Oct. 23, 1945. A. E. SCHNABLE 2,387,412

TOOL HEAD OR THE LIKE

Original Filed Oct. 4, 1941

Fig. 1.

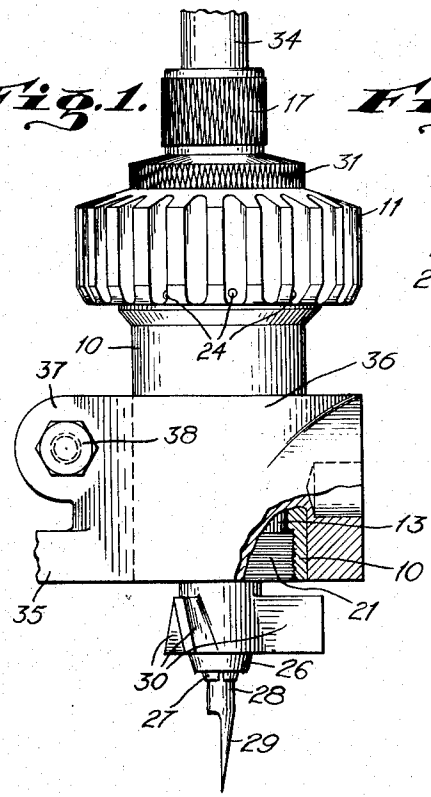


Fig. 2.

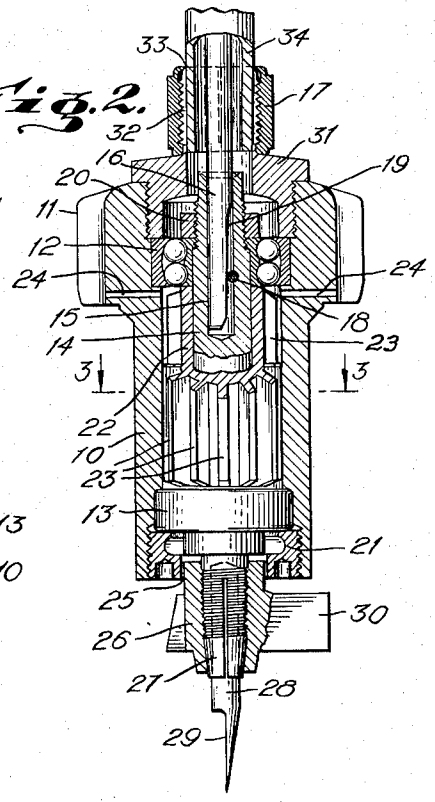
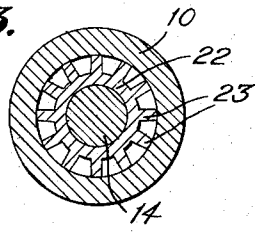


Fig. 3.



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TOOLHEAD OR THE LIKE

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Original application October 4, 1941, Serial No. 413,701, now Patent No. 2,350,704, dated July 6, 1944. Divided and this application March 19, 1943, Serial No. 479,809

6 Claims. (Cl. 90—11)

This invention relates to tool head and like devices. More particularly, the invention relates to devices of this kind designed for use in supporting tools which are operated at high speeds, and employing means providing free rotation of the tool in the tool head, and further having means for circulating air through the tool head to eliminate overheating. Still more particularly, the invention relates to a tool supporting head adapted to be used in conjunction with a routing machine and as part of a pantograph linkage with means comprising a flexible shaft for driving the tool.

The novel features of the invention will be best understood from the following description when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed, and in which the separate parts are designated by suitable reference characters in each of the views; and in which:

Fig. 1 is a side view of a tool head, showing part of a support therefor with part of the construction broken away and in section.

Fig. 2 is a longitudinal sectional view through the tool head device as seen in Fig. 1, with part of the construction shown in elevation, and

Fig. 3 is a cross section on the line 3—3 of Fig. 2.

The invention forming the subject matter of this application constitutes a division of my prior application, Serial Number 413,701, filed October 4, 1941, having since issued in Patent Number 2,350,704, dated July 6, 1944.

In illustrating one adaptation of the invention the same has been illustrated, in said earlier application, as employed in conjunction with routing machines, and in such uses, the tool head was supported on a constituted part of a pantograph mechanism of the machine. In such uses, the drive for the tool supported in the head is by way of a flexible shaft.

In the drawing, 10 represents the body portion proper or casing of the tool head or supporting member. This casing has an upper enlarged and circumferentially ribbed end 11 which forms a hand grip portion on the head. Arranged in the casing, in self alining ball bearings 12 and 13, is a spindle 14. The upper end of this spindle has a recess 15 to receive a flexible shaft coupling 16, arranged in the usual tubular housing which has at its end a coupling nut 17. A key pin 18 is arranged in the spindle to engage a flat side 19 on the shaft end 16 to key the shaft with the spindle.

The upper end of the spindle is threaded to receive a retaining nut 20, which bears against the bearing 12, and this threaded engagement is preferably made by a left hand thread structure. Another retaining nut 21 is mounted in the lower end of the casing 10, and this nut is also preferably provided with a left hand thread.

Arranged upon the spindle 14 between the bearings 12 and 13, and frictionally engaging the spindle is an elongated circumferentially ribbed sleeve forming a fan 22. The ribs or blades 23 of the fan are mounted for free rotation in the bore of the casing 10. This fan is employed to circulate air through the casing, circulating ports being provided in the head 11, as seen at 24, and a clearance is provided as at 25 between the retaining nut 21 and a clamping nut 26 arranged upon the lower split and bevelled chuck end 27 of the spindle.

The chuck end 27 of the spindle has an elongated tool receiving aperture to receive the shank 28 of a routing or other tool 29. It is also preferred that the nut 26 be provided with a series of radially as well as angularly disposed fan blades 30 which are employed to circulate air at the base of the chuck and around the tool to aid in the cooling properties, while at the same time to remove particles cut from the workpiece.

Secured to the top of the enlarged portion 11 of the casing is a milled nut 31, which fits freely around the upper end of the spindle and the nut 20, as well as around the coupling end 16 of the flexible shaft. It will thus be seen that in the use of the self alining bearings 12 and 13, proper alinement of the tool spindle is maintained at all times, as well as free high speed rotation of the spindle and tool.

The nut 31 has an upwardly extending split and externally threaded sleeve 32, the upper end of which is bevelled, as seen at 33, and the coupling nut 17 of the flexible shaft casing or housing engages the bevelled portion to firmly compress the split end of the sleeve 32 upon the casing or housing for the flexible shaft which is identified at 34.

In Fig. 1 of the drawing a small part of one end portion of one of the arms of a pantograph is indicated at 35, the pantograph being of the type and kind identified in the application hereinbefore referred to. At the end of the arm 35 is a split tubular enlarged body 36 in which the casing 10 of the tool head is adapted to be placed, and the split body has winged parts or flanges 37 through which is passed a bolt 38 employed to securely clamp the chuck casing in position within the enlarged body 36.

From the foregoing, it will be understood that a substantially frictionless mounting is provided for the tool in the head, and by reason of the provision of means for circulating air through the head overheating is prevented, thus adapting the tool head or device for use in high speed operation of tools.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A tool supporting member, said member comprising a tubular body, a spindle in said body, means comprising end bearings in said body providing free rotation of said spindle, a sleeve on said spindle and extending from one bearing to the other bearing, a plurality of circumferentially spaced blades extending longitudinally of said sleeve for circulating air through said body, said spindle having an end protruding through one end of said body, means on said protruding end of the spindle for adjustably coupling a tool therewith, said bearings being self-alining to provide automatic centralization of the spindle, the other end of the spindle having a socket, and means for keying a drive shaft in the socket of said spindle.

2. A tool head of the class described comprising a tubular body, an elongated straight wall bore centrally of end portions of said body, bearings in said body and disposed at the ends of said bore, a spindle mounted in said bearings and arranged centrally of the bore of said body, a fan member on the spindle and comprising circumferentially spaced blades extending longitudinally of said bore and freely rotatable therein, said spindle protruding through one end of said body, said body having air discharge passages communicating with the bore at the other end portion of said body, and a tool supporting chuck on the protruding end of said spindle.

3. A tool head of the class described comprising a tubular body, an elongated straight wall bore centrally of end portions of said body, bearings in said body and disposed at the ends of said bore, a spindle mounted in said bearings and arranged centrally of the bore of said body, a fan member on the spindle and comprising circumferentially spaced blades extending longitudinally of said bore and freely rotatable therein, said spindle protruding through one end of said body, said body having air discharge passages communicating with the bore at the other end portion of said body, a tool supporting chuck on the protruding end of said spindle, the other end of the spindle terminating substantially within the second named end of the body and having a drive shaft receiving socket, and means for detachably coupling a drive shaft with the second named end of said body and with said spindle socket.

4. A tool head of the class described comprising a tubular body, an elongated straight wall bore centrally of end portions of said body, bearings in said body and disposed at the ends of said bore, a spindle mounted in said bearings and arranged centrally of the bore of said body, a fan member on the spindle and comprising circumferentially spaced blades extending longitudinally of said bore and freely rotatable therein, said spindle protruding through one end of said body, said body having air discharge passages communicating with the bore at the other end portion of said body, a tool supporting chuck on the protruding end of said spindle, and said chuck including circumferentially spaced and radially extending fan blades arranged adjacent the first named end of said body.

5. The combination with a tool supporting spindle, a casing, bearings widely spaced in the casing longitudinally of the spindle to support and guide the same in the rotation thereof, the casing having intermediate the bearings an aperture, a fan on the spindle intermediate said bearings, said fan having a plurality of circumferentially spaced narrow blades elongated in the direction of and extending substantially the full distance between said bearings, and said fan being adapted to circulate air through said aperture.

6. The combination with a tool supporting spindle, a casing, bearings widely spaced in the casing longitudinally of the spindle to support and guide the same in the rotation thereof, the casing having intermediate the bearings an aperture, a fan on the spindle intermediate said bearings, said fan having a plurality of circumferentially spaced narrow blades elongated in the direction of and extending substantially the full distance between said bearings, said fan being adapted to circulate air through said aperture, and another fan on the spindle outwardly of one of said bearings.

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