

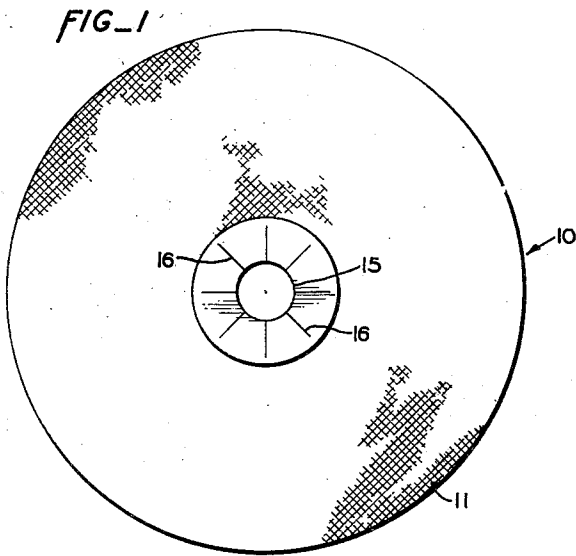
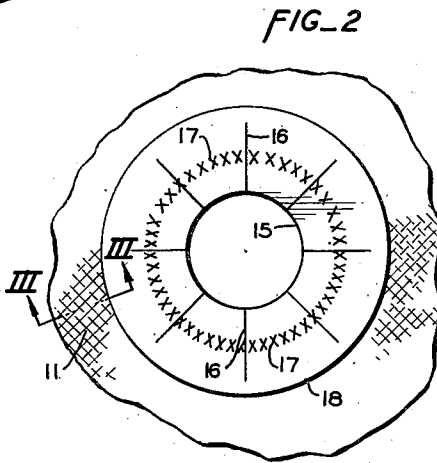
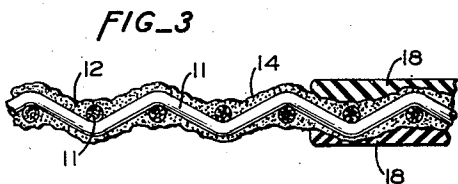
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2,818,694

ABRASIVE DISC

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ABRASIVE DISC

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This invention relates to improvements in abrasive discs, which when used for their intended purposes are usually supported by a back pad and attached to a rotating shaft, for grinding, polishing and finishing all types of materials, including, but not limited to metal, plastic and wood, and more particularly this invention relates to the type of disc which is formed of a reticular abrasive, in which a woven material is either impregnated or coated with an abrasive so that both sides thereof are usable alternately.

It has been found that the product in the form of an abrasive disc in which an open-weave cloth is the foundation for abrasives of variously graded grits, is one of the finest products for finishing all types of material, especially metal, plastic, and wood. For the most part such discs are moisture and waterproof and therefore not susceptible to twisting and warping. They are lighter in weight, do not chip, and do not tear easily, as do their paper and plastic counterparts. However, the use of such discs has been extremely limited because it has heretofore been found impossible to attain many of the normally expected uses for the product and at the same time hold them properly for use under current requirements for the several operations.

Accordingly, it is an object of the present invention to provide a reticular abrasive disc having a flexible, but stiffened central portion sufficient to overcome both radial and frictional torque in use, particularly under conditions of high speed rotation.

It is also an object of the present invention to provide a reticular abrasive disc which permits proper gripping and holding by the usual back pad nut.

It is also an object of the present invention to provide a reticular abrasive disc which may be secured in position on a back pad without the necessity of temporarily coating the back pad surface to hold the abrasive disc in position during use.

It is a further object to improve reticular abrasive discs so that their practical use will attain substantially all of the theoretical claims.

Further objects are to provide a construction of maximum simplicity, economy and ease of manufacture, also such further objects, advantages and capabilities as will fully appear and as are inherently possessed by the device and the invention described herein.

The invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawings, and while there is shown therein a preferred embodiment thereof, it is to be understood that the same is merely illustrative of the invention and that the invention is capable of modification and change and comprehends other details of construction without departing from the spirit thereof or the scope of the appended claims.

Referring to the drawings:

Figure 1 is a plan view of a reticular abrasive disc with the center portion thereof flexibly stiffened in accordance with the present invention;

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Figure 2 is an enlarged fragmentary view of the central portion in plan; and

Figure 3 is a greatly enlarged and idealized vertical section taken on the line III—III of Figure 2.

Referring now more particularly to the drawings, in which like reference numerals indicate like parts in the several views, Figure 1 shows a reticular abrasive disc generally designated 10. As shown in the section of Figure 3, the disc is composed of an openweave fabric 11 which has been coated, and in some instances impregnated with abrasive grit 12 of substantially uniform particle size and hardness and a suitable binder 14. The grit 12 is in accordance with the standards accepted by the industry. It will be observed that the usual reticular abrasive disc 10 has the same effective surface on both sides. This is intentional, for it is said that when one side becomes used to the point where it no longer cuts as it should, the disc may be turned over and used, thus doubling the life of the sanding or abrasive disc.

The discs of this character, while semistiff, are nevertheless floppy to a point which actually inhibits their usefulness. The grade of the mesh of the weave and the particle size used for the abrasive disc do not appear to make much difference in this regard. As the grit is increased in size from very fine to a larger cutting grits, the increased weight of the abrasives and the binders required to retain them on and in the fabric, weighs down the underlying fabric. On the other hand, in the very fine grits, the fabric is finer and, therefore, less self-sustaining.

It is recognized that the sanding, grinding and polishing discs in present use, except in the case of the very finest of paper-backed grits, are usually self-sustaining. That is to say, the discs retain their shape and may be used with the usual supporting back pad, with nothing more required than the back pad nut to hold them to the back pad and the shaft for rotation therewith. In the finer grits, it has occasionally become necessary to coat the face of the back pad temporarily with an adhesive to help hold the disc in place, and to help overcome possible damage and wrinkling due to frictional and radial torque. Beyond the inconvenience of this temporary adhesive, the use of such discs has not been effected.

With the use of reticular abrasive discs the same technique for holding the discs to the back pad has been applied. Adherence was secured by coating an adhesive temporarily on the face of the back pad and securing the disc in place thereon, and then securing the back pad and disc to the shaft by means of the usual back pad nut. The open nature of the fabric 11, however, has been an obstacle to overcoming the holding difficulty. The temporary adhesives or varnishes which are sufficiently tacky to hold the discs in place, penetrate through the open mesh of the fabric to the opposite working surface and become transferred to the work, itself. Even without such transfer of the temporary adhesive, a portion of the usefulness of the disc is lost because of the fouling of the working surface by the penetration of the temporary adhesive. In addition, the fouling of the attaching surface makes it impossible to reverse the reticular abrasive disc without further treatment. It is known, however, that adhesives or the like may be cleaned from the surface of the disc to a great degree, but it is a messy and time-consuming job to clean not only the fabric disc, but the back pad, itself. The cost of the service time and the nature of the chore have prevented reticular abrasive discs from becoming accepted widely or attaining their theoretical advantages, in spite of the fact that they are recognized as a superior product for sanding, grinding, polishing and the like.

All discs for such purposes are provided with a uniform central opening 15. Back pads have a similar opening registering therewith and through these the shank of the

back pad nut passes to secure the abrasive disc to the back pad and to secure the assembly to the shaft for rotation therewith. As is well-known, the head of the back pad nut has a wide inwardly tapering flange so that in gripping and holding the disc between it and the back pad, the central portion of the disc adjacent the aperture 15 will be countersunk to the extent that neither it nor the nut head will contact the work surface, even if the operation is performed flat with the surface of the disc in contact with the work, rather than merely a portion of the periphery. To secure a good grip and yet produce as little distortion of the disc as possible from the countersinking, it has been customary to place radial cuts 16 inwardly. Normally the cuts 16 are about the same length or slightly longer than the radius of the central opening 15. It is apparent that countersinking by drawing the back pad nut up tight on the shaft will not produce the wrinkling of the working face of the disc as formerly encountered.

The addition of devices such as the oscillators, shown and described in United States Patents No. 2,480,078, No. 2,629,990, and No. 2,633,008, which are interposed between the shaft and the back pad, and the oscillating back pads shown in United States Patents No. 2,666,281 and No. 2,681,532, which are themselves attached directly to the shaft, have made possible flat grinding, sanding, and the like, and additionally, have permitted the use of all types of abrasive discs at high speeds of rotation. However, it is to be observed that the gripping of the flange of the back pad nut is only at the central portion of the abrasive disc, and, particularly, at the annular area 17 crosshatched in Figure 2 to show where the maximum holding occurs in use. Any slippage occurring in the holding of discs of the finer grits will result in wrinkling and require immediate replacement of the disc. Particularly at high speeds, the central holding, plus frictional torque in use, have made it practically impossible to use fabric abrasive discs without the additional temporary adhesive on the face of the back pad. Without this additional adhesive, slippage and the frictional and radial torque combine to wrinkle the fabric almost upon the first application of pressure, and once wrinkled, neither face of the disc can be used thereafter. Frictional torque and slippage, even without resulting wrinkling of the disc permits the abrasive surface in contact with the face of the back pad to wear away the back pad itself to an alarming degree.

It has been discovered and thoroughly tested that by providing the central portion with a ring with a flexible stiffening material 18 extending beyond the radial cuts 16 from the perimeter of the central opening 15, a substantial integrity is supplied to the entire gritcloth disc so that even those discs with very fine grits may be securely held by the back pad nut to the back pad, without the expected radial or frictional torque causing wrinkling in use. Likewise, for some as yet unexplained reason, the wear on the back pad face by the inner surface of the gritcloth disc is so minimized as to eliminate the problem of this wear for all practical purposes.

The flexible stiffening 18 shown in the drawings comprises a pair of rings 18 placed on either side of the disc adjacent the central opening 15. These rings are cut from fiber-backed or plastic-backed pressure-sensitive adhesive tape. With this type of material only slight pressure is necessary to secure not only adhesion, but a good bond to the underlying surface. The adhesive also penetrates through the interstices of the fabric from both sides and forms an excellent bond not only to the disc but to each other. The rings 18 not only supply the flexible stiffening to give the discs individual integrity, but also supply an additional surface for the proper gripping of the back pad nut, not only against the outer surface which it contacts directly, but on the under surface against the back pad, itself. Although such stiffening is preferably applied to both surfaces of the reticular abrasive disc

10, it has been found that sufficient stiffening is provided if the ring 18 is applied to one side only.

It will be observed that liquid or plastic coatings which will bond to, or key in the interstices of the fabric and dry to a flexible but firm coating, such as polyvinyl resins, or any other substance which will stiffen the center portion of the disc adjacent the central aperture against torsion beyond the area actually held by the nut, will overcome the difficulties of reticular abrasive discs, no matter the fineness or the coarseness of the disc used and make them serviceable discs to the extent of accomplishing substantially all of the claims of their theoretical use. Rings 18 of surgical adhesive tape have been found to be entirely satisfactory.

It is obvious that the center flexible stiffened area 18 may be used as a relatively permanent location for trademarks, names, advertising, or similar printing and indicia, which would otherwise become obliterated in use, where both sides are usable.

It is also to be understood that while the term reticular abrasive is used herein and refers to a foundation of an open-woven fabric, the fabric may be made from either natural fibers or synthetic fibers, or even glass and metal fibers, or may be formed or stamped from sheet material to simulate a woven fabric. All of these are intended to be embraced in the term reticular abrasive.

I claim:

1. An article of manufacture being an abrasive disc for power rotating use comprising in combination a circular web of open weave fabric impregnated with abrasive and bonding medium leaving open spaces between the warp and woof of the fabric, said web having a circular aperture in the center thereof and providing opposite abrasive surfaces, pliable stiffening means covering a relatively narrow annular area of said web surrounding said aperture, said stiffening means being bonded to said web forming an integral nonabrasive gripping and holding area surrounding said aperture to be secured to power rotating means for rotation of said disc, and radial cuts extending outwardly from said aperture partially into the area of said stiffening means to leave an uninterrupted annular portion of said stiffening means between the outer ends of said radial cuts and the exposed abrasive surface.

2. An article of manufacture as recited in claim 1 wherein said fabric is metallic fiber cloth.

3. An article of manufacture being an abrasive disc for power rotating use comprising in combination a circular web of open weave fabric coated with abrasive and bonding medium leaving open spaces between the warp and woof of the fabric, said web having a circular aperture in the center thereof and providing opposite abrasive surfaces, pliable stiffening means covering a relative narrow annular area of said web surrounding said aperture, said stiffening means being bonded to said web forming an integral nonabrasive gripping and holding area surrounding said aperture to be secured to power rotating means for rotation of said disc, and radial cuts in said web extending outwardly from said aperture partially into the area of said stiffening means to leave an uninterrupted annular portion of said stiffening means between the outer ends of said radial cuts and the exposed abrasive surface.

References Cited in the file of this patent

UNITED STATES PATENTS

65	302,952	Smith	Aug. 5, 1884
	1,176,001	Stewart	Mar. 21, 1916
	1,707,485	Kough	Apr. 2, 1929
	1,749,709	Loveland	Mar. 4, 1930
	2,010,330	Stanley	Aug. 6, 1935
70	2,123,581	Anderson	July 12, 1938
	2,175,073	Amstutz	Oct. 3, 1939
	2,328,998	Radford	Sept. 7, 1943
	2,520,763	Goepfert et al.	Aug. 29, 1950
75	2,567,782	Rhees	Sept. 11, 1951