May 20, 1952 E. H. WHITE 2,597,421

ABRADING UNIT

Filed May 17, 1949

FIG. 1

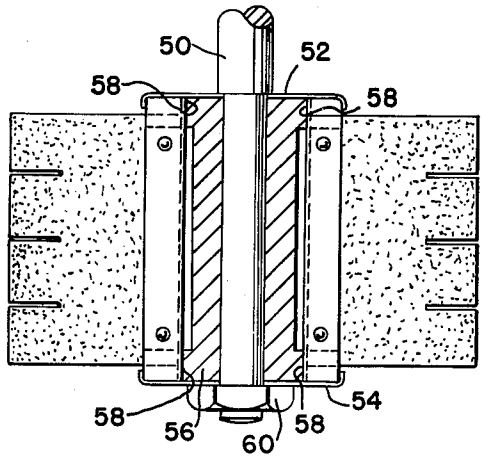


FIG. 2

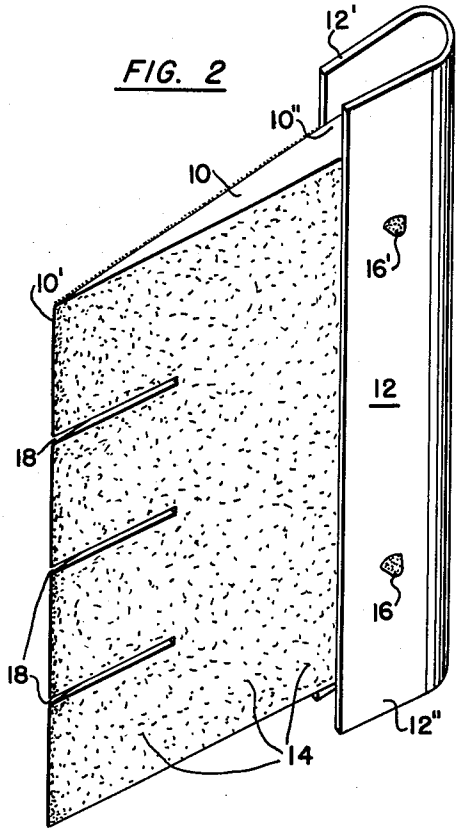


FIG. 3

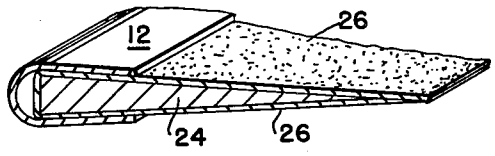


FIG. 4

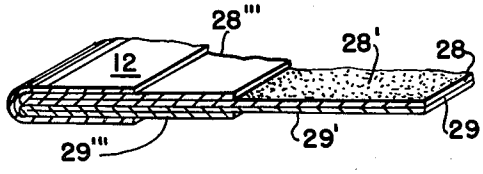


FIG. 5

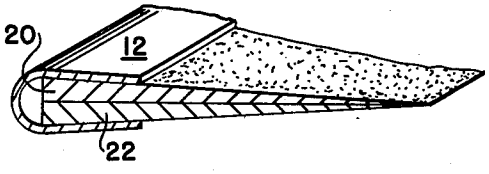


FIG. 6

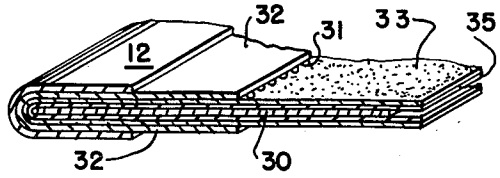
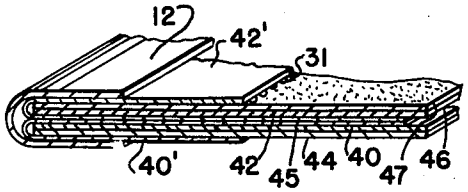


FIG. 7



INVENTOR.

EDWIN H. WHITE

BY

J. Wesley Everett

Patented May 20, 1952 2,597,421

UNITED STATES PATENT OFFICE

2,597,421

ABRADING UNIT

Edwin H. White, Baltimore, Md.

Application May 17, 1949, Serial No. 93,790

1 Claim. (Cl. 51—190)

1

The present invention relates to an improved abrading unit for use in a specially designed tool or spindle which is adapted to hold the abrading unit in position to be rotated within a cylindrical bore for treating the inner surface thereof.

The unit in general in constructed of a rigid holding portion adapted to be fixably fastened to the tool and a flexing portion for engaging the cylinder side walls.

The primary object of the invention is to provide an improved double-faced abrading unit which would be economical to produce and practical in its application.

Another object of the invention is to provide an abrading unit in which the abrading surfaces may be renewed as the outer surfaces become worn without the necessity of removing the unit from the spindle.

While several objects, uses and advantages of the invention have been specifically pointed out, other objects and advantages will become apparent as the nature of the article is more fully disclosed consisting in the novel construction, combination and arrangement of parts as shown in the accompanying drawings and detailed description forming a part of this specification and in which:

Figure 1 is a vertical sectional view of a special tool or spindle for supporting the abrasive unit in operating position.

Figure 2 is an enlarged perspective view of one form of the abrasive unit in which the abrasive material is carried directly upon the flexing element.

Figure 3 is a fragmentary perspective sectional view similar to Figure 2 in which the flexing element supports a sheet of abrading material.

Figures 4 and 5 are fragmentary perspective sectional views of a modified form of the unit in which the abrasive is carried directly upon the flexing element, or elements.

Figures 6 and 7 are views similar to Figures 4 and 5 in which the flexing element supports a plurality of abrasive carrying sheets.

Referring now to the drawings and in particular to Figure 2 which is one of the preferred forms of the invention, there is shown a flexing or resilient portion 10, and a rigid support or element 12. The flexing element 10 is preferably constructed of a relatively thin sheet like flexible plastic material and being tapered toward one of the lateral edges as shown at 10', the other edge 10'' is clamped into the rigid holding element 12 and may be further secured thereto by small indentations as shown at 16 and 16'. The

2

holding element 12 is usually constructed of metal, but any suitable rigid material may be substituted.

In this form abrasive materials 14 are carried directly upon the face of the plastic. Any well-known method of attaching these abrasive particles may be employed, such as gluing, heating and the like. The outer edges 10' of the member 10 has preferably several slots 18 which tend to aid the member to better conform to the side walls of the cylinder and compensate for any mis-alignment of the tool.

The member 10 is made preferably from a suitable plastic mix in which the mix is forced through a suitable tapered die at which time the plastic is partly cured. At this time the abrasive material may be added to the outer surface where it is partly imbedded in the surface of the element. When the strips have been allowed to completely cure, they may be cut to the proper size and the holding element 12 attached by clamping and by disrupting the surface of the holder in any of the well-known fashions as shown at 16 and 16'. The slots 18 are usually a separate operation and may be accomplished by any suitable die or slotting saws.

The flexing element for the purpose of this description will designate the flexible portion of the unit whether it consists of a single sheet or a plurality.

The flexing element shown in Figure 5 is made in substantially the same manner as that described for Figure 2 except the unit comprises two plastic elements 20 and 22 to provide a slipping action along the center and particularly adjacent the outer edge of the flexing element when the element is bent from side to side.

Referring to Figure 3, this form consists of a tapered plastic flexing element 24 in which its purpose is to support a suitable coated cloth or paper 26, such as emery cloth, the holding element 12 also gripping the cloth which is wrapped upon the element 24. The cloth in this modification is usually glued to the member 24, but not necessarily. If desired, several separate pieces of the cloth may be folded around the flexing member 24 and when worn out may be torn off leaving a new piece of cloth and a new outer surface which will be more fully described hereafter.

The modification shown in Figure 4 has one feature which is common to the modification shown in Figures 2 and 5 in that the abrading material is carried directly upon the plastic or flexing element. In this modification, one side 28' and 29' of two plastic sheets 28 and 29 of

equal thickness are wholly or partly coated with an abrasive 14 and is doubled back upon itself as shown at 28''' and 29'''. These turned back portions extend beyond the holding element 12 and along the surface of the members 28 and 29 for retarding the flexing of the members adjacent the rigid holder 12. This allows for the use of relatively thin sheets of uniform thickness by which a substantial amount of flexing may be gotten near the outer free edge of the abrading element.

In Figure 6 there is shown a further modification of the unit. The flexing is accomplished by two separate elements, each of which has a uniform thickness. There is a central element 30 and a wrap-around element 32 which has the same function as that described for the turned back portions 28''' and 29''' in Figure 4. Over the central element 30 is one or more sheets of emery cloth, or abrasive paper. Over the abrasive sheets and along one edge, is the U-shaped member 32 and also over the U-shaped member 32, the holding element 12 is fixably secured as described for the modifications.

The modification shown in Figure 7 is similar to that shown and described for Figures 4 and 6 except in Figure 7 the flexing element does not carry the abrading material, but carries a double flexing element for supporting one or more sheets of emery or abrading sheet. There are two flexing elements 40 and 42 which are doubled back and form retarding flexing members 40' and 42'. Between the main portion 40 and the turned back portion 40' are one or more sheets of emery cloth 44 and 45 and lying between the main body portion 42 and 42' are sheets of emery 46 and 47. Where a plurality of abrasive sheets are used it is not necessary to place them on both sides of the flexing element, as it may be more practical in some instances to have them just on one side of the flexing element and tear them off when they are worn out.

In the forms shown in Figures 6 and 7 several pieces of emery cloth may be used on either, or both sides of the flexing element. In this arrangement when one sheet of cloth has become damaged it may be quickly torn off along the perforations 31 leaving a new surface of abrasive sheet underneath. Again you may have the sheets of different grades: for example, a coarse paper on the outside for making heavy cuts and a finer abrasive on the inner sheets for polishing the surface by simply tearing off the outer sheet. Or the reversible type units may carry a coarse grinding material on one side and a finer one on the other side.

These abrading units are adapted to be inserted into a special tool, or holder shown in Figure 1. The holder comprises a central shaft 50 particularly adapted to be receivable into a standard chuck of a portable electrical hand drill. There is an upper cap 52 and a lower cap 54 for receiving the ends 12' and 12'' of the element 12. While the element 12 is shown as a separate piece from the flexing element it may be cast or made in a single piece by increasing the rigidity of that portion of the unit engaging the holder. Carried between the two cap members is a central body member 56 having slots 58 for receiving the ends 12' and 12'' of the unit for holding the unit on a substantially radial position. The abrading units are held in position upon the spindle by the nut 60 operating against the bottom cap 54. The holder is designed to carry a number of these units, which are usually arranged in pairs on opposite sides of the shaft 50.

In operation, the shaft 50 is locked in a rotatable chuck and inserted into a cylinder (not shown), the outer end portions of the abrasive carrying elements are designed to contact the cylinder walls upon rotation of the holder and perform an abrading action thereon. The purpose of the flexing element is to keep the abrasive carrying element in contact with the cylinder wall as it is rotated within the bore.

While the present disclosure describes and illustrates several specific species of the improved abrasive unit, it is not intended to limit the invention in any manner, as the scope of the invention will be best defined in the appending claim in which I claim:

An abrasive unit for portable cylinder treating tools having a rotatable holding frame for said unit, said unit comprising, a single elongated U-shaped rigid clamping member having its ends extended outwardly beyond the unit to engage the tool holding frame, a pair of gradually tapered elastic abrading members of substantially the same size and thickness having a coating of abrasive on one side only of each member, the U-shaped member adapted to clamp the thicker edges of the two members together throughout their entire length to form a single unit in which the non-coated surfaces of the abrasive member are turned inwardly and the abrasive coated surfaces are turned outwardly, whereby the two elastic abrasive members are fixedly held by the clamp which in turn is holdable within the tool holding frame.

EDWIN H. WHITE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
674,384	Nash	May 21, 1901
926,524	Wattles	June 29, 1909
963,523	Crismore	July 5, 1910
1,581,199	Graves	Apr. 20, 1926
1,670,068	Grimes	May 15, 1928
1,794,092	Phillips	Feb. 24, 1931
2,076,311	White	Apr. 6, 1937
2,103,320	Croff	Dec. 28, 1937
2,316,257	Krastin	Apr. 13, 1943
2,423,992	Nordgren	July 15, 1947
2,474,546	Olafson	June 28, 1949