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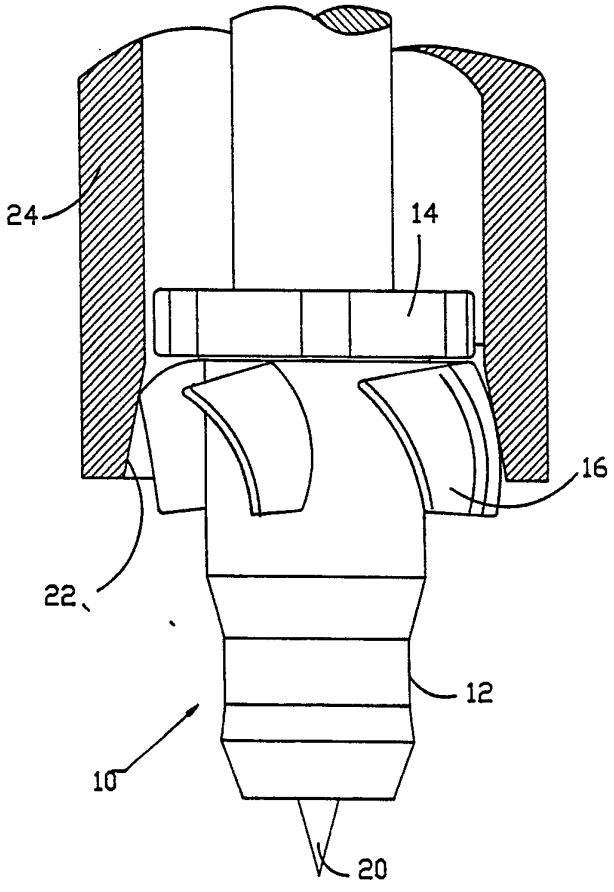
(54) Title: ALIGNING MEMBERS

(57) Abstract

An aligning tip for holding a fastener such as a nail within the barrel of a power actuated tool for firing the fastener into a substrate, such as a steel or concrete beam, comprises a sleeve (12) which fits over the end (20) of the fastener. Fins (16) project from the sleeve (12) and deflect when inserted into the barrel (24) in order to accommodate a range of barrel sizes. The fins (16) are each inclined to the radial direction to ensure uniform deflection and maintenance of the end of the fastener on the longitudinal axis of the barrel.



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ALIGNING MEMBERS

The present invention relates to aligning members for use in power actuated fixing tools and more particularly to aligning members for use in indirect acting power actuated fixing tools.

Aligning members are used in some power actuated tools to hold a pin-like fastener such as a nail within the barrel prior to firing the tool in order to drive the fastener into a substrate such as a steel or concrete beam. Such aligning members are conventionally known as aligning tips. The aligning tip typically comprises a sleeve which is a friction fit over the pointed end of the fastener and which has an outer diameter sized to fit closely within the end of the barrel. The longitudinal axis of the fastener is thereby held by the aligning tip approximately aligned with the longitudinal axis of the barrel, the aligning tip being shattered when the fastener is driven into the work substrate upon firing of the tool.

Most aligning tips currently available are only capable of use with a specific barrel diameter and consequently a range of tip sizes must be produced to suit a range of barrel sizes.

There has been proposed an aligning tip for use with a range of barrel diameters and which comprises a series of axial fins which project from the sleeve and which are capable of deflection in order to fit within barrels of different size. However, in this previously proposed tip, the fins do not deflect uniformly and there is a tendency for the axis of the tip to be displaced from the axis of the barrel, with the result that the fastener is not held centrally within the barrel.

According to the present invention there is provided an aligning tip for holding a fastener centrally with a barrel of a power actuated tool, said tip comprising a sleeve mountable over the fastener and a series of fins extending

generally outwardly from the sleeve, said fins being spaced around the axis of the sleeve and extending axially along the outer surface of the sleeve, each of said fins being inclined to the radial direction and to the same side of the radial direction, and each of said fins being resilient whereby the tip can be fitted within a range of barrel diameters by deflection of the fins further away from the radial direction.

Preferably, the body of the sleeve includes a rigid annular rim corresponding to the minimum barrel diameter within which the tip can be used, said rim serving to limit the eccentricity of the aligning tip within the barrel.

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:-

Figure 1 is a perspective view of a first embodiment of an aligning tip according to the present invention;

Figure 2 is a front end view of the aligning tip shown in Figure 1;

Figure 3 is an axial section of the aligning tip shown in Figures 1 and 2;

Figure 4 is a view illustrating the fin positions when the aligning tip is being inserted into the barrel of a power actuated tool;

Figure 5 illustrates a modified form of aligning tip;

Figure 6 illustrates another modified form of aligning tip; and

Figure 7 illustrates yet another modified form of aligning tip.

Aligning tip 10 shown in Figure 1 to 3 comprises a sleeve 12, a substantially rigid annular rim 14 projecting from the body of the sleeve 12,

and a circumferential array of axially extending fins 16. The rim 14 is positioned rearwardly of the fins 16 and is adjacent the rearward end 18 of the sleeve 12. The fins 16 are equiangularly spaced around the sleeve 12 and have the same radial extent, each fin extending outwardly from the sleeve 12 in a direction inclined to the radial direction of the sleeve 12. The aligning tip 10 has a maximum outer diameter defined by the outer ends 19 of the fins 16 and a minimum outer diameter equal to or slightly larger than the outer diameter of the rim 14. The fins 16 are made of a resiliently deformable material. Preferably, the aligning tip is injection moulded as an integral component and thus the fins 16 are integrally formed with sleeve 12.

Figure 4 shows the aligning tip in use with the pointed end of a fastener 20 held by a friction fit within the sleeve 12, such that the longitudinal axis of the fastener 20 is coincident with the longitudinal axis of the sleeve 12. In Figure 4, the aligning tip 10 is shown while it is being inserted into the muzzle 22 of the barrel 24 of a power actuated tool with the head of the fastener 20 directed inwardly. The forward end of the muzzle 22 is chamfered to allow easy entry of the aligning tip 10 into the muzzle 22. As the aligning tip 10 is pushed into the barrel 24 the fins 16 are resiliently deflected inwardly towards the body of the sleeve 12 to a diameter corresponding to the diameter of the barrel 24. The positions of the fins 16 when the aligning tip 10 is positioned within the barrel 24 are best illustrated in Figure 4. The resilient fins 16 become wedged within the barrel 24 thereby holding the aligning tip 10 and fastener 20 centrally within the barrel 24 until the tool is fired. When the tool is fired the aligning tip 14 shatters and the fastener 20 is driven into the substrate material.

The fins 16 extend outwardly from the sleeve 12 in a radially inclined direction with each fin being to the same side of the radial direction and at the same angle to the radial direction. The inclination of the fins 10 ensures that when the aligning tip 16 is pushed into the barrel 24, the fins 16 collapse evenly around the sleeve 12 with the respective ends 19 of the fins 16 lying in the same direction. This even collapse of the fins ensures that the sleeve 12

always remains substantially concentrically positioned within the barrel. The outer ends 19 of the fins 16 when fully collapsed lie substantially tangential to the sleeve 12.

As the fins 16 are resiliently deformable and can therefore be compressed from their maximum diameter to a range of smaller diameters, the aligning tip 10 can be used in a range of barrel sizes. The maximum and minimum barrel sizes applicable to each size of aligning tip 10 are defined respectively by the maximum outer diameter of the fins 16 and the outer diameter of the rim 14. The rim 14 also serves to limit the eccentricity of the aligning tip 10 if the fins 16 do happen to collapse unevenly about the sleeve 12.

The rim 14 in the embodiment of Figures 1 to 3 is defined by a series of castellations 28. The castellations are positioned as shown in Figures 1 to 3, in order for the clearance between the fins 16 and the rim 14 to be generated in a simple moulding die having the split line of the die normal to the longitudinal axis of the tip. Without this castellated configuration a more complex form of die would be required.

Figure 5 illustrates a modified form of an aligning tip 10 wherein the annular rim 14 is not castellated. Figure 6 illustrates an aligning tip 10 wherein the rim 14 is positioned forwardly of the fins 16 and Figure 7 illustrates an aligning tip 10 without a rim 14. When the aligning tip 10 does not have a rim 14 the minimum size of barrel in which the aligning tip 10 can be used is limited by the diameter of the fins 16 when fully inwardly compressed.

Aligning tips as described herein allow a single size of aligning tip to be used in power actuated tools having a range of barrel sizes. For example, an aligning tip having a maximum outer fin diameter of 9.6mm can be used in power actuated tools having barrel diameter sizes ranging from 7.8 to 9.0mm.

In each of the embodiments described herein the space between

adjacent fins 16 is unobstructed whereby each fin can be deflected inwardly over a relatively large angle to accommodate a large range of barrel diameters while maintaining high stability of the tip within the barrel. The rim 14, when present, is positioned axially to the front or rear of the array of fins 16 and therefore does not impede the deflection of the fins 16. Each fin 16 is of approximately rectangular transverse section to provide a relatively thick parallel sided fin which ensures that the array of fins, on deflection, maintains the sleeve centrally within the barrel.

Modifications are possible within the scope of the invention.

CLAIMS:-

1. An aligning tip for holding a fastener centrally with a barrel of a power actuated tool, said tip comprising a sleeve mountable over the fastener and a series of fins extending generally outwardly from the sleeve, said fins being spaced around the axis of the sleeve and extending axially along the outer surface of the sleeve, each of said fins being inclined to the radial direction and to the same side of the radial direction, and each of said fins being resilient whereby the tip can be fitted within a range of barrel diameters by deflection of the fins further away from the radial direction.

2. An aligning tip according to claim 1, wherein the fins are equiangularly spaced around the axis of the sleeve and are each inclined to the radial direction by the same angle.

3. A tip according to claim 1, or claim 2, wherein the space between adjacent fins is substantially unobstructed.

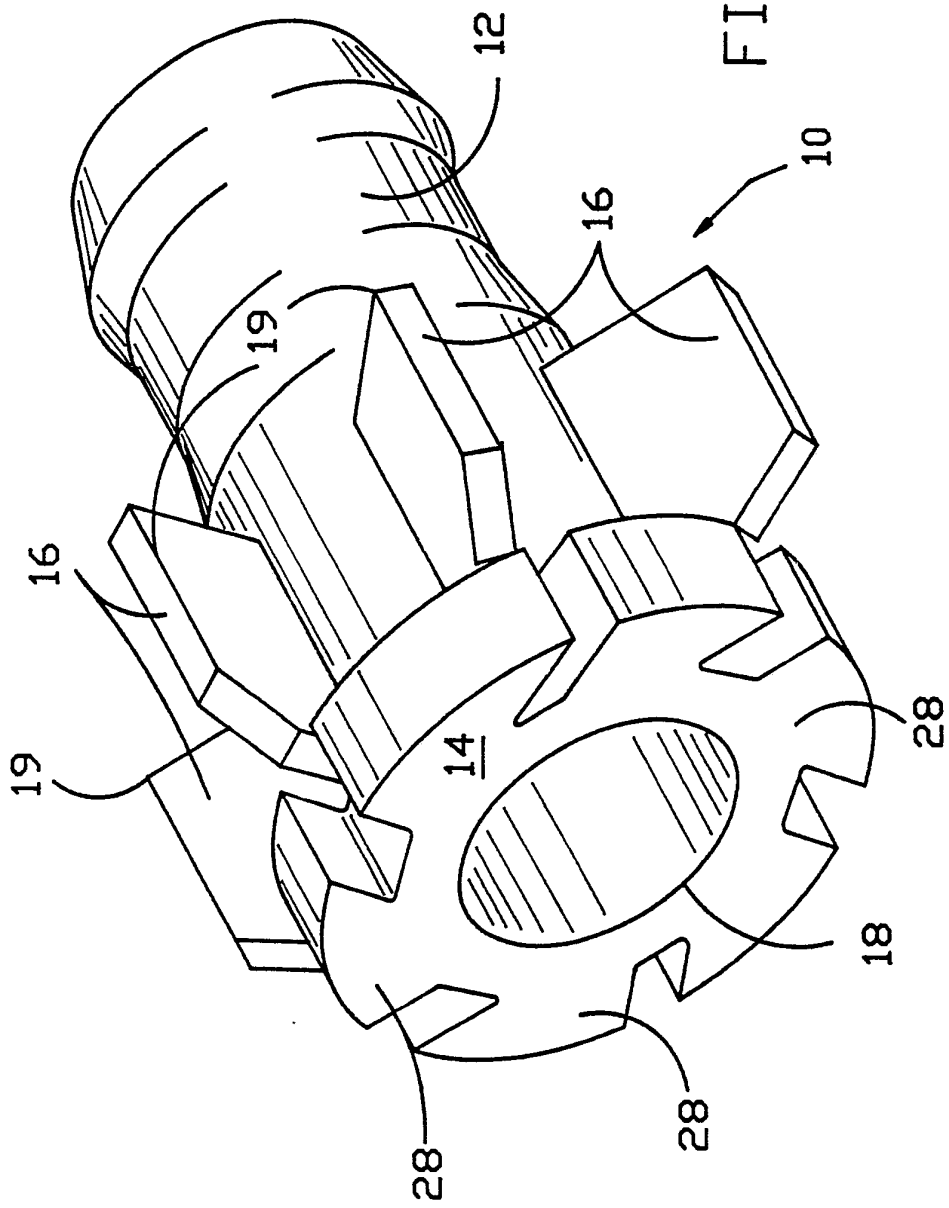
4. A tip according to any one of claims 1 to 3, wherein each fin is of substantially rectangular section in a plane at right angles to the axis of the sleeve.

5. A tip according to any one of claims 1 to 4, further comprising an annular formation extending outwardly from the sleeve, said formation being axially spaced from the fins and having a radial extent less than that of the fins prior to deflection.

6. A tip according to claim 5, wherein the annular formation comprises an annular rim.

7. A tip according to claim 5 or claim 6, wherein the annular formation is substantially rigid.

FIG. 1



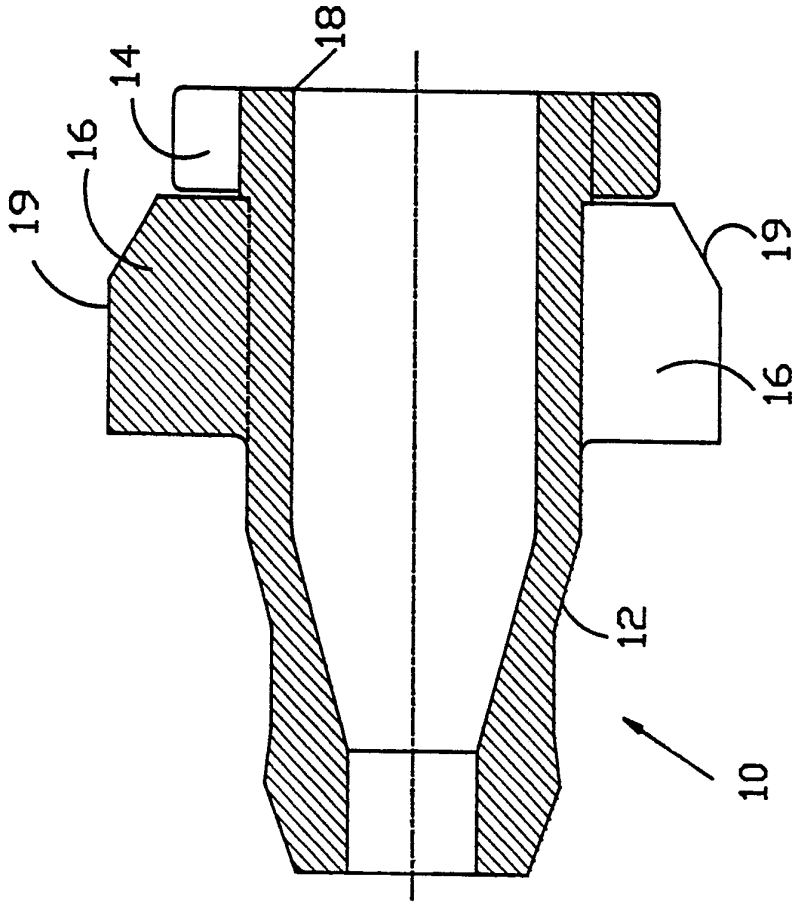


FIG. 3

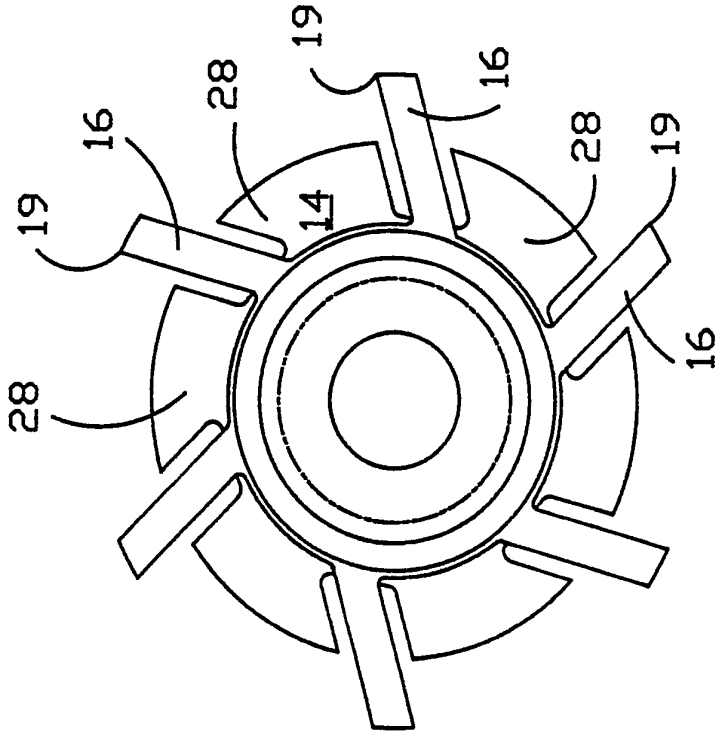


FIG. 2

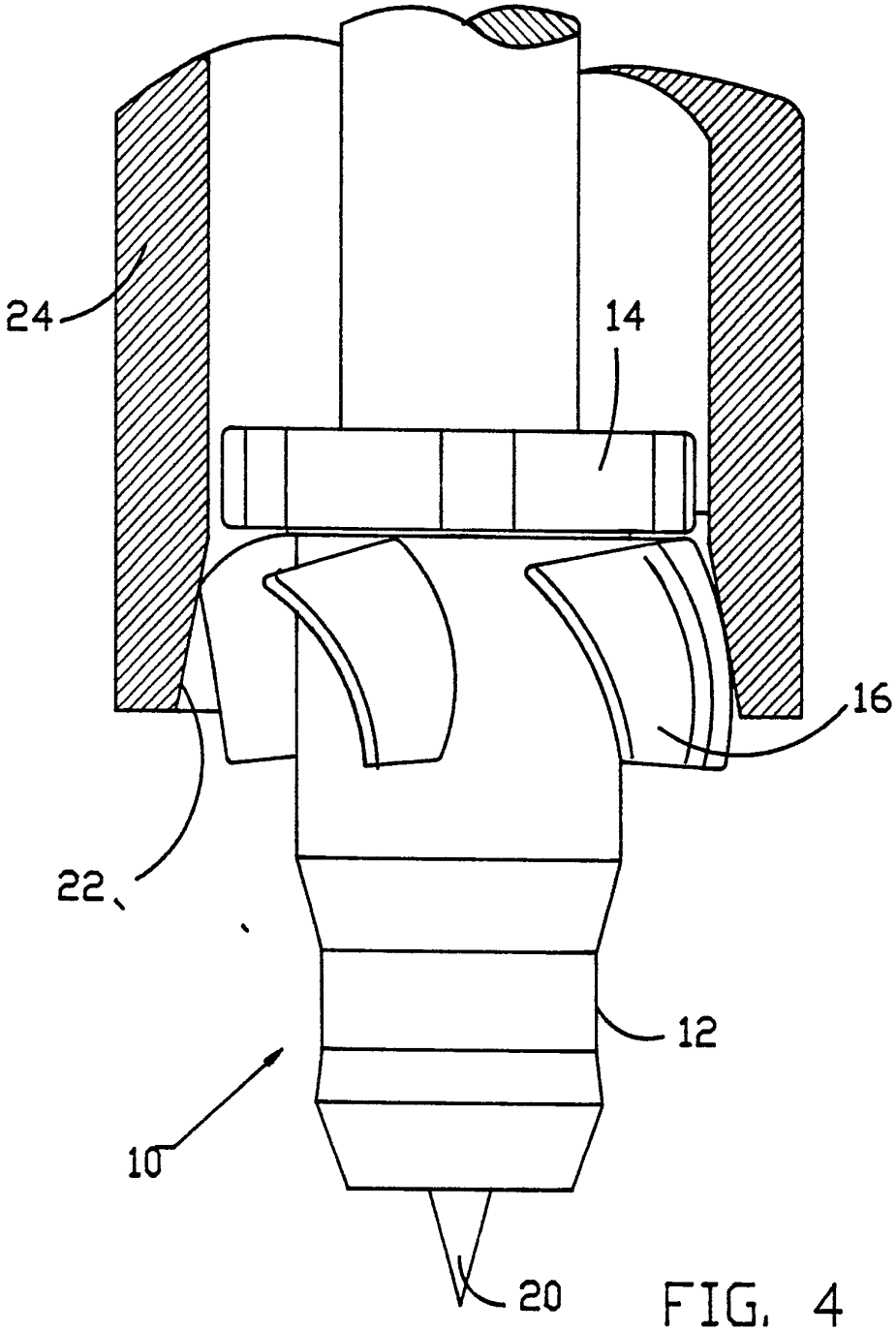


FIG. 4

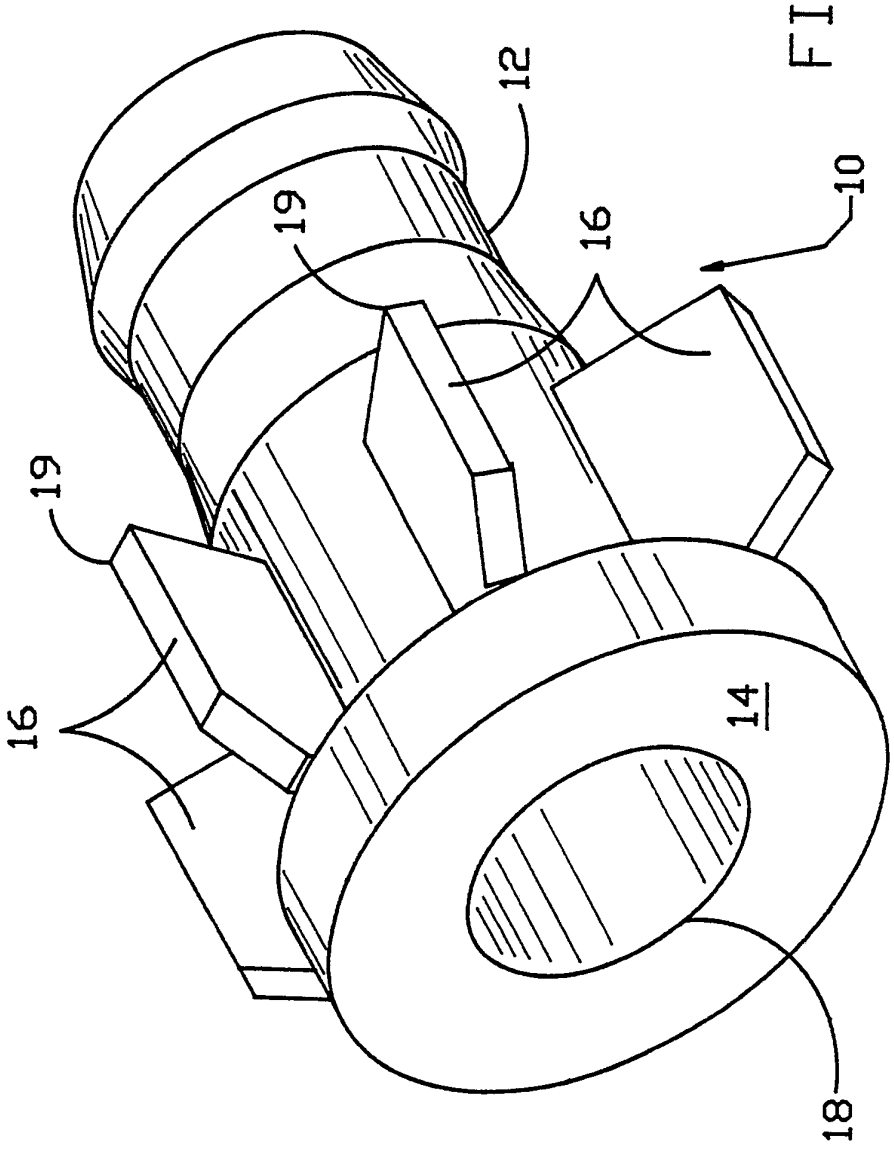


FIG. 5

FIG. 6

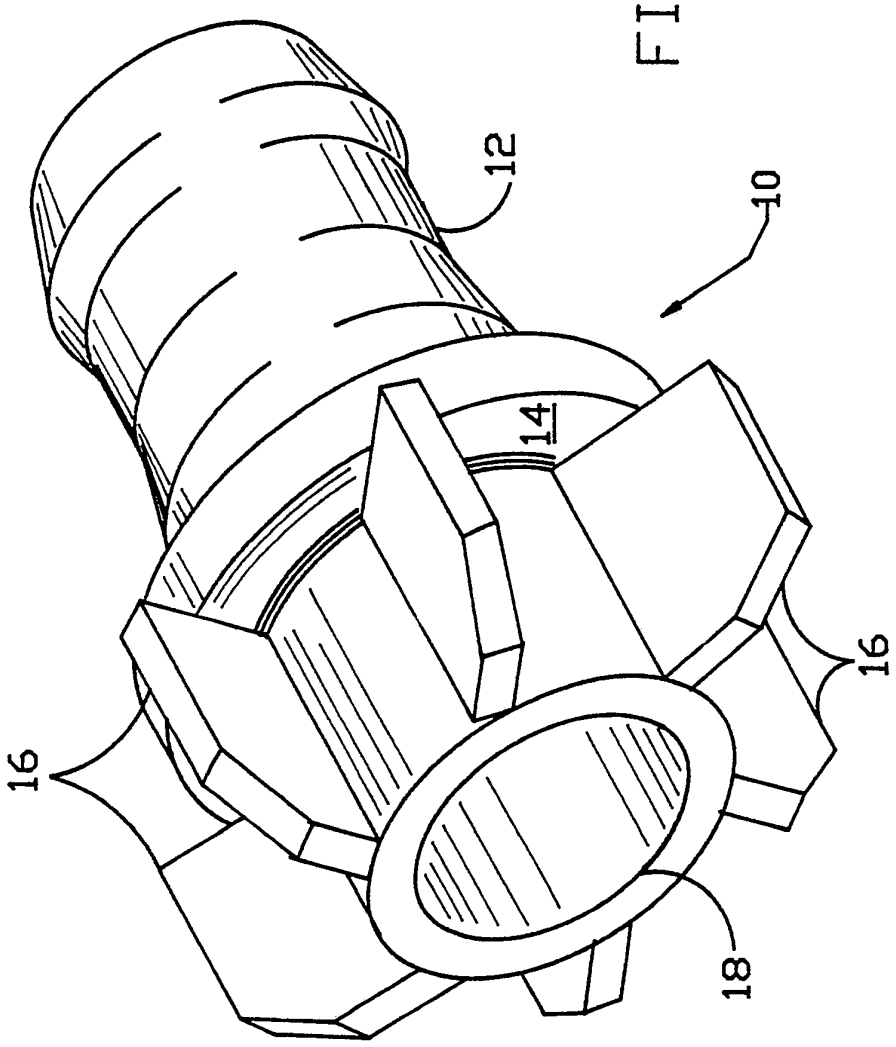
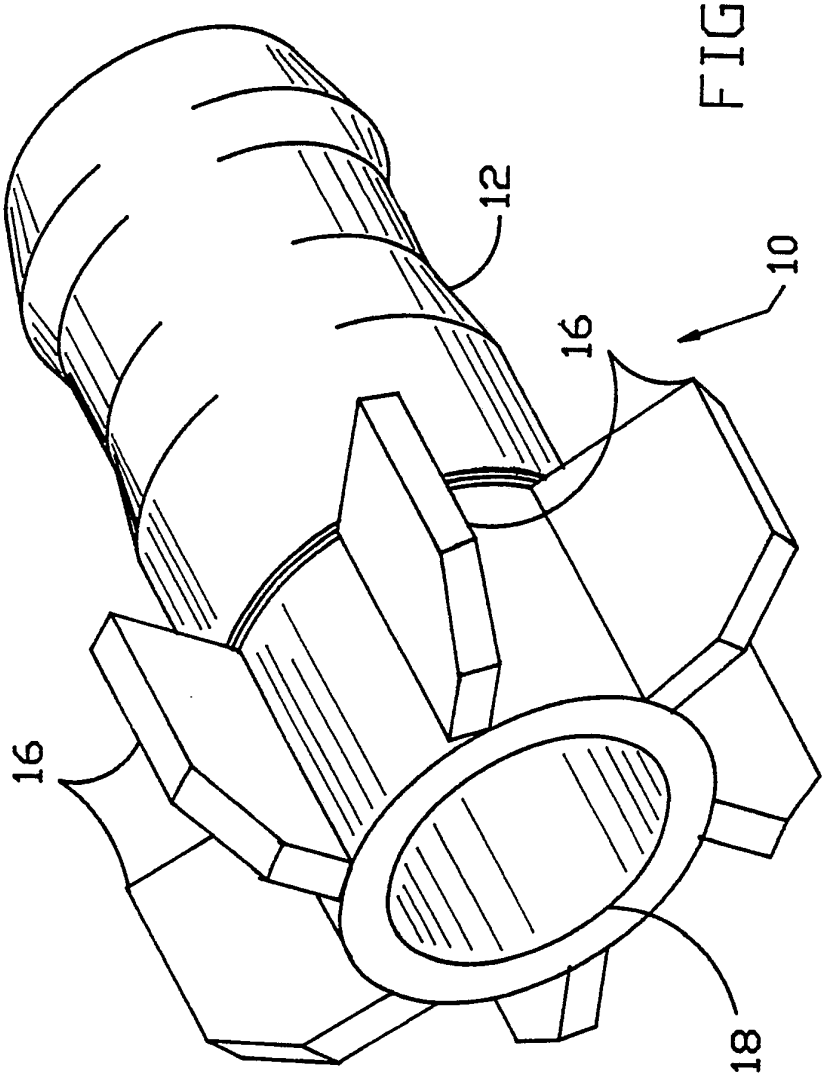


FIG. 7



INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU 90/00287

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) 6

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl.[5] B25C 1/14, 1/18

II. FIELDS SEARCHED

Minimum Documentation Searched 7

Classification System	Classification Symbols
IPC	B25C 1/14, 1/18

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched 8

AU : IPC as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT 9

Category*	Citation of Document, 11 with indication, where appropriate, of the relevant passages 12	Relevant to Claim No 13
X	AU,B, 52348/73 (467010) (HILTI AKTIENGESELLSCHAFT) 22 August 1974 (22.08.74). Refer Figures 2-4 and relevant description.	1
X	AU,B, 58326/65 (289309) (OLIN MATHIESON CHEMICAL CORPORATION) 9 November 1967 (09.11.67). Refer Figure 3 and relevant description.	1
X	GB,A, 737968 (CARL BAUER) 5 October 1955 (05.10.55). Refer entire document.	1
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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
5 September 1990 (05.09.90)	12 September 1990
International Searching Authority	Signature of Authorized Officer
Australian Patent Office	D.G. FRY

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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON
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