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TAP

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7 Claims. (Cl. 10—141)

This invention relates to thread cutting taps of the general type shown in my Patent No. 1,908,575, dated May 9, 1933, and represents improvements thereover.

5 My principal objects now are to provide a tap of this general character so constructed that a very free and easy cut is made without the tap having to be oscillated; one with which a very clear cut thread is formed; one having long wear-
10 ing qualities and does not dull easily; and one which would be almost impossible to break under the same conditions as prove disastrous to the ordinary form of tap.

15 A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

20 These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawing similar characters of reference indicate corresponding parts in the several views:

25 Figure 1 is a longitudinal elevation of the tap. Figure 2 is a similar view partly in section taken on the line 2—2 of Figure 1.

Figure 3 is an enlarged cross section on the line 3—3 of Figure 1.

30 Figure 4 is a similar view on the line 4—4 of Figure 1.

Figure 5 is a fragmentary enlarged longitudinal section of the tip end of a tap, showing a modified cutting of the endmost threads.

35 Referring now more particularly to the characters of reference on the drawing, the tap comprises a body 1 squared at one end as at 2 as usual for engagement with a holding chuck.

40 The body from its outer end to a point short of the end 2 is provided with longitudinal flutes 3 forming a rib 4 therebetween; the circumferential extent of the continuous ungrooved portion of the body being preferably somewhat greater than 180° or approximating three-fifths of the circumference. The bottoms of the grooves
45 preferably slope below the edges of the said unbroken portion relative to a straight line projected thereacross, so as to insure the sharpness of said edges.

50 This unbroken body portion is formed with threads 5, the body at its outer end being provided with a reducing taper as at 6 to reduce the depth of the adjacent threads as is customary.

55 Thus far the construction of this tap is substantially the same as that shown in the previous patent. The major feature of difference is in

the fact that I provide another flute 7 intermediate the flutes 3. This flute 7 extends from the outer end of the body and for approximately one-half the length of the threaded portion thereof; terminating at the outer periphery of the rib 4. 5 Said flute 7 is formed with a longitudinal concave curvature and increases in width toward the outer end of the body; and is also of increasingly concave curvature transversely in the direction of the outer end of the tap. In other words, 10 said flute 7 extends across the end portions of the groove 3 and cuts away and obliterates the corresponding portion of the rib 4.

15 This cutting away of the rib with the curvature and of the general form above mentioned provides a flute of gradually increasing width toward the outer end of the tap and forms a shallow trough 8 at said end, the bottom of which is below the plane of the bottom of the grooves 3. Said outer end of the tap is therefore 20 of crescent shaped form as clearly indicated in Figure 2. The transverse cut of the flute 7 is so offset or tilted relative to the plane in which the opposed edges of the threads lie, that it makes a sharp angle with the periphery of the tap at the leading edge L of the same, while terminating inwardly of said periphery at the trailing edge; and said leading edge L is made lower than the trailing edge as shown in Figure 3. This provides a very free cutting lip for initial en- 30 gagement with the hole to be tapped, a feature which is enhanced by the fact that the adjacent longitudinal edge of the threaded portion at the lip on the leading side assumes a slope as indicated at 9 on account of the intersection of the 35 cut of the flute 7 with said longitudinal edge. Also of course this edge 9 of the lip is actually a short portion of a spiral of long pitch, due to the angular intersection of the concave flute with the cylindrical body of the tap. 40

This offsetting of the flute cut also allows the groove 3 on the trailing side of the tap to extend undisturbed to the end of the tap, as shown in Figure 1. The edges of the threads at the lip are therefore relatively blunt in the transverse 45 plane of the tap, as indicated at 10. This prevents said threads at the trailing edge and which are used as a steady rest, from possibly chipping off when under a heavy cut.

50 By reason of the above features of construction it will be found that the free cutting lip forms in effect a chisel edge making turning of the tap into the metal very easy. The shavings cut by the top threads and entering the main flute space, are definitely directed down or toward the 55

bottom of the hole by reason of the slope of the bottom of the flute 7, while the size of the flute space due to its hollow ground form provides adequate room for the collection of the shavings as the tap approaches the bottom of the hole (if the latter is blind) without danger of choking the hole. The other flutes 3, apart from forming sharp edges of the ends of the threads, only serve to scrape up any fine shavings which might otherwise work under the thread. The tap therefore runs twice as easy as do ordinary taps, besides having far greater strength owing to the use of the one rib 4. The point of the tap does all the actual cutting and its form renders it very easy to sharpen in case it becomes dull.

I have found that my improved taps start to grab the metal and cut very easily, without any excessive pressure being necessary. This action however may be increased by the construction shown in Figure 5. In this form of the tap 1a, the tip threads 5a at their outer periphery and which are naturally flattened by the taper 6a of the tap, are ground off so that while the edges of said threads lie in the plane of the taper 6a, their opposite edges or those nearest the point of the tap, are disposed inwardly of said taper 6a, as shown at 11. The threads in question are therefore substantially ratchet shaped, and provide more acute cutting edges for initial engagement with the metal than are ordinarily provided.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:

1. A tap comprising a body, threads cut in the body from one end and extending continuously thereabout for at least 180° of the circumference of the body, and a flute cut lengthwise in the body and disposed substantially central of that portion of the body lying between the threads and having a converging slope to said end of the body to reduce the cross sectional area of the body at said end to a size less than one-half the circumferential area of the body, said flute having a transverse concave curvature and flaring laterally toward said end of the tap to intersect the terminations of the threads only on the leading side of the tap.

2. A tap comprising a body, threads cut in the body from one end and extending continuously thereabout for at least 180° of the circumference of the body for the major portion of such extent, and a flute cut lengthwise in the body and disposed substantially central of that portion of the body lying between the threads and having a converging slope to said end of the body to reduce the cross sectional area of the body at that end to a size less than one half the circumferential area of the body; said flute having a transverse concave curvature and flaring laterally toward

the outer end of the tap to meet the opposed terminations of the threads at said end, and said flute being canted transversely and relative to the transverse plane in which the opposed terminations of the threads lie so that the bottom of the flute at said end of the tap forms a sharper angle with the adjacent periphery of the tap at the leading end of the threads than at the following end thereof.

3. A tap comprising a body, threads cut in the body from one end and extending continuously thereabout for at least 180° of the circumference of the body, a pair of spaced flutes cut lengthwise in the body along the opposed terminations of the threads and forming a radial rib between said flutes, and a third flute cut substantially central of said first named flutes and extending from said end of the tap and the adjacent opposed terminations of the threads in longitudinally diverging relation to the axis of the tap toward the opposite end of the same to merge along its edge portions into the first named flutes and eliminating the endmost portion of the rib.

4. A tap as in claim 3, in which said last named flute is of concave curvature, and at said end of the tap lies in a plane below the bottoms of the first named flutes relative to a transverse plane intersecting said bottoms.

5. A tap comprising a body, threads cut in the body from one end and extending continuously thereabout for at least 180° of the circumference of the body, and a flute formed in the body and extending lengthwise thereof from said end; said flute at its outer end projecting below the transverse plane of the opposed terminations of the adjacent threads and arranged to meet the leading thread terminations at an acute angle, but leaving the opposed thread terminations blunt.

6. A tap comprising a body, threads cut in the body from one end and extending continuously thereabout for at least 180° of the circumference of the body, and a flute formed in the body and extending lengthwise thereof from said end; said flute at its outer end projecting below the transverse plane of the opposed terminations of the adjacent threads, said flute being cut so that it intersects the leading thread terminations at and for some distance from said end of the tap, to form a substantially wedge-shaped cutting lip; the cut of the flute on the opposite side terminating inwardly of the corresponding thread terminations to leave the same relatively blunt edged.

7. A hole-working tool comprising a cylindrical body and a concave flute extending lengthwise of the body from one end thereof and arranged at said end to reduce the cross sectional area thereof to a size less than one half the circumferential area of the body and merging into the circumferential surface of the body at acute angles therewith to form leading and following edges; the flute at said end of the body being formed with a lateral flare in the direction of the leading edge so as to intersect the normal line of said edge for a predetermined distance from and to said end of the body and to provide a cutting lip whose edge is relatively sharp compared to the opposed following edge.

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