March 4, 1941. B. BANNISTER ET AL 2,233,724

CUTTING TOOL

Filed Sept. 22, 1939

FIG. 1.

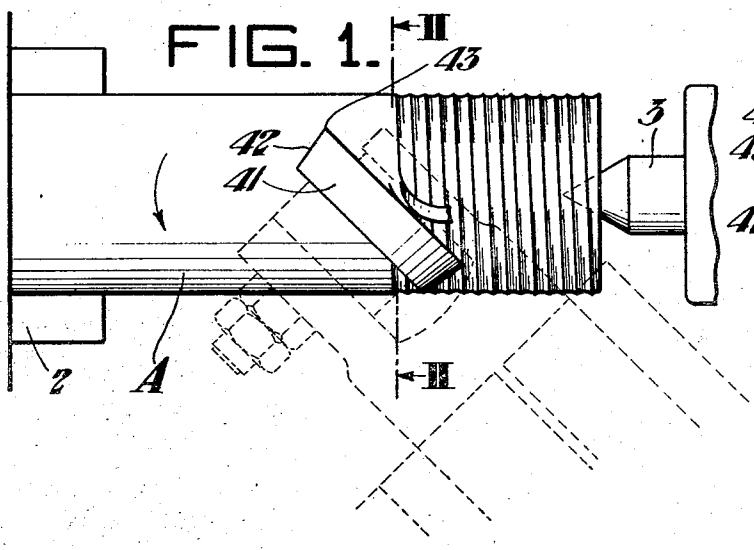


FIG. 2.

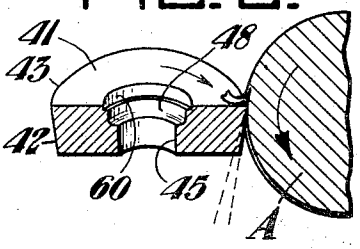


FIG. 3.

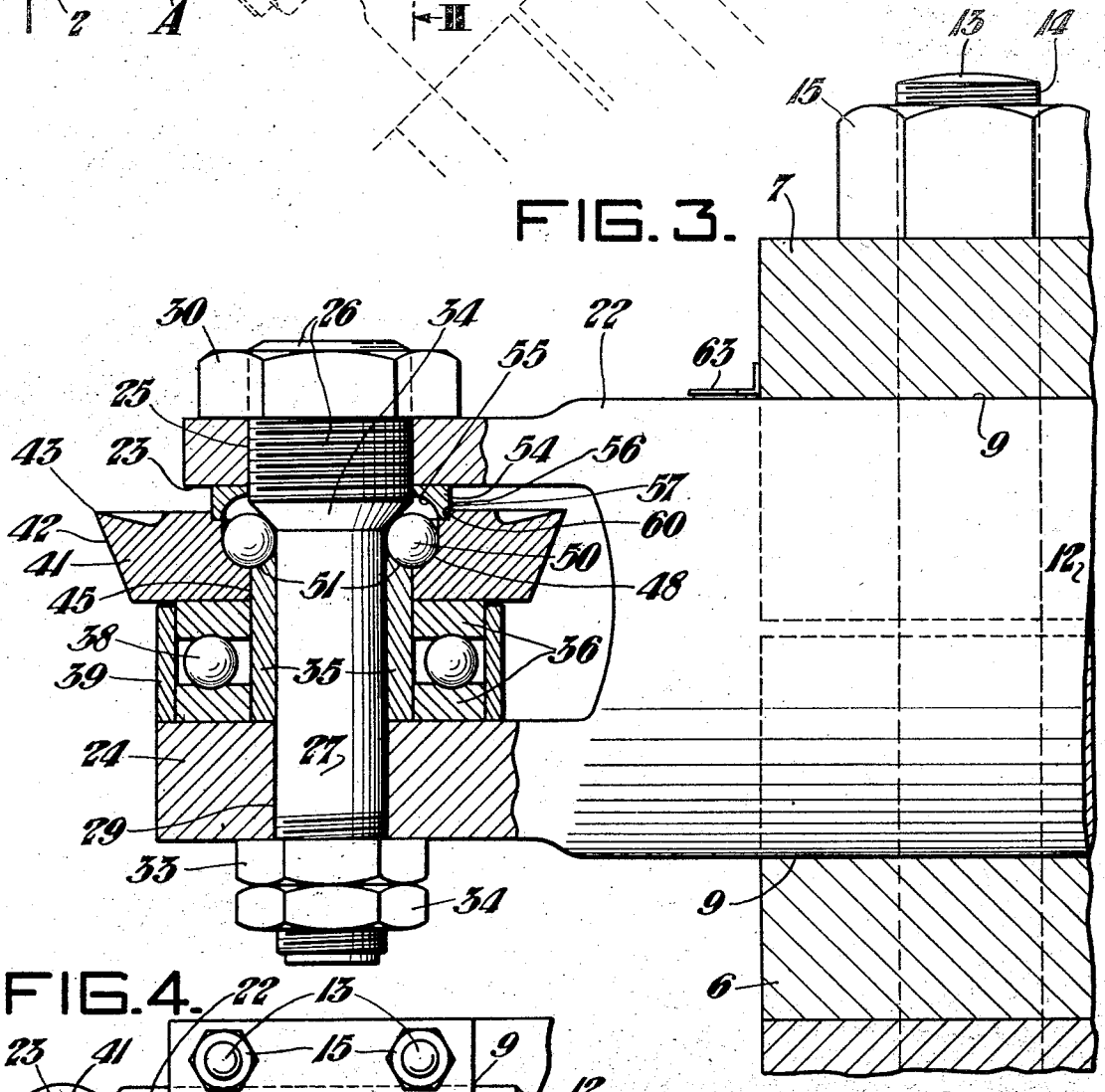
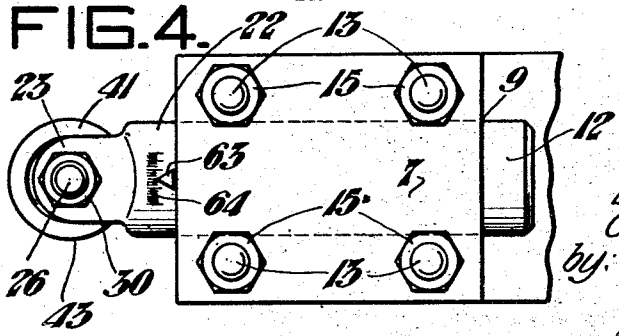


FIG. 4.



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CUTTING TOOL

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4 Claims. (Cl. 29—103)

This invention relates to cutting tools, and more particularly to one which embodies a rotatable cutting disk.

In the conventional cutting of a rotating workpiece, the cutting disk is rotated because of pressure against it and the direction of travel of the workpiece relative to it. This necessitates that the mid-portion of the periphery of the cutting disk overlaps the uncut portion of the rotating workpiece. It has been found in practice that after the largest peripheral portion of the cutting disk (which forms the cutting edge) has become slightly worn, the front face may contact the uncut portion of the workpiece and prevent proper cutting. By reducing the angularity of the plane of the cutting disk with respect to the axis of the rotating workpiece, this interference is removed and proper cutting action takes place without resharpening the cutting edge. This operation may be repeated several times, which results in greatly extending the length of time between resharpening operations, and therefore enhances the life of service of the cutting tool.

It is among the objects of the present invention to provide a novel cutting tool of the rotary type which will operate with maximum efficiency upon a rotating workpiece.

Another object is the provision of a device of the class described which may be easily and cheaply manufactured, installed and used.

The invention, then, comprises the features hereinafter fully described and as particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail the certain illustrative embodiment of the invention, this being indicative of but one of a number of ways in which the principles of the invention may be employed.

In said drawing:

Figure 1 is an elevation of a rotating workpiece together with the cutting instrumentality of the cutting tool of the invention;

Figure 2 is a sectional view on the line II—II of Figure 1;

Figure 3 is an enlarged elevation of the cutting tool of the invention, illustrating a certain part thereof in section; and

Figure 4 is an end view.

Referring more particularly to the drawing, the numeral 2 designates the driving chuck. This chuck 2 is adapted to firmly grip one end and rotate a workpiece, generally designated at A, while the other end thereof is supported in any suitable manner, as at 3.

Referring more particularly to Figure 3, the numeral 6 designates the lower half of a suitably supported bracket, the upper half being indicated at 7. These brackets are in the form of bearing halves providing cooperating grooves 9 within which there is disposed a shaft 12. This shaft 12 is suitably clamped in the grooves, as by means of studs 13, which extend through the lower bracket 6 upwardly through the upper bracket 7 and project therefrom, as designated at 14. The upwardly projecting portions 14 of the studs are suitably screw threaded and provided with nuts 15 in order to secure the desired clamping effect.

One end of the shaft 12 (designated hereinafter at 22) extends from the upper and lower brackets 6 and 7 and is bifurcated, as shown at 23 and 24. The upper arm 23 of the bifurcated end of the shaft 22 is provided with a large aperture 25 within which there is extended a screw threaded shaft 26. This screw threaded shaft 26 carries an elongated and machined downwardly depending portion 27 which extends through an aperture 29 in the lower arm 24 of the bifurcated end of the shaft 22. The upper end of the screw threaded shaft 26 projects from the upper arm 23 of the bifurcated end of the shaft 22 and carries in screw threaded engagement therewith a nut 30; while the lower end of the downwardly depending extension 27 projects from the lower arm 24 of the said bifurcated end, is screw threaded, and carries a clamping nut 33 and a locking nut 34.

Referring more particularly to Figure 3, the screw threaded shaft 26 is connected to the integral machined elongated extension 27 by means of a machined frusto-conical portion 36.

Disposed on the upper surface of the lower arm 24 of the bifurcated end of the shaft 22 is a short tubular portion or sleeve 35 around which there is disposed an anti-friction bearing which comprises a pair of bearing races 36 and a series of intermediately disposed balls 38, the assembly being held in unitary relationship by means of a radially disposed retainer 39.

Disposed upon the upper bearing race 36 is the cutting tool per se comprising a disk generally designated at 41 which is provided with a frusto-conical periphery 42, the largest diameter of which, shown at 43, provides the cutting edge. This cutting disk 41 is provided with a central aperture 45 which is cylindrical to accommodate the sleeve 35. Adjacent the upper portion of the sleeve 35, the bore of the cutting disk 41 is arcuate, as shown at 48, to accommodate a series of balls 50. These balls 50 also rest on the upper end of the sleeve 35, which is provided with a correspondingly arcuate portion 51 to receive the same.

The machined frusto-conical portion 34 of the shaft 26 rests on the balls 50 and serves as an adjusting surface therefor.

The screw threaded shaft 26, on its end adjacent the lower surface of the upper arm 23 of the bifurcated end of the shaft 22, carries in screw threaded engagement a retainer 54 which has an arcuate portion 55 to accommodate the balls 50. The periphery of the retainer 55 is cylindrical, as shown at 56, and carries at its lower end a right angular portion 57 which forms an L-shaped abutment to seat in a correspondingly shaped recess 60 in the upper face of the cutting disk 41.

Referring more particularly to Figure 4, the upper clamp 7 carries a pointer 63 which is adapted for registration with an index 64 which is scribed on the adjacent portion of the end of the shaft 12.

From the foregoing, it will be noted that the cutting disk 41 is entirely supported by anti-friction ball bearings. This provides free turning of the cutting disk 41, which is essential to avoid even momentary stoppage or reduction of speed of rotation of the latter which, at high cutting speeds would cause burning of the cutting edge 43 of the cutting tool, thereby necessitating replacement.

In addition, the holder provided by the elements 6 and 7 and cooperating instrumentalities, provides rapid and easy changing of the cutting angle of the cutting disk.

The device of the invention may be employed for turning, boring, planing, etc., and due to the construction and arrangement of the parts, provides a cutting disk having not only an increased life of service, but also one which permits greatly increased cutting speeds.

While we have shown and described one specific embodiment of the present invention, it will be seen that we do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of the invention, as defined by the following claims.

We claim:

1. A rotatable cutting tool comprising a bifurcated shaft, a spindle extending between the bifurcations of said shaft, an anti-friction bearing carried by said spindle, and a rotatable cutting disk mounted on said anti-friction bearing.

2. A rotatable cutting tool comprising a bifurcated shaft, a spindle extending between the bifurcations of said shaft, an anti-friction bearing carried by said spindle, a cutting disk mounted on said anti-friction bearing, and an anti-friction bearing disposed between said rotatable cutting disk and said spindle.

3. A rotatable cutting tool comprising a bifurcated shaft, a spindle extending between the bifurcations of said shaft, an anti-friction bearing carried by said spindle, a cutting disk mounted on said anti-friction bearing, an anti-friction bearing disposed between said rotatable cutting disk and said spindle, and means for adjusting said last-named anti-friction bearing.

4. A rotatable cutting tool comprising a bifurcated shaft, a spindle extending between the bifurcations of said shaft, axially aligned sets of anti-friction bearings carried by said spindle between the said bifurcations, and a rotatable cutting disk mounted between the said sets of anti-friction bearings.

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