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P. R. GJERTSEN

2,299,225

TOOL

Filed June 13, 1940

Fig. 1.

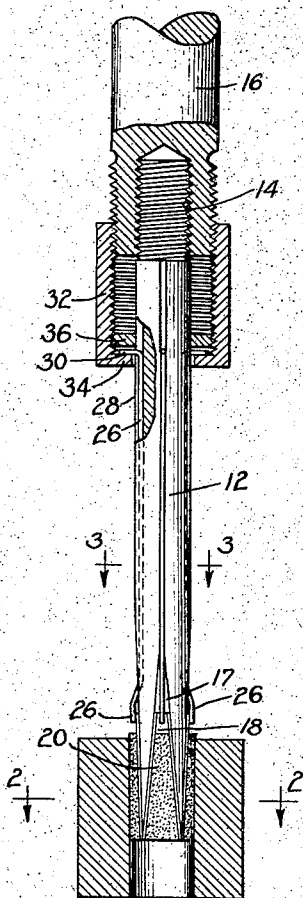


Fig. 2.

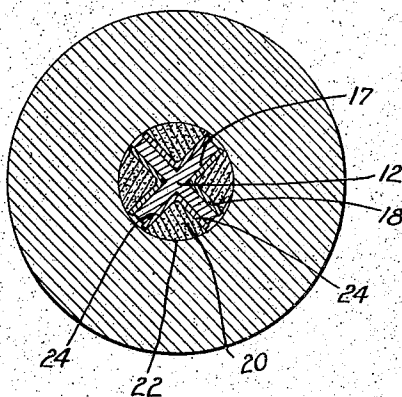
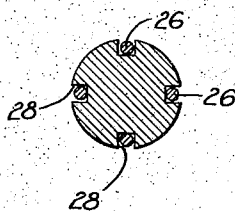


Fig. 3.



Inventor:
Paul R. Gjertsen

By:

Parker, Carlson, Piquet & Hubbard

Attorneys

UNITED STATES PATENT OFFICE

2,299,225

TOOL

Paul R. Gjertsen, Detroit, Mich., assignor to Ex-Cell-O Corporation, Detroit, Mich., a corporation of Michigan

Application June 13, 1940, Serial No. 340,308

1 Claim. (Cl. 51—184.3)

The invention relates to a tool, and more particularly to a lapping or honing tool for use in finishing the inner surface of cylindrical members, and the subject matter of this invention is a continuation-in-part of my copending application Serial No. 188,593, filed February 4, 1938.

An object of the invention is to provide a new and improved tool having axially movable abrasive members associated with means operable as an incident to the axial movement of said members to move them radially to vary the outside diameter of the abrasive surface.

Another object of the invention is to provide a new and improved tool embodying a plurality of abrasive elements slidable longitudinally along tapered surfaces to effect a radial adjustment for varying the outside diameter of the working surface of the abrasive members.

Further objects of the invention are to provide a new and improved tool embodying, among other features, a novel form of abrading element and a novel form of supporting means for the abrading element, the element and the supporting means being arranged to be bonded together and the abrading unit thus formed being fashioned for operative association with coacting tapered surfaces.

Other objects and advantages of the invention will become apparent in the following description and from the accompanying drawing, in which:

Figure 1 is a side elevational view of a tool embodying the features of the invention, parts being broken away and in section.

Fig. 2 is a transverse sectional view through the tool on the line 2—2 of Fig. 1.

Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 1.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawing and will herein describe in detail, the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claim.

Referring to the drawing, the tool in the exemplary form which has been selected for illustrative purposes, includes a shank, mandrel or arbor 12 having one end thereof arranged to be operatively connected with a rotatable driving spindle or the like. Thus, in the present instance, the end of the shank is screw threaded,

as at 14, to engage a socket 16 constituting an element adapted to be inserted in a suitable chuck or the like.

The opposite end of the shank 12 has an end portion arranged to be operatively engaged by the abrading units.

Thus, the opposite end portion of the shank is provided with four grooves 17 of V-shape cross section disposed in substantially equal circumferentially spaced relation on the shank. The grooves are of increasing depth in the direction of the extreme end of the shank and the grooves are dimensioned so that the apexes thereof meet substantially on the axis of the shank at its extreme end. The grooves, therefore, taper toward the extreme end and it is preferred that the faces of the grooves have a right angular relationship so that in cross section, as shown in Fig. 2, the grooved portion of the shank has the form of a cross.

The carrier members or holders 18 for the abrasive elements are arranged to fit in and operatively engage the grooves. Each carrier member 18 is preferably formed of sheet metal and is longitudinally bent medially to complement the cross sectional form of a groove. Each holder is of gradually diminishing width from one end thereof to the other so that the holder has a longitudinally tapering form which is complementary to that of a groove. An abrasive element 20, provided with a substantially cylindrical outer or working surface 22, has opposite faces 24 meeting at a right angle to fit in and be embraced by the holder and has a longitudinal taper complementary to that of the grooves and holders. The abrasive element and the holder are suitably bonded together.

As may be seen in Fig. 1, the holder is somewhat longer than the abrasive element bonded thereto and in assembly the smaller end of the holder extends beyond the smaller end of the abrasive element. An elongated rod 26 is secured at one end to a projected part of the holder, for instance in the apex thereof (as shown). Grooves 28 are formed on the shank to extend longitudinally thereof substantially on the lines of the apexes of the grooves 17. Each of these grooves 28 receives a rod 26 on a holder associated with the corresponding groove 17. The rods preferably do not project beyond the outer periphery of the shank 12.

The free ends of the rods are bent at right angles, as indicated at 30, to provide short ends that in assembly with the shank extend outwardly and radially therefrom. A nut or collar

32 having external screw threaded engagement with the end of the socket has a radial flange 34. A disk 36, screw threaded into the nut or collar 32, is arranged to bind the ends 30 on the rods against the flange 34 on the nut. Adjustment of the nut 32 relative to the socket 16 will effect an axial movement which, through the rods 26 will move the abrasive units in an axial direction along the grooves 17. This movement will, because of the complemental surfaces produce a radial movement of the abrasive units to increase or decrease the outside diameter of the abrading surfaces thereon. It will be understood that in the present form four abrasive units, each preferably comprising an abrading element bonded to a holder, are operatively assembled on the grooved end of the shank.

Cross reference is hereby made to my copending application Serial No. 264,706, filed March 29, 1939, and matured as Patent No. 2,268,479, December 20, 1941, which covers the subject matter of invention generic to the two cases.

I claim as my invention:

In a tool of the class described, in combination, a shank having at one extreme end portion thereof a plurality of grooves of substantially V-shaped cross section, said grooves being equidistantly spaced circumferentially of said shank and being of gradually diminishing depth inwardly from the extreme end of the shank, said grooves having apexes which meet approximately on the axis of said shank on the extreme end thereof, and a plurality of abrading means each including an abrasive element having a wide arcuate abrading surface formed on a radius common to all of the other elements and having surfaces opposite to said arcuate surface complementary to a groove, a supporting member of thin gauge sheet metal having a cross sectional shape complementary to a groove bonded to said opposite surfaces, and means connected with said holder for adjusting said abrading means relative to said shank.

PAUL R. GJERTSEN.