Dec. 7, 1937. W. C. ROBINETTE 2,101,347

TAP

Filed June 24, 1936

FIG. 1.

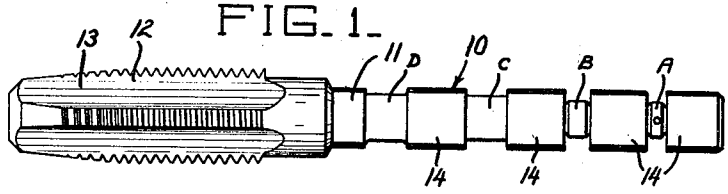


FIG. 2.

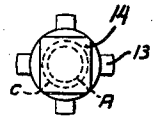


FIG. 3.

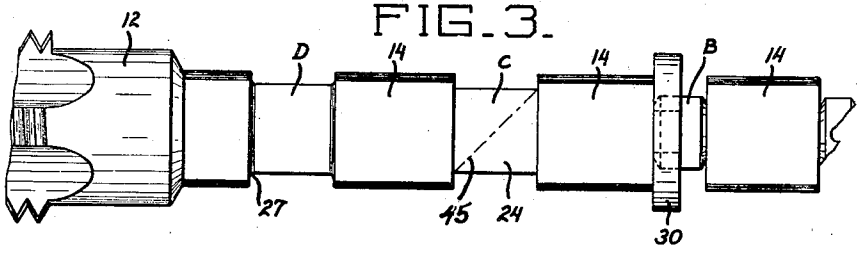


FIG. 4.

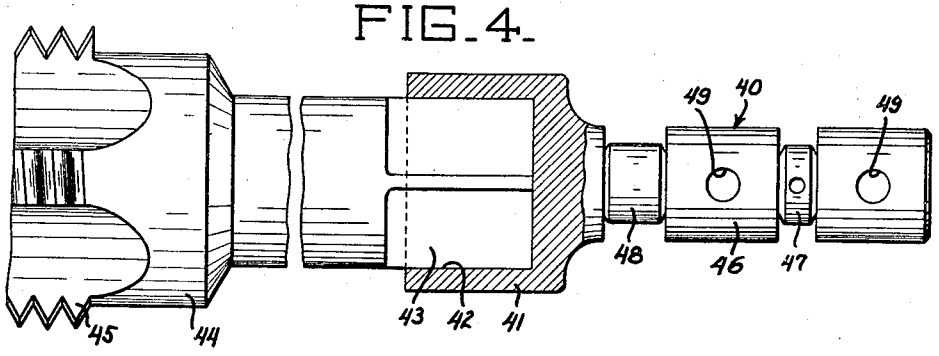


FIG. 5.

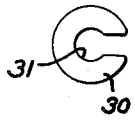


FIG. 6.

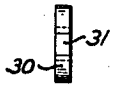


FIG. 7.

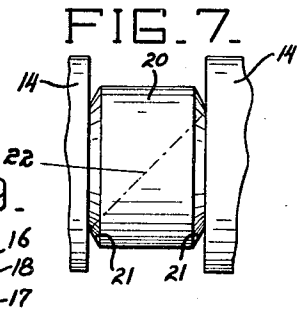


FIG. 8.

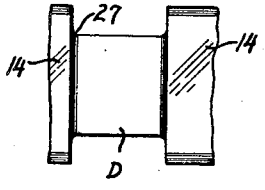
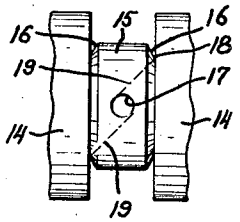


FIG. 9.



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2,101,347

TAP

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Application June 24, 1936, Serial No. 86,965

3 Claims. (Cl. 10—141)

This invention relates to taps such as are used for threading apertures.

The general object of the invention is to provide an improved tap which is so constructed that if breakage occurs it will occur in a portion of the tap which is remote from the hole being threaded.

A more specific object of the invention is to provide a tap including a shank having weakened portions which localize breaks in the shank.

Another object of the invention is to provide a tap including a shank portion having weakened areas which are of progressively increasing strength in one direction.

An additional object of the invention is to provide a tap having weakened portions and having a polygonal wrench engaging portion adjacent each weakened portion.

Another object of the invention is to provide a novel weakened portion for the shank of a tap.

Other objects and the advantages of the invention will be apparent from the following description taken in connection with the accompanying drawing, wherein:

Fig. 1 is a side elevation of a tap embodying the features of my invention;

Fig. 2 is an end view of the tap;

Fig. 3 is an enlarged, fragmentary view showing the tap after one part has been broken away;

Fig. 4 is a central, sectional view through a modified form of my invention;

Fig. 5 is a plan view of a washer which may be used in my invention;

Fig. 6 is a front view of the washer;

Fig. 7 is a fragmentary side elevation showing one of the weakened portions;

Fig. 8 is a fragmentary side elevation showing another weakened portion; and

Fig. 9 is a fragmentary side elevation showing still another weakened portion.

Referring to the drawing by reference character I have shown my invention as embodied in a tap which is indicated generally at 10. Although I have shown and described my invention as embodied in a tap it will be understood that it may be applied with equal facility to other cutting tools without departing from the spirit of my invention.

As shown the tap includes a shank portion 11 and a threading portion 12. The threading portion 12 is shown as a taper tap having four flutes 13 but it will be understood that it may be applied to a plug, bottom, or any other tap without departing from the spirit of my invention.

The shank 11 as shown includes a plurality of portions 14 of a general rectangular shape to be engaged by a wrench or other turning means. On the shank I provide portions of weakness indicated at A, B, C, and D. These portions A, B, C, and D are each disposed adjacent one of the rectangular portions 14 and the portions are of increasing strength towards the head 12. As shown the portion A includes a central cylindrical reduced portion 15 which is provided with a V-groove 16 at each edge and which is provided with a central cylindrical aperture 17 which passes entirely through the portion 15.

The V-groove 16 provides an increased stress at the bottom of the V which tends to induce fracture at this location and the portion A is so constructed that lines extending from the bottom 18 of the V and tangent to the hole 17 as indicated by the dotted lines 19 is arranged at 45° to the longitudinal axis of the tap. I find from observation and study that a majority of the fractures in taps extend substantially 45° to the axis of the tap. This is due to the stresses in the tap and I have shown my invention as taking advantage of this frequent fracture line.

The weakened portion B includes a cylindrical central part 20 having a V-groove 21 in each side thereof. The construction preferably is that a line indicated at 22 and joining the bottom of the V's is arranged at an angle of 45° to the axis of the tap.

The weakened area C includes a cylindrical portion 24. The length of the portion 24 is equal to its diameter so that the diagonal 25 extends at 45° to the axis of the tap.

The weakened portion D has a diameter equal to its length and is provided with a round or fillet portion 27 so that this portion D is slightly stronger than the portion C.

The cross-sectional area of the part D is less than the cross-sectional area of all parts of the threaded portion 11 and the cross-sectional areas of the parts C, B, and A decrease towards the end of the shank.

I preferably provide the tap with a soft washer 30 which includes a central aperture 31 which is fitted about the end weakened portion to assist in holding the tap wrench in place.

In use the tap is inserted in the hole to be threaded and the tap wrench engages the tap shank beyond the weakened portion A. If fracture occurs it will occur at the portion A so that the breakage of the tap in the hole will be overcome. The tapping operation will then be resumed by placing the washer 31 about the part B and engaging the rectangular portion 14 which is

beyond the part B with the wrench. In this way the tap may be used until all of the parts A, B, C, and D are broken away.

In Fig. 4 I show a modification of my invention wherein the weakened portions are provided on an adapter or tap wrench which is indicated generally at 40. As shown the adapter includes a head 41 which has a polygonal recess 42 to receive the polygonal end 43 on the shank of a tap 44 which includes a threading portion 45. The adapter is provided with a cylindrical shank 46 which as shown includes two weakened portions 47 and 48 which are similar to the portions A and B previously described. The shank 46 may be cylindrical and provided with transverse apertures 49 through which pins may be inserted to hold the adapter, for example, in a tapping machine.

The use of the adapter shown in Fig. 4 is similar to that of the tap previously described and further explanation is believed to be unnecessary.

From the foregoing description it will be apparent that I have invented a novel tapping device which is simple and very effective for the purpose intended.

Having thus described my invention I claim:

1. In a tap device, a shank having a tapping head thereon, said shank having weakened portions, the strength of said portions decreasing away from the tapping head.

2. In a tap, a shank and a fluted threaded head portion, said shank including weakened portions, said shank including polygonal portions adjacent to the weakened portions, said weakened portions being of progressively increasing strength towards the head.

3. In a tap, a shank having a threaded head thereon, said shank including a reduced cylindrical portion whose length equals its diameter and which cylindrical portion includes a fillet at its juncture with the shank, a second reduced cylindrical portion whose diameter equals its length, a third reduced cylindrical portion which includes a groove at each end and a fourth cylindrical portion having a groove at each end and having an aperture extending therethrough.

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