

[54] **REMOVABLY MOUNTABLE ARROW HEAD AND DRILL TAP FOR MAKING IT**

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[58] Field of Search **273/106.5 R, 106.5 B; 408/215, 216, 218, 219, 221**

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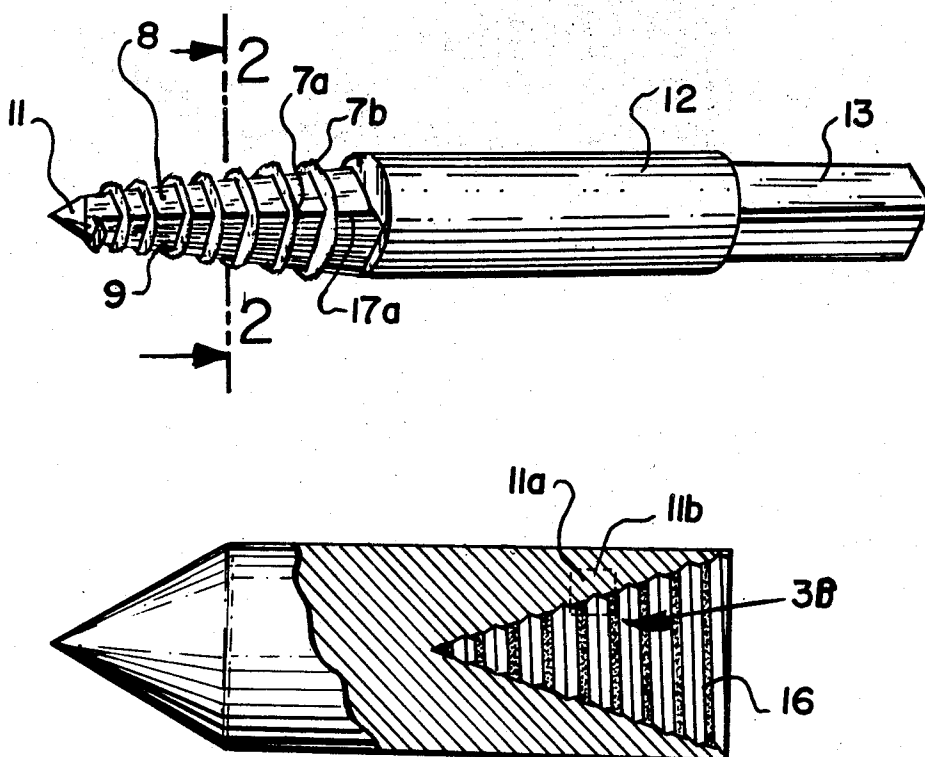
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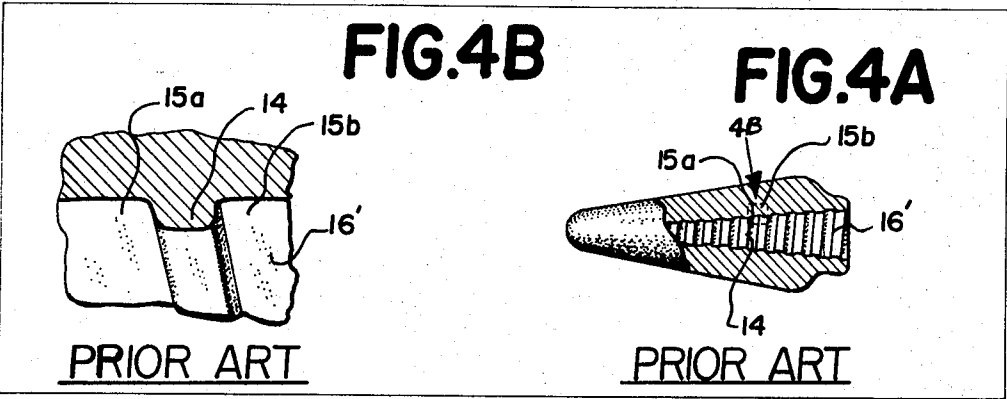
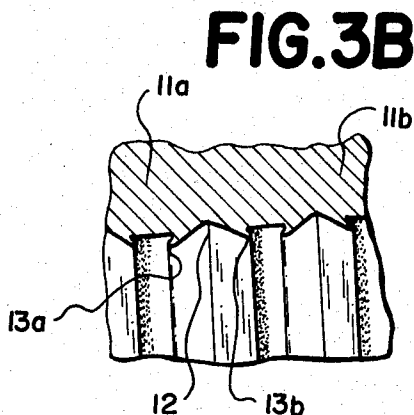
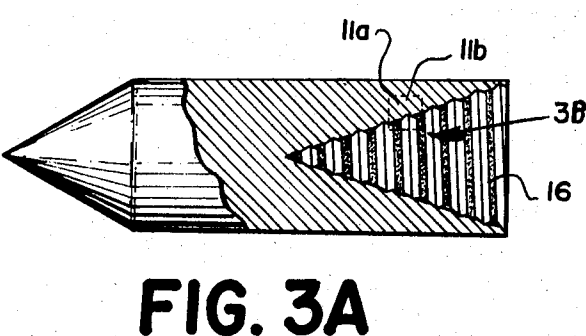
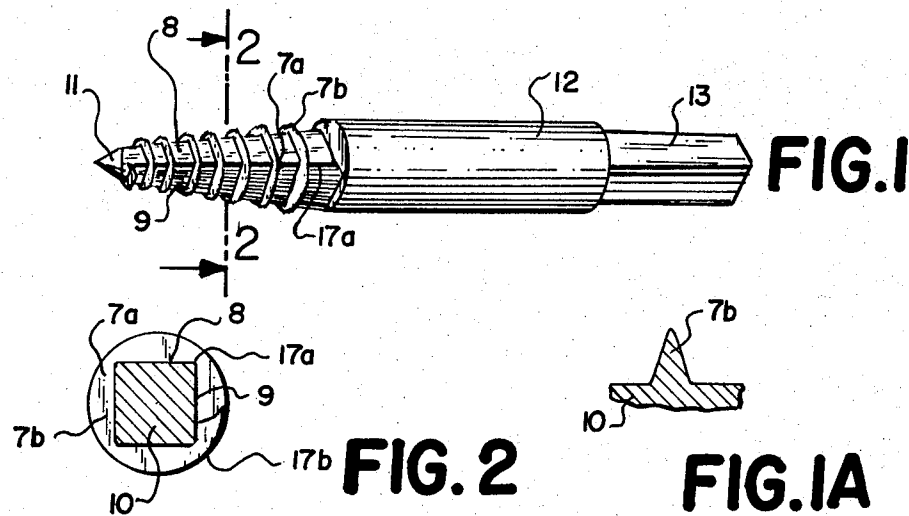
[57] **ABSTRACT**

In a preferred embodiment, an arrow head base either a part of the arrow head or mountable thereon of an ar-

rowhead, as the case may be, in which extending along a longitudinal axis from the base end mountable on an arrow shaft, is a conically shaped cavity having its inner walls converging to narrow cavity diameter toward the arrow head end of the arrow head base, and having helically extending paired ridge projections extending about radially inwardly from the converging converging inner walls, with a groove between paired projections and with each of paired projections leaning away from one-another overhanging adjacent inner wall surfaces, such that particularly steel arrow head bases so characterized are manually interchangeably mountable in a secure state not readily dislodged during normal use of the arrow, the process of producing such a steel arrow head base requiring a novel drill tap having helical threads extending along a substantially conical plane around the longitudinal axis of a tap shank of a plurality of sides as viewed in transverse cross-section, typically being substantially squared — such that upon drilling the cavity momentary screw-in rotary motion for predetermined duration of drilling motion, the plurality of shank wall extending angularly to one another forming pointed portions dig-out the groove portions during the forcefully axially moving screw-in and forms the arrow head base paired ridge projections leaning angularly in opposite directions, with the result that the ridge projections in effect act in the nature of barbs securing or secureable of the head in a mounted state on the end of particularly a wooden arrow shaft.

9 Claims, 7 Drawing Figures





REMOVABLY MOUNTABLE ARROW HEAD AND DRILL TAP FOR MAKING IT

This invention relates to an arrow head base as an integral part of an arrow head or as a base section on which the separate blade is interchangeably mountable, the invention relating to novel threads by which the ferrule is mounted onto an arrow shaft.

BACKGROUND OF THE INVENTION

Prior to the present invention, there have existed ferrules which are mounted or mountable removably onto the arrow-head end of an arrow shaft, and when such ferrules are plastic and thereby normally molded to shape, there has not been any major problem in obtaining diverse shapes which facilitate the secure mounting thereof onto the arrow shaft. However, the problem has been a major one with nonmoldable metals — not subject to ready injection molding — the jar of impact in particular causing such metal heads to come-off and possibly to become lost. Consequently, it has been the general practice to permanently mount such heads or ferrules by a permanent mounting base section or by a permanent arrow head base. As a result of the permanently mounted practice heads, for example, being a part of arrows of differing arrow head weight that of hunting arrows, the shooting of hunting arrows is substantially different than that of the practice target arrows, thereby throwing-off the accuracy of the archer.

SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to obtain an arrow head base or a base mountable of a blade, overcoming one or more of the above type problems, together with other novel advantages.

Another object is to obtain a base mounting thread (or threads) advantageous to both metal and plastic heads and/or ferrule(s).

Another object is a novel drill tap obtainable of the novel base threads of the present invention particularly in the producing of metal target and field point(s).

Other objects become apparent from the preceeding and following disclosure.

One or more of the objects of the present invention are obtained by the invention as defined herein.

Broadly the invention includes the novel arrow head base or ferrule having a cavity defined by converging wall converging in the direction of the arrow-head blade end of the base, the converging inner-cavity wall having helically extending ridges extending at an acute angle over an adjacent face from which the ridge projection extends, and preferably being paired ridges helically continuous with a preferably about-V-shaped groove extending along between the ridge projections, and with preferably the ridge projection in the paired state leaning in opposite directions from one-another.

As a result of the novel arrow head base(s) and/or ferrule(s) of the present invention, there are now provided heads or ferrules which are of the removably mountable nature of various unlimited types, particularly the target points and field points being now also removably mountable. The arrow heads and/or ferrule(s) which incorporate the novel ridge projections of the present invention are removably mountable in a secure state, and are interchangeable with hunting arrow heads. Additionally, the normally light weight target heads may be now readily available in a variety of dif-

fering weights matching any of hunting heads and/or blades of different weights, such that at any time of practice the archer may mount a head of a weight corresponding mass to that of the hunting head.

In arriving at the present invention, various ineffective process procedures and drill taps were unsuccessfully tried before eventually arriving at the present invention arrow head base, inventive drill tap, and process utilizing that drill tap.

Basically the drill tap of the present invention must be at predetermined force rammed into the conical cavity of a head to be drilled, while concurrently turning the drill in a screw-in rotary direction during the application of the ramming force, to result in the novel arrow head base securing threads of the type already discussed above. It should be noted that this process is primarily designed for and applicable to metal arrow head bases — as opposed to plastic, since even though some general plastics might successfully be drilled, it is necessary for the plastic to which the process would be most beneficial in the resulting head, to be a plastic that is of high tensile strength resistant to the breaking off of the ridge projections during the first mounting or head removal operation on an arrow shaft; typically a rigid or brittle plastic head would result in the shearing off of the ridge projection probably during the first use thereof. Also, if applied to the drilling of plastic, because of the typically lesser tensile strength thereof — as compared to steel head base(s), the contour of the converging outer walls of the novel drill tap and the amount of jamming force and the bite of the helical drill tap threads must all vary slightly to best advantage in the drilling process and the resulting durable head. The metal heads obtained by process and drill tap of the present invention are not subject to being produced by any other process nor any other drill tap.

Accordingly, the novel drill tap must have helically extending along the longitudinal axis thereof preferably a continuous thread which preferably rises to a point — as viewed in cross-section transversely across the body of the respective thread — with the helically extending thread converging in a spiral manner toward the insertion point of the drill tap, while the drill tap shank along the longitudinal axis of the drill tap also converges toward a point, but additionally with the shank wall surface between the drill tap threads including several substantially flat faces meeting angularly one-another to form more or less corners, such that in a transverse cross-section through the shaft there is viewed a multi-sided shank, preferably of about square shape, whereby during the process as above described the corner portions gouge-out and force backwardly and/or forwardly gouged portions to result in the ridge projections of the novel arrow head base of the present invention.

The present invention may be better understood by reference to the figures as follow.

FIG. 1 illustrates a side perspective view of a typical novel drill tap of the present invention.

FIG. 1A illustrates a typical transverse cross-sectional view taken through the drill tap thread.

FIG. 2 illustrated a typical transverse cross-sectional view taken across the longitudinal axis of the shank along lines 2—2 of the FIG. 1 embodiment.

FIG. 3A illustrates a typical target arrow head having integral base as viewed in in-part cross-sectional side view through the conical cavity already drilled by the novel process of the present invention.

FIG. 3B illustrates the same view as that of FIG. 3A, except that the FIG. 3B view is limited to an enlarged view of the portion within the square phantom-lines 3B of FIG. 3A.

FIG. 4A corresponds to the view of FIG. 3A except that this embodiment represent typical prior art for molded ferrule(s).

FIG. 4B similarly corresponds to the enlarged view of FIG. 3B, this prior art enlargement disclosing merely a helical perpendicular projection relative to the face of the conical cavity inner surface of the ferrule wall.

DETAILED DESCRIPTION OF THE INVENTION

In more particular reference to the particular FIGS. reference is first made to FIG. 3A which discloses the typical said appearance of a novel arrow head embodying the novel securing threaded structure of the present invention, with the respectively bored portions 11a and 11b of the phantomly outlined section 3B.

In the enlarged view of FIG. 3B, it is more discernably notable the very small bored portions 11a and 11b with the resulting oppositely leaning ridge projections 13a and 13b with the V-shaped groove therebetween. In this view there are viewable the two separate paired opposing sets of ridge projections, each set having its respective groove therebetween, such as the groove 12. It should be noted that these ridge projections are so small that they are scarcely viewable with the unaided eye, and that the distance between consecutive rows of the re-occurring continuous helical ridge projections and grooves is very small.

Accordingly, it should be noted that the helical angle of progression axially per helical revolution of the helical thread around the shank in FIG. 1 is very small and that it is much smaller than that represented in the perspective view, the FIG. 1 accordingly not being to scale but being merely representative of the cutting and jamming blade-threads 7a and 7b along the conical portion of the tap 12 having tap shank faces 8, etc., extending around the shank and meeting to form cutting corner portions such a corner 9 of the shank body 10 (FIG. 2). Like the spiraling threads 7a and 7b converging helically to a lesser diameter nearer the insertion portion, the shank body 10 similarly converges towards a substantially pointed end 11. The tap is typically secureable by a squared section 13, or of any desired and/or conventional shape employable by a drilling machine.

As opposed to the above-described inventive arrow head base and drill tap and process, as illustrated in FIGS. 1, 2, 3A and 3B, the prior art closest structure to that of the present invention is illustrated by the FIGS. 4A and 4B which illustrate a molded plastic ferrule shown in partial cross-section in FIG. 4A, with an enlarge view of the FIG. 4A portion 4B illustrated FIG. 4B. In the prior art molded embodiment, there exist basically strictly upright (vertical) projections having wide flat spaces between consecutive consecutive projections such as the projection 14 having flat portions 15a and 15b adjacent opposite sides of the projection 14. The molded helical continuous ridge vertical projection is much more widely spaced and much more pronounced than those typically of the present invention also, although the present invention is not limited to specific dimensions, except that there are preferred ranges for steel tap drilling — which dimensions obviously would not be the same for a plastic base to be drilled.

Typically the preferred drill tap has a shank which at its broader diameter is between about one-fourth inch and five-eighth inch, typically three-eighth inch in diameter, and the helical threads thereof preferably taper at an angle ranging from about 3° to about 5°, typically about 5°, at about 12 to 20 threads preferably per inch of taper, typically about 16 threads per inch. The height of the acute-angularly leaning ridge projection above the inner wall surface over-hung by the leaning projection, is from about five to 15 ten-thousandths inch in height for a steel base embodiment, and for the same steel base, the gully or groove preferably ranges from about 10 to about 30 ten-thousandths of an inch in depth. For plastic heads to be drilled, or molded — as the case may be, the plastic typically may be mylar type or any other suitable type that may be desired, as based on above-described prerequisites.

The preceding illustrative embodiments are intended to merely illustrate the heart of the present invention, and not to limit the scope thereof. Thus, for example, any type or shape of arrow head or ferrule or base may embody the present invention by the application of ordinary skill for modifications, variations, substitution of equivalents, and the like, as within the scope and spirit of the present invention.

With regard to the embodiment illustrated in FIGS. 4A and 4B of the prior art, the illustrated structure is recognizable by those skilled in the art as a ferrule mountable of a blade (not shown). As noted above, this type of ferrule as well as any other may embody the present invention, within the limitations as set forth as critically described in the preceding disclosure.

We claim:

1. A removably mountable arrow head base mountable on an arrow shaft's forward end, comprising in combination: an arrow head element having an axially extending mounting base with a hollowed end of base walls having an outer surface and having an inner surface with circularly opposing faces defining a circular mouth and the opposing faces of the inner wall surface converging from the mouth axially in an arrow-head end direction to an inner-cavity less in diameter than the diameter of said circular mouth, there being a plurality of ridge projections extending angularly upwardly from said inner surface in a radially inwardwardly direction relative to the circular nature of the inner surface converging from the mouth, substantially each ridge projection defining an acute angle relative to its respective base face, with the plurality of ridge projections extending in substantially common helical directions along said converging inner wall surface.

2. A removably mountable head arrow head base mountable on an arrow shaft's forward end, according to claim 1, in which each ridge projection leans over said respective base face.

3. A removably mountable arrow head base mountable on an arrow shaft's forward end, according to claim 2, in which each ridge projection converges to substantially a point in side cross-section thereof.

4. A removably mountable arrow head base mountable on an arrow shaft's forward end, according to claim 3, in which the ridge projections are paired and lean angularly in diverging axial directions from one-another along said inner surface.

5. A removably mountable arrow head base mountable on an arrow shaft's forward end, according to claim 4, in which the space between each of said di-

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verging paired ridge projections is a substantially V-shaped gulley.

6. A removably mountable arrow head base mount-
able on an arrow shaft's forward end, according to
claim 5, in which each of paired projections and the
gulley therebetween is helically continuous with others
of said paired projections and gulley thereof, of said
plurality, and in which said hollowed end is substan-
tially of conical shape.

7. A removably mountable arrow head base mount-
able on an arrow shaft's forward end, according to
claim 6, in which said base is of steel.

8. A removably mountable arrow head base mount-
able on an arrow shaft's forward end, according to
claim 1, in which said base is of steel.

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9. A drill tap comprising an axially elongated mem-
ber having a shank defined by angularly converging
outer shank walls converging substantially axially to
substantially a point, and including helical substantial-
ly-axially extending thread projections projecting sub-
stantially radially outwardly from said shank, substan-
tially each helical projection in cross-section having
converging opposite surfaces rising to substantially a
point, the tap shank in transverse cross-section being
defined by a plurality of substantially linear edges, each
edge being angularly disposed with respect to the adja-
cent edge around the periphery of said shank, each ad-
jacent piece of edges defining therebetween an out-
wardly directed vertex.

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