April 22, 1941. T. DE GRAEVE 2,239,456

PROCESS OF CUTTING CONTACT POINTS

Filed Aug. 29, 1938

FIG. 1.

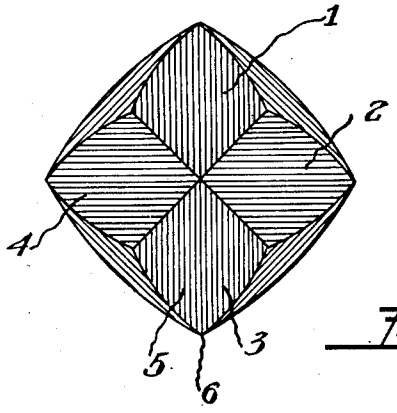


FIG. 5.

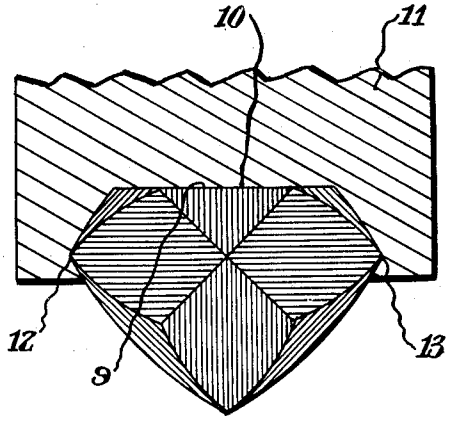


FIG. 2.

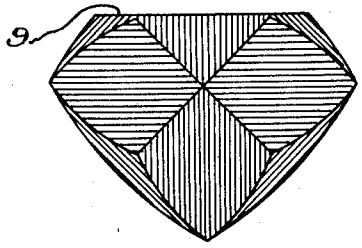


FIG. 3.

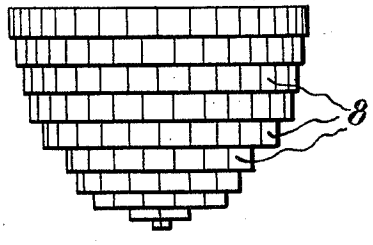
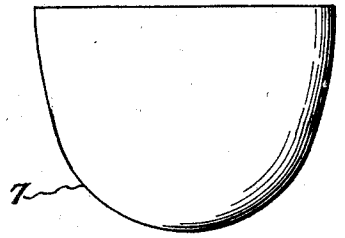


FIG. 4.



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PROCESS OF CUTTING CONTACT POINTS

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Application August 29, 1938, Serial No. 227,313

3 Claims. (Cl. 51—283)

My invention relates to a new and useful improvement in the process of cutting contact points for use on penetrators and the product resulting from the process. The class of penetrators referred to consists of a hard point generally formed from a diamond and mounted in a holder so arranged and constructed that the penetrator may be pressed against the surface of a material which it is desired to test for hardness. The degree of penetration into the material tested under a predetermined pressure indicates the hardness of the material tested.

In the mounting of diamonds in holders, an objectionable feature is that when the penetrator is subjected to pressure the diamond is frequently forced into the holder and it is an object of the present invention to provide a penetrator diamond so constructed and arranged as to prevent the penetration of the same into the holder.

Another object of the invention is the provision of a penetrator diamond so constructed and arranged as to be possessed of maximum efficiency and durability.

Another object of the invention is the provision of a process whereby a diamond may be cut into a stepped formation approximating the contour of the geometrical figure desired and then subjected to the grinding operation to remove the steps formed.

Another object of the invention is the provision of a penetrator diamond having a spherical contacting or engaging surface.

Another object of the invention is the provision of a penetrator diamond so formed and mounted as to prevent oscillation or tilting when brought into contact with the material to be tested.

Other objects of the invention will appear hereafter.

The invention consists in the combination and arrangement of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawing which forms a part of this specification, and in which—

Fig. 1 is a side elevational view of a diamond of the octahedron design.

Fig. 2 is a side elevational view of the diamond showing one step in the process of formation.

Fig. 3 is a side elevational view illustrating a further step in the manufacture.

Fig. 4 is a side elevational view of a diamond point showing the completed portion.

Fig. 5 is a sectional view of the diamond point mounted in a holder preparatory to formation.

In the drawing I have illustrated an octahedron diamond and each of the faces of the diamond is provided with sections 1, 2, 3 and 4. While I have illustrated the operation of the invention on a diamond, I do not necessarily limit myself to the formation of a penetrator contact member from diamonds, as other materials may lend themselves to this purpose with satisfactory results and with which materials the present invention may be employed equally as well as with diamonds or nearly so.

It will be noted that the grain 5 of the section 3 extends at right angles to the grain 5 of the section 4 and the apex 6 of the section 3 is used to locate approximately the contact part of the spherical surface 7 of the finished body. The penetrator point is cast in the holder 11, so that the holder, after the casting operation, is provided with a socket 10 in which the penetrator point is engaged. The first step in the operation is the removal of one of the apices or heels of the octahedron to provide the flat surface 9 so that when the point is cast in the holder 11, the flat surface 9 will bear against the flat surface 10 of the holder 11. Thus there is a large area of the penetrator which serves to deliver the thrust to the holder 11 and in this manner forcing of the penetrator point into the holder itself is avoided. This forcing of the penetrator point into the holder is commonly referred to as sinking or drifting and is a difficulty which is commonly encountered. As shown in Fig. 5 when the penetrator point is cast in the holder 11, the apices 12 and 13 serve as anchorages for securely anchoring the contact member or penetrator in the holder 11.

The penetrator when finished is provided with an outwardly projecting or exposed portion having a spherical surface and constituting substantially a semi-sphere projecting outwardly from the end of the holder 11. The penetrator shown in Fig. 2 is operated upon after it has been cast in the holder and by such operation the exposed portion is reduced to the contour shown in Fig. 4. This contour is a spherical contour and it is centered on the longitudinal axis of the holder 11. It is brought into spherical formation by means of a cutting operation in which the body is cut inwardly into various steps 8 to provide the formation shown in Fig. 3. After this cutting into stepped formation is completed, the penetrator is then subjected to a grinding operation to produce the spherical surface 7 shown in Fig. 4. This surface 7 will, of course, be a smooth

surface free from indentations and projections so that all of the steps indicated in Fig. 3 will have been removed.

In cutting the penetrator into the stepped formation shown in Fig. 3, these various steps result in a plurality of faces or facets and each of these facets is cut according to the grain of the section in which it appears so that a fracturing or splitting of the facet is avoided. It will also be noted from Fig. 5 that when the penetrator is completed and strain is exerted upon the center point, the strain will be directed angularly to the length of the grain and thus a tendency to flex is present and a fracturing strain thus avoided.

In the use of diamond contact members or penetrators, a common construction provides an initial contact point with a spherical engaging surface which proceeds from the spherical formation into a conical formation, proceeding inwardly from the outer end of the diamond. In the use of such penetrator diamonds, great difficulty is encountered in proper centering. The initial contact is effected on a spherical surface and then as the pressure is exerted, the pressure is transmitted from the spherical surface onto a conical surface. Unless this spherical surface is centered with the conical surface accuracy cannot be obtained. With the penetrator diamond constructed in accordance with the present invention, this difficulty of centering resulting from the use of two formations is entirely avoided. Moreover, when the initial contact with my invention is effected, it is effected on a center which does not change as subsequent pressure is exerted. This results in a higher degree of accuracy and prevents the tendency to tilt which ordinarily results from a shifting of centers or lines of pressure.

With a penetrator diamond constructed in this manner, I have made possible the construction of a penetrator which will be accurate, in which tilting will be avoided, and in which the sinking of the penetrator into the holder is prevented. In the process of manufacture an economical operation is provided and one which facilitates the formation of a true spherical peripheral surface so that a multiplicity of contact points is thus presented.

While I have illustrated and described the preferred form of construction, I do not wish to limit myself to the precise details of structure shown, but desire to avail myself of such variations and modifications as may come within the scope of the appended claims.

What I claim as new is:

1. The method of forming a contact point from an octahedron diamond consisting in removing a portion of said diamond to form a backing surface and cutting said diamond from opposite apices in a stepped formation to approximate the shape desired and removing the steps to provide an uninterrupted smooth curvilinear peripheral surface.

2. The method of forming a contact point from an octahedron diamond consisting in cutting said diamond in stepped formation from adjacent opposite apices toward an intermediate apex to approximate the shape desired and removing said steps in a grinding operation to provide a smooth uninterrupted curvilinear peripheral surface.

3. The method of forming a contact point from an octahedron diamond consisting in removing one of the apieces of said diamond and cutting said diamond from adjacent a pair of opposite apices proceeding toward an intermediate apex in stepped formation and grinding off said steps to provide a smooth uninterrupted substantially spherical peripheral surface.

THEODORE DE GRAEVE.