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C. C. WINTER

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ADJUSTABLE TAP OR THE LIKE

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Fig. 1.

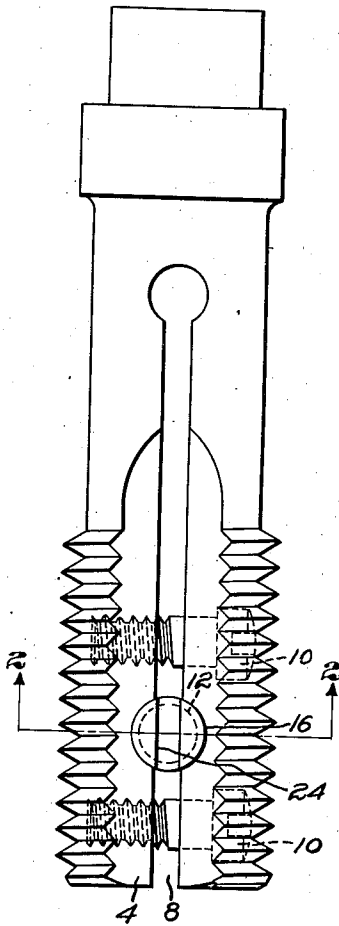
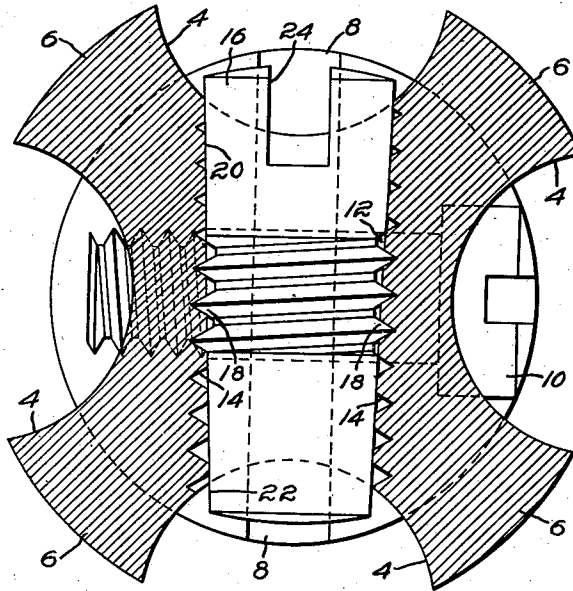


Fig. 2.



Inventor:
Charles C. Winter,
by *Ernest Booth, Foreman, Miller & Heidner*
Attys.

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ADJUSTABLE TAP OR THE LIKE

Charles C. Winter, Wrentham, Mass., assignor to
Winter Brothers Company, Wrentham, Mass.,
a corporation of Michigan

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4 Claims. (Cl. 10-142)

This invention relates to that class of rotary tools which have peripheral cutting portions adapted on rotation and axial advance of the tool to form or shape the wall of an opening to diametrical measurements determined by corresponding dimensions of the tool. An outstanding example of such a tool is a thread-cutting tap wherein the form and size of the thread cut is determined by the form and size of the teeth of the lands between the flutes. The object of the invention is to provide an improved construction for adjusting the effective diameter of a tool of the class referred to.

My invention will be well understood in connection with the accompanying drawing, wherein by way of example I have shown a particular construction for a thread-cutting tap and wherein:

Fig. 1 is a side elevation of the tap; and

Fig. 2 is a section on the line 2-2 of Fig. 1 on a larger scale.

In the drawing I show a tap having a shank of ordinary form with four flutes 4 defining intervening lands provided with cutting teeth 6 of any usual or suitable form. A central kerf 8 may extend between diametrically opposite flutes dividing the toothed portion of the tap into opposed sections or legs which may be spread apart by a suitable wedging action exerted at the kerf, thus to adjust the external diameter of the tap. Locking screws 10 transverse to the kerf serve to restrain and limit the expansive movement.

Taps split as described are known and various mechanisms for expanding them have been proposed. These, however, are not altogether satisfactory, particularly in the case of smaller sizes of taps wherein dimensions are small. Obviously the adjusting means must be strong and durable. At the same time if much metal is removed from the body of the tool to accommodate the adjusting means, the tap body itself is unduly weakened. The construction which I am about to describe overcomes these difficulties.

The construction given the tap body in providing for the adjustment may be most simply described in terms of a preferred method of making it. Referring particularly to Fig. 2, a hole 12 may be drilled in the plane of the kerf 8, in the embodiment shown transversely across the shank of the tap, and providing when the shank is kerfed opposed recesses in the walls of the kerf. The hole 12 may then be reamed to a suitable taper, as illustrated in Fig. 1, the recesses then corresponding to segments of a cone. The hole is then tapped with a straight thread 14, that is,

a thread having equal pitch diameters throughout, such as is formed on the usual machine screw nut, the proportion and arrangement being such that the inner diameter of the theoretical complete thread lies, at least substantially throughout the hole, inwardly of the conical surface while the outer diameter extends outwardly beyond that surface. The resultant construction might be otherwise described as that of an opening provided with a straight female thread with the inner crests of the threads cut away to correspond to the surface of a conical frustum, the elements of which (using the word "elements" in the geometrical sense) lie between the inner and outer cylindrical surfaces corresponding to the inner and outer diameters of the thread 14.

The opening described receives an expanding element 16 in the nature of a plug, the central portion of which may be cylindrical and provided with a complete straight male thread 18 fitting the thread 14 in the hole, while the upper and lower portions 20 and 22 respectively are conical frusta tapered to correspond to the taper of the hole. The expanding member is provided with a slot 24 to receive a screw driver.

It will be apparent from Fig. 2 that, if the member 16 is inserted in the opening 12 and rotated so that the cooperating threads draw it downwardly, viewing Fig. 2, the conical portions will serve to wedge apart the legs of the tap and increase the effective diameter of the latter. The screws 10 are set up to clamp the legs against the expanding element and lock the legs in adjusted position.

Since the interengaging threads 14 and 18 are straight threads (as distinguished from tapered threads), they may be accurately and uniformly cut and are strong and well adapted to exert a steady and powerful force when the expanding member is rotated. The conical surfaces 20 and 22 and the thread 18 are of approximately like size, as appears in Fig. 2. Thus, on the one hand, the thread may be made of large diameter without the necessity of removing a large amount of metal to accommodate the cone and, on the other hand, for a given size of cone the size and strength of the thread section is not scamped. A strong and durable construction with a minimum loss of metal from the body of the tap is thus provided for.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not

restrictive; reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

I claim:

1. A rotary tool of the class described which is kerfed longitudinally to provide relative expansible portions and is provided with a conical opening extending in the plane of the kerf, the wall of which opening is formed with a straight thread, the inner and outer diameters of which respectively lie within and without the surface of the cone at least substantially throughout its length, and an expanding member having a portion with a corresponding straight male thread and an unthreaded portion correspondingly conical.

2. A rotary tool of the class described which is kerfed longitudinally to provide relatively expansible portions and is provided with an opening substantially in the plane of the kerf having a straight thread, the crests of the thread throughout at least a portion of its extent being cut away on a taper, and an expanding member

having a portion with a corresponding straight male thread and an unthreaded portion correspondingly tapered.

3. A rotary tool of the class described which is kerfed longitudinally to provide relatively expansible portions, an expanding member to enter the kerf having a central portion with a straight thread and end portions corresponding to frusta of a cone, the elements of which intersect the straight thread between the inner and outer diameters thereof, the walls of the kerf having recesses presenting parts of a straight female thread to fit said central thread, the inner crests of such thread being cut away to correspond to the angle of the cone.

4. A tool of the class described having relatively expansible legs, a conical plug having a straight thread projecting from a portion only of its conical surface, the legs presenting recesses coned to fit the plug and having cut therein a portion of a straight thread in which the thread of the plug fits.

CHARLES C. WINTER.