

(No Model.)

B. W. PRENTICE.  
SECTIONAL EXPANSION TAP.

No. 572,445.

Patented Dec. 1, 1896.

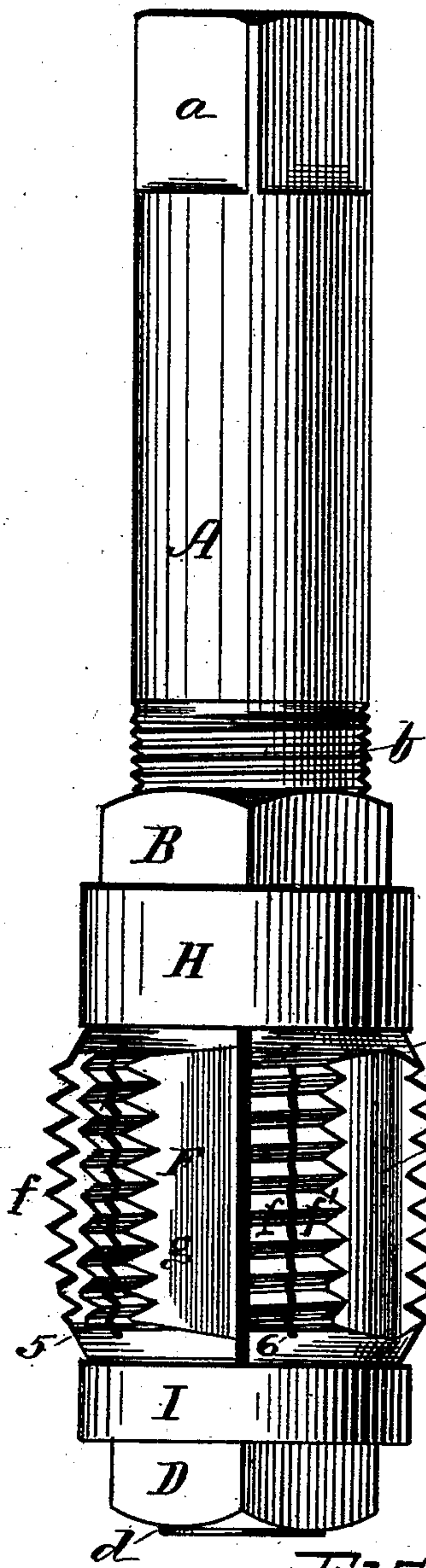


FIG. 1.

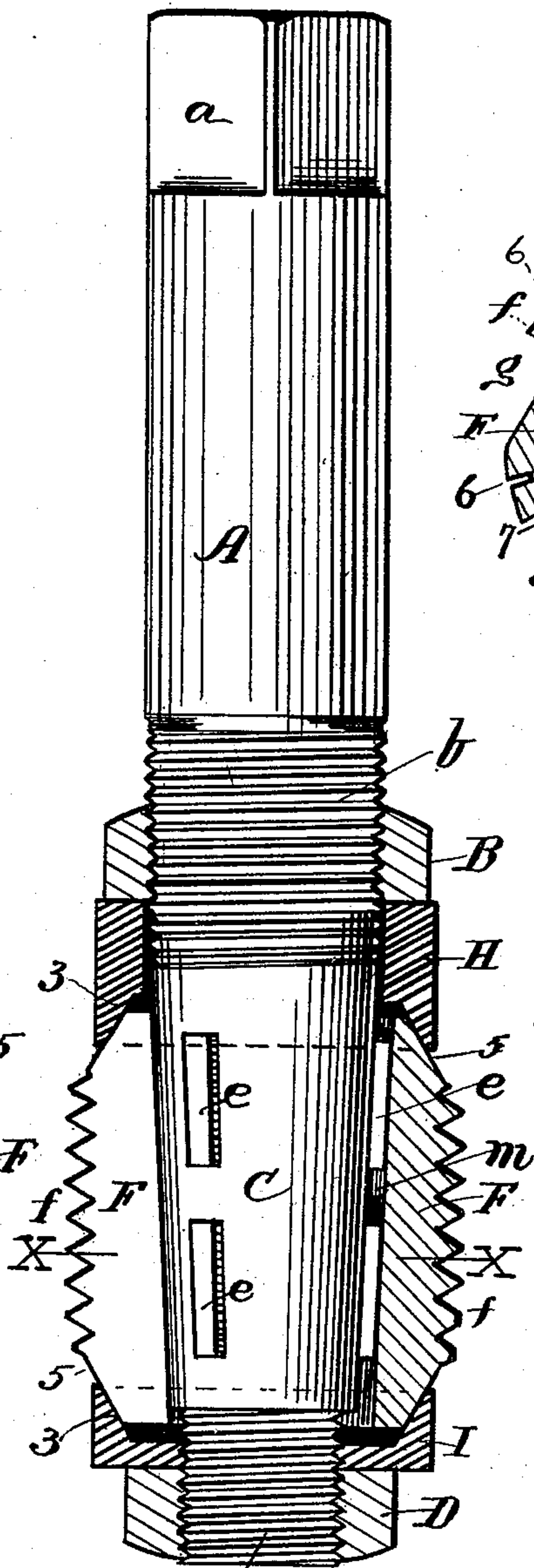


FIG. 2.

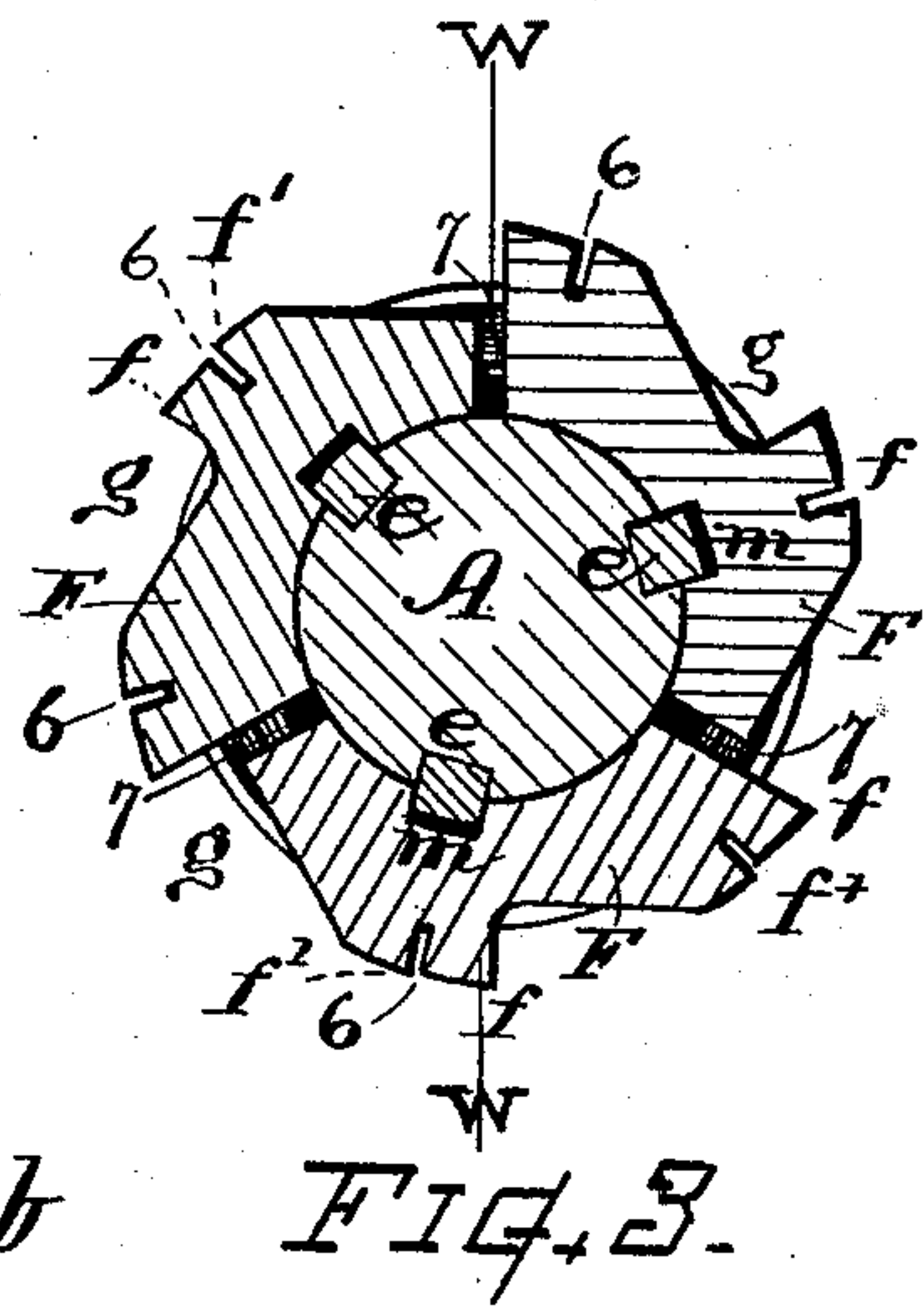


FIG. 3.

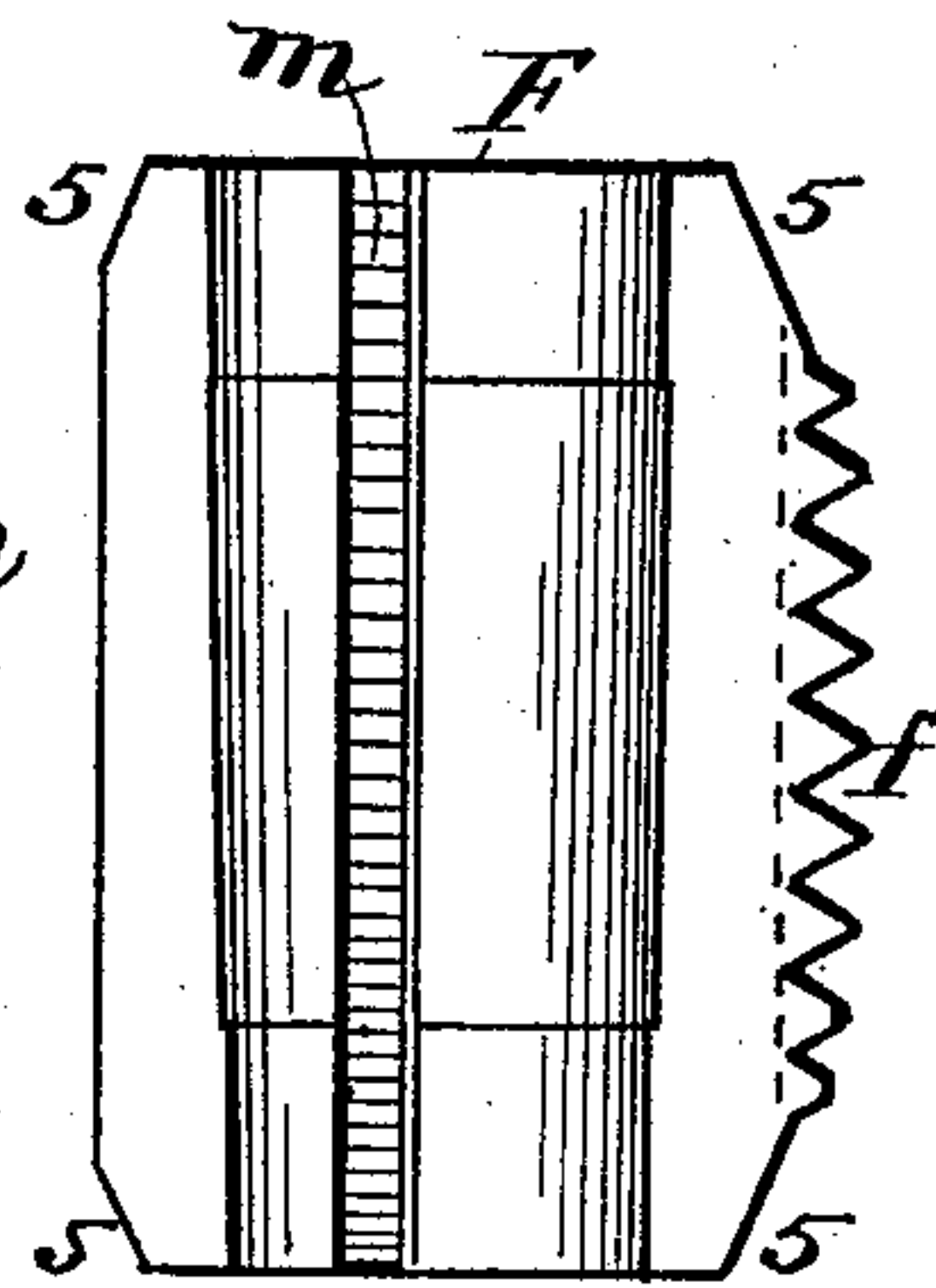


FIG. 4.

Witnesses.

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# UNITED STATES PATENT OFFICE.

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## SECTIONAL EXPANSION-TAP.

SPECIFICATION forming part of Letters Patent No. 572,445, dated December 1, 1896.

Application filed March 10, 1896. Serial No. 582,676. (No model.)

*To all whom it may concern:*

Be it known that I, BENJAMIN W. PRENTICE, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Sectional Expansion-Tap, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

The object of my present invention is to provide a more efficient and serviceable expansion tap or tool for accurately threading holes in machine-work; also, to provide an expansible tap comprising a series of detachable sections and having means for retaining the said sections rigid upon their supporter or stem, and adapted for convenient adjustment or expansion, as the cutting edges become worn by use, for maintaining the working diameter of the tool at standard gage, as more fully hereinafter explained. These objects I attain by an expansion tap or instrument constructed as shown in the drawings, wherein—

Figure 1 is a side view of a screw-threading tap embodying my invention. Fig. 2 is a longitudinal sectional view in the direction of line W W, Fig. 3. Fig. 3 is a transverse section at line  $x x$ , Fig. 2; and Fig. 4 is a view of the inner side of one of the working sections detached.

Referring to parts, A denotes the shaft, bar, or stem, which may be of any desired length and of suitable diameter, according to the required size of tool. One end,  $a$ , is suitably fitted for connection with the stock or spindle of the drilling-machine or lathe in which the tool is to be used, and near its other end the stem A is formed slightly conical, or with a tapering exterior surface C, also with a screw-threaded end  $d$  at its smaller extremity, while a second screw-thread  $b$  is formed on the stem at the larger end of the tapered portion. Said tapered surface is provided with longitudinally-disposed keys or splines  $e$ , projecting therefrom, and screw-nuts B and D are arranged on the threaded portions  $b$  and  $d$  of the stem.

F F F indicate a series of independent cy-

lindrical segmental plates or working sections internally hollowed to seat at or near their edges upon the tapered portion C of the stem A. Each of said sections F is longitudinally grooved, as at  $m$ , to fit the splines or keys  $e$ , being free to slide endwise thereon, but held for rotation with the stem. The sections F are provided on their exterior with cutting edges  $f$  and intermediate grooves  $g$ , said edges being fitted with thread-cutting teeth for tapping purposes, or, if for a reamer, the tool may be made with plain cutting edges in lieu of teeth. The ends of the sections F are fitted with conically-beveled surfaces  $5$  on their outsides, and two annular cups or inwardly-beveled collars H and I are arranged on the stem A adjacent to the ends of the sections, their inwardly-coned surfaces  $3$  matching over the beveled surfaces  $5$  of the sections, thereby centering and rigidly holding the sections firmly in position when the nuts B and D are screwed up against the collars, as indicated.

In the present instance the threading-cutters  $f$  on the tap are made dual between each of the respective clearing-grooves  $g$ , said cutters having formed therein a narrow inward incision or channel  $6$ , extending across the threads and longitudinal with the axis of the tap. The two portions at front and rear of said incision are each backwardly reduced or relieved, thereby providing a series of principal cutting-points  $f$  and a series of followers or secondary cutting-points  $f'$ , that work in adjacent succession thereto. This structure serves for steadying the action of the tap and giving greater efficiency in service, the secondary cutting-point clearing the thread cut in case the primary point fails to fully do its share of the work. This style of cutter for a tap is a feature of my invention.

Expansion of the tap is effected by adjusting the sections longitudinally along the tapered portion C of the stem toward the larger end of the taper. This is conveniently effected with the nuts B and D by easing back nut B and the collar H and forcing on the collar I by nut D, thereby increasing the working diameter of the tool to a degree corresponding with the taper C of the stem, and this without deviation in destroying the par-



allel relation of the working edges of the several sections.

Reduction in the working diameter of the tool can be effected by adjusting the sections 5 toward the smaller end of the taper C by reverse operation of the nuts. The sections can be made interchangeable with others when desired, thereby providing for change of size or pitch of thread or for renewal of 10 working sections when worn out.

The cups H and I hold the ends of the sections F firmly to their central stem or support at any position of adjustment, and the splines or keys e insure their fixedness laterally and 15 their proper alinement with the axis of the stem. The working sections can be readily and accurately made by first constructing the group as a full cylinder and then slitting the same into detached independent sections by 20 longitudinal cuts on the desired lines of separation, as at 7.

As herein shown, the tap is made with three sections F, a preferable number; but a greater number of sections may be employed as in any 25 instance desired, the greater number being preferable in very large-sized taps.

I claim as my invention herein, to be secured by Letters Patent—

1. The within-described sectional expansion-tap, comprising in combination the axial 30 stem formed with a tapered seat and having

screw-threaded portions at either ends of the taper, the series of radially-projecting splines disposed longitudinally on said tapered seat, the series of independent detachable segmental sections having conically-beveled 35 ends, and straight edges that are adjustably supported on said tapered seat, each section internally fitted with a longitudinal groove to receive the respective splines, and externally provided with cutting-points and clearance-grooves, as described, the internally-beveled annular collars mounted on the stem adjacent to and embracing the ends of the several sections, and the screw-nuts arranged 45 upon the threaded stem adjacent to said collars, all substantially as set forth.

2. In a screw-threading tap, the threading-cutters made in dual form, as shown, with the narrow incision or channel 6 extending longitudinally of the body and dividing the raised 50 portions of the thread-cutter between the regular clearance-grooves into a series of primary cutting-points and a series of secondary cutting-points, substantially as set forth. 55

Witness my hand this 19th day of February, A. D. 1896.

BENJAMIN W. PRENTICE.

Witnesses:

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SIMEON E. KING.