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Dosser

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[54] **FASTENING DEVICE FOR PSA ABRASIVE DISC**

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[52] **U.S. Cl.** **51/376**

[51] **Int. Cl.** **B24d 17/00**

[58] **Field of Search** 51/358, 376, 378, 389

[56] **References Cited**

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[57] **ABSTRACT**

A backup pad having a protruding centering button to quickly fasten pressure sensitive adhesive abrasive discs and other surface treating discs on a backup pad for a conventional power rotary tool.

9 Claims, 4 Drawing Figures

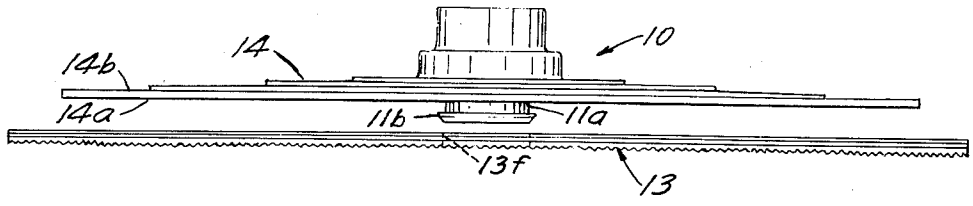


Fig. 1

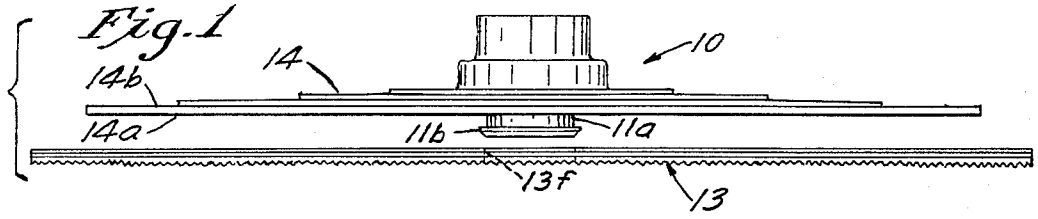


Fig. 2

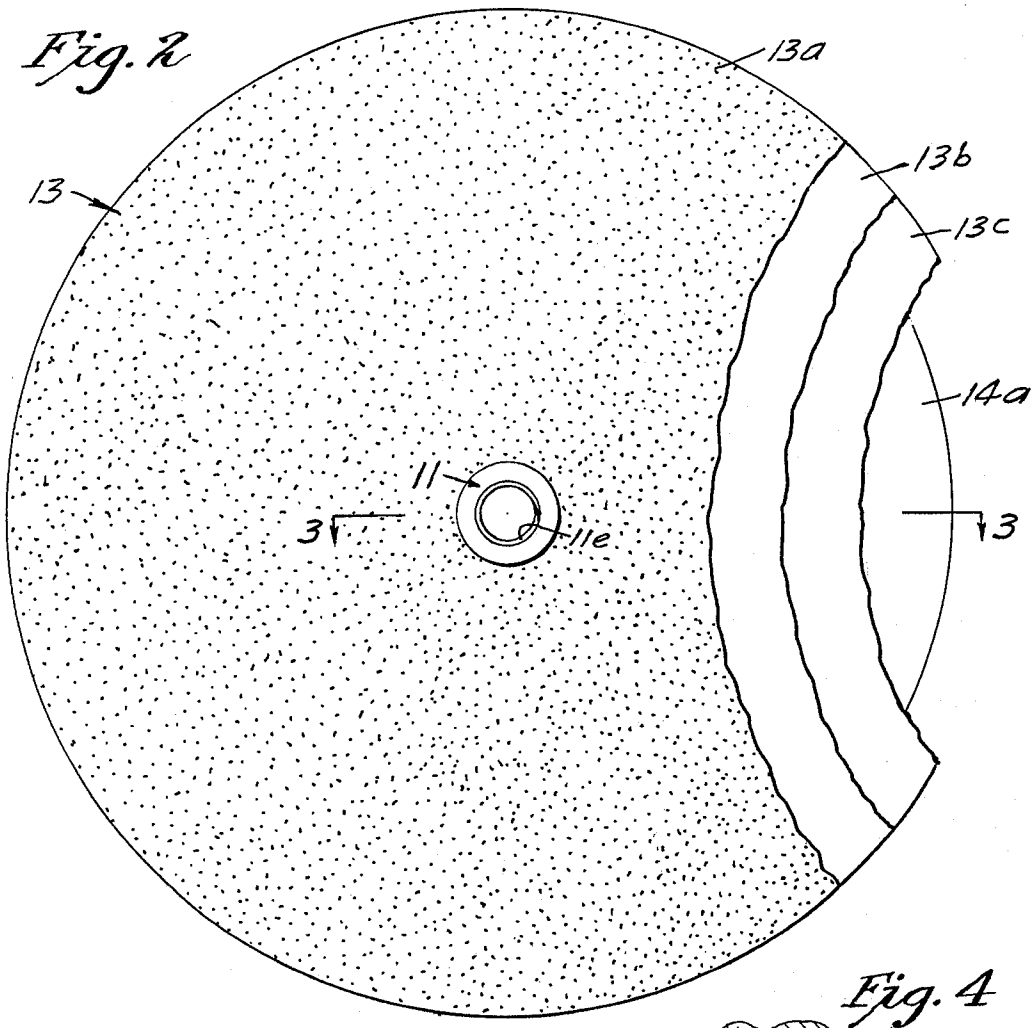


Fig. 4

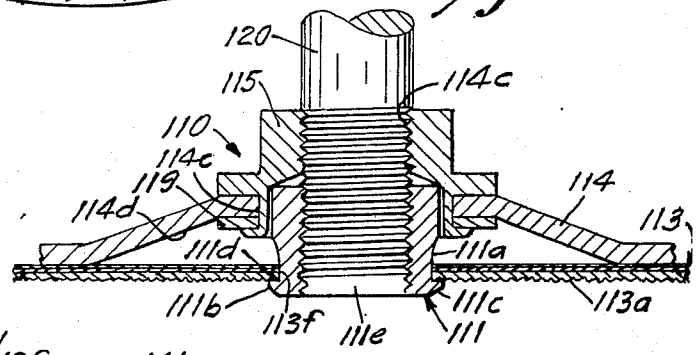
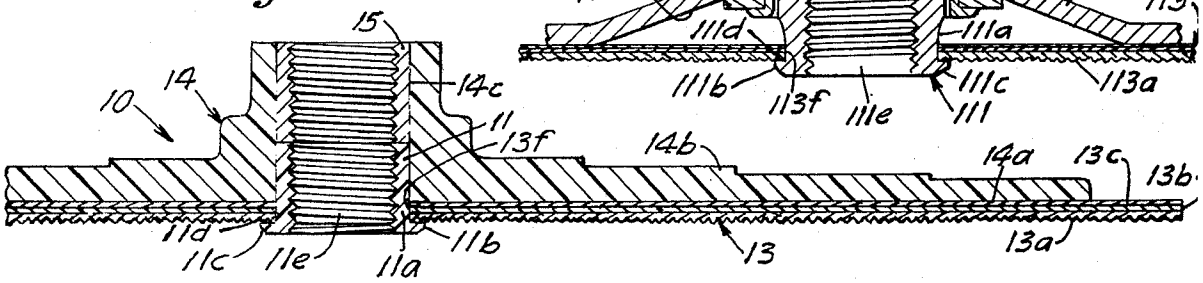


Fig. 3



FASTENING DEVICE FOR PSA ABRASIVE DISC

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a backup pad and pressure sensitive adhesive (PSA) coated surfacing disc, and in one aspect, to a disc fastening member on a backup pad for a conventional rotary power tool.

2. Description of the Prior Art

Coated abrasive discs, which have existed for decades in a wide spectrum of constructions, can be used to remove stock, cut grooves, polish a surface, etc. These discs are typically and preferably constructed so that the disc can be mounted and demounted with a minimum of effort. That this had been an object of many inventions is evidenced by the number of patents directed to quick change tools. To the best of our knowledge and belief, however, all tools heretofore known have suffered from one or more of such disadvantages as high cost of fabrication, excessively complicated mechanism, danger of damaging either the disc or the drive assembly during installation or removal, necessity for separable fasteners of which one tends to lose a part, special mounting tools, inability to resist the torque encountered in normal use, tendency to mar the workpiece, etc.

One means of quickly mounting a disc is by the use of a pressure sensitive adhesive (PSA) coating on the backside of the disc; there is an advantage of a quick change but this advantage is offset by the hazard of a disc flying off during normal speed operations. This is particularly true if the PSA disc is not centered on the backup pad. The known prior art has not provided any fastener or centering member to aid in securing the PSA disc to the backup pad.

SUMMARY OF THE INVENTION

The present invention provides an improved fastening device for quickly attaching a pressure sensitive adhesive (PSA) coated abrasive disc to a backup pad for a rotary power tool. The present invention eliminates the need for tools and other separate pieces to aid in placement or attachment of the discs to the pad.

The present invention includes a conventional backup pad comprising a circular backup plate and a central fitting. The backup pad is provided with a centering button which is secured to and protrudes from the disc supporting surface of the backup plate.

The centering button aids in centering the disc on the backup plate and also aids in preventing hazardous lateral displacement of the PSA disc relative to the backup plate when rotating at high rpms. The novel backup pad device provides quick attachment and "fail-safe" retention of pressure sensitive adhesive coated abrasive discs and other PSA coated surfacing discs that are used on power tools that may operate at speeds of 4,000 to 5,000 rpms.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be more fully understood by reading the following detailed description which refers to the accompanying drawing, in which like reference numbers refer to like parts in the several views, and in which:

FIG. 1 is an exploded side elevational view of the backup pad and a PSA abrasive disc, constructed according to the invention.

FIG. 2 is a plane view of the assembly of FIG. 1 with portions cut away to show hidden portions.

FIG. 3 is a vertical section taken generally on the line 3—3 of FIG. 2; and

FIG. 4 is a vertical cross-sectional partial view of a modification of the backup pad of FIGS. 1 to 3.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawing there is illustrated in FIG. 1 a generally circular backup pad generally designated **10** and an abrasive disc **13** embodying the invention. The backup pad **10** includes a nylon disc-centering button **11** having a regular geometric shape and comprising a short neck **11***a* protruding outward from a disc supporting surface **14***a* of the pad and terminating with a shoulder **11***b* formed about the outer protruding end of the button **11**. The button **11** provides for the firm engagement and the centering of the abrasive disc **13** on the backup pad.

Backup pad **10** further includes a backup plate **14** having a disc supporting surface **14***a* and a rear side **14***b*. The backup plate **14** has a central fitting in part provided by a threaded metal shaft-connecting hub **15** and in part by a threaded base **11***e* of the button **11** as seen in FIG. 3.

The shaft-connecting hub **15** is an insert permanently affixed in an opening **14***c* in the backup plate **14**. The button base **11***e* is permanently affixed in the opening **14***c* coaxially with the hub **15**.

The button **11** protrudes from the supporting surface **14***a* in a manner such that an opening **13***f* in the abrasive disc **13** is easily snapped over the shoulder **11***b* to fit around the neck **11***a*. In the illustrated embodiments, the button **11** and the opening **13***f* are circular but they could be triangular, square, star-shaped, or have other selected geometric shapes. Preferably the button **11**, and especially its neck **11***a* are continuous to provide sufficient strength to resist any tendency of the disc to migrate laterally. The opening **13***f* in the disc **13** is preferably slightly smaller than the shoulder **11***b* and is slightly larger than the adjacent portion of the neck **11***a*. The length of the neck **11***a*, as measured from the supporting surface **14***a*, is approximately equal to the total thickness of the abrasive disc **13** at its opening **13***f*.

The abrasive disc **13** includes a granular coating **13***a*, a support base material **13***b*, a pressure sensitive adhesive coating **13***c*, and the opening **13***f*. The PSA coating **13***c* adheres the abrasive disc to the entire disc supporting surface **14***a* of the backup pad **10**.

As FIG. 3 illustrates, the shoulder **11***b* of the button **11** has a beveled outer edge **11***c* designed to temporarily expand the opening **13***f* in disc **13** upon placement of the disc on the backup pad. An under surface **11***d* of the shoulder **11***b* engages the abrasive coating **13***a* of the abrasive disc **13** adjacent to the opening **13***f*. For that purpose, the backing **13***b* of the disc **13** is made of a flexible material such as paper or cloth so as to facilitate the expansion of the opening **13***f*.

In FIG. 4, the backup pad **110** has a central fitting which is provided by an internally threaded metal shaft-connecting hub **115** which is permanently affixed to a backup plate **114**. The hub **115** is inserted into a central opening **114***c* in the backup plate **114** and swaged around a metal washer **119**.

The centering button **111** is a separate metal piece which is also internally threaded for attachment to a driving shaft **120** of a rotary power tool (not shown). The centering button **111** includes a neck **111***a* and a shoulder **111***b* which is formed with a beveled outer edge **111***c*. An under surface **111***d* of the shoulder **111***b* engages the abrasive coating **113***a* of the abrasive disc **113** adjacent to its opening **113***f*.

The backup plate **114** includes a depression **114***d* around the central fitting. This permits the centering button **111** to be replaced by a shorter button which would be recessed with respect to the plane of the working surface of the abrasive disc **113**, thus providing a wider working band and less likelihood that the button will contact a work piece.

If desired, the backup pad may include two or more centering buttons as described, preferably symmetrically arranged about the central fitting.

Backup plates may be formed of a variety of materials, such as multi-ply phenolic cloth laminate or polycarbonate. If a rigid material is used, the disc supporting surface may be a layer of an elastomeric material. By using a rigid material, the circular backup plate, the central fitting and the centering button may be formed as a single piece of material.

I claim:

1. In combination, a rotary backup pad and a pressure sensitive adhesive abrasive disc having a centering opening of a regular geometric shape, said backup pad designed for supporting and readily removably retaining said disc, said backup pad comprising

a circular backup plate having a disc supporting surface;

a central fitting adapted to connect to a rotary driving shaft of a power driven tool;

a centering button which protrudes from the disc supporting surface, which button is formed at its protruding end with a shoulder which is slightly larger than the opening of the disc and with a neck which is equal to or slightly smaller than the opening of the disc and has a length equal to or greater than the thickness of the disc at its opening to center the abrasive disc on the support surface and to restrict lateral displacement of the abrasive disc relative to the backup pad during the operation thereof.

2. A combination of claim **1** wherein said central fitting is integral with said centering button and has an inner threaded bore portion that screws onto the driving shaft of the rotary power tool.

3. A combination of claim **1** wherein the circular backup plate, the central fitting and the centering button are formed as a single piece of material.

4. A combination of claim **1** wherein the disc supporting surface of the backup plate is covered with a resilient surfacing adapted to aid in receiving and holding the pressure sensitive adhesive coated abrasive disc thereon.

5. A combination of claim **1** wherein the shoulder of said centering button has an under surface spaced from and opposed to said supporting surface to engage the abrasive surface of a said abrasive disc adjacent to the opening in the abrasive disc.

6. A combination of claim **1** wherein a centering button is located at the center of the backup pad and is internally threaded to provide at least a part of the central fitting.

7. A combination of claim **1** wherein the centering button is an integral part of the backup plate.

8. The combination of claim **1** wherein the central fitting is provided by an internally threaded metal hub permanently affixed to the backup plate, and the centering button is a separate metal piece which is internally threaded for attachment to the driving shaft of the power tool, and the backup plate is depressed around the central fitting.

9. The combination of claim **7** wherein the centering button, when the backup pad and abrasive disc are attached to the power tool, does not substantially project beyond the plane of the outer working portion of the abrasive surface.

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