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G. UPTON

2,318,907

ABRASIVE ARTICLE

Filed Sept. 16, 1942

Fig. 1

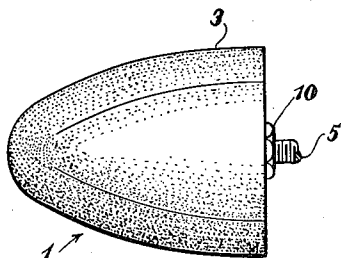


Fig. 2

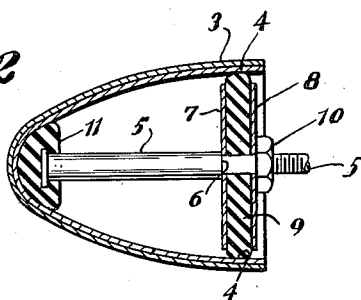
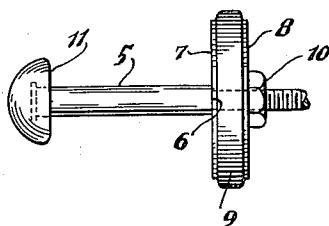


Fig. 3



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ABRASIVE ARTICLE

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Application September 16, 1942, Serial No. 458,572

1 Claim. (Cl. 51—185)

The invention relates to abrasive articles of the type shown in Letters Patent No. 2,282,650, and application Serial No. 420,549 filed November 26, 1941. The abrasive articles there shown are arranged upon and driven by a rubber mandrel, and are especially designed for finishing holes or recesses.

Though the device as heretofore mounted on a rubber mandrel possessed more or less resiliency, yet the action of the tool has been accompanied with some small degree of chatter, and this it is an object of my invention to eliminate. Another difficulty was that there was some tendency to grain shed, or uneven wear, and this it is a further object of my invention to eliminate.

The invention can best be seen and understood by reference to the drawing in which—

Fig. 1 is a side elevation of the abrasive article as mounted.

Fig. 2 is a longitudinal section of what is shown in Fig. 1; and

Fig. 3 is a side elevation of the mandrel with the abrasive cover removed.

1 represents an abrasive article like that shown in the patents before referred to. Both of these patents show an abrasive article of flexible abrasive material fashioned to provide a more or less elongated body 2, with concaved outer end portion 3, with vaulted interior, and at its inner end portion made with a sleeve 4, against which an interior mandrel may be expanded for holding the abrasive article in place during its rotation, and for rotating it.

The abrasive article as described in said patents possesses a considerable inherent stiffness, coupled with elasticity, which enables it to maintain its normal shape and to return to such shape when slightly distorted. For all this, it was thought necessary that the abrasive article be reinforced, especially in the working parts lying forward of its sleeve portion, and this by extending the rubber mandrel, on which the abrasive article was mounted, and by which it was rotated, forward into the vaulted interior of the article with bearing against the interior surface thereof. I have found, however, that if the working portion of the abrasive article forward of its sleeve portion is left free from mandrel, and dependence made upon the inherent stiffness and elasticity of the abrasive article, that this, coupled with centrifugal force, for the abrasive article is rotated at a very high speed, will enable the abrasive article not only to work more efficiently, and better conform to the shape of the work, but also eliminate chatter, and the abrasive will wear evenly with practically no shedding of the grain in spots. These ends are attained by a mandrel construction to which reference will now be made.

The mandrel comprises a spindle 5 which extends longitudinally into the interior of the abrasive article to a point approaching the apex of its vaulted interior. The spindle is made with a shoulder 6. This shoulder, when the spindle is in place, lies just forward of the sleeve 4. Arranged upon the spindle and bearing against the shoulder is a washer 7. Arranged also upon the spindle back of the washer 7 is a second washer 8. Both of these washers are preferably of the same size and diametrically of less size than the diameter of the interior of the sleeve 4. Located between the washers is a disk 9 of soft or sponge rubber, or like material, capable of expansion when compressed. This disk when uncompressed is normally of about the same diameter as that to the interior of the sleeve 4 and is of about the same thickness as the longitudinal length of the sleeve. When compressed by force tending to move the washer 8 towards its companion washer 7, the disk will be expanded, when its peripheral edge will bind against the interior of the sleeve 4, whereupon the abrasive article will become fixed to the mandrel that it may be rotated by it. The disk is compressed by means of a threaded nut 10 arranged upon the spindle back of the washer 8. This when tightened forcibly moves the washer 8 against which it is bearing, for compressing the disk between the two washers.

For the purpose of centering the abrasive article upon the mandrel, and assisting in holding it in place, the outer end of the spindle, which lies adjacent the apex to the vaulted interior of the mandrel, is provided with a tip 11 preferably of soft or sponge rubber which bears against said apex and becomes slightly compressed upon application of the abrasive article to the mandrel before its attachment to the rubber disk.

I claim:

40 A mandrel driven abrasive article of the type specified having, an elongated body portion with concaved outer end portion with vaulted interior, and sleeve-forming inner end portion with which the mandrel has driving engagement, characterized by a construction in which the working body of the abrasive article between its sleeve forming portion and the apex to its concaved portion is left free, unbacked by the mandrel, and which result is attained by combining with the abrasive article a mandrel comprising a spindle extending into the interior of the abrasive article, means fixedly secured to the spindle and expandable to bear against the sleeve, and means borne by the end of the spindle with bearing against the apex to the vaulted interior of the abrasive article.

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