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Haigh et al.

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[54] **REPLACEABLE RESILIENT PAD ASSEMBLY FOR ABRASIVE FINISHING ARTICLES**

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[52] **U.S. Cl.** **51/378,** 51/401, 51/405

[51] **Int. Cl.** **B24d 13/14,** B24d 13/20

[58] **Field of Search** 51/376, 377, 378, 394, 51/401, 402, 404, 405, 209, 210; 15/230.12

[56] **References Cited**

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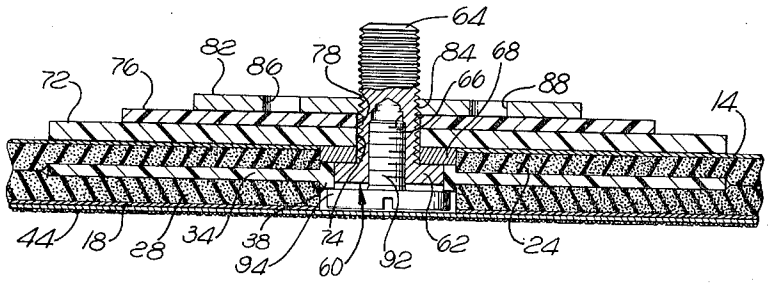
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[57] **ABSTRACT**

A throwaway resilient pad assembly formed of a body of resilient material having first and second side faces. The side faces are such that a plurality of abrasive finishing members can be adhered sucessively thereto. A disc-like member having a central opening is formed in the body of resilient material. The pad assembly is removably coupled to a drive member at the central opening of the disc-like member. The drive member may then be affixed to a power tool for imparting movement to the resilient pad assembly and finishing members. The faces of the resilient member may be constructed of a cloth material to which the finishing member is adhered. A drive shaft can be attached to the disc-like member at the central opening.

7 Claims, 3 Drawing Figures



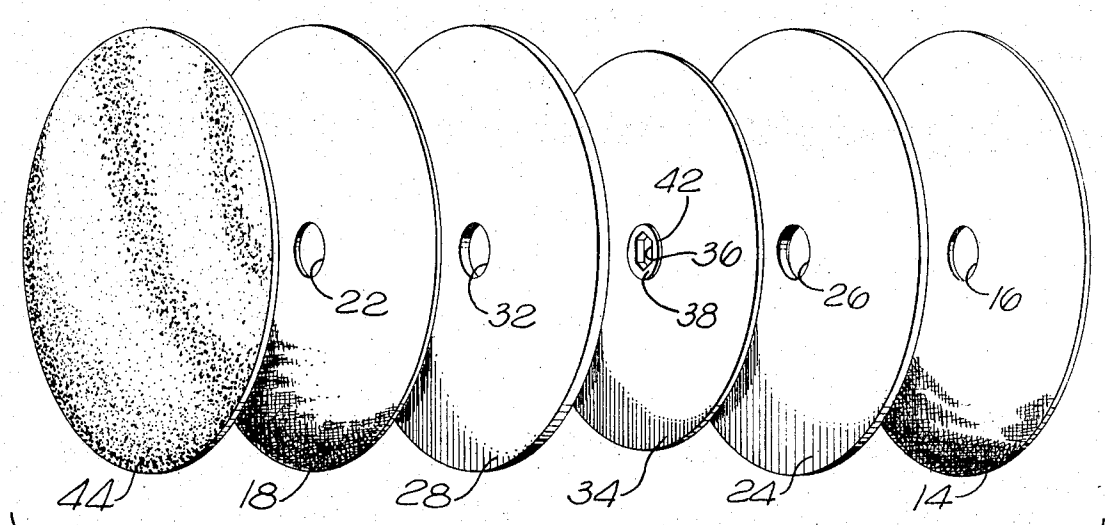


Fig. 1.

Fig. 2.

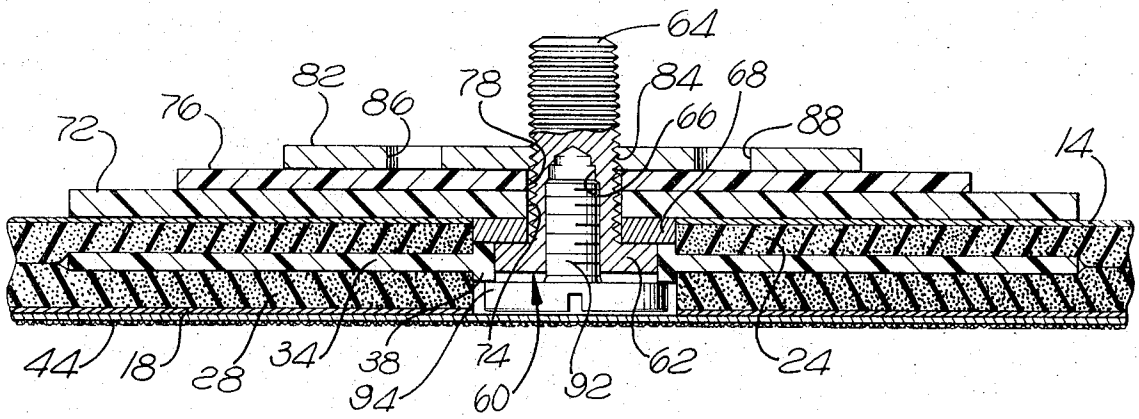
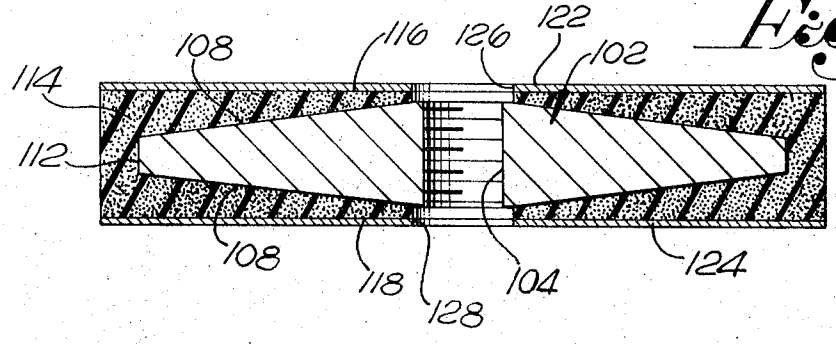


Fig. 3.



REPLACEABLE RESILIENT PAD ASSEMBLY FOR ABRASIVE FINISHING ARTICLES

BACKGROUND OF THE INVENTION

1. Field of Art

The field of art to which the invention pertains includes the field of abrasive finishing articles, particularly with respect to a throwaway resilient pad assembly for supporting such articles.

2. Description of the Prior Art

Known resilient pad assemblies, such as those used to support adhesively secured abrasive finishing articles driven by conventional power tools, are constructed of a sponge body having a cloth face on one side thereof and a support backing on the opposite side. The support backing includes a drive member which is riveted or bolted to the support layer and, in turn, may be threaded or otherwise secured to the drive shaft of a power tool. Abrasive finishing articles are attached to the cloth face with adhesives. When such an article becomes worn, another is adhered or glued to the cloth face. As the worn finishing articles are repeatedly removed from the pad, the cloth face tends to separate from the sponge, taking portions of the sponge body therewith creating holes in the face of the pad. Repeated replacement of the finishing articles causes a build-up of glue on the cloth face resulting in further irregularities. As the pad with adhered finishing article is used, the edges of the pad are constantly brought into contact with the workpiece. Such contact, or bumping, creates further wear on the sponge body. As a result of the repeated glueing of the finishing articles on the cloth face, as well as the bumping of the edge of the sponge material on the workpiece during use thereof, it has been found that such prior art resilient pads wear out rather rapidly. In addition, the natural breakdown of the sponge material from prolonged use, as well as from damage as above described, requires the resilient pad be discarded after a relatively short life. Since prior art pads include a sponge body and cloth face formed integrally with the entire support backing assembly, the entire structure must be discarded, even though the supporting and attaching members retain their integrity.

In order to overcome the attendant disadvantages of prior art resilient pad assemblies, the present invention provides a resilient pad which can be replaced while retaining the structural portion of the assembly. The pad can be reversed when one face thereof is no longer usable, and, due to the support of the sponge portion of the pad, the breakdown of the sponge body does not occur as rapidly as in conventional pad assemblies, yet the same "feel" experienced by users of the pads is retained. Moreover, an oversized pad can be used on a smaller diameter support structure to give a softer edge which may be desirable when the pad is used with an abrasive finishing article for certain contoured material. This softness is obtained in conventional prior art pads only by using a thicker, softer sponge which increases wear of the sponge, resulting in an even shorter life. Should any part of the support mechanism be damaged, it can be replaced rather than replacing the entire support assembly.

SUMMARY OF THE INVENTION

A throwaway pad assembly formed of a body of resilient material having first and second side faces. A disc-like member having a central opening is formed in the body of resilient material. An abrasive finishing article may be secured to one of the faces during use. The central opening receives a drive member for imparting movement to the assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded perspective view of a pad assembly made in accordance with the invention;

FIG. 2 is a view, partly in section, of the pad assembly of FIG. 1 mounted on a support structure; and

FIG. 3 is a fragmentary view, partly in section, of an alternative arrangement of a pad assembly.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIG. 1, there is shown a resilient pad 12 made in accordance with the principles of the invention. The pad 12 is normally secured to a pad holder, and the entire assembly then coupled to a drive member which causes the pad to rotate when affixed to a power tool. While the pad has many uses, it is shown illustrated as having an abrasive finishing article such as a paper disc of sandpaper mounted thereon.

The resilient pad 12 is shown in FIG. 1 in an exploded perspective view prior to assembly in a sandwich configuration. The pad comprises a first outer face member 14 having a central opening 16 therein and a second outer face member 18 having a central opening 22 therein. The first and second outer face members are normally identical thin layers of material such as duck cloth but may be formed of plastic, rubber, or the like. Positioned between the face members 14 and 18 are a first sponge layer 24 adjacent the member 14 and having an opening 26 therein, and a second sponge layer 28 adjacent the member 18 and having an opening 32 therein. The face members 14 and 18, as well as the sponge layers 24 and 28, have equal diameters, although the face members 14 and 18 may be made slightly larger. In addition, each of the openings 16, 22, 26 and 32 are normally concentric.

Positioned between the first sponge layer 24 and the second sponge layer 28 is a central semi-rigid, but flexible, disc 34 having an outer diameter slightly smaller than that of the face member and sponge layers. The disc may be formed of plastic, metal, or the like so long as the desired flexibility and semi-rigidity is retained. A non-circular opening such as the hexagonally shaped opening 36 is formed in the center of the disc 34. Cylindrical flanges 38 extend in both directions from the center of the disc 34 along an axis perpendicular to the disc. The hexagonal opening 36 forms the inner surface of the flanges and the outer edges 42 of the flanges 38 have a diameter slightly smaller than the openings in the face members and the sponge layer.

In assembly, as shown in FIG. 2, the plastic disc is centrally positioned between the first sponge layer 24 and the second sponge layer 28, and normally secured thereto by any conventional adhesive compatible with the layers 24 and 28. The openings 26 and 32 of the sponge layers, respectively, surround the flanges 38 and rest on the outer edge 42 thereof. Then the first face member 14 and the second face member 18 are secured to the outer surfaces of the first sponge layer 24 and the second sponge layer 28, respectively, also utilizing any desired adhesive. Normally, the face mem-

bers can be laminated to the sponge layers in sheet form and then can be die-cut as one unit.

The resilient pad **12** may be used to support an abrasive finishing article, such as sandpaper which is illustrated in FIG. **1** as a paper disc **44.** It should be noted that the resilient pad **12** is arranged in a manner such that a paper disc can be glued to either face member **14** or **18.** Thus, should wear or glue build-up occur on either outer surface of the face members, the resilient pad can be reversed and a paper disc then glued on the other face member.

When the resilient pad **12** is assembled, it is then mounted on a pad holder. As illustrated in FIG. **2,** the pad holder is formed of a bolt **60** having a hex head **62** which is inserted into the hexagonal opening **36** of the central plastic disc **34.** It should be noted that the hex head **62** and opening **36** could be of shape other than hexagonal. Extending from one side of the hex head is a shaft **64** of the bolt **60** which contains an internal bore **66** extending from the hex head to an interior portion of the shaft. The outer surfaces of the shaft **64** and the bore **66** are threaded. A washer **68** is positioned over the shaft **64** adjacent the hex head. The washer **68** has a thickness approximately equal to the thickness of the first sponge layer **24** and is positioned in the opening **26.**

The pad holder is further formed of a first plastic disc **72** positioned with one side thereof adjacent the first face member **14** and a disc opening **74** enables the disc **72** to fit over the shaft **64.** The diameter of the disc **72** is slightly smaller than that of the face member **14.** In addition, a second plastic disc **76** having an opening **78** therein is fitted over the shaft **64** and positioned adjacent the disc **72.** The disc **76** has a diameter smaller than that of the disc **72.** Finally, an enlarged locking nut **82** having a threaded interior opening **84** and a pair of openings **86** and **88** is positioned over the shaft **64** by threading the opening **84** onto the shaft **64.** The openings **86** and **88** enable a tool, such as a spanner wrench, to grasp the nut and thereby tighten it.

At the other end of the assembly, a threaded bolt **92** is threaded into the internal bore **66** of the bolt **60.** The bolt **92** has an enlarged flange head **94** whose outer edge rests against one side of the flange **38** of the disc **34,** and prevents separation of the pad **12** from the pad holder. While the assembly is shown with a pair of discs **72** and **76,** it should be noted that the assembly could be used with only one of these discs. The dimension of the disc adjacent the pad varies the amount of flexibility at the outer edge of the resilient pad. It should be noted that when the shaft **64** is secured to a drive member such as a drill, that all drive forces are taken by the central plastic disc **34.**

The central plastic disc can be glued between the sponge layers and the face members in turn glued to the outer surface of the sponge layers by any conventional type adhesive which is compatable with the material layers. Typically, the central plastic disc **34** is made of molded thermoplastic material such as Nylon or Delrin; however, other materials such as metal or thermosetting plastic could also be used, so long as the central disc can be secured to an attaching device. In addition, the central disc is flexible and extends almost to the edge of the sponge layers **24** and **28** in order to keep the edges of the sponge layers from breaking down. The sponge layers **24** and **28** are normally made of neoprene sponge of approximately ⅛ inch thickness each. This thickness provides less opportunity to allow a breakdown of the sponge. It has been found that as the sponge thickness increases, the opportunity for sponge breakdown is also increased. While previously ¼ inch to 5/16 inch thickness sponges have been used, because it has been found that operators would obtain a desired "feel" with such thickness, the ⅛ inch thickness sponge layers **24** and **28** do not break down as readily, yet when assembled with the plastic disc, the desired "feel" is retained. Typically, the face members **14** and **18** are made of duck cloth, although the assembly could be made without the duck cloth faces by providing a special skin molded on the outer face of the sponge layers to give additional strength and durability to the sponge. However, the duck cloth material has been found to be a desirable configuration for securing the paper disc to the pad assembly.

In FIG. **3,** there is illustrated an alternative arrangement for assembling as well as driving a throw-away pad assembly. The embodiment of FIG. **3** utilizes a disc-like member **102** which typically can be made of a thermoplastic material and contains a central opening **104** which extends from a first side **106** to a second side **108.** The sides **106** and **108** may taper from the central opening **104** to the edge **112** of the member **102.** The disc-like member **102** may be rigid in the area of the central opening **104** and, depending on the degree and type of taper, either rigid or flexible in the area of the edge **112.** A foam body **114** is molded in place around the member **102** and is spaced from the central opening **104.** The foam body **114** also extends beyond the edge **112** of the rigid member. The resultant combined configuration of the tapered disc-like member **102** and foam body **114** forms a uniform cross-section except for the area adjoining the opening **104.**

Secured to the outer surfaces **116** and **118** of the foam member **114** are a pair of face members **122** and **124,** respectively. These face members **122** and **124** may be formed of cloth, rubber, plastic or other suitable material or may be molded as a skin surface of the foam body **114.** The face members **122, 124** have openings **126, 128,** respectively, which enable the members to be secured to the sponge layers yet enable a drive member to be secured to the threaded opening **104** of the rigid member **102.** The face members **122** and **124** may be secured to the foam member surfaces **116** and **118** by means of an adhesive such as that utilized in the arrangement of FIGS. **1** and **2.** The arrangement of FIG. **3,** which utilizes a more rigid disc-like member **102,** eliminates the need for a rigid backing member such as the discs **72** and **76** of FIG. **2.**

When a tapered disc-like member **102** of FIG. **3** is used, it is normally necessary to mold the foam directly to the member **102.** Should a flat disc-like member of uniform crosssection be used in place of the tapered disc of FIG. **3,** a foam layer could be placed on opposite sides of the disc-like member, as in the arrangement of FIG. **1,** where the sponge layers **24** and **28** are placed on opposite sides of the central disc member **34.** However, the tapered disc-like member **102** enables the edge pressure of the pad assembly to vary with the amount of taper.

We claim:

1. A reversible symetrically formed replaceable pad assembly comprising:

a body of resilient material having a central opening therein, said body having a disc-like member

formed therein, said disc-like member radially extending into said body and having a central opening formed therein, said disc-like member central opening being smaller than said body central opening, an axially central portion of said disc-like member thereby extending into said body opening and having a thickness thereat greater than remaining portions of said disc-like member but less than the thickness of said body thereat, said openings being co-axial with each other, said body having a first side face and a second side face;

means formed on said faces for securing an abrasive finishing article to either one of said faces;

drive means; and

securing means positioned in said openings for securing said assembly to said drive means for imparting movement to said assembly, said securing means having an outer flange smaller than said body opening for abutting said axial central portion of said disc-like member and being operable when inserted into said opening from either of said faces and secured therein.

2. A reversible replaceable pad assembly in accordance with claim **1** wherein said first means comprises a cloth face material to which said abrasive finishing article is secured.

3. A reversible replaceable pad assembly in accordance with claim **1** wherein said disc-like member extends near to the edge of said resilient member for preventing structural failure of said resilient member.

4. A reversible replaceable pad assembly in accordance with claim **3** wherein said layers of resilient material are made of a sponge-like material.

5. A reversible replaceable pad assembly in accordance with claim **1** wherein said body of resilient material is formed of plastic foam which is molded to said disc-like member on both sides thereof.

6. A reversible replaceable pad assembly in accordance with claim **5** wherein said disc-like member tapers from a maximum cross-sectional thickness adjacent said central opening to a minimum thickness adjacent the edge of said plastic foam.

7. A reversible replaceable pad assembly in accordance with claim **6** wherein said central opening is threaded.

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