



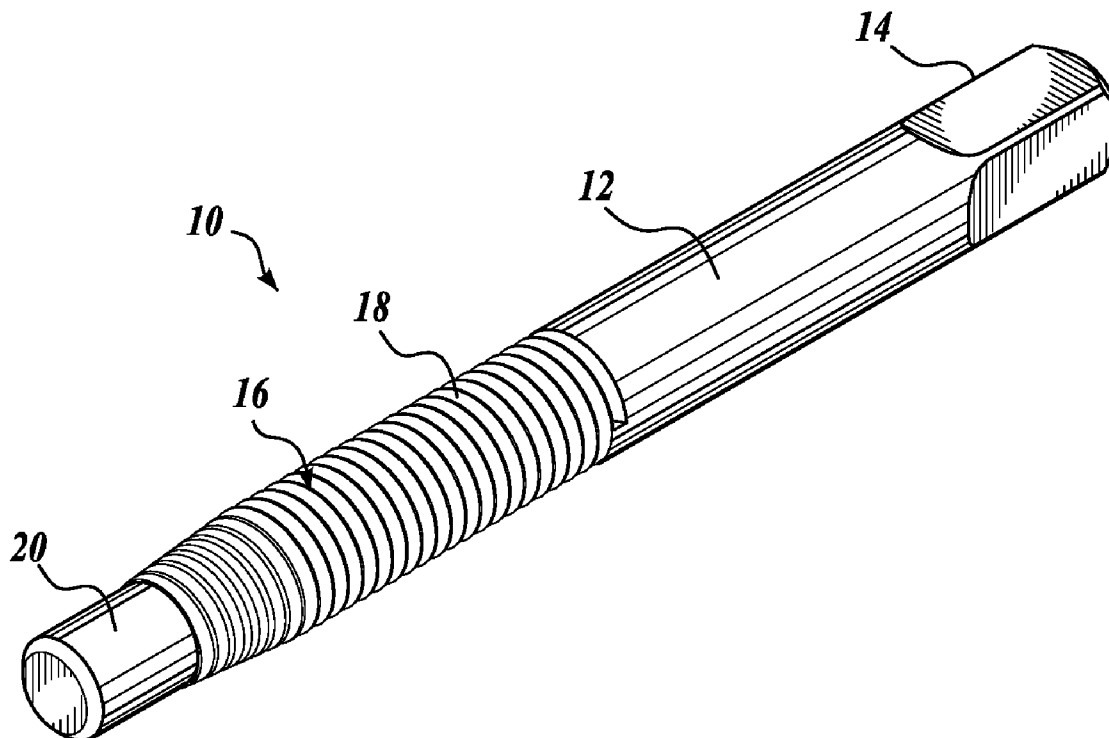
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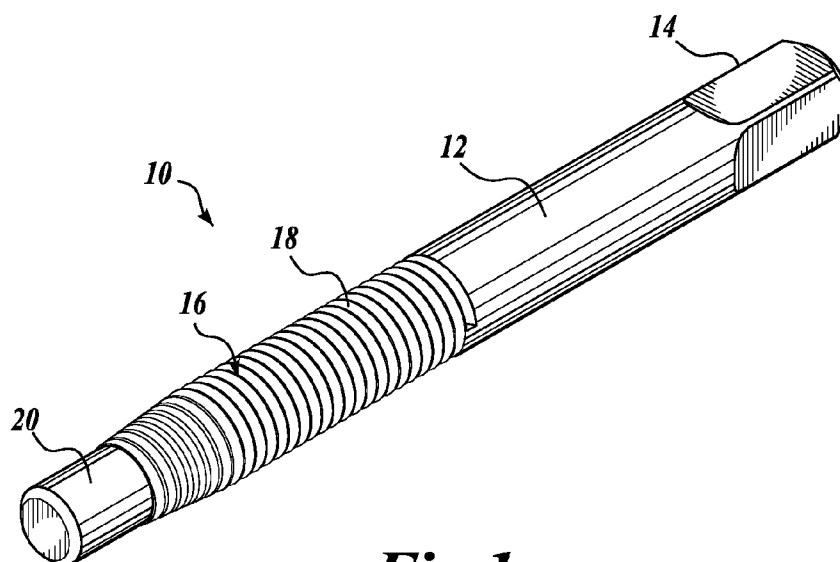
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**Chirico**(10) **Pub. No.: US 2009/0215544 A1**(43) **Pub. Date: Aug. 27, 2009**(54) **SELF ALIGNING TAP****Publication Classification**(75) Inventor: **Kahl David Chirico**, Polson, MT  
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Correspondence Address:

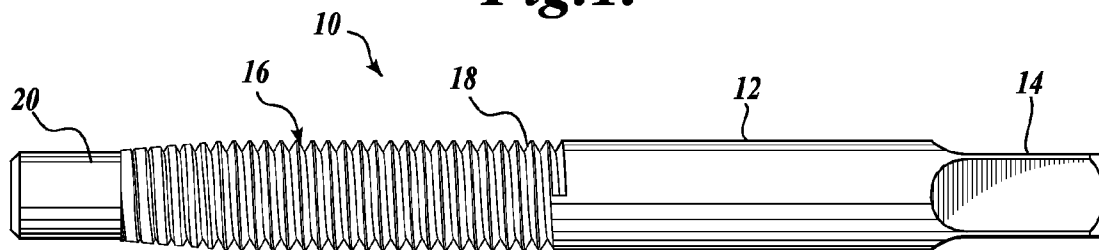
**CHRISTENSEN, O'CONNOR, JOHNSON,**  
**KINDNESS, PLLC**  
**1420 FIFTH AVENUE, SUITE 2800**  
**SEATTLE, WA 98101-2347 (US)**(57) **ABSTRACT**(73) Assignee: **JOE CORPORATION**, Ronan,  
MT (US)

A tap for forming threads in a workpiece is provided. The tap includes a shank having a first end adapted for insertion in a hand tool and a second end. The tap also includes a threaded shaft portion extending from the second end of the shank, the shaft portion includes a substantially uniform diameter and threads. The tap further includes a substantially cylindrical tip extending from the shaft portion. The tip has a diameter less than the diameter of the shaft portion and a length sufficient to co-axially align the tap with an sized opening of a workpiece to be tapped.

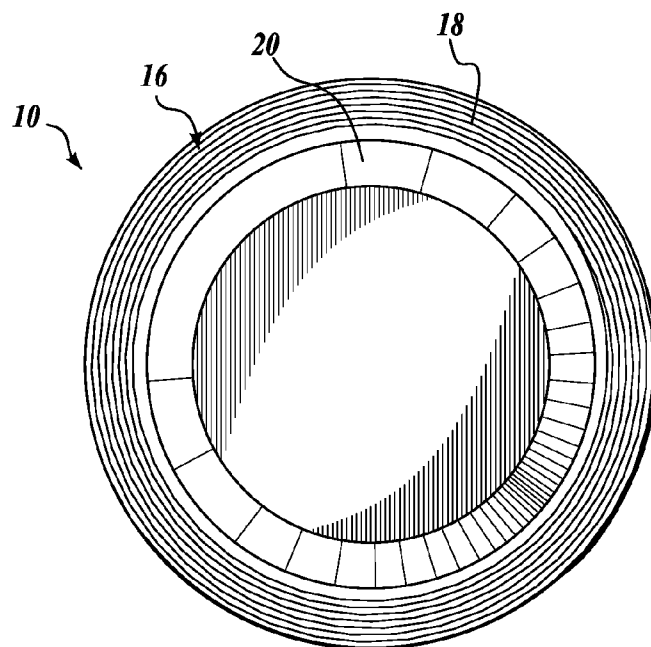
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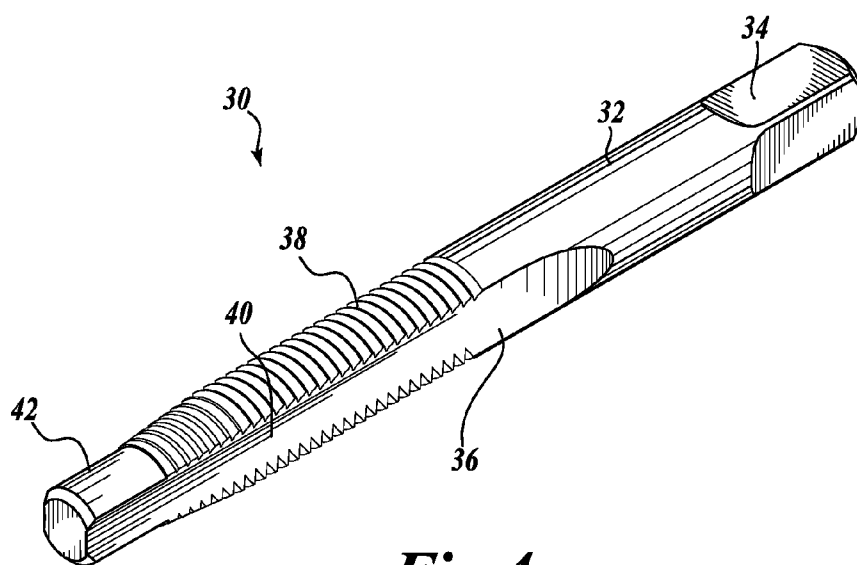
**Fig. 1.**



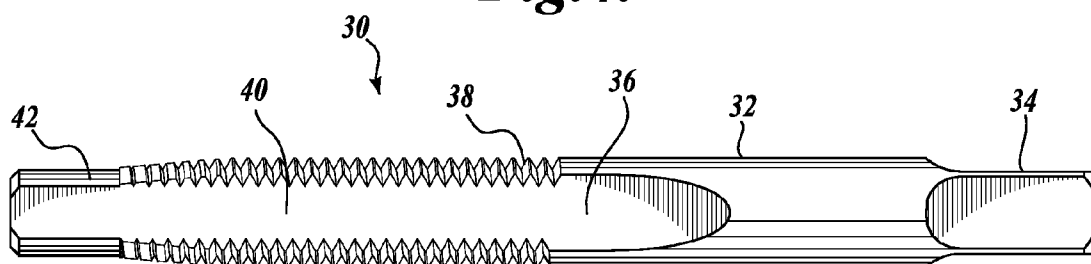
**Fig. 2.**



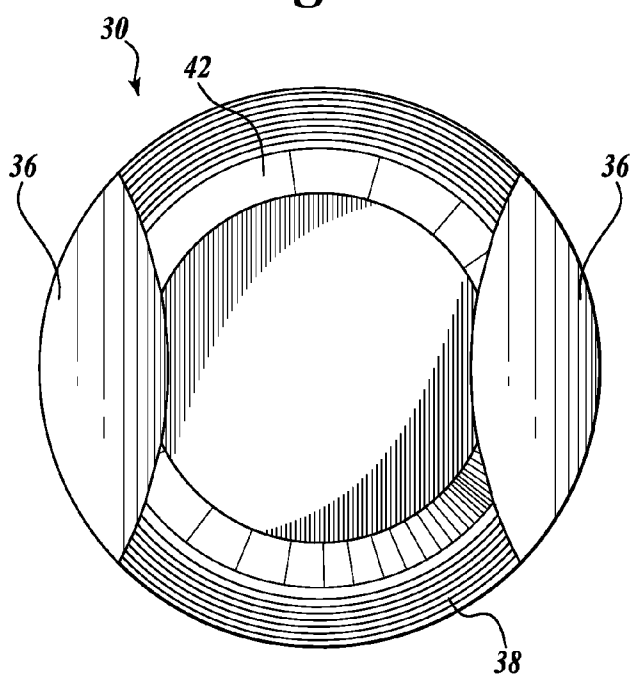
**Fig. 3.**



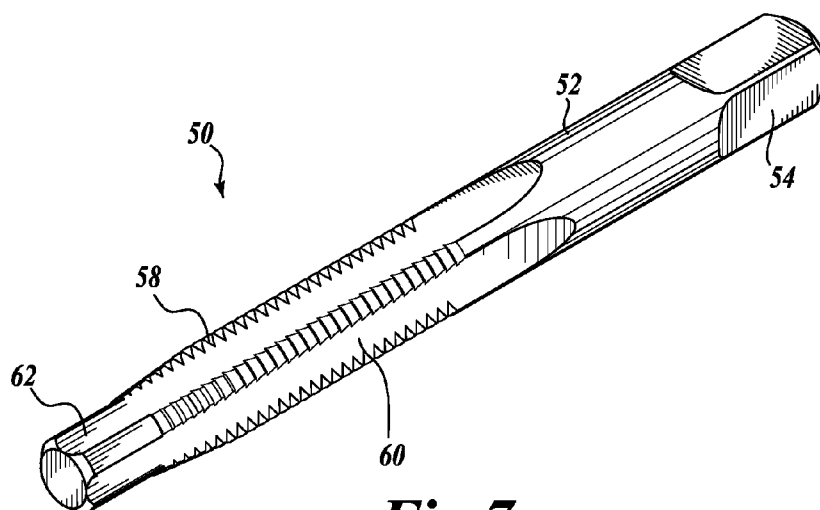
**Fig. 4.**



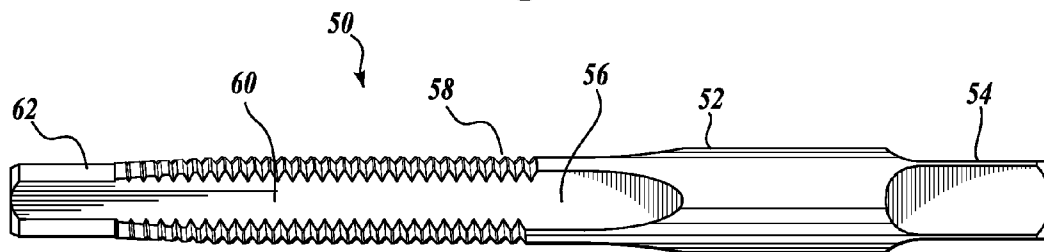
**Fig. 5.**



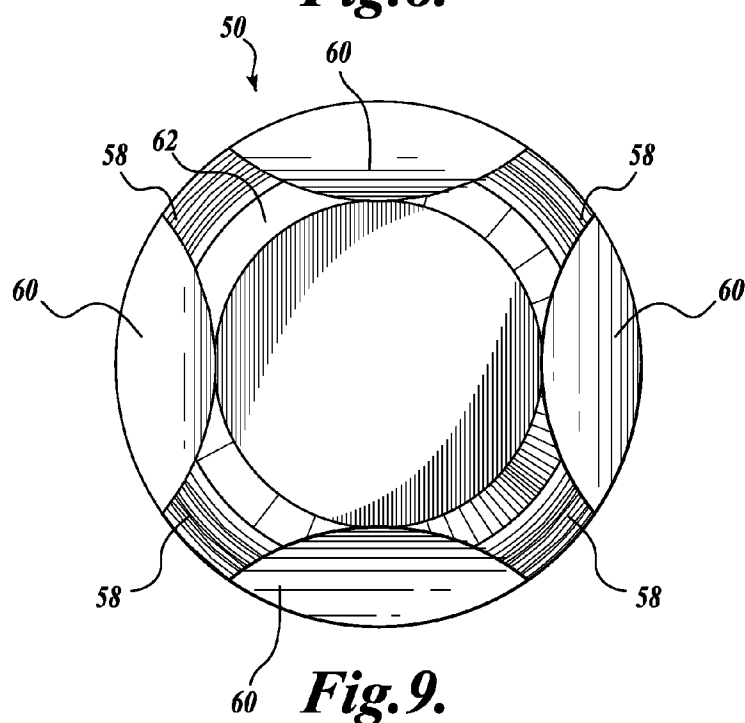
**Fig. 6.**



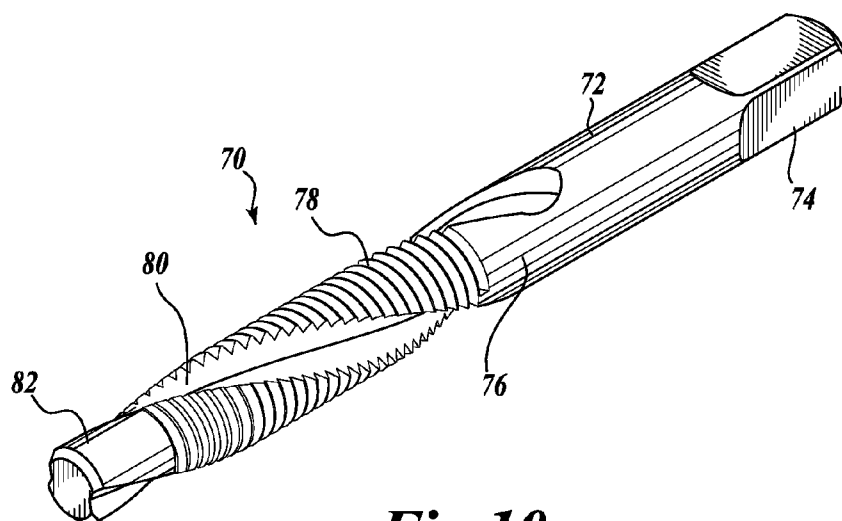
**Fig. 7.**



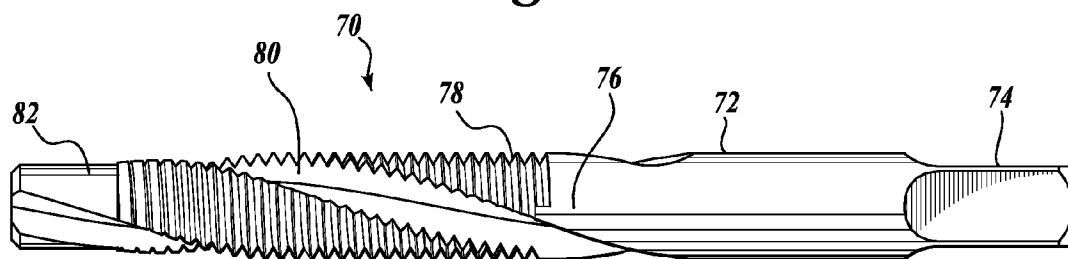
**Fig. 8.**



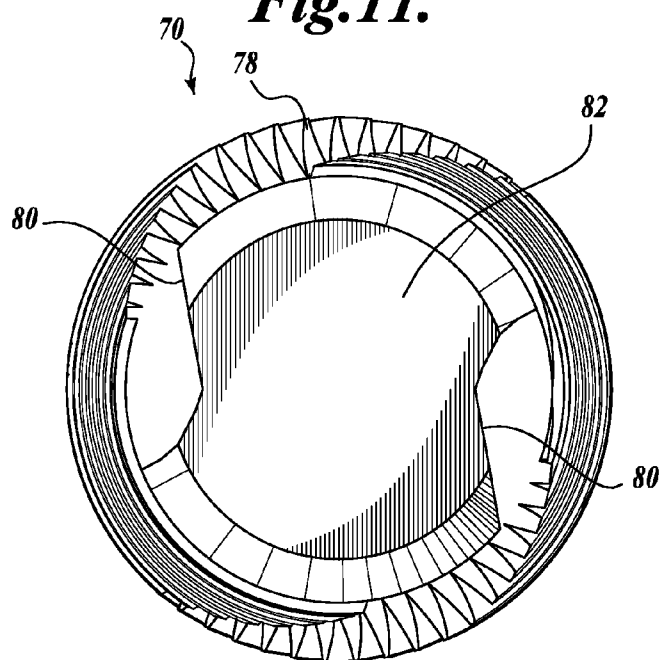
**Fig. 9.**



**Fig. 10.**



**Fig. 11.**



**Fig. 12.**

## SELF ALIGNING TAP

### BACKGROUND

**[0001]** Taps are known in the market and have a number of variations. Shank configurations of taps vary from the standard four-sided shank to hex shanks. Different flute styles are available for the threaded portion of the tap, such as straight flutes and helical flutes, with one or more flutes possible per tap. Even though variations exist, taps can all be reduced to three common types: standard taps, bottoming taps, and “draps” (i.e., drill-tap combinations).

**[0002]** Standard taps and bottoming taps, however, require the use of a drill press or mill. A drill press or mill is necessary to ensure that the tap is used on the same axis as the drill bit used to drill the opening to be tapped, so that the opening is tapped straight, not crooked. The necessity of using a drill press or mill can limit the usefulness of these taps.

**[0003]** Draps combine a tap with a drill into a single tool. The front of the tool is a drill bit of approximately one half of an inch in length, followed by a tap. Draps are, however, limited to use with thin-wall material where the drill bit can clear the material before the tap portion comes in contact with the material. Because it advances at a constant rate, the tap portion of a drap would bind the drill bit portion to the material if both portions of the drap were in contact with the material at the same time.

### SUMMARY

**[0004]** A tap for forming threads in a workpiece is provided. The tap includes a shank having a first end adapted for insertion in a hand tool and a second end. The tap also includes a threaded shaft portion extending from the second end of the shank, the shaft portion includes a substantially uniform diameter and threads. The tap further includes a substantially cylindrical tip extending from the shaft portion. The tip has a diameter less than the diameter of the shaft portion and a length sufficient to co-axially align the tap with an sized opening of a workpiece to be tapped.

**[0005]** This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This summary is not intended to identify key features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

### DESCRIPTION OF THE DRAWINGS

**[0006]** The foregoing aspects and many of the attendant advantages of this invention will become better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

**[0007]** FIG. 1 is an isometric view of a self-aligning tap constructed in accordance with one embodiment of the present disclosure;

**[0008]** FIG. 2 is a side planar view of the self-aligning tap of FIG. 1;

**[0009]** FIG. 3 is an end planar view of the self-aligning tap of FIG. 1;

**[0010]** FIG. 4 is an isometric view of a self-aligning tap constructed in accordance with an alternate embodiment of the present disclosure and showing two flutes alternating with the threads;

**[0011]** FIG. 5 is a side planar view of the self-aligning tap of FIG. 4;

**[0012]** FIG. 6 is an end planar view of the self-aligning tap of FIG. 4;

**[0013]** FIG. 7 is an isometric view of a self-aligning tap constructed in accordance with a second alternate embodiment of the present disclosure and showing four flutes alternating with the threads;

**[0014]** FIG. 8 is a side planar view of the self-aligning tap of FIG. 7;

**[0015]** FIG. 9 is an end planar view of the self-aligning tap of FIG. 7;

**[0016]** FIG. 10 is an isometric view of a self-aligning tap constructed in accordance with a third alternate embodiment of the present disclosure and showing two helical flutes alternating with the threads;

**[0017]** FIG. 11 is a side planar view of the self-aligning tap of FIG. 10; and

**[0018]** FIG. 12 is an end planar view of the self-aligning tap of FIG. 10.

### DETAILED DESCRIPTION

**[0019]** FIGS. 1-3 illustrate a tap 10 constructed in accordance with one embodiment of the present disclosure. The tap 10 is suitably fabricated from hardened tool steel, hardened cast steel, cast aluminum or some other material capable of withstanding the application of torque and tensile forces. Such a tap 10 includes a shank 12 with a tang 14 or other suitable projection adapted for insertion in a drill or other hand tool capable of producing a rotational motion along the axis of the tap 10. The tap 10 also includes a threaded shaft portion 16 that is substantially cylindrical in shape and of substantially uniform diameter. One of skill in the art will appreciate that a variety of standard diameters are available and can be employed, such as ¼ inch, ⅝ inch, etc., and that specialized diameters are possible as well.

**[0020]** The tap 10 also includes a substantially cylindrically shaped alignment tip 20 of substantially uniform diameter. The alignment tip 20 is suitably smaller in diameter than the threaded shaft portion 16. The diameter of the alignment tip 20 corresponds substantially to the diameter of an opening in a workpiece, such as wood, to be tapped.

**[0021]** The alignment tip 20 is preferably of a length sufficient to ensure that the length of the tap 10 is co-axial with the opening to be tapped. The alignment tip 20 should not, however, be so long that a substantial portion of a blind hole or other similar opening remains untapped as a result of the excessive length of the alignment tip 20. Accordingly, it is envisioned that the length of the alignment tip 20 is substantially equal to or greater than the diameter of the alignment tip 20. As a non-limiting example, if the alignment tip 20 is ¼ inch in diameter, then the length of the alignment tip 20 is at least ¼ inch.

**[0022]** Such a ratio, based on the present teachings, is within the skill of one in the art and, therefore, a multitude of configurations are within the scope of the present disclosure and will vary according to the size of the tap 10. Further, a number of shapes in addition to a circular shape can be used for the tip, such as a regular hexagon, a regular nonagon, and a regular decagon.

**[0023]** Use of the tap 10 may be best understood by referring to FIGS. 1-3. The alignment tip 20 is inserted in the opening to be tapped. The drill or other suitable hand tool (not shown) is activated and the tap 10 begins rotating. The alignment tip 20 serves to align the tap 10 with the opening such that the threaded shaft portion 16 is aligned coaxially with the

length of the opening as it is being tapped. In this way, the threads formed in the opening by the tap **10** as the threaded shaft portion **16** advances into the opening are substantially orthogonal in relation to the axis of the opening.

[0024] A tap **30** constructed in accordance with an alternate embodiment of the present disclosure may be best understood by referring to FIGS. 4-6. The tap **30** is substantially identical in materials and operation as the tap **10** described with respect to FIGS. 1-3, with the following exception. Specifically, the tap **30** includes flutes **40**. The flutes **40**, of which there are two, act to channel chips out of the opening during operation of the tap **30**. The flutes **40** carry the chips up from the cutting edge to the top of the hole where they are cast off. The flutes **40** additionally provide cutting edges and channels for lubrication.

[0025] A tap **50** constructed in accordance with another alternate embodiment of the present disclosure may be best understood by referring to FIGS. 7-9. The tap **50** is substantially identical in materials and operation as the tap **30** described with respect to FIGS. 4-6, with the following exception. Specifically, the tap **50** includes multiple flutes **60**. As a non-limiting example, the tap **50** includes four flutes **60**. As was the case in the embodiment illustrated in FIGS. 4-6, the flutes **60** serve to remove chips, and to provide cutting edges and channels for lubrication.

[0026] A tap **70** constructed in accordance with yet another alternate embodiment of the present disclosure may be best understood by referring to FIGS. 10-12. The tap **70** is substantially identical in materials and operation as the tap **50** described with respect to FIGS. 7-9, with the following exception. Specifically, the tap **70** includes a plurality of helical flutes **80**. As will be appreciated by one of skill in the art, helical flutes **80** are particularly effective at removing chips. As will be further appreciated by one of skill in the art, the number of helical flutes **80** can vary, from a single helical flute to two or more and, therefore, such embodiments are also within the scope of the present disclosure.

[0027] The taps disclosed above generally includes a tip that is slightly smaller in diameter than the opening to be tapped. The tip thus acts as a guide for the tap, keeping it straight as the tap enters the opening. The tip extends from the tap portion of the device which is cylindrical, bears threads, and has a diameter greater than the diameter of the tip. The tap is adapted for insertion in a drill or other similar hand tool. This tap is capable of tapping both a through hole and a blind hole.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A tap for forming threads in a workpiece, the tap comprising:

- (a) a shank having a first end adapted for insertion in a hand tool and a second end;
- (b) a threaded shaft portion extending from the second end of the shank, the shaft portion having a substantially uniform diameter and threads; and
- (c) a substantially cylindrical tip extending from the shaft portion, the tip having a diameter less than the diameter of the shaft portion and a length sufficient to co-axially align the tap with an sized opening of a workpiece to be tapped.

2. The tap of claim 1, further comprising at least one flute alternating with the threads.

3. The tap of claim 2, wherein the at least one flute is a helical flute.

4. The tap of claim 1, further comprising a plurality of flutes alternating with the threads.

5. The tap of claim 4, wherein the plurality of flutes are helical in shape.

6. A self-aligning tap for forming threads in a suitably-sized opening, the tap comprising:

- (a) a shank having a first end and a second end;
- (b) a tang extending from the first end of the shank;
- (c) a substantially cylindrical shaft portion having a substantially uniform diameter and including a threaded portion extending from the second end of the shank; and
- (d) a substantially cylindrical tip extending from the shaft, the tip having a diameter less than the diameter of the shaft portion and a tip length less than a length of the shaft portion.

7. The tap of claim 6, further comprising at least one flute alternating with threads of the threaded portion.

8. The tap of claim 6, further comprising a plurality of flutes alternating with threads of the threaded portion.

9. The tap of claim 7, wherein the at least one flute is a helical flute.

10. A self-aligning tap for forming threads in a suitably-sized opening, the tap comprising:

- (a) a shank having a first end adapted for insertion in a hand tool capable of producing a rotational motion and a second end;
- (b) a substantially cylindrical shaft extending from the second end of the shank, the shaft having a substantially uniform diameter and threads; and
- (c) means for aligning the tap with an opening in a workpiece.

11. The tap of claim 11, further comprising at least one flute alternating with the threads.

12. The tap of claim 12, wherein at least one flute is a helical flute.

\* \* \* \* \*