Jan. 18, 1966 R. H. HOMEYER 3,229,425

RESILIENT-BACKED ABRASIVE STONE

Filed Oct. 13, 1964

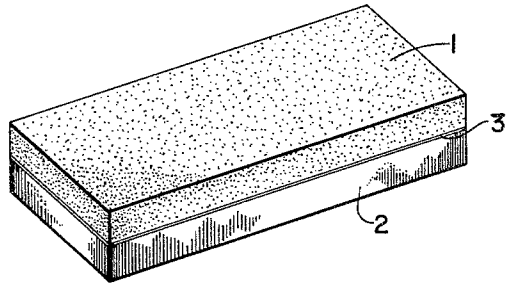


FIG. 1

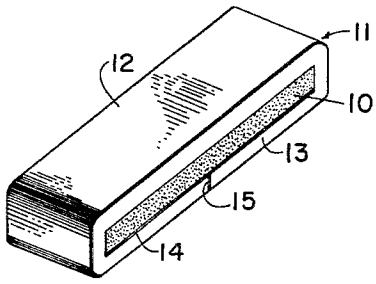


FIG. 2

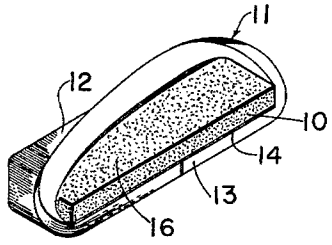


FIG. 3

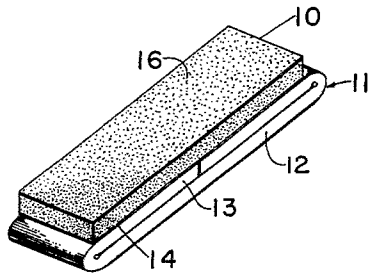


FIG. 4

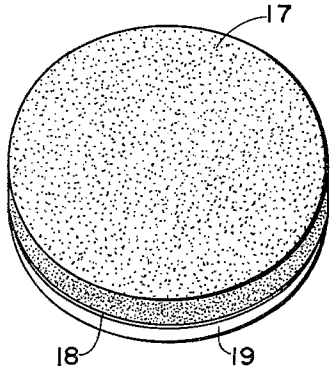


FIG. 5

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United States Patent Office 3,229,425
Patented Jan. 18, 1966

3,229,425

RESILIENT-BACKED ABRASIVE STONE

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Filed Oct. 13 1964, Ser. No. 403,591
17 Claims. (Cl. 51—211)

This is a continuation-in-part of application Serial No. 237,936, filed November 15, 1962.

This invention relates to an abrasive article and particularly to articles adapted for use in improving or sharpening the cutting edge of tools, such as knives, sharpening the points on draftsman's pens, and the like. More particularly this invention relates to an abrasive sharpening stone provided with a backing of a resilient, flexible, non-slip member.

In abrasive sharpening stone devices of the past it has been customary to form the sharpening stones in the shape of an elongated rectangle of considerable thickness. Heretofore, it was considered essential to provide thick stones, for in order to use such stones it was customary for the operator to hold the sharpening stone in his hand while sharpening the desired edge. However, the disadvantage of holding such sharpening stones is that during use the fingers of the user are constantly exposed to contact with the cutting edge being sharpened.

Several alternatives have been previously proposed in order to overcome the difficulties inherent in the use of hand held sharpening stones. One proposed remedy was the use of abrasive sharpening stones having a structure such that the fingers of the user would be protected from contact with the cutting edge being sharpened, such as in U.S. Patent 2,674,834. Another proposed remedy was the use of containers or holders for the abrasive sharpening stone, such as disclosed in U.S. Patents 1,998,259 and 1,959,647.

Such prior art devices, however, suffered from the disadvantage that thick abrasive sharpening stones must still be used with the result that the sharpening stones were relatively expensive. Also, the use of containers or holders for the stones further added to the cost of the sharpening stone to the consumer. However, the ultimate consumer, other than professional tradesmen, will rarely or never use more than a few top layers of grain of a sharpening stone. Therefore, the average user, in order to obtain an abrasive sharpening stone, has been required to purchase a relatively expensive, thick stone and if he did not wish to hold the stone during use had to purchase an expensive holding device.

One object of the present invention is to simplify the construction and reduce the cost of manufacture of abrasive sharpening stone devices, thereby permitting marketing of a relatively thin, low cost abrasive article.

A further object of the invention is to provide an abrasive sharpening stone having a greatly improved degree of safety over the abrasive sharpening stone which is normally hand held.

A further object of the invention is to provide improved and simplified means for preventing movement of the sharpening stone during use.

A further object of the invention is to provide a relatively thin abrasive sharpening stone secured to a resilient backing member whereby the backing member is effective to make the thin stone extremely resistant to accidental breakage.

Further objects and advantages of the invention will be apparent from a consideration of the following description of the embodiments described below and shown for the purpose of illustration in the accompanying drawings, in which:

FIGURE 1 is a perspective view of one embodiment of an improved abrasive article made in accordance with the invention;

FIGURE 2 is a similar view of another embodiment of the present invention;

FIGURE 3 is a perspective view of the embodiment of the invention shown in FIGURE 2 in which the resilient member surrounding the sharpening stone is partially folded back from the abrading surface of the sharpening stone.

FIGURE 4 is a perspective view of the embodiment of the invention illustrated in FIGURE 2 in which the resilient member has been completely removed from the abrading surface of the abrasive sharpening stone; and

FIGURE 5 is a perspective view of another embodiment of the invention.

While the abrasive sharpening stone and the resilient backing member have been principally illustrated in a rectangular, flat form, it will be understood that the invention may be embodied in other shapes and forms, such as in an abrasive sharpening stone of circular shape secured to a backing of a resilient member more or less conforming in shape to the circular form of the stone as shown in FIGURE 5.

In the embodiment illustrated in FIGURE 1 the sharpening stone is a relatively thin, rigid, brittle abrasive plate designated by the numeral **1** and a resilient, flexible, non-slip, backing member therefor is designated by the numeral **2**. An adhesive layer **3** firmly secures the rectangular abrasive sharpening stone **1** to the resilient backing member **2**.

In the embodiment of the invention shown in FIGURES 2 to 4, inclusive, the numeral **10** designates an abrasive sharpening stone similar to the one indicated at **1** in FIGURE 1. This stone has a pair of substantially parallel flat surfaces and is surrounded by a resilient, flexible, non-slip member **11**, which is substantially as wide as the sharpening stone. The resilient member **11** comprises an upper layer **12** which is contiguous with the upper flat surface **16** of the sharpening stone and a bottom layer **13** which is firmly secured to the bottom surface of the abrasive sharpening stone by means of a suitable adhesive layer **14**. The resilient member, in this embodiment of the invention is formed as an elongated strip and the ends thereof are secured to the bottom flat surface of the sharpening stone in abutting relation as shown at **15** so that the resilient member forms a continuous band surrounding the upper and lower flat surfaces and the ends of the abrasive sharpening stone, but is secured thereto only at the lower surface of the sharpening stone. While the ends of the resilient member are shown in FIGURES 2 to 4, inclusive, in abutting relation at approximately the midpoint of the bottom flat surface of the sharpening stone, it will be understood that the ends of the resilient member may abut one another at any point on the bottom flat surface. Furthermore, the ends of the resilient member may be secured to the bottom flat surface of the sharpening stone in adjoining relation, so that the ends are not in contact with one another.

In the embodiment of the invention shown in FIGURE 2 the resilient, non-slip member **11** serves to protect the relatively thin, rigid, brittle, abrasive sharpening stone **10** from breakage during handling and storage. The shock absorbing effect of the resilient member protects the thin, rigid, stone from accidental breakage and fracture. Such an abrasive article can even be dropped onto a cement or concrete floor without breaking the abrasive stone. The reduced mass of the thin sharpened stone contributes to its resistance to breakage in such case.

In order to use the abrasive surface of the sharpening

stone, the upper layer **12** of the resilient member is merely folded back from the upper surface of the abrasive sharpening stone, as shown in FIGURES 3 and 4, thereby exposing the upper flat surface **16** of the sharpening stone. When the upper layer **12** of the resilient member is completely folded back upon itself, the entire upper flat surface **16** of the abrasive sharpening stone is thereby exposed and available for use. The upper layer **12** of the resilient, non-slip member, upon being folded back from the upper surface of the sharpening stone is folded below the bottom layer **13** of the rsilient member, as shown in FIGURE 4, and thereby becomes a bottom supporting layer for the abrasive stone. Thus the abrasive sharpening stone is cushioned by a double layer member of a resilient, flexible, non-slip material. When the abrasive article is in the form shown in FIGURE 4, the double layered resilient member may be placed upon a surface such as a bench, table, desk and the like and the edge to be sharpened is applied to the upper surface of the stone in the customary manner. The nature of the resilient material is such that considerable pressure can be exerted on the stone and the resilient supporting layers will hold the abrasive stone firmly in position.

In a specific embodiment of the invention a rigid, abrasive sharpening stone, for example, one employing fine grit silicon carbide particles bonded with a conventional vitrified bond, produced by any conventional or known practice such as described in U.S. Patent No. 2,158,034, and having a thickness of about one-quarter inch was adhesively secured to a foamed rubber backing member having substantially the same dimentions as the sharpening stone and having a thickness of about one-quarter inch. A conventional neoprene base contact cement, such as that sold by the Armstrong Cork Company under the identification number 253–N–30, was used to secure the backing member to the sharpening stone.

The sharpening stone used in the invention may be either a natural abrasive stone, such as the commonly known "Arkansas" stone, or it may be formed of bonded artificial abrasives such as particles of silicon carbide, aluminum oxide, corundum, emery and the like. The bond employed in the formation of the sharpening stone may vary in accordance with the properties desired. While in general ceramic bonds are preferred, in some cases metal or organic bonds of well known types may be used.

The sharpening stone may be made in any shape or configuration desired. However, rectangular aid circular shapes are preferred. Thus, in place of the rectangular shaped sharpening stone shown in FIGURE 1, a relatively thin, rigid, brittle circular sharpening stone may be firmly secured to a resilient, non-slip member. Such an embodiment is illustrated in FIGURE 5 where the numeral **17** designates a thin, rigid, brittle, relatively thin, circular shapening stone. The stone **17** is attached by a layer **18** of suitable adhesive to a resilient, flexible, non-slip backing member **19**. Similarly, relatively thin, rigid, brittle sharpening stones of circular shape having substantially parallel flat surfaces may be formed and encompassed in a resilient, flexible, non-slip member, as in the embodiment shown in FIGURES 2–4, so that the resilient member surrounds a plurality of surfaces of the stone including the parallel flat surfaces and protects the edges of the sharpening stone.

As indicated above, the sharpening stones with which the invention is concerned are relatively thin as compared to conventional stone. Generally, the thickness of the stones is in the range of from about ⅛-inch to about ½-inch thick, the thickness employed being determined by the area of the sharpening stone, stones of larger area normally being thicker than smaller stones. However, stones having a somewhat greater thickness are considered to be within the scope of the invention. The dimensions of the rigid, brittle sharpening stone will vary according to the intended use, manufacturing techniques, cost advantage and so forth. In any case, the present

invention makes possible the use of sharpening stones that are relatively thin as compared to such stones designed for use unmounted without danger of breaking the stone in use or of cutting the hand of the user. This is due to the presence of the resilient backing which functions as a non-slip, stable base that supports the stone in a flat immovable position on a surface during sharpening operations and thus eliminates the necessity of holding the stone, with the fingers or otherwise, during such operations.

The resilient backing member may have substantially the same dimensions as the abrasive stone and in the embodiment of the invention shown in FIGURES 2 to 4, inclusive, should be of a length sufficient to encompass the upper and lower flat surfaces and the ends of the sharpening stone. In a modification of the invention shown in FIGURES 2 to 4, inclusive, the resilient member may be in the form of an endless band of resilient, flexible, non-slip material which encompasses the sharpening stone and which is firmly secured to only one flat surface of the abrasive sharpening stone.

In the embodiment of the invention illustrated in FIGURES 2 to 4, inclusive, the backing member in addition to being resilient and flexible preferably is stretchable to some extent. This facilitates the removal of the upper layer of the resilient member from the upper flat surface of the sharpening stone. The material to be used for the backing member should also have the characteristic of being non-slipping, so as to hold the relatively thin, rigid, brittle sharpening stone in position when placed on a smooth or rough surface when pressure is applied to the upper flat surface of the sharpening stone in a direction parallel thereto as occurs when tool edges are sharpened thereon. Material of the type of foam or sponge rubber, a flexible, foamed plastic material such as polyurethane foam, polyvinyl foam, and the like, or a felt material such as hair or sisal felt have been found to be suitable materials for the resilient backing member. When a stretchable member is desired, however, foam rubber is preferred.

Preferably the thickness of the resilient backing member is in the range of from 1/16-inch to ⅜-inch thick, but a resilient member having a somewhat greater thickness is considered to be within the scope of the invention.

Generally, a rubber or synthetic rubber base cement has been found to be suitable for most purposes for securing the resilient backing member to the abrasive sharpening stone. However, other materials capable of securing the backing member to the sharpening stone, such as epoxy resin cements, phenolic resin cements, rubber modified resin cements, and the like are suitable. The adhesive material may be applied to either or both contacting surfaces over the entire surfaces or over portions of one or both surfaces.

While the invention has been described in connection with specific embodiments thereof, it will be understood that it is capable of further modification, and this application is intended to cover any variations, uses or adaptations of the invention. It will therefore be recognized that the invention is not to be considered as limited to the precise embodiments shown and described but is to be interpreted as broadly as permitted by the appended claims.

I claim:

1. An abrasive article comprising a flat, rigid, brittle abrasive sharpening stone of bonded abrasive particles, said stone being adapted for safe manual operation and said stone being relatively thin in comparison with conventional sharpening stones and having a thickness of the order of ⅛-inch to ½-inch; and a backing member of resilient, flexible, non-slip material adhesively secured to the rear surface of said stone and functioning as a stable, non-slip base for holding said stone immovable in a flat sharpening position on a surface.

2. An abrasive article as defined in claim 1 in which said stone has substantially flat top and bottom surfaces and said backing member has a pair of substantially flat surfaces one of which is adhesively secured to the bottom of said stone.

3. An abrasive article as defined in claim 2 in which the flat surface of said backing member secured to the bottom of said stone is substantially the same size and shape as said bottom of said stone.

4. An abrasive article as defined in claim 1 in which said sharpening stone is circular.

5. An abrasive article as defined in claim 3 in which said sharpening stone is circular.

6. An abrasive article as defined in claim 1 in which the resilient, flexible, non-slip member is a material selected from the group consisting of foam rubber, sponge rubber, flexible polyurethane foam, flexible polyvinyl foam, hair felt and sisal felt.

7. An abrasive article as defined in claim 3 in which the resilient, flexible, non-slip member is a material selected from the group consisting of foam rubber, sponge rubber, flexible polyurethane foam, flexible polyvinyl foam, hair felt and sisal felt.

8. An abrasive article as defined in claim 4 in which the resilient, flexible, non-slip member is a material selected from the group consisting of foam rubber, sponge rubber, flexible polyurethane foam, flexible polyvinyl foam, hair felt and sisal felt.

9. An abrasive article comprising a relatively thin, rigid, brittle abrasive sharpening stone having a pair of substantially parallel, flat surfaces in which one of said surfaces is secured to a surface of a layer of a resilient member which surrounds a plurality of surfaces of said stone including the parallel flat surfaces thereof and protects the edges of said stone, the resilient member being capable of being removed from all surfaces of the sharpening stone except the surface to which it is secured.

10. An abrasive article which comprises a continuous band of a resilient, flexible, non-slip member having a pair of substantially flat parallel surfaces and a substantially rectangular, relatively thin, rigid, brittle abrasive sharpening stone having a pair of substantially parallel flat surfaces, in which one of said surfaces of said member is adhesively secured to one of said surfaces of said sharpening stone, said resilient member surrounding a plurality of surfaces of said stone including said parallel flat surfaces and protecting the edges of said stone, whereby the resilient member is capable of being removed from all surfaces of the sharpening stone except the surface to which it is secured.

11. An abrasive article which comprises a relatively thin rigid, brittle abrasive sharpening stone having a pair of substantially parallel flat surfaces, a resilient, flexible, non-slip member which is at least substantially as wide as said abrasive stone, and means for securing said member to one of said surfaces of the abrasive sharpening stone, in which said member forms a continuous band which surrounds a plurality of surfaces of said stone including the parallel flat surfaces thereof and protects the edges of said stone and is capable of being removed from all surfaces and edges of the sharpening stone except the surface to which it is secured.

12. An article as described in claim 11 in which the abrasive sharpening stone is a relatively thin, rigid, brittle circular-shaped stone.

13. An article as described in claim 11 in which the abrasive sharpening stone is a relatively thin, rigid, brittle substantially rectangular-shaped stone.

14. An article as described in claim 11 in which the abrasive sharpening stone has a thickness of from about ⅛-inch to ½-inch.

15. An abrasive article which comprises a thin, rigid, brittle bonded abrasive sharpening stone, said stone having a pair of substantially parallel flat surfaces consisting of an upper flat surface and a lower flat surface and end edge surfaces, and a resilient, flexible, non-slip member surrounding said upper and lower flat surfaces and said end edge surfaces of said stone and being secured to said lower flat surface, said member being capable of being removed from all surfaces of said stone except the surface to which it is secured.

16. The abrasive article as defined in claim 15 in which the resilient, flexible, non-slip member comprises an upper layer which is contiguous with the upper flat surface of said stone, and a bottom layer which is secured to the lower flat surface of said stone.

17. The abrasive article as defined in claim 15 in which the resilient, flexible, non-slip member is an elongated strip, the ends of which are secured to said lower flat surface of said stone.

References Cited by the Examiner

UNITED STATES PATENTS

1,639,204	8/1927	Welch	51—211
1,852,223	4/1932	Stockert	51—204 X
1,949,804	3/1934	Love	51—211.1
2,398,890	4/1946	Howard	51—209

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