July 15, 1924. 1,501,117

C. G. JOHNSON

TAP AND CUTTER

Filed June 13, 1922

Fig. 1

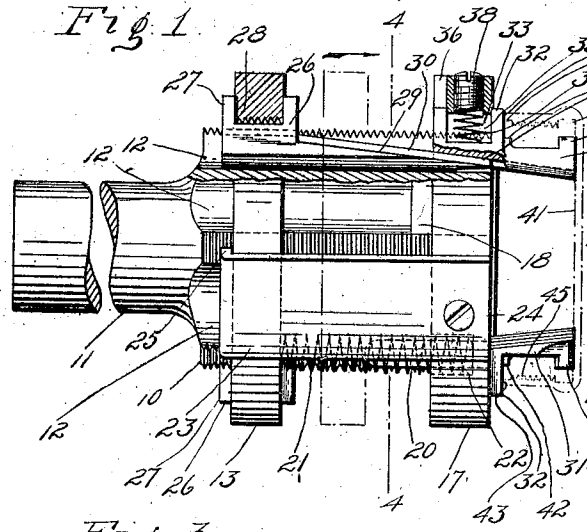


Fig. 2

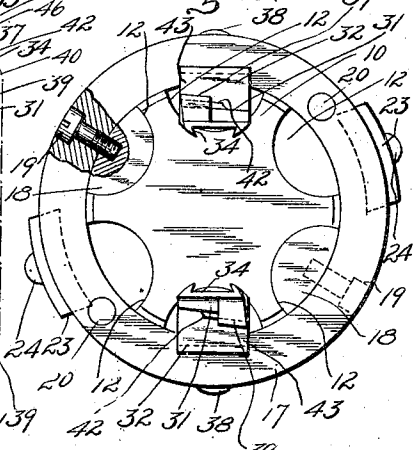


Fig. 3

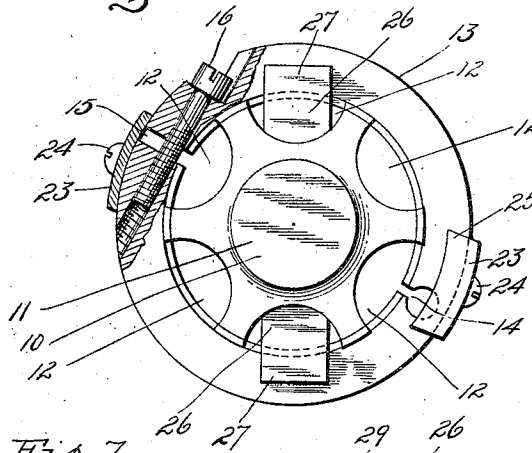


Fig. 4

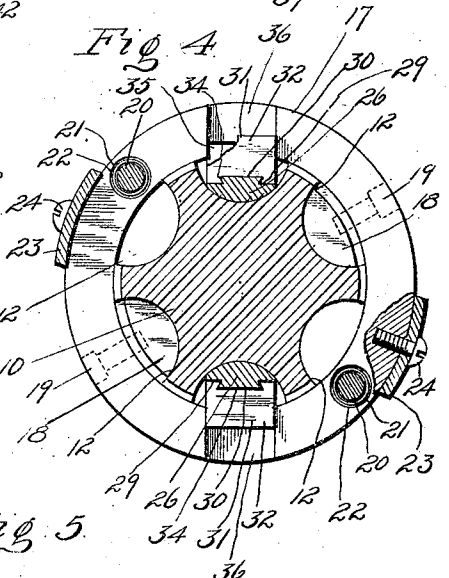


Fig. 7

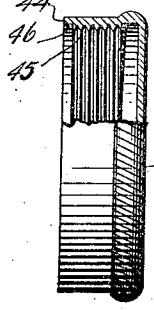


Fig. 5

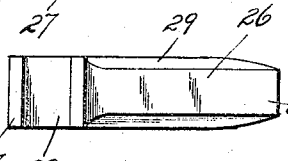
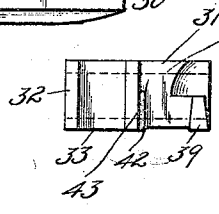


Fig. 6



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# UNITED STATES PATENT OFFICE.

CHARLES G. JOHNSON, OF WORCESTER, MASSACHUSETTS.

## TAP AND CUTTER.

Application filed June 13, 1922. Serial No. 568,014.

*To all whom it may concern:*

Be it known that I, CHARLES G. JOHNSON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Taps and Cutters, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a combined tap and cutter, its principal object being to provide means for threading and otherwise cutting an article at one and the same operation.

Among other aims and objects of the invention may be recited the provision of a device of the character mentioned with a view to compactness, in which the number of parts are few, the construction simple, cost of production small and efficiency and operation high.

The improvements in the details and arrangement of parts will be apparent from an inspection of the accompanying drawings, in connection with the description hereinafter contained and wherein a preferred embodiment of the invention is disclosed for the purpose of imparting an understanding of the same.

Referring to the drawings in which like characters of reference indicate corresponding parts in the several views;

Figure 1 is an elevation of my improved invention, partly in section;

Figure 2 is an elevation thereof, partly in section, looking toward the right of Figure 1;

Figure 3 is a similar view, partly in section, looking toward the left of Figure 1;

Figure 4 is a transverse sectional view thereof taken generally upon line 4—4 of Figure 1;

Figure 5 is a view of the cutter wedge;

Figure 6 is a view of the cutter; and

Figure 7 is an elevation, partly in section, of one form of article produced by my improved mechanism.

The article illustrated in Figure 7 is a metal cap that is formed either by casting, spinning, drawing or other means and completed with my improved tap and cutter, by threading the interior thereof, cutting the groove 40 in the inner wall and near the bottom thereof that will be at least as big in diameter, but preferably slightly larger, than the diameter of the threads at the bottom thereof, trimming the outer end and chamfering the mouth of the open end at 46, preferably by removing one or more of the threads.

Heretofore with an article of this character the operations have been successively performed by tools of different forms and structure, necessitating the securing of the article for each of the tools, removing it and after the operation, again securing it for the next succeeding operation, etc.

In my invention I have provided a simple and effective device that performs all of the requisite operations with the same tool while the article is secured but once in a holding device, instead of a plurality of times as heretofore. In these and other ways with my improved mechanism the objections heretofore found in the prior art have been entirely eliminated.

In the drawings, 10 designates a tap having a shank 11 thereon and provided with a plurality of longitudinal flutes 12. This tap is of a well known type and requires no further detailed description herein.

Threaded on said tap is a wedge collar 13 that is split at 15 and slotted at 14 so as to permit of a limited spring movement to the sections upon either side thereof. A screw 16 provides means for drawing the sections of the collar together so that the same may be rigidly clamped, as well as threaded, upon the body of the tap in any desired adjusted position.

Slidable upon said tap is a cutter collar 17 which is held against rotation thereon by the blocks 18 secured to the wall of the bore thereof by the screws 19, or similar means, and project into two of the flutes 12, see Figure 4.

Upon the inner face of the cutter collar 17 are two pins 20 each of which is surrounded by a coil spring 21 that abuts at one end against the inner face of the wedge collar 13 and at the other end against the bottom of a recess 22 in the cutter collar 17. The tension of this spring is exerted so as to remove the cutter collar 17 away from the wedge collar 13. Only two springs are shown herein, but obviously more may be used, if found desirable, or equivalent means may be substituted.

The outer position of the cutter collar 17 is limited by the stop plates 23, which are fixed thereto opposite each other, by the screws 24, or the like, and each having an inwardly turned lip 25 upon its upper end

which projects over the edge of the wedge collar 13 and prevents further movement of the cutter collar when it engages the wedge collar.

Arranged within two of the flutes that are diametrically opposite each other, are the cutter wedges 26 each being provided with a head portion 27 having a slot 28 thereon of substantially the same width as the thickness of the wedge collar 13, which projects therein and holds said wedges against movement.

The face 29 of each wedge as it approaches the outer end of the tap, inclines toward the center thereof, substantially as shown in Figure 1 and is provided with a tongue 30. Slidably mounted upon each wedge is a cutter 31, having a head 32 provided with a recess 33 and a groove 34, substantially the same shape in cross-section as the tongue 30, which projects therethrough.

The walls of the bore of the cutter collar 17 are slotted at 35 as is also the inner face thereof adjacent thereto at 36. Both slots 35 and 36 are of substantially the same width as the cutter head 33 which is in engagement therewith, thereby permitting radial movement of the cutter relatively to the cutter collar 17.

To assist each cutter 31 in maintaining its contact with the wedge 26 a spring 37 is provided that is held in contact therewith by a stud 38 threaded through the cutter collar 17. This spring is not absolutely essential to the operation of the device, but does help in relieving any possible strain upon the parts. The cutter, of course, may be made of an endless variety of shapes, depending upon the character of work required, but as shown herein it is constructed with a lip 39 near its outer end, which is of substantially the same width as the groove 40 in the article 41, a second lip 42 for the chamfered cut 46 near the outer edge of the article and a cutting face 43 for trimming and squaring the wall 44 of the article near its open end.

In operation the article 41, outlined in Figure 1 by broken lines, is securely held in any convenient manner, after which the tool with its parts substantially shown in Figure 1, is positioned relatively thereto, the body of the cutter projecting therein with the lower end adjacent to the inner face of the head.

The tool is now rotated, if not previously rotating, and the tap 10 moves axially and cuts the thread 45 inside of the bore in a well known manner. As the end of the tap approaches the inner faces of the head of the article, the cutters 31 move radially by reason of its contact with the angular face 29 of the wedges 26, so that when the head of the tap has reached said inner face, the cutters are in their outermost positions and perform their operations by cutting the groove 40, the chamfered groove 46 and square the end at 46.

As the tap is withdrawn the cutters move inwardly until the lips 39 and 42 thereon are free from the grooves cut thereby. After the lips 25 of the stop plates 23 contact with the outer face of the wedge collar 13, the cutters move axially with the tap and are also withdrawn from the then completed article, which is removed, a new one substituted and the operations continued as before.

Minor changes and alterations may be made within my invention, aside from those herein suggested, and I would therefore have it understood that I do not limit myself to the exact construction herein shown and described, but claim all that falls fairly within the spirit and scope of the appended claims.

What I claim as new and desire to secure by Letters Patent, is:

1. In a device of the character described; a tap; a cutter connected therewith; and means for moving said cutter radially relatively to said tap during the operation of the tap.

2. In a device of the character described; a tap; a cutter connected therewith; means for moving the cutter radially relatively to the tap during the operation of the tap; and means for moving the cutter parallel to the axis of the tap.

3. In a device of the character described; a tap; a cutter connected therewith; means for moving the cutter radially relatively to the tap during the operation of the tap; and yielding means for moving the cutter parallel to the axis of the tap.

4. In a device of the character described; a tap; a cutter connected therewith; means for moving the cutter radially relatively to the tap during the operation of the tap; means for moving the cutter parallel to the axis of the tap; and means for limiting said parallel movement.

5. In a device of the character described, a tap; a cutter connected therewith; and means for moving said cutter radially relatively to said tap, comprising inclined planes held in a fixed position relatively to said tap.

6. In a device of the character described, a tap; a cutter connected therewith; means for moving said cutter radially relatively to said tap, comprising inclined planes held in a fixed position relatively to said tap; and means for adjusting the endwise position of said inclined planes.

7. In a device of the character described, a tap; a cutter connected therewith; means for moving said cutter radially relatively to said tap, comprising inclined planes held in a fixed position relatively to said tap; means for adjusting the endwise position of said

inclined planes; and means for securing said planes in their several adjusted positions.

8. In a device of the character described, a tap; a plurality of inclined planes adjustably connected therewith and lying within the flutes of said tap; a plurality of cutters corresponding in number with said planes; and means for moving said cutters parallel to the axis of said tap.

9. In a device of the character described, a tap; a plurality of inclined planes adjustably connected therewith and lying within the flutes of said tap; a plurality of cutters corresponding in number with said planes; means for moving said cutters parallel to the axis of said tap; and means for supporting said cutters, upon which the same are radially movable.

10. In a device of the character described, a tap; a plurality of inclined planes adjustably connected therewith and lying within the flutes of said tap; a plurality of cutters corresponding in number with said planes; means for moving said cutters parallel to the axis of said tap; means for supporting said cutters, upon which the same are radially movable; and means for limiting the axial movement of said cutters.

11. In a device of the character described, a tap; a member adjustable thereon; a plurality of wedges lying within the flutes of said tap and connected with said member; a cutter slidably mounted upon each of said wedges; and means for limiting the endwise position of said cutters relatively to said wedges.

12. In a device for threading the interior of an article and cutting a groove in the wall thereof adjacent to the threaded portion; a tap; a cutter movably connected therewith; and means actuated by the movement of the tap for moving said cutter radially relatively to said tap so that said cutter will extend beyond the threaded portion thereof.

13. In a device for threading the interior of an article and cutting a groove in the wall thereof adjacent to the threaded portion; a tap; a cutter; and means for mounting said cutter upon said tap so that the same may rotate therewith and move outwardly relatively thereto while the tap is moving parallel to its axis.

14. In a device for threading the interior of an article and cutting a groove in the wall thereof adjacent to the threaded portion, and trimming the outer end thereof; a tap; a cutter movably connected therewith for performing both the grooving and trimming operations; and means for moving said cutter radially relatively to said tap so that said cutter will extend beyond the threaded portion thereof.

15. In a device for threading the interior of an article and cutting a groove in the wall thereof adjacent to the threaded portion, trimming the outer end and chamfering the mouth of the open end thereof adjacent to the threaded portion; a tap; a single cutter for cutting said groove, and trimming and chamfering the article, movably connected with the tap; and means for moving said cutter radially relatively to said tap so that said cutter will extend beyond the threaded portion thereof.

16. In a device of the character described, a tap; a plurality of inclined planes adjustably connected therewith and lying within the flutes of said tap; a plurality of cutters corresponding in number with said planes; means for moving said cutters parallel to the axis of said tap and during the operation of the tap; means for supporting said cutters, upon which the same are radially movable; and means for limiting the endwise position of said cutters relatively to said tap.

17. In a device of the character described, a tap; a plurality of inclined planes adjustably connected therewith and lying within the flutes of said tap; a plurality of cutters corresponding in number with said planes; means for moving said cutters parallel to the axis of said tap and during the operation of the tap; means for supporting said cutters, upon which the same are radially movable; and means for limiting the endwise position of said cutters relatively to said tap and comprising a part connected with said supporting means and engaging said member when in its extreme outer position.

In testimony whereof, I have hereunto affixed my signature.

CHARLES G. JOHNSON.