

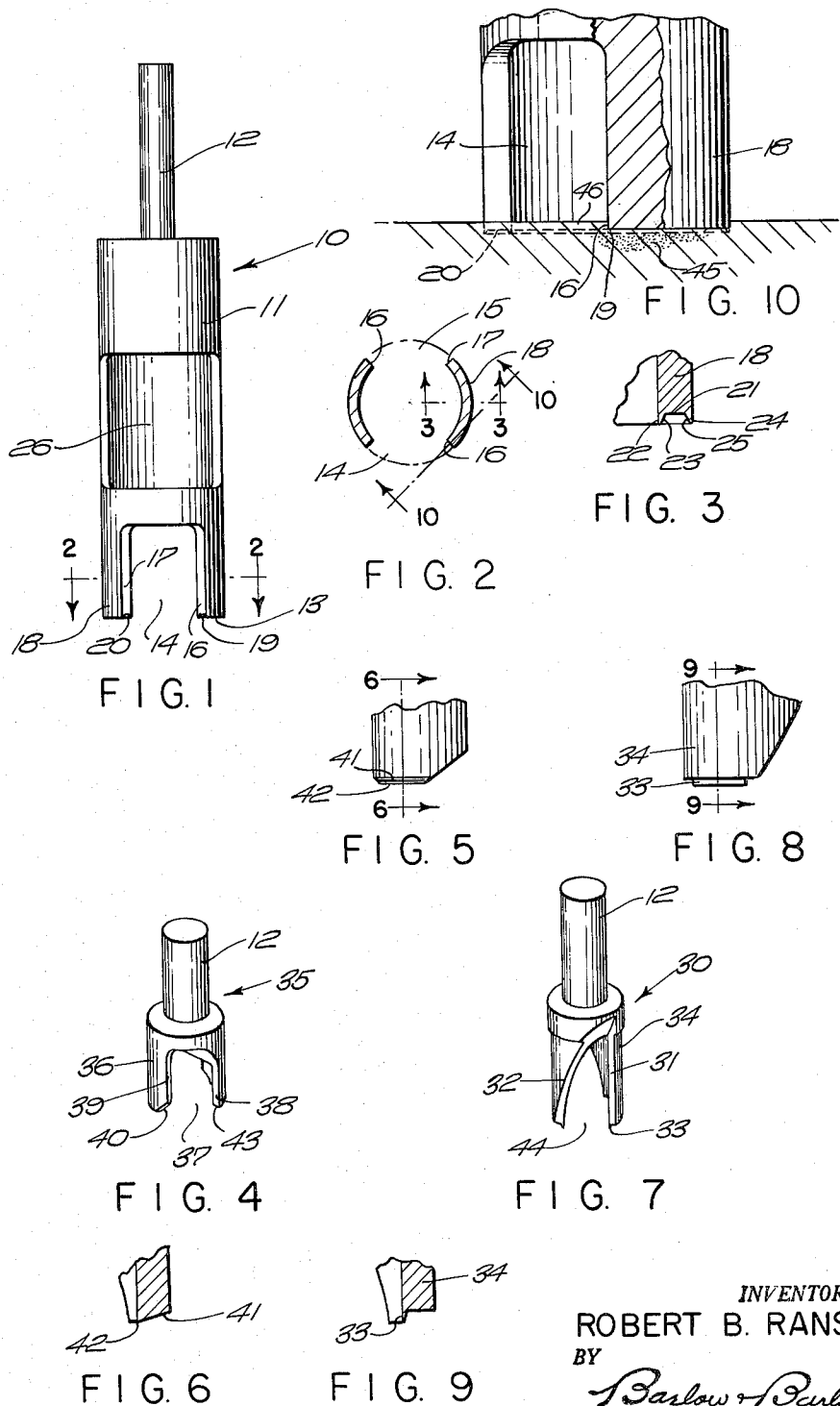
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PLUG CUTTER

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PLUG CUTTER

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2 Claims. (Cl. 145—120)

This invention relates to a plug cutter and is a continuation-in-part of my application, Serial No. 709,825, filed January 20, 1958.

One of the objects of this invention is to provide for cutting a plug in a piece of wood which will provide a better surface on the edge of the plug than has heretofore been provided.

Another object of this invention is to provide a cutter, the rate of feed of which will be dependent upon the pressure which is applied and the abutting surface which engages the wood, thus providing for a better control of the advancing of the cutter into the work.

Another object of this invention is to provide a cutter which will have no tendency to dig into the material which it is removing and whose action will be wholly dependent upon the pressure which is applied.

Another object of the invention is to provide for the removal of the material about the plug by the compression of a part of this material, which is somewhat resilient and cut the non-compressed material and control the advance by controlling the pressure applied.

Another object of this invention is to provide for the removal about the plug by essentially a scraping action.

With these and other objects in view, the invention consists of certain novel features of construction as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is an elevation of a plug cutter embodying this invention;

Figure 2 is a section on line 2—2 of Fig. 1;

Figure 3 is a section on line 3—3 of Fig. 2 and enlarged;

Figure 4 is a perspective view of a modified form of plug cutter;

Figure 5 is an elevational view of a fragmental portion looking at substantially right angles to the line of vision of Fig. 4;

Figure 6 is a section on line 6—6 of Fig. 5;

Figure 7 is a perspective view of a still different modified form of plug cutter;

Fig. 8 is an elevation of a fragmental portion looking at right angles to the line of vision in Fig. 7;

Figure 9 is a section on line 9—9 of Fig. 8; and

Figure 10 is a sectional view illustrating the action of the tool when sufficient pressure is applied to the tool to compress the resilient work into which it is inserted, this section being on line 10—10 of Fig. 2.

The tool here referred to is for operation in a power chuck. It will form a circular cut into a piece of fibrous material such as wood essentially forming a cylindrical recess so as to form a plug which may be removed from the wood. The tool is so shaped that it will score the surface of the fibrous material into which it is desired to be sunk by forming a sharp circular line cutting the fibers along this circle before any of the fibers are removed. This will occur on the inner radius of the cutting wall of the tool and may optionally be provided on the

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outer radius of the wall of the tool. The end of the tool will provide an arcuate surface abutting the work so that as pressure is applied to the tool the work beneath this surface will be compressed allowing the wood in the uncompressed parts to be above the compressed areas and in a position to be scraped off by the leading edge of the arcuate abutting surface.

With reference to the drawings, 10 designates a plug cutter which will have a cylindrical body 11 from which a stem 12 protrudes to be gripped in some chuck for rotating the same. The lower edge 13 of the body 11 is essentially at right angles to the axis of the cylindrical body 11, although there will be special shaping of this lower edge as will be hereinafter pointed out. The lower edge is interrupted by being cut away as at 14 and 15 at diametrically opposite points leaving edges 16 and 17 of the arcuate wall 18 in the lower edge. If it is assumed that the cutter will be rotated clockwise as shown in Fig. 2, then the edges 16 become the leading and cutting edges of the cutter and the trailing edges such as 17 are unimportant when the rotation is clockwise as seen in Fig. 2. The edges 16 will be formed in a plane which passes through the central axis of the cylindrical body 11, the lower edge 19 of this surface 16 becoming the cutting edge of the cutter.

Considering the wall 18 at its lower arcuate edge, there is a surface 21 which is generated by the revolving of a portion of a radius line about the axis of the body and disposed at an angle to the axis of the body. This radius line thus forming the surface 21, as shown in Fig. 3, is at right angles to that axis, although the angle may be varied somewhat from a right angle. Thus, there will be formed at the juncture of the surface 21 and the surface 16 at the edge 19 a right angular edge which serves as the cutting edge or scraping edge for the removal of the wood as the cutter proceeds into the wood.

A lip 22 is shown as extending below the surface 21 and follows the arcuate inner edge of the wall 18 and is of chisel shape in cross-section presenting a scoring edge as shown in Fig. 3 with its bevel 23 outwardly or on the convex side of the arc so that as the plug cutter is forced into the wood, this rotating scoring edge will first cut the fibers of the material before their removal by the edge 19, and it will be noted that this scoring edge is beveled on the outer side of the arc as at 23 or in the removed part of the wood. Such a lip 22 may also be duplicated as at 24 on the outer circumferential edge of the wall 18 and it will then be beveled oppositely as at 25 so that its beveled portion also will be in the removed part of the wood. The cylindrical body 11 also has a part removed as at 26 so that plugs as they are formed may pass up and out through the opening 26. The amount of cut out 14, 15 controls the amount of abutment surface 21 resisting the pressure applied to the tool and thus the extent of abutment surface may be used as one of the factors which together with the pressure applied will govern the speed of advance of the tool into the work.

In some cases instead of having the formation such as shown in Figs. 1 to 3, the tool designated 30 (Fig. 7) may have the cutout of a different shape than shown in Fig. 1, thus providing the leading edge 31 for clockwise rotation parallel to the axis of the body while the trailing edge 32 is shown as sloping at an angle to such a line, this tool being suitable for rotation clockwise and providing a cutout which in some instances may be more conveniently mechanically formed. In this modification, I have also shown a lip 33 formed only on the inner edge of the wall 34 of the body. Otherwise, this modification has the essentials of the showing in Figs. 1 to 3 above described in greater detail.

In Figs. 4, 5 and 6 a little different modification is shown. Here the plug cutter 35 has a cylindrical wall 36

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which is cut away as at 37 providing in clockwise rotation a leading surface 38 and a trailing surface 39 which is cut away as at 40 to provide less abutment area and illustrating one means of reducing the abutment area without enlarging the whole of the cut out 37, thus enabling a feed with less pressure. This occurs at diametrically opposite sides as will be apparent. In this case instead of a pronounced lip from the edge 43 of the wall 36 which forms a cutting surface, the edge of the wall is beveled upwardly as at 41, it being generated by revolving from the tool axis a portion of a radius disposed at the angle there shown so as to form a chisel-shaped arcuate scoring edge 42 at this inner edge. Thus, in this case the cutting edge 43 formed between the plane of the surface 38 and the generated surface 41 will be at an upwardly sloping angle and the scoring edge 42 will be at the inner circumference of this surface 41. Thus, the fibers will be cut prior to the edge 43 removing any of the stock and thus preventing tearing or splitting of the surface as the tool is passed therein.

In use it will be apparent that I may insert the stem 12 of the plug cutter in a chuck and rotate the same and by pressure the cutter will enter the wood first circularly severing the fibers on the surface. The cutting edge formed between the leading edge of the cut out portion and the end of the wall will remove the wood which is not compressed by the abutting surface by a scraping action causing the severed wood to move in the cut-away parts of the cutter and be removed at the upper portion of these cut away areas such as along the inclined surface of the form shown in Fig. 4 or 7 by the continued action of the rotation of the cutter. The rate of

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feed depends on the elasticity of the wood or stock being cut and the pressure applied. In Fig. 10 I have shown the compressed stock at 45 and the relatively higher non-compressed stock at 46. It will be apparent that the cutting edge, such as 19, will scrape or cut away the higher non-compressed stock 46 as the tool rotates.

I claim:

1. A plug cutter comprising a hollow cylindrical body providing an arcuate wall having an end in a plane at right angles to the axis of said body, said end being interrupted by a clearance opening extending inwardly into the wall from the end, a cutting edge provided by the junction of said end and one edge of the wall formed by said opening, said end along a portion of the end of the wall adjacent said cutting edge having a surface generated by the revolving of a portion of a radius line disposed at a right angle to the axis of the body, and the inner radius of said arcuate wall being provided with a thin lip presenting a scoring edge protruding in line with said cylindrical body from the surface formed by said radius line for initially entering the work.

2. A plug cutter as in claim 1 wherein the outer radius of said wall is also provided with a thin lip presenting a chisel edge leaving a recess between said lips.

References Cited in the file of this patent

UNITED STATES PATENTS

900,044	Swanson	Sept. 29, 1908
1,494,897	Freya	May 20, 1924
2,027,139	Abramson et al.	Jan. 7, 1936
2,748,817	Stearns	June 5, 1956