of cutters has the teeth of the full height or diameter at the middle part of the intermediate or finishing section, the teeth being tapered from this middle portion toward the opposite ends of this middle or finishing section; that is to say, the diameter of the teeth of the finishing section decreases from the middle portion toward each end thereof, where the cutters may be of substantially the same height, or slightly less, to facilitate the entrance of the finishing section into the work, than the last cutter or cutters of the adjacent roughing section. Thus the tap can have either end of the cutter portions inserted into a blank or bore of any member and be passed entirely through the same, so that one nut or other blank may be tapped from one end and another blank or nut tapped from the opposite end, the tap of course being rotated in one direction to tap one blank and in the opposite direction to tap the other, when the tap is rotated.

As many roughing sections may be used as is found necessary, but the diameter of each section will increase step by step, the first being the smallest and increasing each one in the proper ratio so that each step will remove an equal proportion of stock and thus leave a small portion for the middle or finishing section. The number of roughing sections will depend on the form, diameter and pitch of thread to be cut in the blank.

The roughing portion or section at either end of this improved tap removes the greater part of the stock, thus making it easier for the finishing section and so prolonging the life thereof, while at the same time the roughing end allows the tap to enter into a blank much easier and to cut much easier. In practice it has been found that this style of tap is far superior to other forms of tap, as it is much easier to start

and is not apt to miss, especially where the bores or blanks are irregular. The reduced portion of each roughing section of this improved tap enables the same to enter or start much easier and also reduces the strain of cutting, while increasing the life of the tap by the so-called "breaking" of the cut.

I claim as my invention:

A double-ended tap comprising a shank having a set of roughing cutters near each end thereof, the cutters of one set having a circumferential rake extending in a rotative direction opposite to that of the cutters of the other set, a set of finishing cutters at the middle of the length of said shank and intermediate said sets of roughing cutters, said set of finishing cutters extending over approximately twice as much of the length of said shank as each of said sets of roughing cutters and separated from said sets of roughing cutters by clearance grooves, the set of finishing cutters tapering from the middle part toward the ends whereby the cutters at the ends of such set are approximately the same height as the nearest adjacent cutters of the roughing sets at the ends thereof.

Signed at Cleveland, Ohio, this 21st day of January, 1913.

OSCAR A. SMITH.

Witnesses:
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