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K. W. CONNOR
UNIT ABRADING ELEMENT
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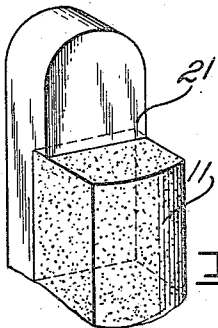
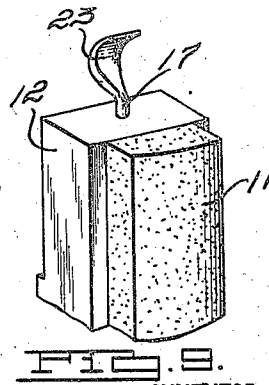
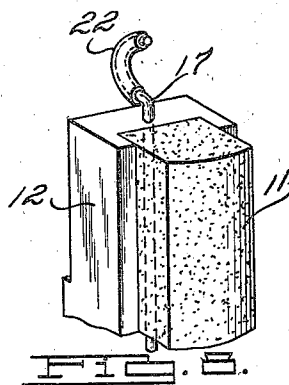
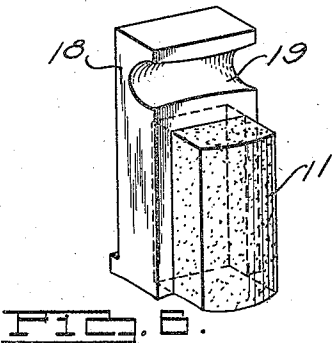
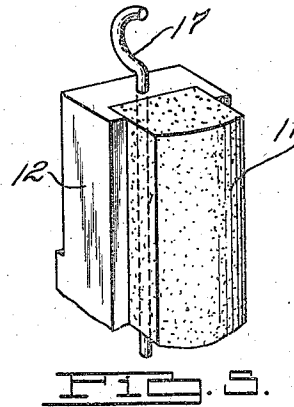
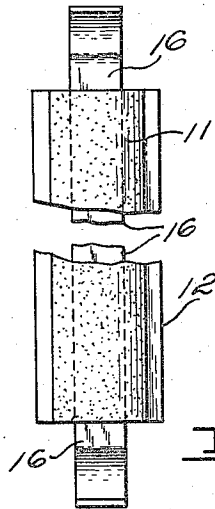
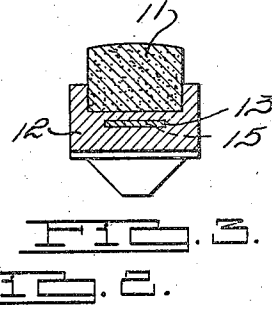
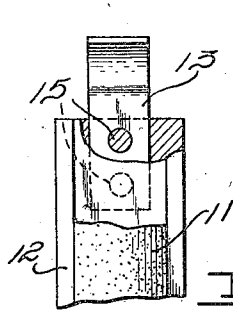
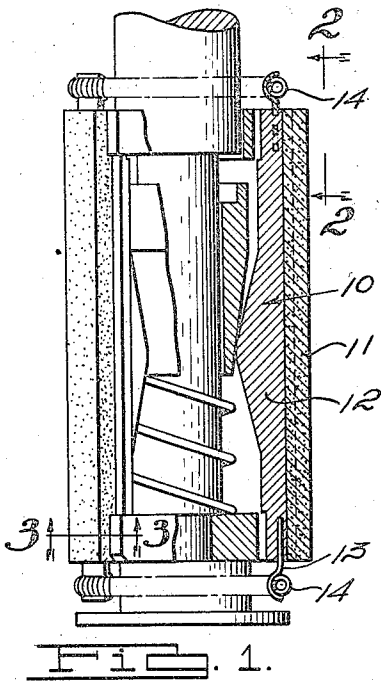


FIG. 7.

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UNIT ABRADING ELEMENT

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2 Claims. (Cl. 51—184.3)

My invention relates to honing tools and particularly to unit abrading elements therefor which constitute the radially movable portion of the tool.

It has been the practice heretofore in the art to provide a honing tool with a base portion which is adjustable radially relative to the tool and to provide an abrading element which is separately bonded to or removably supported on the base portion to be radially moved therewith.

The present invention embodies the construction of a combined base and abrading element to form the radially movable portion of the tool. An abrading stone, made up of bonded particles to constitute a unit element, has a base molded directly thereto out of a material which forms a bond with the abrading stone. The molding material is formed in the shape of a base which may be extended or otherwise molded to constitute retaining or holding portions for the unit. Inserts may be disposed within the molding material to constitute the means by which the unit abrading element is retained on the tool. Any molding material which will form a bond with the unit abrading stick may be employed, such as metal or materials employing phenol condensation products, rubber, cellulose or the like, as a base.

Accordingly, the main objects of my invention are to mold a material on a unit abrading stick to form a unit radially movable element of a honing tool; to provide an abrading stick with the bonding material molded to form a base which reinforces the stick and forms a portion of the abrading tool; to have the end portions of the molding material extended to constitute engaging means for retaining the unit abrading element on the tool; to provide inserts in the molding material which project therebeyond to be engaged by retaining means for holding the unit abrading elements on the tool; and, in general, to provide a unit abrading stick which is renewable, rigid and economical of manufacture.

Other objects and features of novelty of my invention will be either specifically pointed out or will become apparent when referring, for a better understanding of my invention, to the following description taken in conjunction with the accompanying drawing, wherein:

Fig. 1 is a broken plan view, partly in section, of a honing tool embodying features of my invention,

Fig. 2 is an enlarged broken sectional view of the structure illustrated in Fig. 1, taken on the line 2—2 thereof.

Fig. 3 is an enlarged sectional view of the structure illustrated in Fig. 1, taken on the line 3—3 thereof,

Fig. 4 is a broken view in elevation of a honing tool, similar to that illustrated in Fig. 1, showing a modified form thereof,

Fig. 5 is an enlarged perspective of an abrading element embodying features of my invention, showing a further modified form thereof, and

Figs. 6, 7, 8, and 9 are perspective views of abrading elements, similar to that illustrated in Fig. 5, showing further modified forms thereof.

In practicing my invention, I construct unit abrading elements 10 containing abrading sticks 11 constructed of bonded abrading substance to form a unit element.

Each stick 11 has a base 12 bonded thereto molded from a material which readily bonds with the stick and formed into a predetermined shape. Inserts 13 are molded in the ends of the base 12 to provide hooked ends which are engaged by garter springs 14 for retaining the unit elements 10 on the honing tool for radial movement relative thereto.

The molding material for the base 12 is preferably in powdered or macerated form when a molten metal is not utilized. Such substance as a phenol condensation product, and its derivatives, can be employed successfully which are heat hardened and made up primarily of formaldehyde and phenol as a base. When such a molding rosin of the heat hardening phenolic type is utilized, an inert filling material such as sawdust, asbestos, clay, impregnated paper, woven fibers, macerated paper and/or fibers are employed. Such material is treated with the phenol material and pressed to predetermined form, about the abrading stick, in heated molds.

The material may be further heated after removing from the molds to complete the chemical reaction in the rosin. Any condensation product of phenol, formaldehyde or other substances known in the art to be suitable for molding into a hard body and which will readily bond directly to the abrading stick may be utilized in my present invention.

In Figs. 2 and 3, I have illustrated a unit abrading element 10 in enlarged form to show the disposition of the inserts 13 which are preferably provided with a plurality of apertures 15 through which the bonding material will project to form a rigid bond.

In Fig. 4, I have illustrated an insert 16 which projects throughout the entire length of the element forming hooks at each end and which may

likewise be provided with apertures 15 for anchoring the inserts relative to the molding material.

In Fig. 5, I have shown a base 12 having a wire 17 extending therethrough and provided with hooked ends by which the unit abrading element is retained relative to the tool.

In Fig. 6, I have illustrated a unit abrading element having the molded base extended at 18 beyond the abrading stick 11 and provided with a groove 19 formed to receive the garter spring 14 to thereby eliminate the inserts heretofore referred to.

In Fig. 7, I have shown a unit abrading element having the end extended at 21 to form a ledge for receiving the end of an individual spring, such as that disclosed in the patent issued to F. M. Kern, No. 1,944,662, dated January 23, 1934, and assigned to the assignee of the present invention. In the present construction, the stick 11 is of the same width as the base 12. The material extends over the end to provide additional strength to the bond. A dovetailed end or undercut portion could be provided to effect additional strength.

In Fig. 8, I have shown a further modified form of my invention which follows the construction of Fig. 5 with the exception that a tube 22 is provided over each of the hooked ends of the wire 17 for the purpose of enlarging the surface thereof to prevent the spreading of the garter springs 14 over the wire.

In Fig. 9, I have shown a further modified form of the structure illustrated in Fig. 5, wherein the wire 17 is flattened at the hooked ends 23 to provide a broader surface for the reception of the garter springs 14. In this construction the stick 11 is bonded during the molding operation directly to the back surface of the base 12.

In all of the constructions, unit abrading elements are provided constituting renewable parts of the honing tool. The material which forms the backing element 12 is molded directly to the abrading stick 11 forming a direct bond therewith. After the abrading stick 11 is worn beyond useful life the entire element 10 may be discarded and a new element substituted therefor. A further advantage in this type of construction resides in the elimination of hard metal parts adjacent to the abrading element which, when the abrading stick 10 became worn, caused the marring of the surface of the cylinder wall being honed. The molded material may contact the

cylinder wall without causing damage to the surface as would occur when hard metals were employed for supporting the abrading stones.

It will be understood that any type of molding material may be utilized, the phenol and rosin compositions hereinabove referred to being cited as an example. It is to be understood that any material known in the art to be suitable may be utilized for bonding to the abrading stick and forming the backing element therefor to constitute radially movable abrading and base elements of the honing tool. Any rosin, synthetic or otherwise, rubber, cellulose or the like, may be employed alone or in combination with each other or other material or materials, while relative soft metals such as lead, tin, zinc and the like, alone or in combination or in combination with other elements could be utilized. Such metals could be salvaged and reemployed after the abrading sticks have been worn beyond useful life.

While I have described and illustrated several embodiments of my invention, it will be apparent to those skilled in the art that various changes, omissions, additions and substitutions may be made therein without departing from the spirit or scope of my invention, as set forth in the accompanying claims.

I claim as my invention:

1. In a honing tool having a head for carrying an abrading element and means on said head for engaging said abrading element to adjust the same, an abrading element comprising an abrasive stick, a holder for said stick of heat hardenable resin non-harmful to the surface upon which the tool is operating, said holder having one face formed to cooperate with said tool adjusting means and having an end thereof extended beyond the abrasive element for retaining the holder on said tool, said holder being so formed and bonded to the abrasive element during the molding operation.

2. An abrading element for a honing tool having an adjusting means comprising in combination, an abrasive stick and a molded holder for said stick of heat hardenable resin bonded to said stick during the molding operation, said holder having a cam surface to cooperate with tool adjusting means and having an end extended beyond the abrasive element to retain the holder on the tool.

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