

June 16, 1959

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2,890,694

DIAMOND DRESSING TOOL ASSEMBLY

Filed May 22, 1958

2 Sheets-Sheet 1

Fig. 1

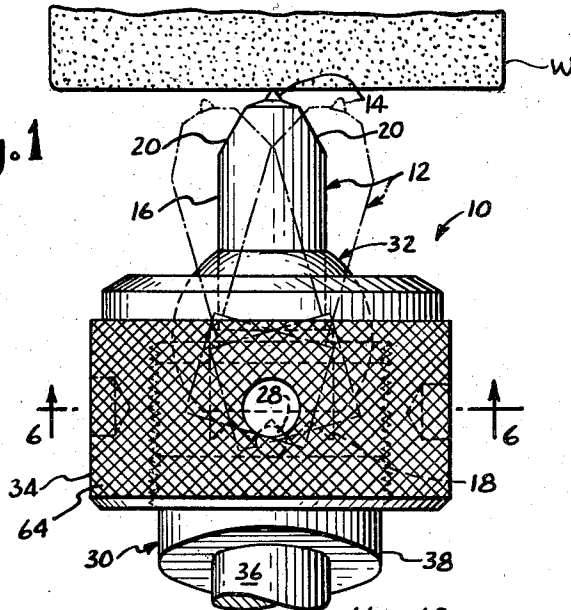


Fig. 2

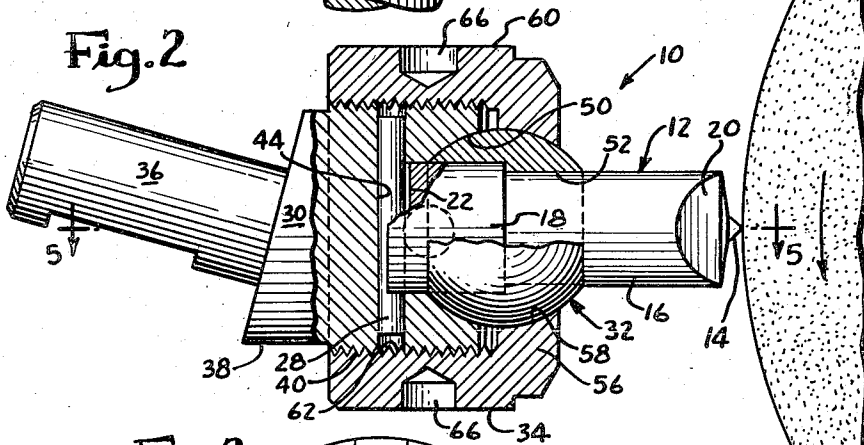


Fig. 3

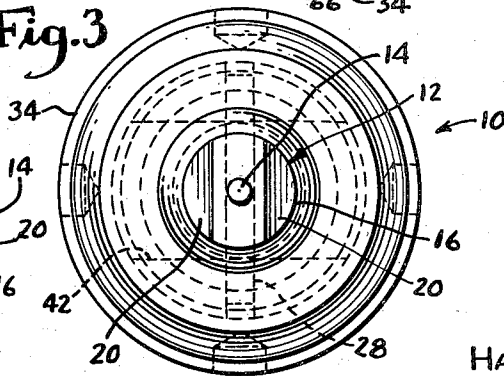
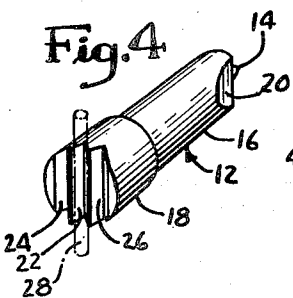


Fig. 4



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2 Sheets-Sheet 2

Fig. 5

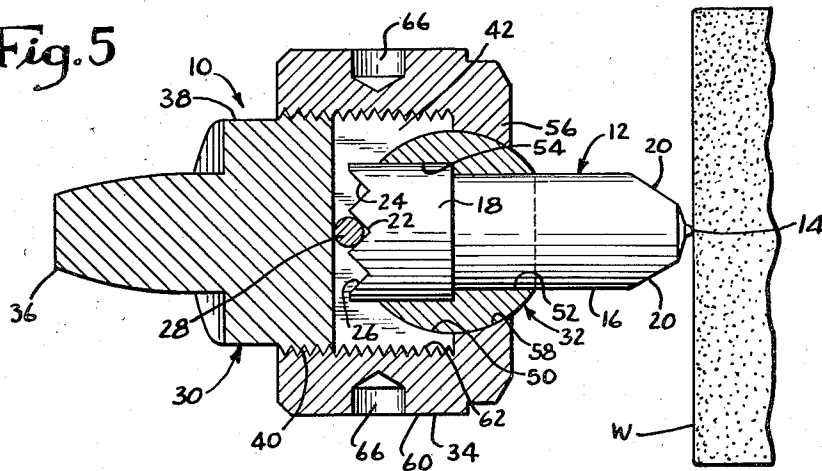


Fig. 6

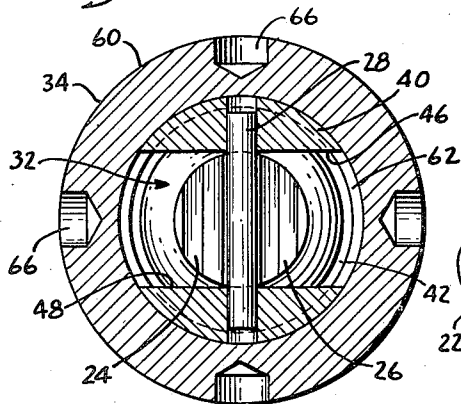


Fig. 8

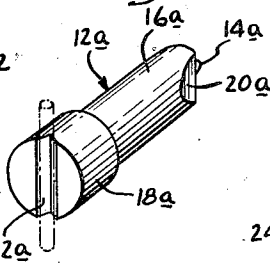


Fig. 9

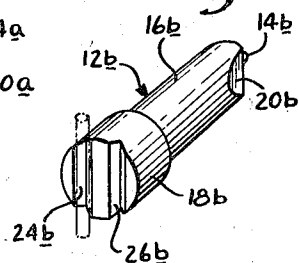


Fig. 10

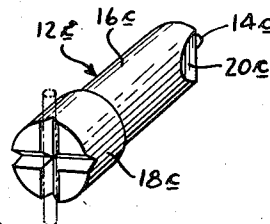
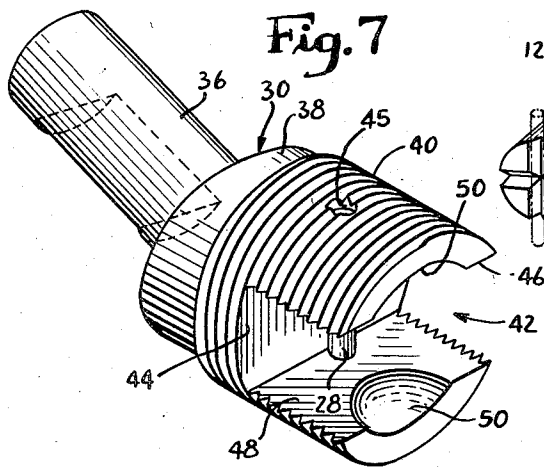
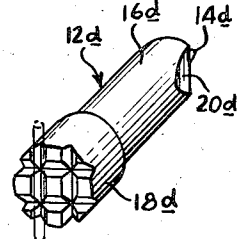


Fig. 11



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2,890,694

DIAMOND DRESSING TOOL ASSEMBLY

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Application May 22, 1958, Serial No. 737,032

13 Claims. (Cl. 125—39)

The present invention relates to apparatus for dressing abrasive grinding wheels or the like and it has particular reference to a novel combination of a tool and tool holder assembly wherein the tool consists of a shank having mounted therein a diamond dressing stone adapted to be presented to a rotating grinding wheel for dressing purposes, the dressing action taking place in either direction of traverse across the surface of the wheel. Specifically, the invention is concerned with a diamond-carrying mount or tool and a cooperating holder therefor of novel construction by means of which the diamond dressing stone associated therewith may be applied to the rotating surface of the grinding wheel at selected regions on the surface of the diamond and in selected vectorial directions relative to the crystallographic structure of the diamond on the one hand, and in selected directions relative to the rotating surface undergoing truing on the other hand to produce maximum resistance to abrasion on the part of the dressing stone and to produce maximum dressing effect on the surface undergoing treatment.

In a co-pending application of Leopold H. Metzger and Harold C. Miller, Serial No. 664,570, filed on June 10, 1957 and entitled "Method of and Apparatus for Dressing Grinding Wheels," there has been shown and described a diamond-carrying mount and a holder therefor by means of which a diamond dressing stone may be applied to the rotating surface of a grinding wheel at such selected regions and in such selected vectorial directions, and the diamond-carrying mount and holder of the present invention is designed as an improvement over the mount and holder shown in the above-identified application, the present mount and holder assembly being capable of accomplishing substantially the same functions as that of the application and in a more efficient manner from the standpoint of change-over operations as will be set forth presently.

The efficiency of diamond-carrying mounts and holders such as have been exemplified in the above-identified co-pending application is predicated upon the fact that the diamond dressing stone is at all times oriented relative to the grinding wheel in such a manner that its (110) direction is parallel to the direction of abrasion. In using such an assembly, as well as in using the assembly of the present invention, the method outlined in said co-pending application is followed. Reference may be had to such application for a full disclosure of the method involved, but for purposes of description herein, it is deemed sufficient to state that a dressing edge of the stone which extends in the (110) direction of the stone according to the system of crystallographic rotation known as Miller's indices, and which may be the result of the presentation of an edge existing between two intersecting octahedron faces, is initially presented to the grinding wheel in the plane of rotation thereof so that the bi-secting plane of the two intersecting octahedron faces extends normal to the surface of the wheel at

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the line of contact and parallel to the direction of abrasion. This truing dressing position is maintained during an initial dressing phase during which wear takes place and new dressing edges are generated on the opposite sides of the flat which is developed on the stone as a result of the abrasion involved. When the nature of such flat becomes critical and dressing operations are no longer practicable, dressing operations are momentarily terminated and a new position is given the diamond by a lateral angular displacement thereof wherein one or the other of the generated edges at one side or the other of the critical flat is presented to the grinding wheel surface. This newly selected edge also extends parallel to the (110) direction of the dodecahedron plane and its presentation to the rotating surface commences a second grinding phase wherein abrasion takes place in a plane or family of planes inclined relative to the initial (110) plane but in the (110) direction offering maximum resistance to abrasion, and wherein a second critical flat is generated. Upon generation of such second critical flat, dressing operations are again momentarily terminated and the previously generated edge of the critical flat in the dodecahedron plane, not selected for dressing in the second phase, is now selected for dressing purposes. To properly apply such edge to the rotating surface, a second new position is given the diamond by lateral displacement thereof and the tool is restored to its initial "head-on" position to present the new edge existing by virtue of the intersection between the two previously generated flats to be presented squarely to the surface of the wheel. This last mentioned edge will exist in the crystal structure as a counterpart of the (110)-directed line originally selected for dressing purposes in the first phase of operations, and the diamond as a whole will assume the same relative position with respect to the plane of the grinding wheel that it assumed when grinding operations were initially commenced so that a complete three-phase cycle of operations will have been completed.

From the above brief description of the method involved, and which method will hereinafter be referred to as the oriented vector method of utilizing a diamond for dressing purposes, it will be seen that, for commercially practicing such a method, a dressing tool assembly is required by means of which movement of the tool shank laterally through a predetermined angle in one direction or the other about an axis extending at a right angle to the axis of rotation of the wheel and normal to the radius of the wheel at the point of contact between the wheel periphery and the diamond must be effected. Such shifting of the tool shank, and the anchoring thereof in the selected positions of which it is capable of assuming will effect the desired presentation of the diamond to the wheel for optimum dressing conditions at the commencement of any given dressing phase. Such a dressing tool assembly forms in part the subject matter of the above-mentioned co-pending application, as well as forming the subject matter of the present invention which is designed as an improvement over the dressing tool assembly shown in such application.

In the tool assembly of the above-mentioned application, selective anchoring of the tool shank in three predetermined positions of angularity is made possible by pivotally mounting the shank on a holder having three placement holes formed therein designed for selective register with a single threaded reference hole formed in the tool shank. A clamping bolt is selectively receivable through the placement holes and is designed for threaded reception in a reference hole and when the bolt is thus positioned, tightening thereof will serve to clamp the tool shank in the desired position of orientation,

While such an assembly will effectively perform its intended function, it has been found that in actual practice the necessary change-over operations involving unthreading of the clamping bolt, its removal from the assembly, accurate alignment of the various pairs of holes involved, replacement of the bolt and tightening thereof, involve numerous detailed operations which are troublesome to an operator and which require a modicum of skill and which are time-consuming. Furthermore, the assembly is subject to clogging due to the accumulation of abrasive products or other foreign material in the unused holes.

The present invention is designed to overcome the above-noted limitations that are attendant upon the construction and use of tool assemblies of the specific type briefly outlined above and, toward this end, it contemplates the provision of an improved dressing tool assembly capable of use in carrying out the method set forth in the above-mentioned co-pending application, and wherein the tool shank projects into and has its proximate or inoperative end enclosed within a sealed chamber provided in a two-part separable tool holder. Clamping means are provided within the chamber whereby the proximate end of the shank may be selectively clamped in any one of a plurality of positions of adjustment whereby the shank as a whole may be caused to assume predetermined positions of orientation including the three desired positions outlined above, namely, a centered position and two laterally displaced positions of angularity. Change-over operations between these three positions of adjustment may be effected by a releasable clamping operation which may be accomplished manually without the use of special tools and without necessitating separation of the holder parts while the proximate end of the shank and the clamping instrumentalities associated therewith remained substantially sealed within the holder. Each of the positions of adjustment of which the shank is capable is accurately determined by cooperating interengaging releasable detent means on the shank and one of the holder parts respectively so that the selected positions attained by the shank are accurately and automatically attained without guesswork.

The tool holder assembly of the present invention is susceptible to considerable modification and, by the use of tool shanks having varying forms of detent means associated therewith, positions of orientations other than those outlined above in connection with the oriented vector method of utilizing a diamond for dressing purposes, may be attained and are capable of being selected for use with a minimum of effort on the part of an operator and without separating the holder parts or otherwise exposing the detent means or removing the same from its sealed environment within the tool holder.

The provision of a dressing tool assembly of the character briefly outlined above being among the principal objects of the invention, it is another object to provide such an assembly having means associated therewith whereby the tool holder portion of the assembly may be mounted in or attached to a slide or carriage by means of which the assembly is caused to traverse the face of the grinding wheel with compensation being made for the normal drag angle associated with the slide or carriage.

The provision of a dressing tool assembly which is relatively simple in its construction and which, therefore, may be manufactured at a low cost; one which is rugged and durable and which, therefore, is unlikely to get out of order despite any rough usage to which it may be put; one which is easily assembled and dismantled for purposes of inspection, replacement or substitution of parts or repair; one which requires no particular skill for its proper use during dressing operations; and one which otherwise is well adapted to perform the services required of it are further desirable features which have been borne in mind in the production and development of the present invention.

Other objects and advantages of the invention, not at this time enumerated, will become more readily apparent as the following description ensues.

In the accompanying two sheets of drawings forming a part of this specification, a preferred embodiment of the invention has been shown.

In these drawings:

Fig. 1 is a top plan view of a diamond dressing tool assembly constructed in accordance with the principles of the present invention showing the same operatively applied to the peripheral face of a grinding wheel for dressing purposes;

Fig. 2 is a sectional view taken substantially along the line 2—2 of Fig. 1;

Fig. 3 is a front elevational view of the structure shown in Fig. 1;

Fig. 4 is a perspective view of a diamond mount or tool shank employed in connection with the invention;

Fig. 5 is a sectional view taken substantially along the line 5—5 of Fig. 2;

Fig. 6 is a sectional view taken substantially along the line 6—6 of Fig. 5;

Fig. 7 is a perspective view of one element of a composite tool holder employed in connection with the invention; and

Figs. 8, 9, 10 and 11 are perspective views similar to Fig. 4 showing various modified forms of diamond mounts or tool shanks capable of being employed in connection with the invention.

Referring now to the drawings in detail and in particular to Figs. 1 and 2, one form of dressing tool constructed in accordance with the principles of the present invention has been designated in its entirety at 10 and involves in its general organization a diamond mount or "tool shank" in the form of a generally cylindrical steel body 12 carrying a diamond 14 at its forward end. The shank 12 is provided with an elongated stem portion 16 and an enlarged head portion 18 (see also Fig. 4). The forward end of the stem portion 16 may be relieved as at 20 on opposite sides thereof to provide clearance regions whereby the diamond 14 may be presented to the surface of a grinding wheel W undergoing dressing without interference by the body of the shank, it being understood that the character of the clearance regions may be varied to accommodate various diamond mountings and various angles of presentation of the diamond to the rotating surface undergoing dressing. In the form of the invention illustrated in Figs. 1 to 4, inclusive, the enlarged head portion 18 is formed at its rear end with three rearwardly facing parallel linear grooves including a centrally disposed groove 22, and two adjacent grooves 24 and 26, respectively, on opposite sides of the groove 22. As will be set forth in greater detail presently, the grooves 22, 24 and 26 constitute placement grooves and are designed for selective register and cooperation with a locating pin 28 carried by a holder body 30, the details of which will also be set forth in detail subsequently.

The shank 12 is mounted for limited universal swinging and rotational movements in a composite three-part, separable tool holder assembly including the holder body 30, a ball member 32 and a clamping ring 34.

As best seen in Figs. 2, 5 and 7, the holder body 30 includes a cylindrical stem portion 36 designed for attachment to a slide or carriage (not shown) by means of which the dressing tool assembly 10 as a whole is traversed across the face of the grinding wheel W. It will be understood, of course, that in certain installations, the tool assembly 10 will be maintained stationary and the rotating grinding wheel will traverse the tool. Irrespective, however, of the particular means whereby the tool and grinding wheel are caused to move laterally relative to one another, the essential features of the invention remain substantially the same.

The forward end of the stem portion 36 carries an enlarged integral head portion 38 of generally cylindrical

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design and having an exterior surface which is threaded as at 40 throughout a major portion of its axial extent. The threads 40 are interrupted at diametrically opposed regions by virtue of the existence of a transverse slot 42 which is formed in the forward face of the head portion 38. The slot 42 is relatively deep and relatively wide and it affords a bottom wall 44, and opposed side walls 46 and 48, respectively. The outer regions of the side walls 46 and 48 are formed with recesses 50 presenting concentric semi- or frusto-spherical surfaces, which, in combination with each other, define an interrupted spherical socket designed for reception therein of the ball member 32. The previously mentioned locating pin 28 extends across the slot 42 adjacent the bottom wall 44 thereof and has its opposite ends secured in holes 45 provided in the head portion on opposite sides of the slot respectively.

When the tool and tool holder assembly are operatively mounted in a slide or carriage, the bottom wall of the transverse slot 42 extends in a vertical plane while the outer or rear face 51 is disposed at an angle of approximately 15° from a vertical plane. The axis of the stem portion 36 is normal to the face 51. The axis of the stem portion 36 is thus inclined at an angle of approximately 15° to the axis of the shank 12 to compensate for the normal drag angle associated with conventional slides.

The ball member 32 is of spherical configuration and is formed with a central bore 52 therethrough presenting an enlarged counterbore 54. The diameter of the bore 52 is such that it may receive the stem portion 16 of the shank 12 therein with a snug fit, while the diameter of the counterbore 54 is such that it may similarly receive the head portion 18 of the shank 12, as clearly shown in Fig. 2.

The clamping ring 34 is generally of cylindrical cup-shape configuration and the bottom wall 56 thereof is formed with a central opening 58 therethrough having a rim portion presenting a semi- or frusto-spherical surface. The cylindrical wall 60 of the clamping ring 34 is threaded interiorly as at 62 to receive therein the interrupted threaded portion 40 of the holder body 30. The outer cylindrical surface of the clamping ring 34 is knurled as at 64 and a plurality of recesses or sockets 66 are formed therein and are designed for cooperation with a spanner wrench or the like (not shown) so that tightening of the clamping ring 34 against the ball 32 may be facilitated.

From the above description it will be seen that the shank 12, holder body 30, ball member 32 and clamping ring 34 may be assembled in such selective fashion that the longitudinal axis of the shank 12 may assume any one of three positions of orientation. As shown in Fig. 1, when the ball member 24 and shank 12, as a unit, are positioned between the bottom wall 56 of the clamping ring 34 and the frusto-spherical recesses 50 with the linear groove 22 straddling and thus receiving the locating pin 28 therein, the shank 12 will present the diamond 14 in "head-on" fashion to the rotating surface of the grinding wheel W. The diamond 14 is so mounted at the forward end of the stem portion 16 of the shank 12 that the (110) direction of the diamond is parallel to the longitudinal direction of extent of the various linear grooves 22, 24 and 26 in the rear end face of the shank. Thus, with the diamond 14 in the "head-on" position in which it is shown in full lines in Fig. 1, abrasion will take place in the (110) direction offering maximum resistance to abrasion of the diamond.

When the ball member 24 and shank 12, as a unit, are positioned between the bottom wall 56 and the recesses 50 with the linear groove 24 straddling the locating pin 28 as shown in dotted lines in Fig. 1, the shank 12 will present the diamond 14 to the surface of the grinding wheel undergoing dressing at an angle to its "head-on" position and with the diamond being laterally displaced to the left as seen in this view. Similarly, when the ball member and shank are positioned with the linear groove

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26 straddling the locating pin 28, the shank 12 will present the diamond 14 to the grinding wheel at an angle to its "head-on" position with the diamond being laterally displaced to the right as seen in Fig. 1 in broken lines. Since the grooves 24 and 26 are equally spaced from the medial groove 22, the lateral displacement angles and the lateral displacements of the diamond as outlined above are equal. These two equal angles of displacement have been designated at θ and θ' , respectively, in Fig. 1 and they may assume different magnitudes within operable limits to vary the angles of displacement of the tool shank from its centered position within the holder body 30 to thus change the position of the diamond. In the illustrated embodiment of the invention shown in Figs. 1 to 4, inclusive, the angles θ and θ' are each of 18° magnitude since this magnitude has been found to be appropriate for most dressing operations utilizing diamonds having average shape characteristics. It has been found, however, that the various grooves 22, 24 and 26 may be spaced apart in such a manner as to produce displacements of from 6° to 30° in either direction in the performance of special grinding operations or to accommodate stones having specific shapes.

It is deemed unnecessary to set forth in detail herein the method involved in the dressing of grinding wheels such as that shown in Figs. 1 and 2 at W, since this method is substantially identical with the method described in the above-mentioned co-pending application. Briefly, however, such a method involves three repetitious phases of dressing operations, each phase utilizing application of the diamond 14 to the surface of the grinding wheel W in a different position of orientation. These positions are, first, the centered position which the diamond assumes when the locating pin 28 is in register with the linear groove 22; secondly, the laterally displaced position of the diamond when the pin 28 and groove 24 are in register; and thirdly, the laterally displaced position of the diamond when the pin 28 and groove 26 are in register.

In the use of the assembly 10, the shank 12 may be firmly clamped in any one of the three positions of which it is capable of assuming by merely rotating the clamping sleeve or ring 34 to an extent sufficient to loosen the same and thus free the ball member 32. After the ball member 32 has thus been loosened, a slight additional rotational movement of the sleeve member 34 will increase the distance between the bottom face 44 of the transverse slot 42 in the holder body 30 and the bottom wall 56 of the cup-shaped sleeve member 34 to such an extent that the crest portions existing between adjacent grooves 22, 24 or 26, as the case may be, will clear the locating pin 28 and permit the shank 12 to be swung in either direction to bring the pin into register with the selected groove. After the desired registry of the pin with the selected groove, the clamping ring 34 may be tightened so that the locating pin 28 will be securely drawn into the selected groove and wedged against the bottom region thereof.

It will be observed that the interlocking pin and groove devices are wholly contained within the cylindrical confines of the clamping sleeve 34 and tool holder body 30 and are thus concealed from view. Despite this, however, and despite the fact that when the clamping sleeve 34 is loosened, rotational movement of the shank 12 relative to the axis of the sleeve is made possible, selection of grooves may be readily made since there is no occasion for voluntary turning of the parts relative to one another after an initial adjustment of the locating pin 28 in one of the grooves 22, 24 or 26. Furthermore, where the forward end of the stem portion 16 of the shank 12 has been machined to produce the flats 20, as previously described, these flats may be utilized as a visual guide for proper rotational orientation of the shank.

In Figs. 8 to 11, inclusive, a series of four alterna-

tively useable diamond mounts or shanks have been illustrated. These shanks are capable of being substituted in the tool holder assembly 30, 32, 34 in place of the shank 12. The various shanks shown in these four views are substantially identical in external configuration to the external configuration of the shank 12 except for the character of the rear end faces thereof. To avoid needless repetition of description, similar characters of reference have been employed in Figs. 8 to 11, inclusive, to designate the corresponding parts in these views.

In Fig. 8, the rear end face of the enlarged head portion 18a of the shank 12a is provided with a single groove 22a which extends parallel to the (110) direction of the diamond 14a. In the use of the assembly when the shank 12a is clamped in position therein, the locating pin 28 is in register with the groove 22a and no adjustments of the shank 12a are contemplated since all dressing operations are conducted with the (110) direction of the diamond extending parallel to the direction of abrasion and with the shank assuming its "head-on" position.

In Fig. 9, the rear end face of the enlarged head portion 18b of the shank 12b is provided with two spaced parallel grooves 24b and 26b arranged on opposite sides of a central or diametrical dividing line of the end face of the head portion. In the use of this shank 12b, the diamond is capable of assuming two laterally displaced positions, depending upon which groove receives the locating pin 28. In both positions, the (110) axis of the diamond 14b extends parallel to the direction of abrasion.

In Fig. 10, the rear end faces of the enlarged head portion 18c is provided with two intersecting grooves 22c and 25c, the groove 22c extending parallel to the (110) direction of the diamond 14c and the groove 25c extending at an angle of 90° to the groove 22c. In the use of this shank 12c, dressing operations with the diamond assuming its "head-on" position may be attained and, additionally, dressing operations with the (110) direction of the diamond extending at a right angle to the direction of abrasion.

In Fig. 11, the rear end face of the enlarged head portion 18d is provided with two spaced vertically disposed grooves 24d and 26d, respectively, and with two horizontally disposed grooves 29d and 31d, respectively. In the use of the shank 12d, the same two positions of orientation of which the diamond is capable in connection with the shank 12b of Fig. 9 may be attained, as well as two additional positions of orientation wherein the diamond 14d has its (110) direction extending transversely of the direction of abrasion.

The invention is not to be limited to the precise arrangement of parts shown in the accompanying drawings or described in this specification as various changes in the details of construction may be resorted to without departing from the spirit of the invention. For example, although five forms of the diamond-carrying shank 12 having end faces provided with variously positioned vertical and horizontal grooves therein, other forms of shanks having end faces provided with grooves which assume various angles relative to a vertical plane may be employed if desired.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:

1. A tool and tool holder assembly designed for use in dressing a surface on a rotating grinding wheel or the like, said assembly comprising a holder body having a rear stem portion by means of which the assembly may be operatively secured in a grinding machine, and a forward enlarged cylindrical head portion having a threaded exterior surface, a semi-spherical socket formed in the forward end of said head portion, a cup-shaped clamping ring telescopically and threadedly received over said cylindrical head portion, said clamping ring being provided with a bottom wall having a semi-spherical recess formed therein which, in combination with said

semi-spherical socket, defines a confining socket, a ball member mounted for universal swinging and turning movements in said confining socket, a tool shank extending forwardly from said ball member and projecting through said bottom wall and having its forward end region exposed exteriorly of the socket, a diamond dressing element carried at the forward end of said tool shank, said ball member and tool shank being movable bodily as a unit relative to the holder body and clamping ring and constituting a movable support for the diamond dressing element, and cooperating detent means on said holder body and movable support respectively and disposed wholly within the confines of said socket, said detent means comprising a groove in said movable support, and a locating pin on said holder body, said locating pin and groove being movable into cooperating register with each other when said shank assumes a predetermined angular position relative to the holder body, said clamping ring being adapted upon full threaded reception over said cylindrical head portion to engage said ball member and clamp the same against said holder body and move said locating pin and groove into fixed cooperating relationship against dislodgment.

2. A tool and tool holder assembly as set forth in claim 1 wherein said ball member is formed with a diametrically extending bore therethrough having a counterbore providing a rearwardly extending internal annular shoulder, said tool shank including a stem portion fitting snugly within the bore and an enlarged head portion fitting snugly within the counterbore and presenting a rearwardly facing end surface, said cooperating detent means being provided on the rear end surface of the enlarged head portion and on the holder body respectively.

3. A tool and tool holder assembly as set forth in claim 1 wherein said ball member is formed with a diametrically extending bore therethrough having a counterbore providing a rearwardly extending internal annular shoulder, said tool shank including a stem portion fitting snugly within the bore and an enlarged head portion fitting snugly within the counterbore and presenting a rearwardly facing end surface, said cooperating detent means comprising a locating pin on said holder body adjacent the bottom of said socket and a groove formed in the rear end surface of said enlarged head portion.

4. A tool and tool holder assembly as set forth in claim 3 wherein said locating pin and groove extend transversely of the holder body and tool shank respectively and wherein the groove extends parallel to the (110) direction of the diamond carried by said shank.

5. A tool and tool holder assembly designed for use in dressing a surface on a rotating grinding wheel or the like, said assembly comprising a holder body having a rear stem portion by means of which the assembly may be operatively secured in a grinding machine, and a forward enlarged cylindrical head portion having a threaded exterior surface, a semi-spherical socket formed in the forward end of said head portion, a cup-shaped clamping ring telescopically and threadedly received over said cylindrical head portion, said clamping rings being provided with a bottom wall having a semi-spherical recess formed therein, which, in combination with said semi-spherical socket, defines a spherical confining socket, a tool shank projecting through said bottom wall and having a diamond dressing tool mounted on its forward end, the rear end of said shank extending into said confining socket, means adjacent the rear end of said shank providing a spherical ball within the confining socket, the bottom of said semi-spherical recess being formed with an intersecting transverse groove into which the rear end of said shank extends, a locating pin carried by said holder body and extending across said groove, and a plurality of pin-receiving grooves formed in the rear end of said shank and designed for selective register with said locating pin, said clamping ring being adapted, upon tightening thereof, to force said ball and shank rearwardly to bring the lo-

cating pin and a selected groove into cooperating engagement and thus clamp the shank in a predetermined position of orientation relative to the holder body.

6. A tool and tool holder assembly as set forth in claim 5 wherein said grooves are three in number including a medial diametrically extending groove, and a pair of grooves on opposite sides of said medial groove respectively and parallel thereto.

7. A tool and tool holder assembly as set forth in claim 5 wherein said grooves are two in number, said two grooves being parallel and equally spaced on opposite sides of the vertical diametrical plane of the shank.

8. A tool and tool holder assembly as set forth in claim 5 wherein certain of said grooves intersect one another at right angles.

9. A tool and tool holder assembly as set forth in claim 5 wherein said grooves are four in number, two of the grooves being parallel and equally spaced on opposite sides of the vertical diametrical plane of the shank, the two other grooves being parallel and equally spaced on opposite sides of the horizontal diametrical plane of the shank.

10. A tool and tool holder assembly designed for use in dressing a surface on a rotating grinding wheel or the like, said assembly comprising a holder body having a rear stem portion by means of which the assembly may be operatively secured in a grinding machine, and a forward enlarged cylindrical head portion having a threaded exterior surface, a semi-spherical socket formed in the forward end of said head portion, a cup-shaped clamping ring telescopically and threadedly received over said cylindrical head portion, said clamping ring being provided with a bottom wall having a semi-spherical recess formed therein, which, in combination with said semi-spherical socket, defines a spherical confining socket, a tool shank projecting through said bottom wall and having a diamond dressing tool mounted on its forward end, the rear end of said shank extending into said confining socket, means on the rear end of said shank providing a spherical ball within the confining socket, said enlarged

cylindrical head portion of the holder body being formed with a relatively wide and relatively deep transverse straight-sided transverse groove intersecting said semi-spherical socket and interrupting the threads on the exterior of the holder body at diametrically spaced regions, said transverse groove presenting a forwardly facing bottom wall, a locating pin carried by said holder, said pin extending across said groove diametrically of the holder and adjacent the bottom wall of said groove, and a plurality of pin-receiving grooves formed in the rear end of said shank and designed for selective register with said locating pin, said clamping ring being adapted, upon tightening thereof, to force said ball and shank rearwardly to bring the locating pin and a selected groove into cooperating engagement and thus clamp the shank in a predetermined position of orientation relative to the holder body.

11. A tool and tool holder assembly as set forth in claim 10 wherein said grooves are three in number including a medial diametrically extending groove, and a pair of grooves on opposite sides of said medial groove respectively and parallel thereto.

12. A tool and tool holder assembly as set forth in claim 10 wherein certain of said grooves intersect each other at an angle.

13. A tool and tool holder assembly as set forth in claim 10 wherein said grooves are four in number, two of the grooves being parallel and equally spaced on opposite sides of the vertical diametrical plane of the shank, and two other grooves being parallel and equally spaced on opposite sides of the horizontal diametrical plane of the shank.

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