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2,544,444

BEVEL RECESSING REAMER

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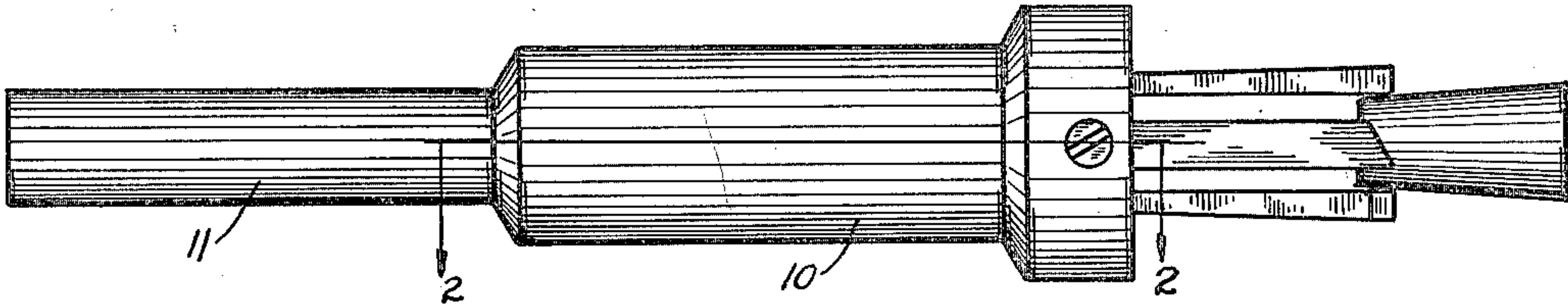


Fig. 1.

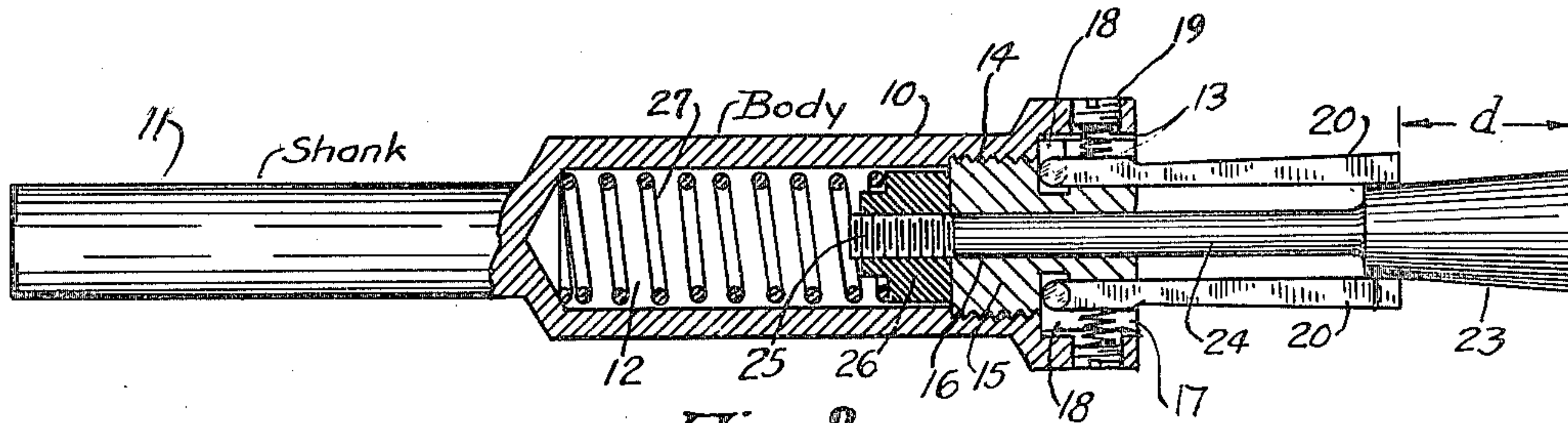


Fig. 2.

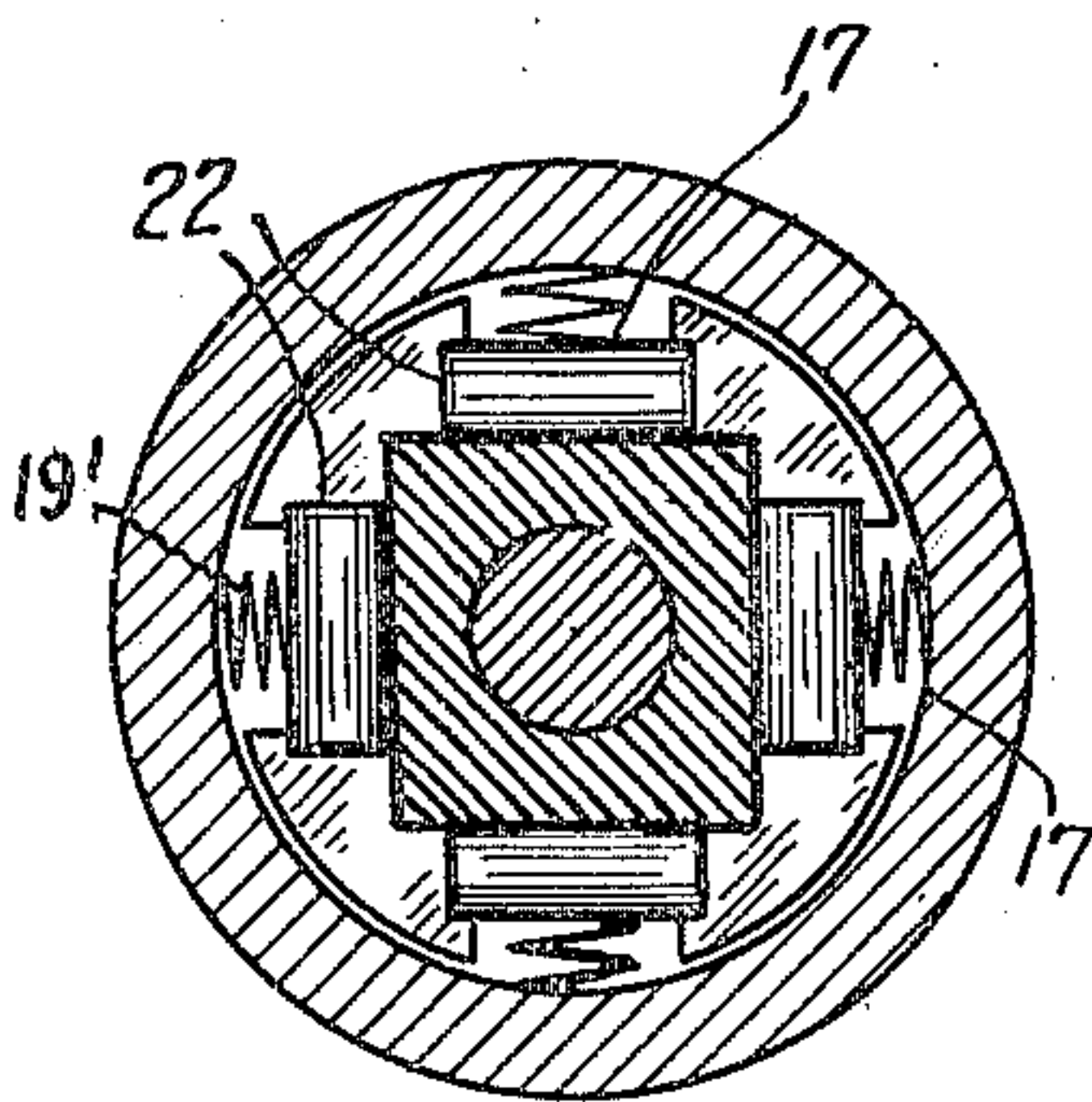


Fig. 4.

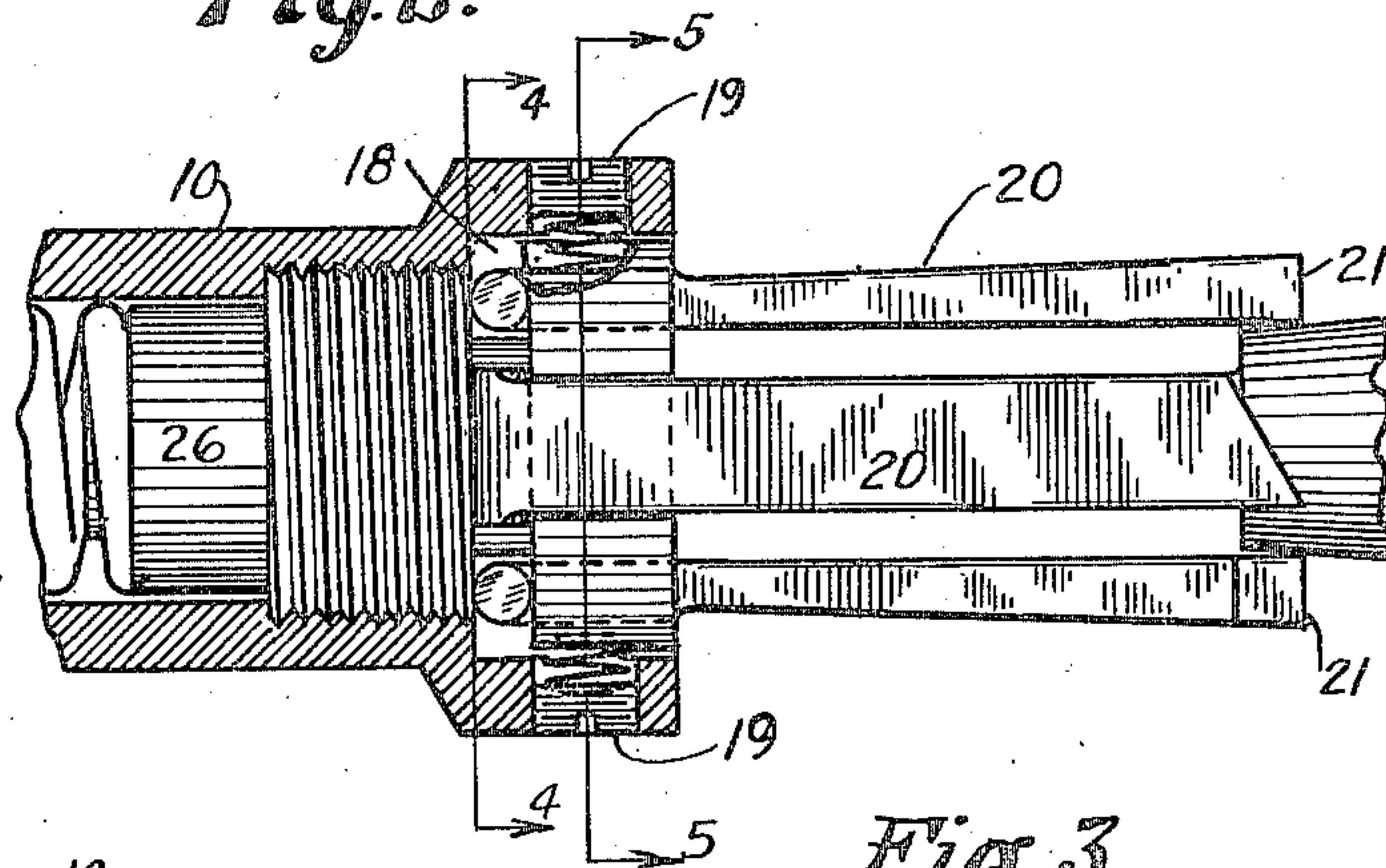


Fig. 3.

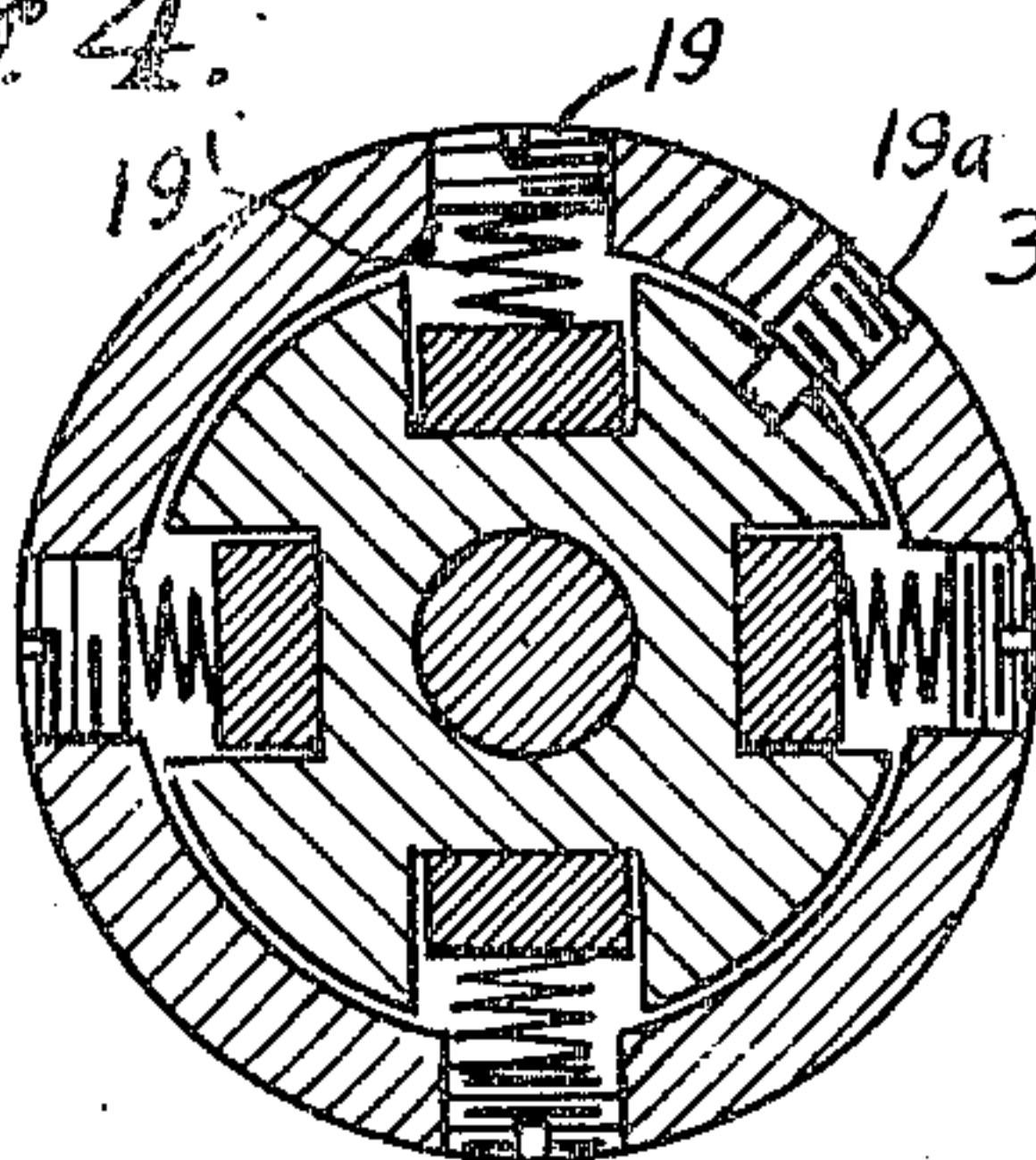


Fig. 5.

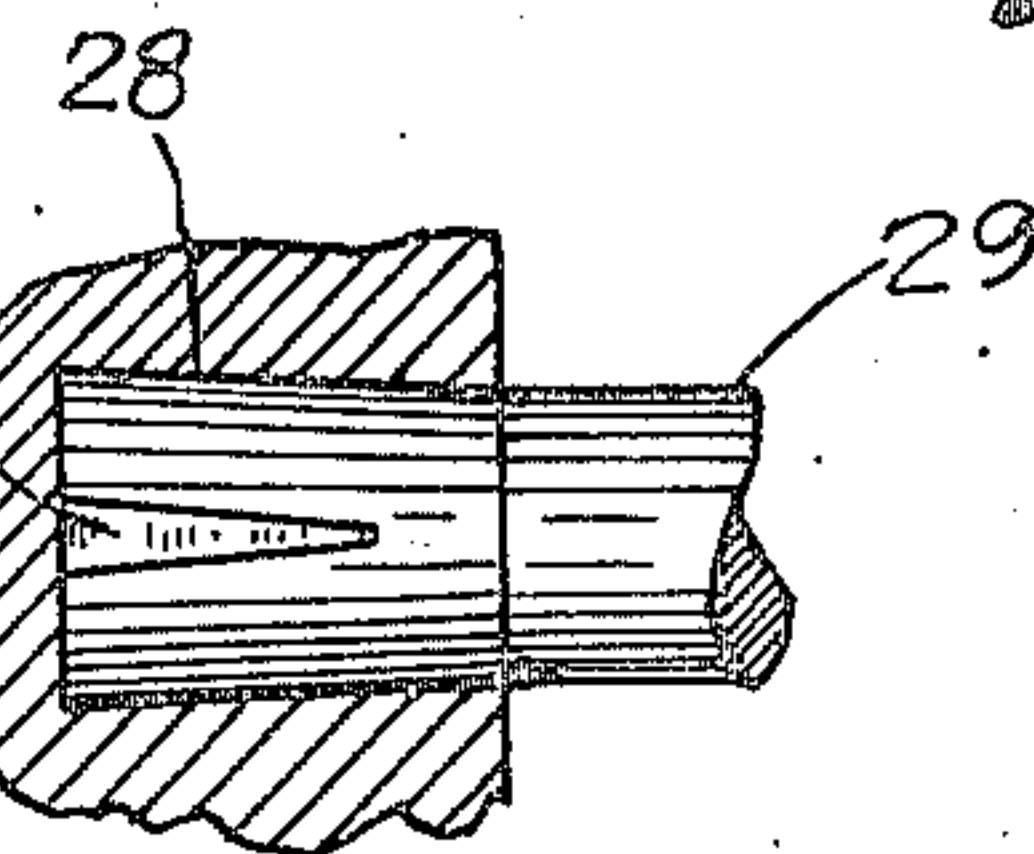


Fig. 6.

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## UNITED STATES PATENT OFFICE

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## BEVEL RECESSING REAMER

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2 Claims. (Cl. 145-114)

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This invention relates to improvements in bevel recessing reamers.

In the manufacture of furniture and in wood working manufacture generally, it is frequently necessary to provide an article such as a chair with braces or bars and these are usually made by turning down an end portion to a predetermined size, inserting this into a hole of the same size and securing the two parts together with a liberal quantity of glue.

As an example of an article that is frequently constructed in this manner, reference is made to the ordinary dining room chairs.

It is evident that a much better and more secure joint would be obtained between two members if the hole in one member were inwardly flaring and the male portion of the other member reduced to a size of the outer end of the opening, split and provided with a wedge in such a way that when it is driven into the hole or opening the end will spread and conform to the sides of the inwardly flaring hole.

It is the object of this invention to produce a simple and substantial tool that can be used either in a drill press, or with an ordinary hand operated brace and which will quickly ream pre-bored holes so as to give them an increasing diameter inwardly towards the bottom.

Another object of this invention is to produce a device of the class mentioned which shall be of a simple construction and so designed that the cutter blades may be readily removed for sharpening.

A further object of the invention is to produce a tool of the type indicated in which no part of the tool will contact the outer surface of the member having the opening that is being reamed.

A further object of the invention is to produce a tool of such construction that all holes reamed thereby will be exactly alike.

A further object of the invention is to produce a tool with a few rugged parts that can be easily assembled and which can be held from moving in response to the torque forces exerted thereon during operation.

The above and other objects that may become apparent as this description proceeds are attained by means of a construction and an arrangement of parts that will now be described in detail and for this purpose reference will be had to the accompanying drawing in which the tool has been illustrated in its preferred form, and in which:

Figure 1 is a side elevation of the tool;

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Figure 2 is a section taken on line 2-2, Figure 1;

Figure 3 is an enlarged fragmentary view taken partly in section on line 2-2, Figure 1, and showing other parts in elevation;

Figure 4 is a section taken on line 4-4, Figure 3;

Figure 5 is a section taken on line 5-5, Figure 3; and

Figure 6 is a section through a member showing an inwardly flaring opening in which is positioned the expanded end of a brace member.

Referring now to the drawing, reference numeral 10 designates the elongated hollow body of the tool, and reference numeral 11 designates the shank portion thereof, which may be of the proper size and shape to fit the means by which it is rotated. Body 10 is provided with an axial opening 12 that terminates in a short section of concentric opening whose wall has been designated by numeral 13. The end opening is of larger diameter than the main opening 12 and the outer end of the wall of the smaller or inner opening has a threaded section 14. Positioned within the open end of the tubular body is a plug 15 having an axial opening 16 and longitudinally extending grooves 17 in its outer surface. In the drawing four such grooves have been shown. A smaller or larger number may be used, if desired. Plug 15 has a threaded section of the proper size to operatively engage the threads in the inner surface of tubular body 10 and an outer cylindrical section of greater diameter than the threaded section. The outer enlarged end of the plug is provided with transverse notches 18 at the inner ends of grooves 17. Wall 13 surrounds the outer grooved end of the plug and forms a closure for the grooves therein. Wall 13 has a threaded opening at each notch 17 in which is positioned a screw 19 that serves as an abutment for spring 19', that serves to hold cutter blades 20 in the collapsed position shown in Figures 2 and 3 until they are urged outwardly by the spreader in a manner hereinafter described. Cutter blades 20 have a shape somewhat like that shown in Figures 2, 3 and 4 and are positioned in grooves 17 as shown. Set screws 19a prevent the plug from rotating (Fig. 5). The free ends of the blades are each provided with an inclined surface that forms a cutting edge 21. The inner ends of the cutter blades are provided with laterally projecting trunnions 22 that are located in notches 18 and prevent the cutting blades from moving outwardly while permitting them to spread laterally to a limited extent.



A blade spreading member comprising a cam having an inwardly tapering frustoconical surface 23 and an axially extending cylindrical portion 24 is so positioned that member 24 projects through the opening 16 in plug 15 and terminates in a threaded end portion 25. A round nut 26 is connected with the threaded end portion as shown. A helical compression spring 27 is positioned in opening 12, one end abutting the inner end of opening 12 and the other end abutting the nut 26. Spring 27 is under compression and tends to hold the parts in the position shown in Figure 2 in which position the outer surfaces of the cutting blades are substantially parallel. The maximum distance between the outer surfaces of diametrically positioned blades is slightly less than the diameter of the hole to be reamed. The largest diameter of the cam 23 is less than the diameter of the opening to be reamed and therefore the tool may be inserted into the opening with the base of part 23 resting on the bottom of the hole to be reamed. The tool is now rotated in such a direction that the side nearest the observer when viewed as in Figure 3, moves downwardly. This produces a cutting action on the part of the cutter blades, and as these move inwardly into the opening they are spread apart by the cam action of member 23 with the result that an inwardly flaring hole like that designated by reference numeral 28 in Figure 6 results. The length of the spreading cone or cam should be such that the distance from the cutting edges 21 to the base of the cone portion shall be equal to the depth of the hole to be flared. This distance has been designated by the letter *d* in Figure 2. After the hole has been reamed and flared to the shape shown in Figure 6, the end of bar 29, that is to be inserted therein, is split diametrically and provided with a wedge 30. When the bar is driven into the opening the wedge will be forced into the end of the bar spreading it in the manner shown in Figure 6. The two parts will then be permanently and rigidly interconnected. If desired glue may be used in addition to the wedge, in either case it will be practically impossible to separate the parts due to the inwardly flaring interconnecting surfaces.

From the above description it will be seen that by use of the tool described herein and shown on the drawing, holes bored by ordinary augers can be readily reamed into a shape in which they are inwardly flaring with the result that any joint constructed in the manner described will be permanent.

Having described the invention what is claimed as new is:

1. A bevel recessing reamer comprising, in combination, an elongated body having an axial opening extending inwardly from one end, the other end having a shank, the wall of the opening having a short threaded section positioned a short distance inwardly from said one end, the portion between the threaded section and said one end having a diameter greater than the root diameter of the threads, a plug having a threaded portion engaged in the threaded section, and a portion of greater diameter, said portion of

greater diameter having a plurality of longitudinally extending grooves, cutter blades positioned in the grooves the grooved portion of the plug being positioned in the enlarged outer end of the body, the wall of which serves to close the grooves and secure the cutter blades therein, means providing a pivotal connection between the blades and the plug adjacent the inner ends of the notches, whereby the blades are free to spread, the plug having an axial opening, an outwardly flaring spreader cone having an axial rod-like member extending through the opening in the plug, an enlarged head on the inner end of said rod limiting its outward movement, and a compression spring positioned in the axial opening of the body in abutting relation with the bottom of the opening and the enlarged head, the force of the spring normally holding the cone in its outermost position.

2. A bevel recessing reamer, comprising, in combination, an elongated body having an axially extending shank at one end, the other end having an inwardly extending axial opening comprising two sections of different diameter, the one of larger diameter being adjacent said other end, the wall of the smaller opening having a threaded section extending inwardly from the juncture of said two sections, a plug comprising two sections of different diameters, the smaller section being threaded and in engagement with the threaded section of the opening wall, that portion of the plug of larger diameter being positioned in the enlarged outer end of the axial opening, the plug having an axial opening, the larger end of the plug having a plurality of longitudinally extending radial grooves terminating at their inner ends in transverse notches, a cutter blade positioned in each longitudinal groove, the inner ends of the blade having laterally extending trunnions engaging in the transverse notches for outward spreading pivotation, means latching the plug and tubular body against relative rotary movement, an outwardly flaring spreader cone having an axial rod-like extension extending through the opening in the plug, said cone engaging the blades for spreading them, a nut on the inner end of the rod-like extension for limiting its outward movement, the spreading cone being normally positioned with its smaller end in engagement with the blades, whereby inward movement of the cone will spread the blades, and a helical compression spring positioned in the opening, between the bottom thereof and the nut for normally holding the spreading cone in its outermost position.

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