Feb. 18, 1964 J. T. MELLON 3,121,298

PERFORATED ABRASIVE DISC

Filed March 26, 1963

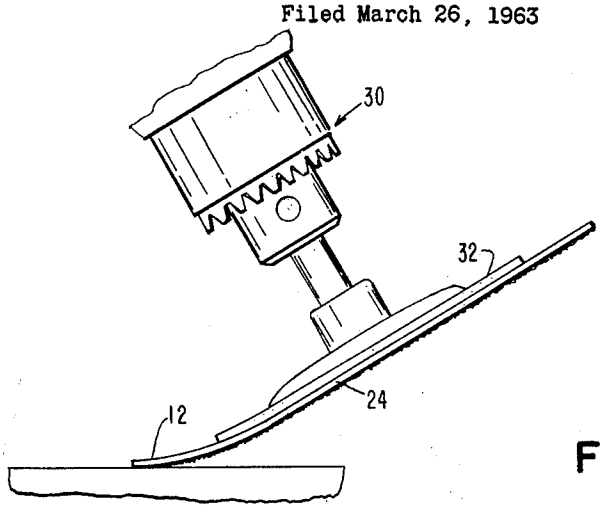


FIG. 1

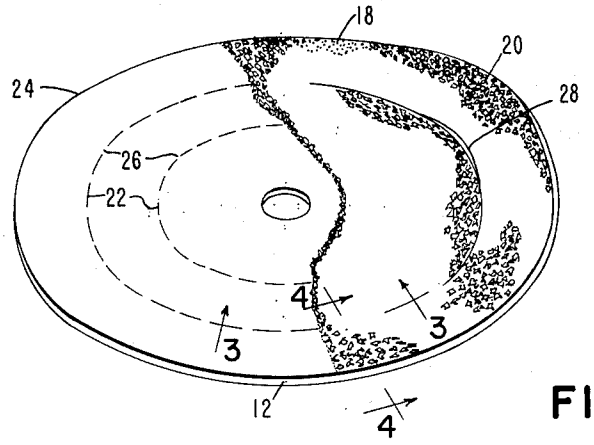


FIG. 2

FIG. 3

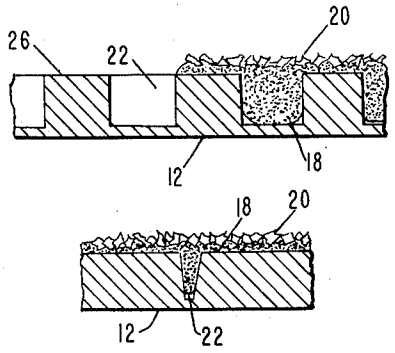


FIG. 4

United States Patent Office 3,121,298 Patented Feb. 18, 1964

3,121,298

PERFORATED ABRASIVE DISC

Joseph T. Mellon, Canton, Mass., assignor to Abrasive Products, Inc., South Braintree, Mass., a corporation of Massachusetts

Filed Mar. 26, 1963, Ser. No. 268,102
4 Claims. (Cl. 51—195)

This invention relates to abrasive discs and more particularly to abrasive discs adapted for selective manual dimension reduction as the peripheral edges thereof are worn smooth.

Ordinarily, abrasive discs are used and dulled primarily on the peripheral edges thereof. Thus after a period of use such a disc will have a worn and dulled annular surface adjacent the periphery thereof which is virtually useless, and an inner surface which is unscathed but which cannot be used unless and until the worn portion is removed.

Because it is expensive and wasteful to dispose of such discs which have been only partially used, various expedients have been adopted for removing the worn peripheral portion. When the usage of discs is sufficiently large to warrant its installation, a die press is perhaps the most practical means of removing the worn outer periphery. Where the usage of discs is not large enough to warrant investment in a die press, the same operation is sometimes done manually, with a hammer, die and block. A third very common method employs a rotary cutter to trim off the worn peripheral portion.

The die press is too costly to install except where the usage of discs is very large. The manual method using hammer, die and block requires several pieces of bulky equipment and is an awkward operation to perform. With the rotary cutter, the blade tends to dull rapidly, making it difficult or impossible to trim more than a very few discs with a single blade, particularly when the abrasive is bonded to the backing with phenol-formaldehyde type resins. Additionally, all of the foregoing methods for reducing the diameter require equipment which must be stored or mounted permanently in a location which is usually remote from the area where the discs are being used.

It is, therefore, a prime object of this invention to provide an abrasive disc adapted for selective manual diameter reduction without the use of cumbersome or expensive ancillary tools.

It is a further object of this invention to provide an abrasive disc which can be easily reduced in diameter by the workman using the disc, at the location where he is using it.

It is still a further object of this invention to provide such a disc which will not rupture or shred or otherwise create any undue safety hazard during normal use.

To accomplish the purposes of this invention a disc is provided which has a backing of any desired size and configuration. Positioned inwardly from the periphery of the backing are one or more lines of diminished tear resistance, concentric with the periphery, adapted for manual rupture upon extreme flexing of the disc adjacent said lines. Standard adhesive coats and a standard grit are also positioned on the backing.

Other features, advantages and objects of this invention will be apparent to those skilled in the art from the following detailed description thereof together with the accompanying drawings, wherein:

FIG. 1 is a side elevation of a disc constructed according to this invention mounted for operation on typical apparatus;

FIG. 2 is an isometric view of a preferred embodiment of this invention, showing one section left without its

coating of adhesive and abrasive, and showing another section coated with adhesive and abrasive and partially ruptured along one line of diminished tear resistance;

FIG. 3 is an enlarged, developed sectional view of the preferred embodiment of this invention, taken along the line 3—3 of FIG. 2; and

FIG. 4 is an enlarged, sectional view of the preferred embodiment of this invention taken along the line 4—4 of FIG. 2.

Referring nw to the drawings and more particularly FIGS. 3 and 4, thereof, it will be seen that a backing 12 is provided which may be of any material customarily used for such purposes. This invention is particularly useful with heavier backings such as vulcanized fibre or vulcanized fibre laminated to a fabric such as an open or closed mesh woven cloth or nonwoven filamented strands. The backing 12 may be presized and/or backsized with adhesives, softeners, or waterproofing agents at any time prior to the application of the adhesive coat 18 which anchors the abrasive grit 20 to the backing.

The backing 12 is either cut into the desired final peripheral shape and dimension from a continuous web of backing material prior to coating, or may be incompletely cut therefrom to be subsequently removed after coating and curing or pre-curing.

Either simultaneously with the cutting of the backing or subsequently, in a second operation, preferably before the application of the making coat of adesive and preferably on the same side of the backing to which the making coat is to be applied, one or more lines of diminished tear resistance 22, concentric with the peripheral configuration of the cut backing, are positioned in the backing. The periphery 24 and the lines of diminished tear resistance 22 may be of any desired configuration, i.e., circular, scalloped, polygonal, etc., and are successively smaller as they become more remote from the periphery.

Preferably, the lines of diminished tear resistance are provided in the backing by perforations 22 which may be of any desired shape. Tapered, uniformly-spaced, slit perforations are used in the preferred embodiment and have lands 26 of a length approximately equal to that of the slits. Although slit and land lengths are not necessarily equal the most satisfactory ratio of slit length to land length is in the range of from 0.75:1 to 1.25:1. This range minimizes the danger of rupture during use and thus maximizes the safety factor consonant with the desired end of providing a disc which can be manually reduced in diameter. Also, to maximize safety, the perforations preferably extend only partially through the backing although, to facilitate tearing, they extend at least through one half the depth of the backing and in practice usually extend almost entirely therethrough as in FIGS. 3 and 4.

Standard adhesive coatings 18, which usually include making and topsizing coatings of adhesive and an abrasive grit 20 are positioned on one side of the backing. Preferably, the adhesive coat and the abrasive grit are applied to the backing after the perforations are provided and on the same side of the backing as the perforations. Although a disc may be made in accordance with this invention by placing the lines of diminished tear resistance on the backing after application of the adhesive and abrasive coats, or on the reverse side of the disc, opposite the side to which the adhesive and abrasive coats are applied, such is not usually desirable. Thus, by perforating on the adhesive coat side of the disc, prior to the application of the making coat, FIGS. 2, 3, and 4, the adhesive is permitted to totally or partially fill the perforations and thus to re-seal the cut edges as in FIGS. 3 and 4. Such re-sealing reduces the likelihood of edge shredding when using the disc with a reduced diameter.

By providing a continuous sealing surface over the perforations, the danger of rupture during use is also reduced.

In operation a disc in accordance with this invention is mounted on a rotary sanding machine 30, as in FIG. 1 and is used until the outer annulus thereof is worn down or dulled. Significantly, in use, such a disc may be flexed and bent to conform to corners and fillets being sanded, without the occurrence of any sign of rupture. The disc may then be removed from the sander or if an undersized back-up pad 32 is used it may be left on the sander. The operator then bends the disc, see FIG. 2, in either direction along the selected line of reduced tear resistance to rupture the disc thereat 23. The worn outer annulus is thus removed leaving the usable inner portion of the disc ready for further use.

Thus an abrasive disc is provided which eliminates the need for expensive diameter reduction machinery and/or tools and which can be manually reduced in diameter by the sanding machine operator. Moreover, the disc is safe to use under ordinary operating conditions.

It will be understood by those skilled in the art that many variations and modifications of the present invention are possible without departing from the true spirit and scope thereof. Therefore, the foregoing description of specific embodiments of this invention is in no way intended to limit the scope of the claims appended hereto.

What is claimed is:

1. An abrasive disc adapted for manual dimension reduction comprising:

a backing having a periphery of predetermined dimension and configuration;

a continuous abrasive surface on one side of said backing comprising an adhesive coat and an abrasive grit anchored in said coat;

and at least one line of diminished tear resistance in said backing only, said line having a reduced dimension relative to that of said periphery and a predetermined configuration concentric with that of said periphery, and said line comprising a series of perforations and lands, said perforations having a depth at least one half that of said backing.

2. The disc claimed in claim 1 having a plurality of said lines successively remote from said periphery, said lines having, respectively, successively reduced dimensions relative to that of said periphery.

3. The disc claimed in claim 1 wherein said adhesive coat is also positioned at least partially within said perforations.

4. The disc claimed in claim 3 wherein said perforations extend only partially through said backing and are positioned on said one side thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

1,635,350	Simons	July 12, 1927
1,862,103	Stratford	June 7, 1932
2,087,318	Foss	July 20, 1937
2,804,733	Hurst	Sept. 3, 1957