March 7, 1944. W. L. RUDAITIS 2,343,709

INSERTED BLADE MILLING CUTTER

Filed Dec. 22, 1942

FIG. 1

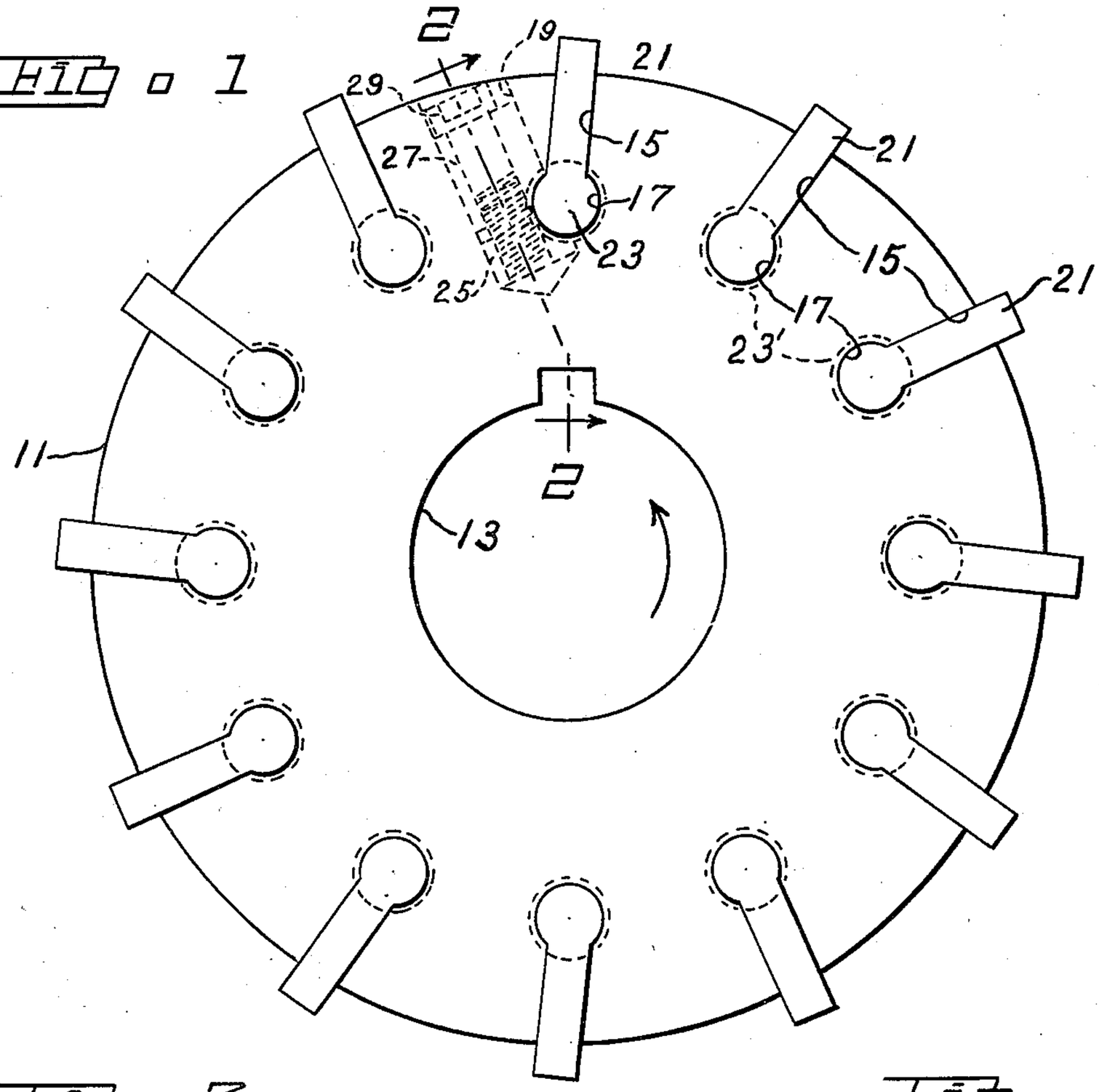


FIG. 3

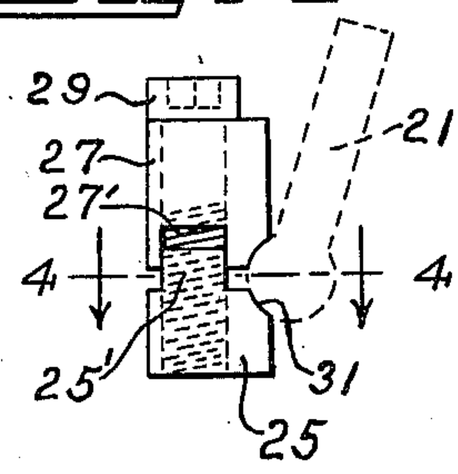
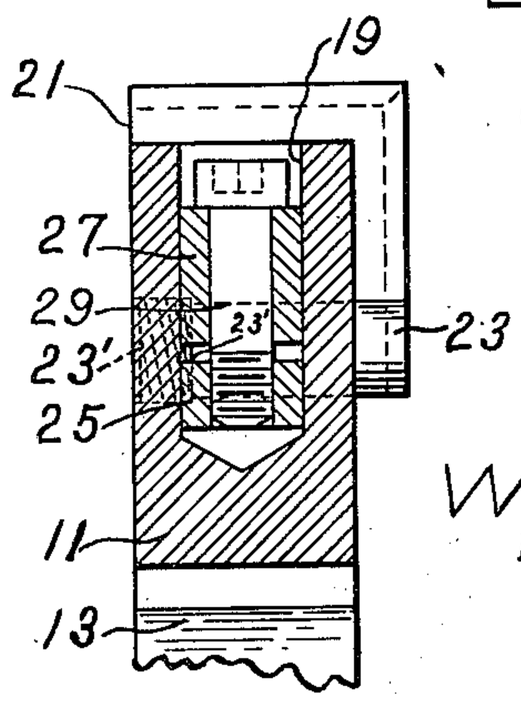


FIG. 5

FIG. 6

FIG. 2



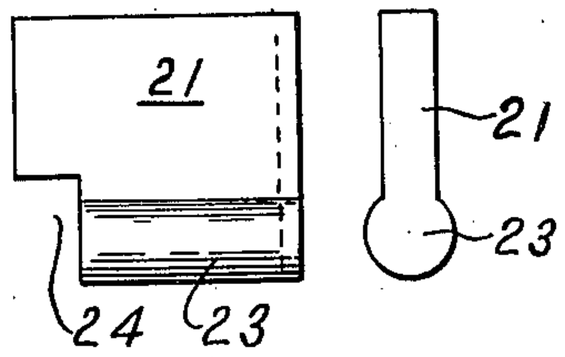
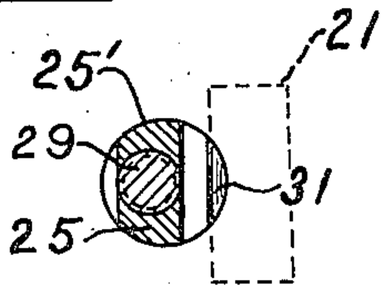


FIG. 4



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INSERTED BLADE MILLING CUTTER

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3 Claims. (Cl. 29—105)

My invention pertains to inserted blade rotary cutters, such as milling cutters for example, and to improved anchoring means for securing the inserted blades.

It is an object of my invention to provide an improved inserted blade rotary cutter having conveniently insertable, interchangeable and replaceable cutter blades secured rigidly therein.

It is also an object of my invention to provide improved anchoring means for conveniently and firmly securing the inserted blades in insertable blade rotary cutters.

Further objects and advantages are within the scope of my invention such as relate to the arrangement, operation and function of the related elements, to various details of construction and to combinations of parts, elements per se, and to economies of manufacture and to numerous other features as will be apparent from a consideration of the specification in conjunction with the drawing disclosing a form of my invention, in which:

Fig. 1 is a side elevational view of an improved inserted blade rotary cutter or milling cutter in accordance with my invention;

Fig. 2 is a fragmentary sectional view on line 2—2 in Fig. 1;

Fig. 3 is an enlarged side elevational view of a single anchoring assembly;

Fig. 4 is a section on line 4—4 in Fig. 3; and Figs. 5 and 6 are views of one of the blades.

Referring more specifically to the drawing, I have illustratively disclosed my invention embodied in a rotary inserted blade milling cutter comprising a tool head 11, which may be of a substantially disc shaped conformation, having a shaft aperture 13 for receiving a shaft on which it may be firmly secured, as by a key (not shown), to be supported and driven thereby. A plurality of blade receiving slots 15 are provided at circumferentially spaced points in the peripheral surface of the head and the slots extend a substantial distance into the head toward the central portion thereof. The inner portion of each slot 15 opens into a recess 17 of greater width than the slot. Various shaped recesses 17 may be provided, but for convenience I prefer to provide the recess as a bore extending axially through the head along the inner or bottom edge of the slot.

An anchor receiving aperture, or bore, 19 is provided in the peripheral surface of the head adjacent each blade slot and extending into the head, one such bore being represented by dotted lines adjacent the uppermost one of the slots in Fig. 1. The anchor block receiving aperture 19 passes into the tool head 11 in such a direction that it intersects with the enlarged recess 17 of the adjacent slot, as shown.

Cutter blades 21 are provided having an enlarged anchoring protuberance or cylinder 23 of greater thickness or diameter than the thickness of the blade and extending along or across the inner edge of the blade, as shown particularly in Figs. 5 and 6. The other or outer edges of the blade are suitably conformed and provided with suitable back-off to present a metal cutting edge. The cutting portion of the blade is preferably made of some high speed tool steel while the remainder of each blade, including the enlarged protuberance 23, is preferably made of a softer and cheaper grade of steel welded or brazed thereto. In one side the inner edge of each blade is provided with a cut out notch 24. The blades 21 are inserted axially into the respective blade slots 15 in the tool head 11 with the anchoring protuberance 23 of each blade in the enlarged recess or bore 17 of the slot, and the cutting edges of each blade projecting outwardly from the head, as shown. One end of each bore 17 is internally threaded and receives a flush socket screw 23' engaging the end of the protuberance 23 in the notch 24 in each blade for adjustably setting the positions of the respective blades axially in the head 11.

For firmly securing and anchoring the blade in each slot, I provide an inner anchor block 25 and an outer anchor block 27. The anchor blocks have similar cross-sections suitable to be inserted in pairs in aligned relation in the anchor block receiving aperture 19 with the inner block 25 disposed inwardly from the point of intersection with the recess 17 and the outer anchor block 27 disposed outwardly therefrom. Apertures or screw holes are provided in aligned relation in each pair of inner and outer blocks and the hole in the inner block is threaded for receiving the threaded end of a socket headed screw 29. The inner anchor blocks are first inserted into the inner ends of the apertures, the cutter blades are then inserted and the outer anchor block is then inserted. Each inner anchor block 25 is provided with a pilot flange 25' projecting from the upper end into a corresponding pilot recess 27' provided in the inner end of the outer anchor block 27. A screw 29 being inserted and turned up clamps the head of the screw firmly upon the outer end of the outer anchor block of each pair and draws each pair of anchor blocks together. The interfitting pilot flange 25'

and recess 27' provide a firm and rigid clamping action. This pinches or squeezes the bulbous protuberance 23 on the inner end of each blade thrusting it away to one side and wedging it firmly into the remote side of the anchor recess 17. In order to increase the wedging or thrusting action of each pair of anchor blocks, the adjacent or clamping ends of these are preferably provided with smoothly diverging or camming surfaces.

When my improved anchor means is utilized in a tool head which is substantially longer axially and having wider blades, two or more pairs of the anchor blocks may be provided along the side of the blade slot for anchoring the blade at a plurality of points therealong, as will be readily understood. Also it will be apparent my improved blade anchor means may be utilized in an insertable blade cutter of the type wherein the blades are inclined to the axis of rotation instead of being parallel thereto, as in spiral or dove-tailed cutters.

It is apparent that within the scope of the invention, modifications and different arrangements may be made other than herein disclosed, and the present disclosure is illustrative merely, the invention comprehending variations thereof.

I claim:

1. An inserted blade rotary cutting tool comprising, a tool head, a plurality of blade receiving slots disposed at spaced points in the periphery of said head and extending thereinto, the inner portion of each slot opening into an enlarged recess of greater width than the slot, a plurality of cutter blades, each blade having a protuberance of greater thickness than the blade, one of said blades being inserted into each slot with the enlarged protuberance disposed in said recess, an anchor block receiving aperture opening into said tool head from the peripheral surface adjacent each slot and passing thereinto in a suitable direction for intersecting with the enlarged recess of the adjacent slot, an inner anchoring block disposed in each of said apertures inwardly from the intersection with the slot, an outer anchor block disposed in each aperture outwardly from the intersection with the slot, screw receiving holes passing in aligned relation through each respective pair of inner and outer anchor blocks, the screw receiving hole in each innermost anchor block being threaded, a clamping screw threadably entering the hole in each inner anchor block and passing freely through the hole in the outer block so that by turning the screw the head thereof is clamped snugly upon the outer end of the outer block for drawing each pair of anchor blocks firmly together upon the protuberance on each blade so that the blades are firmly wedged in the tool head.

2. An inserted blade rotary cutting tool comprising, a tool head of a substantially disc-like conformation having a shaft receiving bore extending axially through the center for mounting and driving the cutter, a plurality of blade receiving slots disposed at circumferentially spaced points in the periphery of said head and extending thereinto, the inner portion of each slot opening into an enlarged recess of greater width than the slot, a plurality of cutter blades, each blade having on an inner portion a protuberance of greater thickness than the blade, one of said blades being inserted into each slot with the enlarged protuberance disposed in the recess, an anchor block receiving aperture opening into the tool head from the peripheral surface adjacent each slot and passing thereinto in a suitable direction for intersecting with the enlarged recess of the adjacent slot, an inner anchor block disposed in each of said apertures inwardly from the intersection with the slot, an outer anchor block disposed in each aperture outwardly from the intersection with the slot, screw receiving holes passing in aligned relation through each respective pair of inner and outer anchor blocks, the screw receiving hole in each innermost anchor block being threaded, a clamping screw threadably entering the hole in each inner anchor block and passing freely through the hole in the outer block so that, by turning the screw, the head thereof is clamped snugly upon the outer end of the outer anchor block and the two anchor blocks are drawn firmly together upon the protuberance on the blade so that it is firmly wedged and rigidly locked in the enlarged recess in the tool head.

3. An inserted blade rotary cutting tool comprising, a tool head of a substantially disc-like conformation having means for rotatable mounting, a plurality of blade receiving slots disposed at circumferentially spaced points in the periphery of said head and extending thereinto, the inner portion of each slot opening into a bore of a diameter greater than the width of the slot, cutter blades having a substantially cylindrical anchoring protuberance along the inner edge of each blade of a diameter slightly smaller than the diameter of the bores opening from the slots, one of said blades being inserted into each slot with the anchoring protuberance disposed in the associated bore, an anchor block receiving aperture opening into said tool head from the peripheral surface adjacent each slot and passing into the head in a direction suitable for intersecting the bore associated with the adjacent slot, an anchor block disposed in each of said apertures inwardly from the intersection with the bore, an outer anchor block disposed in each aperture outwardly from the intersection with the bore, screw receiving holes passing in aligned relation through each respective pair of inner and outer anchor blocks, the screw receiving hole in each innermost anchor block being threaded, a clamping screw threadably entering the threaded hole in each inner anchor block and passing freely through the hole in the outer block so that by turning the screw the head thereof is clamped snugly upon the outer end of the outer anchor block and the two anchor blocks are clamped firmly together upon the cylindrical anchoring protuberance on the inner portion of the blade in the slot so that it is wedged firmly and locked rigidly in the tool head, and interfitting pilot means cooperatively engaging between each pair of anchor blocks to provide a firm clamping action when the anchor blocks are drawn together.

WILLIAM L. RUDAITIS.