

Oct. 6, 1959

R. L. DYAR

2,907,146

GRINDING DISCS

Filed May 21, 1957

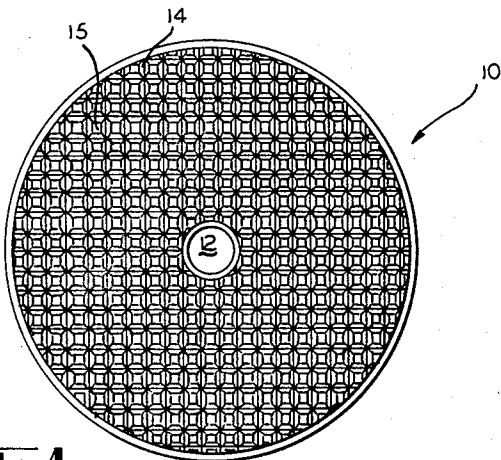


Fig. 1

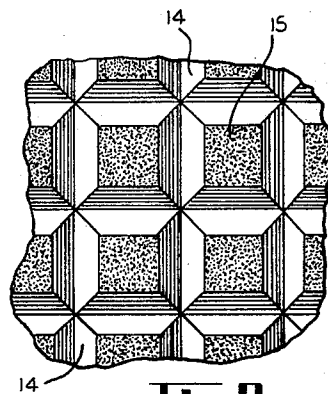


Fig. 2

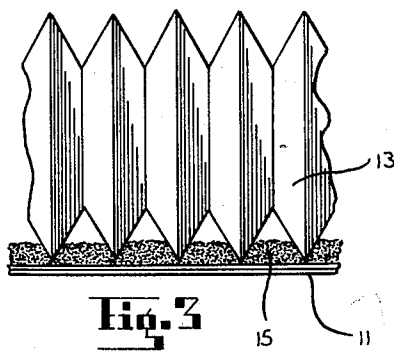


Fig. 3

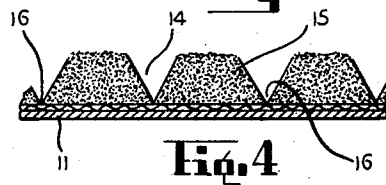


Fig. 4



Fig. 5

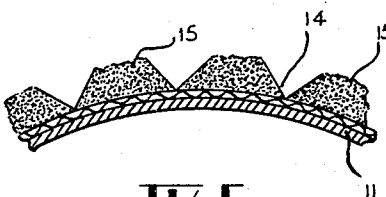


Fig. 6

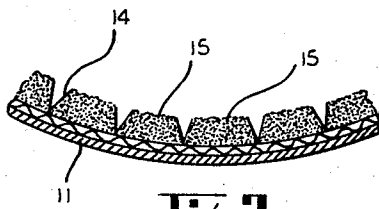


Fig. 7

INVENTOR.

ROBERT L. DYAR

BY

PARKER & CARTER
ATTORNEYS

1

2,907,146

GRINDING DISCS

Robert L. Dyar, Milwaukee, Wis., assignor to Milwaukee Motive Mfg. Co., Milwaukee, Wis., a corporation of Wisconsin

Application May 21, 1957, Serial No. 660,681

3 Claims. (Cl. 51—195)

This invention relates to abrasive discs and the construction thereof, and more particularly to the type of abrasive disc employed in grinding the surfaces of metal or other material.

It is manifest to anyone familiar with the art that when abrasive discs are coated with abrasive material adherently attached to the face of the disc, such coating material tends to prevent flexing of the disc, and when too much flexing is applied it would cause the material to crack, and be forced away from the surface of the disc. It is also manifest that the material from which the disc is made has a tendency to absorb moisture, or be affected by temperature variations, causing expansion and contraction, and in this manner the abrasive material and its adherent agent may be readily torn from the disc and separated therefrom.

The principal object of the invention is to overcome the above-mentioned difficulties by providing an abrasive disc consisting of a flat backing plate to which abrasive particles are adherently attached, but separated in a plurality of individual areas or units.

A further object of the invention is to provide an abrasive disc of the character described so that it may be flexed or bent in any direction without affecting the particles of abrasive material adherently attached to the surface thereof.

Still another object of the invention is to provide an abrasive disc which has particles of abrasive mixed in a binder of adherent material and formed into individual areas spaced from each other to admit circulation of air between the disc surface and the work piece, thereby preventing any matting, or gumming of the surface of the disc.

A still further object of my invention is to provide a disc of the character described, in which the abrasive mixed with the adherent binder is formed into separate units, permitting the disc to which the abrasive is adherently attached to expand, contract or flex, without cracking or fracturing the abrasive surface.

Other and further objects of the invention will become more apparent as the description proceeds when taken in conjunction with the drawing, in which—

Figure 1 shows the working face of an abrasive disc made in accordance with the invention;

Figure 2 shows an enlarged fragmentary portion of the face of the disc, showing the individual grinding areas or units, separated from one another by the V type of groove;

Figure 3 is a fragmentary cross-section of a portion of the disc, coated with abrasive material mixed with an adherent agent, and showing one method of producing separate surface areas by a forming roll which is passed over the surface of the disc to form the abrasive material and adherent agent into individual areas, and exposing the surface of the disc substantially at the base of each groove;

Figure 4 is an enlarged fragmentary cross-section of a

2

portion of the disc treated by means of the roller, as shown in Figure 3;

Figure 5 shows a modified form of disc surface in which the grooves between individual areas are flattened at opposite sides near the base to provide a V groove below the flattened portions;

Figure 6 is a fragmentary cross-section of a portion of a disc made in accordance with the invention, and showing the disc flexed to a convex form, with the V grooves spread; and

Figure 7 is a view similar to that shown in Figure 6, but with the disc portion flexed in the opposite direction to a concave form, showing the V grooves closing, instead of spreading as in Figure 6.

Similar characters of reference indicate corresponding parts throughout the several views and referring now to the same, the character 10 generally shows a circular disc which may be coated on one side, or both sides, with abrasive particles adherently attached thereto. The disc 11 itself may be constructed of fiber cloth, felt, or the like, and may have a centrally disposed aperture 12. The abrasive particles are suitably mixed with an adherent binder, such as glue, applied to the face of the disc as by adding the abrasive particles to the surface of the adherent. The surface of the combined abrasive and adherent agent is scored by a roller having V-shaped blades 13, as shown in Figure 3. Manifestly this scoring is preferably done before the adherent has hardened. The roller may be passed in paths substantially at right angles to each other, thereby producing V grooves 14 in the working face of the disc, as seen in Figures 4 and 2. Accordingly, the working face of the abrasive disc is built up into individual areas or units 15, with the bottoms 16 of the grooves reaching substantially to the body of the disc 11. The grooves 14 also provide paths in both directions at right angles to one another for the passage of air currents when the abrasive disc is applied to the surface of the workpiece being ground.

The V grooves 14 thereby permit the disc 11 to be readily flexed either in concave or convex form, as shown in Figures 6 and 7. This, in Figure 6, as the units 15 spread apart from each other, due to the flexing of the disc 11, the V grooves 14 will open wider, with the sides spread apart from each other. The opposite occurs, as shown in Figure 7, when the individual units 15 are brought towards each other, the oppositely disposed sides of the grooves being brought into closer proximity to each other.

It will be understood further, that disc 11 manufactured of any material suitable for the purpose is likely to be affected by atmospheric changes as well as temperature changes. In other words, the disc 11 will expand or contract according to the temperature and according to the humidity, or moisture, if and when applied to the surface. In such cases, however, the individual units 15 of abrasive will be unaffected, but will act as individual grinding surfaces in performing the function for which the disc is intended.

Figure 5 shows a modified construction in which the individual abrasive areas are separated by a groove having a flat stepped surface 17 at each side, intermediate the outer face and the face of the disc 11. The groove 16 is extended in V shape down to the disc surface. This arrangement will afford somewhat greater air circulation between the individual contact areas 15, and will give more room for the particles to be removed from the surface of the work piece, as they tend to be thrown outward through the grooves due to centrifugal force and the speed of the revolving disc.

With the novel form of grinding disc herein described, it is possible to get a better abrasive action; it is possible to flex the discs in either direction without fractur-

3

ing the adherent material, or the abrasive material held to the disc by means of an adherent agent, thus affording a longer life to the surface of the disc, and giving a cleaner surface which will not become coated so readily by the particles being removed from the workpiece.

Although I have shown and described certain embodiments of my invention, it will be understood that I do not wish to be limited to the exact construction shown and described, but that various changes and modifications may be made without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. In a circular abrasive disc, a backing disc body formed from flexible fibrous material, a working face on said disc, said working face being comprised of a plurality of working areas of abrasive material particles mixed with an adherent binder bonding the particles together and the areas to said disc, said working areas being separated by crossed sets of grooves of V-shaped cross section extending at right angles to one another, each of said grooves extending rectilinearly across said disc and downwardly from the face of said material to a point substantially coincident with the surface of said body, the grooves of each set being generally parallel to one another and generally parallel to lines extending diametrically of said disc so that the crossed sets provide working areas of generally uniform size.

2. The structure of claim 1 wherein the grooves have a stepped V-shaped cross section.

4

3. The method of making a flexible abrasive disc including the steps of forming a mixture of abrasive material particles and an adherent binder on the surface of a flexible disc body of fibrous material, scoring the mixture, before the binder has hardened, with a plurality of equally spaced V-shaped blades and forming a plurality of generally parallel V-shaped grooves extending parallel to a diameter of said body, then turning the body and blades relative to one another and similarly scoring the mixture along a path at right angles to the path of the first scoring, the scoring being to a depth such that the bottoms of the grooves are located substantially at the surface of said body so as to divide the abrasive material into individual working areas of generally uniform size, each of which is bonded to the body, the disc thereby formed being capable of flexure along the grooves.

References Cited in the file of this patent

UNITED STATES PATENTS

794,495	Gorton	July 11, 1905
945,931	Gardner et al.	Jan. 11, 1910
1,862,103	Stratford	June 7, 1932
2,001,911	Wooddell et al.	May 21, 1935
2,292,261	Albertson	Aug. 4, 1942
2,682,735	Buckner	July 6, 1954
2,743,559	Ball et al.	May 1, 1956