July 11, 1944. D. R. HAMMILL ET AL 2,353,236

DIAMOND TOOL

Filed March 10, 1943

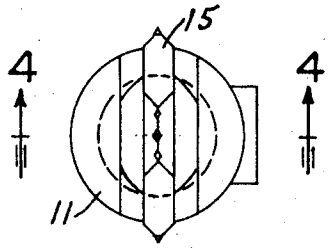

FIG. 1

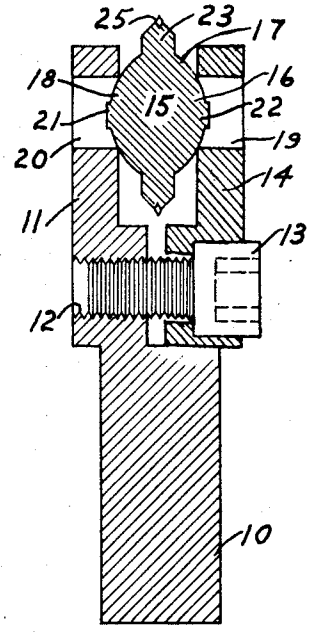

FIG. 4

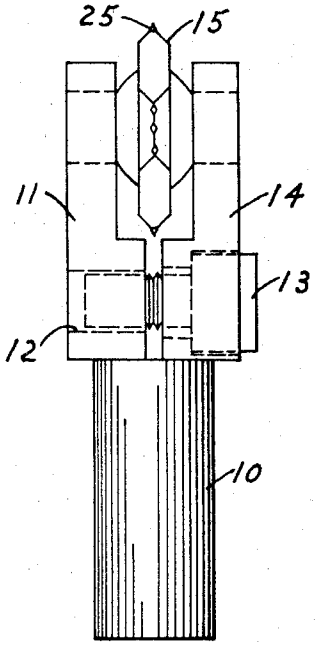

FIG. 2

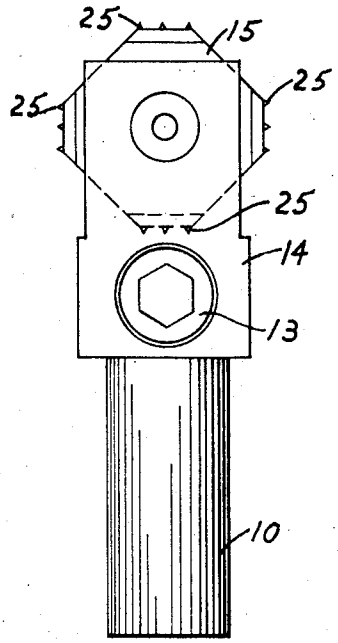

FIG. 3

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DIAMOND TOOL

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6 Claims. (Cl. 125—39)

The present invention relates to a diamond tool and particularly to such tools used for dressing or truing grinding wheels of abrasive materials.

Such tools are used in wheel-truing devices and fixtures of various types and are designed to hold a diamond or plurality of diamonds in surface contact with a grinding surface of an abrasive wheel, either to develop a desired contour therein or to restore a desired contour thereto.

Since such abrasive wheels are used to a great extent in high precision work, it is important that the dressing or truing operation be accurately performed. This requires that the diamond tool be held in a suitable holding fixture and be moved into an adjusted position with the diamonds therein in a predetermined position relative to the abrasive wheel surface to be dressed.

In conventional tools used for this purpose, a diamond or plurality of diamonds is held in a fused or sintered powdered metal matrix secured, as by brazing, to the end of the tool shank. Frequently distortion occurs in the mounting of the diamond and metal matrix in the tool shank which makes difficult the attainment of an accurate precision adjustment of the tool in the abrasive wheel dressing or truing fixture. When the d'amonds in such tool are worn off in use, it is necessary to replace the entire tool and reset it in the fixture. This is an uneconomic operation not only because of the time lost in changing the tool, but also in the loss of materials which are expensive and many of which are very critical in the present national emergency.

It is, therefore, an object of the present invention to provide a diamond tool for dressing or truing an abrasive wheel and which is of a novel design and construction to provide a plurality of diamond set dressing faces in a single tool holding shank, the tool being readily adjusted while in a wheel dressing or truing fixture to bring into surface contact with the abrasive wheel any desired diamond set face.

It is a further object of the present invention to provide a diamond tool for dressing or truing an abrasive wheel and in which the several diamond set faces are formed as a part of an adjustably movable member comprising the diamond holding matrix, the movable member being mechanically held in the tool shank without brazing.

It is a further object of the present invention to provide a diamond tool for dressing or truing an abrasive wheel, and in which the diamond set movable member may be removed from or replaced in the tool while the shank is held in its adjusted position and location in the wheel dressing or truing fixture. This allows the use of various types of diamond set members in the same tool, thus giving the tool a wider application in commercial use than is the case with conventional tools in which the diamond set matrix is brazed into the shank.

It is a further object of the present invention to provide a diamond tool for dressing or truing an abrasive wheel and in which the novel design and construction permits efficient and economical manufacture of the tool by production methods, with the maximum utilization of the materials employed.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawing forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawing:

Fig. 1 is a top plan view of a tool embodying the present invention.

Figs. 2 and 3 are side and front elevations respectively of the tool shown in Fig. 1.

Fig. 4 is a longitudinal section taken substantially on the line 4—4, looking in the direction of the arrows in Fig. 1.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawing, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Referring to the drawing, the numeral 10 indicates a tool-holding shank which is adapted to be received in a tool-holding jig or fixture (not shown), which is formed to provide an extending clamping arm 11, and is drilled and tapped as at 12 to receive a suitable screw-threaded clamping member, such for example as an Allen set screw 13. A movable clamping arm 14 is adjustably secured to the shank 10 by means of the screw-threaded member 13, which together with the member 11 provides a clamping device for holding the diamond set member indicated in general by the numeral 15.

The diamond set member 15 as shown in Fig. 4 comprises a body portion 16 which is preferably formed of a fused or sintered powdered metal matrix, shaped to provide the hemispherical side

portions 17 and 18, which are adapted to be received in openings 19 and 20 provided in the clamping members 14 and 11, respectively.

Stops 21 and 22 are provided on the body portion 16, and limit the amount of movement of the diamond set member relative to the clamping members 11 and 14. A plurality of faces 23 extend radially outwardly from the hemispherical portions 17 and 18 of the body of the diamond set member 15, and have mounted at the terminal faces therein a diamond or diamonds indicated by the numeral 25.

In the embodiment of the invention here shown, there are three diamond points 25 in each of the four faces thus providing in a single tool twelve diamond cutting or truing surfaces.

By adjustment of the clamping members 11 and 14, the diamond set member 15 may be turned in any desired position to bring any one of the diamond set faces into contact with the surface of an abrasive grinding wheel. If desired, the tool may be held in a tool-holding jig or fixture (not shown), and the diamond set member 15 adjusted in the position in the clamping member so as to bring it into the required intimate surface contact with the wheel to be dressed or trued. This facilitates the accurate and close adjustment which is required for truing an abrasive wheel within the desired precision limit. Also it will be observed that the tool may be held in the jig or fixture and the entire diamond set member replaced by a diamond set member of a different design or with different diamond settings so that the single tool shank and clamping member may if desired be used with a plurality of different types of diamond holding surface contacting members.

The body of the diamond set member 15 may be formed of any desired type of material. One preferred type which has been used successfully consists chiefly of a pressed or briquetted body portion of powdered metal, such for example as tungsten, copper and tungsten carbide mixed in suitable proportion, either with or without other materials, such for example as cobalt. However, it is to be understood that the diamond set member may be formed of any other desired type of such materials.

We do not desire, therefore, to be limited to any particular type or kind of diamond set member, although the sintered or fused powdered metal member is a very desirable and advantageous form since it permits ready shaping of the member 15 to any desired contour and at the same time provides a positive grip and lock on the diamonds placed therein.

From the foregoing it will be seen that the tool of the present invention is of a novel design and construction and provides a plurality of diamond set dressing faces in a single tool-holding shank, the construction of the tool being such that it is readily adjusted while in a wheel dressing or truing fixture to bring into surface contact with the abrasive wheel any desired diamond set faces. The tool also is such that the diamond set faces are formed as the part of an adjustable movable member, which is held mechanically in the tool shank without brazing.

The diamond set movable member may be removed from and replaced in the tool while the shank is held in its adjusted position and location in the wheel dressing or truing fixture. This allows the use of various types of diamond set members in the same tool, thus giving the tool a wider application in commercial use than is the case with conventional tools in which the diamond set matrix is brazed in the shank. The tool is of novel design and construction and is such as to permit efficient and economical manufacture by mass production methods, providing for the maximum utilization of all of the materials employed.

We claim:

1. A tool for dressing an abrasive grinding wheel and comprising a shank, a clamp on one end thereof comprising a fixed clamping arm, a removable clamping arm associated therewith and held in adjusted clamping position by an adjustable set screw, and a diamond set member removably held in an adjusted position in said clamp, said fixed clamping arm and the said removable clamping arm having aligned openings in which a diamond set member is adjustably mounted, said diamond set member comprising a body portion having substantially hemispherical sides adapted for engagement in said aligned openings to form an adjustable universal swivelling connection between said member and said clamp.

2. A tool for dressing an abrasive grinding wheel and comprising a shank, a clamp on one end thereof comprising a fixed clamping arm, a removable clamping arm associated therewith and held in adjusted clamping position by an adjustable set screw, aligned openings in said fixed clamping arm and said removable clamping arm, and a diamond set member comprising a body portion having substantially hemispherical sides adapted for engagement in said aligned opening to form an adjustable universal swivelling connection between said member and said clamp, and a plurality of faces extending radially outward from said substantially hemispherical side portions, each extending face having diamonds set therein with exposed cutting surfaces for surface contact with an abrasive dressing wheel.

3. A tool for dressing an abrasive grinding wheel as claimed in claim 2 and further characterized in that stops are formed on the hemispherical sides of said diamond set member to limit the relative movement of said diamond set member relative to said clamp.

4. A tool for dressing an abrasive grinding wheel as claimed in claim 2, and further characterized in that the diamond set member is formed of a fused powdered metal matrix.

5. A tool for dressing an abrasive grinding wheel as claimed in claim 2, and further characterized in that the body portion is provided with stops formed thereon to limit the relative movement of said diamond set member relative to said clamp, and the diamond set member is formed of a fused powdered metal matrix.

6. A tool for dressing an abrasive grinding wheel and comprising an adjustable clamping member secured to one end of a shank, a diamond set member adjustably held in said clamping member, said diamond set member comprising a body portion having substantially hemispherical sides engaged by said clamping member and four radially extending diamond set faces, each of said faces having at least three exposed diamond cutting surfaces therein.

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