

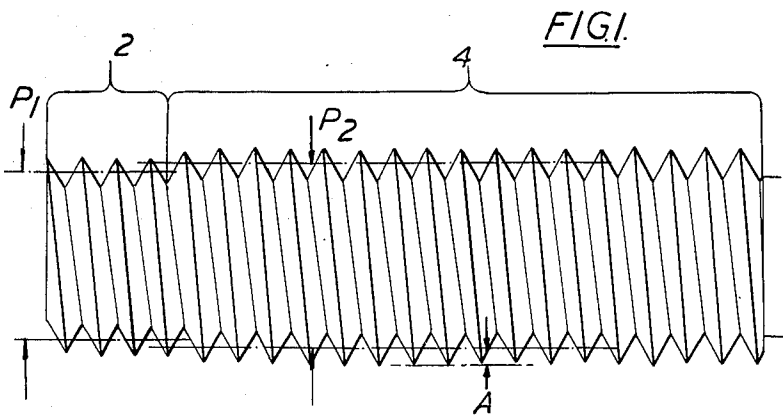
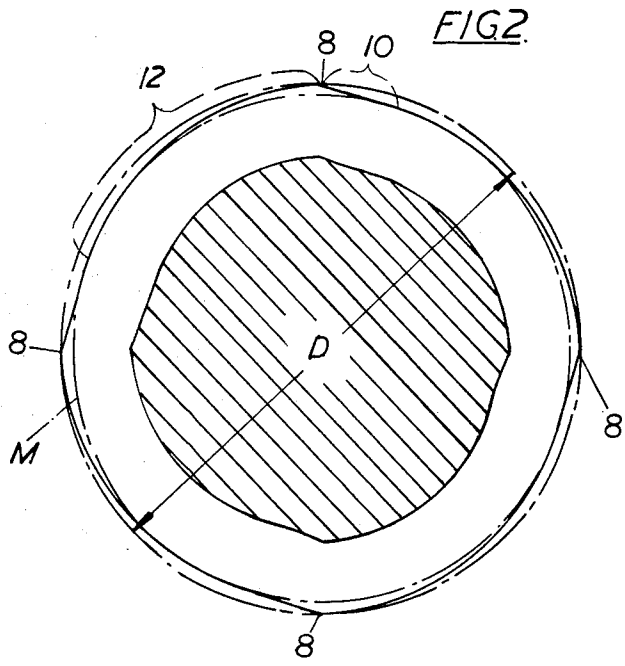
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FLUTELESS TAPS

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1

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FLUTELESS TAPS

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2 Claims. (Cl. 10—152)

Fluteless taps are taps which do not cut threads but act by deforming the wall of a cylindrical bore without deliberately removing any material. For this purpose a fluteless tap has a thread with a number of circumferentially spaced radially relieved parts between which there are accordingly circumferentially spaced crests. At their maximum radial distance from the axis of the tap these crests have profiles, as seen in section planes lying along the axis of the tap, corresponding to the shape of the thread which is to be formed by the tap. For convenience we refer to the "diameter of the tap," meaning the diameter of the thread which will be formed by the tap, that is to say twice the maximum radius of the crests from the axis of the tap.

According to the present invention a tap has at the leading end a primary thread zone which has circumferentially spaced crests at a constant radial distance which is less than the radial distance of the crests on the remainder of the tap but is greater than half of the crests on the remainder of the tap; that is to say, the radius of the primary thread zone is smaller than the radius of the remainder by an amount less than half the radial depth of the crests on the remainder. The thread on the tap has a smooth transition from the primary thread zone to the remainder of the thread, which remainder may be termed the "secondary thread zone."

In use when the tap is screwed into a bore of the appropriate diameter, the primary thread zone on the tap partially forms the required thread in the bore, and the thread in the bore is completed by the secondary thread zone. As the primary thread zone can enter relatively easily into the bore (as compared with a tap with a thread of constant radius all the way to the end) and is of a constant radius, it ensures that the axis of the tap is accurately aligned with the axis of the bore. To ensure accurate alignment the primary thread zone preferably has at least three turns of thread.

An example of a tap according to the present invention is shown in the accompanying drawings. In the drawings:

FIGURE 1 is a fragmentary side view showing the threaded part of the tap; and

FIGURE 2 is a cross section, which for convenience is taken in a helix through the centre of the helical valley between two adjacent turns of the thread.

The tap has a primary thread zone 2 at its leading end, and a secondary thread zone 4. There are about three turns of the primary thread zone, and the transition from the primary zone to secondary zone takes place through one turn of the thread.

The secondary thread zone has an addendum A, that is to say, half the radial depth of the final thread which is formed by the secondary zone thread. The diameter

2

of the crests of the primary thread zone is equal to the diameter of the secondary thread zone minus the addendum of the secondary thread zone.

The secondary thread zone has a pitch diameter P_2 . It will be seen that this is smaller than the crest diameter of the primary thread zone. The primary thread zone has a pitch diameter P_1 .

As shown in FIGURE 2, the tap has four circumferentially spaced crests 8. Each crest is at the junction of a steeply relieved leading part 10 and a progressively relieved trailing part 12. The tap diameter is the dimension D. It will be seen that the outer edge of the leading part 10 is substantially a straight line passing through the crest tangentially to a circle M which has the minimum diameter of the tap. The outer edge of the progressively relieved trailing part 12 extends from the crest to a point at about the junction of the circle M with the outer edge of the leading part of the adjacent crest. The relief of diameter, that is to say the difference between the dimension D and the diameter of the circle M, is shown slightly exaggerated in FIGURE 2 for the sake of clarity.

The thread form shown in FIGURE 2 is the subject of patent application No. 30,995/60.

I claim:

1. A fluteless tap having, in axial sequence, a leading end, a primary thread zone, a transition thread zone, and a secondary thread zone; each of the primary and secondary thread zones consisting of a plurality of helical turns, each turn, viewed axially, having a plurality of circumferentially spaced crests, all the crests of the primary thread zone lying at a uniform first radius from the axis of the tap, and all the crests of the secondary thread zone lying at a uniform second radius from the axis of the tap; all the thread zones having turns which, considered in planes containing the axis, are of the same profile; the first radius being less than the second radius by an amount not exceeding half the radial depth of the crests on second thread zone; the transition thread zone consisting of about one spiral turn which links the adjacent turns of the primary and secondary thread zones; and the profile of the turns having an apex at its radially outermost extremity, whereby the part of the primary thread zone adjacent to the leading end will exert a first thread forging action upon insertion into a bore and thereby form a primary thread, the remainder of the primary thread zone will maintain the tap in axial alignment in the bore, and the transition thread zone will exert a second thread forging action upon the primary thread and thereby enlarge the primary thread into secondary thread, and the remainder of the secondary thread zone will smooth the secondary thread.

2. A fluteless tap according to claim 1, in which the first radius is substantially equal to the second radius minus one quarter of the radial height of the profile.

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