Feb. 23, 1943. L. P. JACKSON 2,311,756

ABRASIVE ARTICLE

Filed March 2, 1942

FIG. 1.

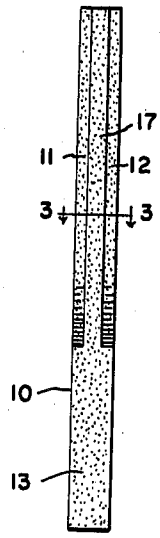


FIG. 2.

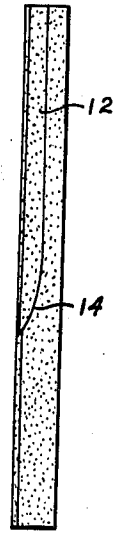


FIG. 3.

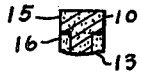


FIG. 4.



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ABRASIVE ARTICLE

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1 Claim. (Cl. 51—204)

The present invention relates to an abrasive article and more particularly to a stone for use in honing the interior surface of a hole in a work piece.

Honing the interior surface of a blind hole in a work piece has in the past been carried out by means of a honing device which is positioned in the hole and is both rotated and reciprocated in the hole. This honing device includes a plurality of carriers for honing stones, and these carriers are mounted for radial adjustment in order to apply a predetermined pressure to the interior surface of the hole. Means such as a longitudinally movable conical feeding element may be employed to feed the carriers radially outwardly, with their length always parallel to the axis of the hole so as to form the hole to truly cylindrical shape.

Due to the fact that this honing operation is a result of combined axial reciprocation and rotation of the honing device, there is a tendency for the honing operation to remove less material from adjacent the bottom of the hole than from nearer the top thereof As a result of this, honed holes tended to be tapered inwardly, which was a very undesirable condition. By employing stones modified as taught herein, this tendency can be counteracted and it is even possible, if desired to reverse the taper to the other direction.

This disadvantage in the prior honing operations is overcome by the honing stones which constitute the present invention.

It is an object of the present invention to provide honing stones for honing blind holes in a work piece having a working surface which is of greater width adjacent one end than throughout the balance of the stone.

It is a further object of the invention to provide a stone for the purpose described, having a work surface of uniform, relatively reduced width extending from one end thereof to a point somewhat closer to the other end, and having a substantially greater uniform width from said point to the said other end thereof.

It is a further object of the present invention to provide a stone for the purpose specified which comprises a supporting back of uniform cross section from one end of the stone to the other, and a working portion projecting from said back which is of greater width at and adjacent one end than it is throughout the balance of the length of the stone.

Other objects of the invention will be apparent as the description proceeds and when taken in conjunction with the accompanying drawing, wherein:

Figure 1 is a front elevation of a preferred embodiment of the present invention;

Figure 2 is a side elevation of the stone shown in Figure 1;

Figure 3 is a section on the line 3—3, Figure 1; and

Figure 4 is a section similar to Figure 3, illustrating a somewhat modified construction.

Referring first to Figures 1 to 3, I have illustrated a stone 10 for honing the interior of blind holes. The stone may conveniently be produced from an elongated rectangular block of bonded abrasive material For a substantial portion of its length, the stone has its corners cut away as indicated at 11 and 12. The working surface of the stone is therefore of reduced width, shown at 17, where the corners of the stone are cut away. The balance of the working surface is of the full width of the original stone, as shown at 13. As best seen in Figure 2, the portions 11 and 12 may conveniently be molded and trimmed so as to leave a radius as indicated at 14. This radius at 14 is merely the result of the particular method of making the stone and is not significant in the completed article.

The working surface 13 of the stone 10, as best seen in Figure 3, is rounded to a radius substantially equal to the radius of the blind hole to be honed.

It is convenient to consider the improved stone as comprising a back 15 which is to be received within a holder, and a forwardly projecting abrading portion 16 carried by and an integral part of said back.

The shape of the back 15 may be rectangular, or it may be somewhat modified to correspond to the structure of a particular holding element. Thus in Figure 4 I have indicated a stone 20 having a back 21, the corners of which are cut away as indicated at 22 to conform to the shape of a particular holder. The abrading portion 23 of the stone is of the same configuration as that of the stone 10 shown in Figures 1 to 3.

It will be appreciated that the portion of the stone which has the relatively wide working surface, is positioned in the honing device so that it is located adjacent the bottom of the hole. The provision of the relatively wide working surface adjacent the bottom of the hole provides a greater area of contact between the honing element or stone and the surface of the blind hole, with the result that in the ordinary honing operation, the hole is kept at uniform diameter if desired. The

relative widths of the lower finishing surface and upper finishing surface may be varied to obtain somewhat different results. For example if the relatively narrow portion of the working surface is sufficiently narrow as compared to the widths of the relatively wide portion thereof, it will be possible to hone out a blind hole so as to provide a somewhat greater diameter adjacent the bottom of the hole than adjacent the top thereof. Correspondingly, by properly proportioning the relative widths of different portions of the stone, it will be possible to produce a honed hole of absolute uniform diameter from top to bottom.

Stones of the present type may be made in all sizes and lengths corresponding to the size and depth of the hole to be honed. In general it may be said that the relatively wide portion of the abrading surface shall be of a length such that when the stone extends to the bottom of the hole, the relatively narrow portion of the abrading surface extends for a substantial distance into the hole. Otherwise, of course, the corrective effect of the differential width of the finishing surface would be lost. It may be stated at this time that it is quite important to provide a supporting back for the stone which is of uniform cross section from end to end so as to provide for secure positioning of the stone in a symmetrical holder.

While I have illustrated and described in considerable detail two specifically different embodiments of stones, it will be appreciated that this has been done merely to enable those skilled in the art to practice the invention, the scope of which is indicated by the appended claim.

What I claim as my invention is:

An abrasive stone of the class described comprising an elongated solid bar of abrasive material provided throughout its length with a front working surface and a supporting back, the back being of uniform cross section from one end to the other of the bar, a relatively short length of the working surface at one end of the bar being uniformly wide throughout its length and substantially equal in width throughout its length to the width of the bar, the remainder of the working surface from the wide length just mentioned to the other end of the bar being uniformly cut away throughout its length at opposite longitudinal side edges of the bar so that said remainder of the working surface is at approximately the longitudinal median line of the bar and is uniformly narrow throughout its length.

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