Oct. 3, 1939. J. O. AMSTUZ 2,175,073

ABRASIVE DISK

Original Filed Oct. 30, 1936

Fig. 1

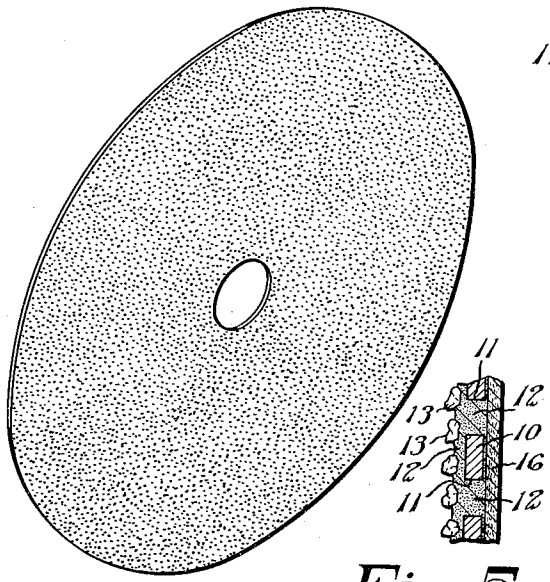


Fig. 2

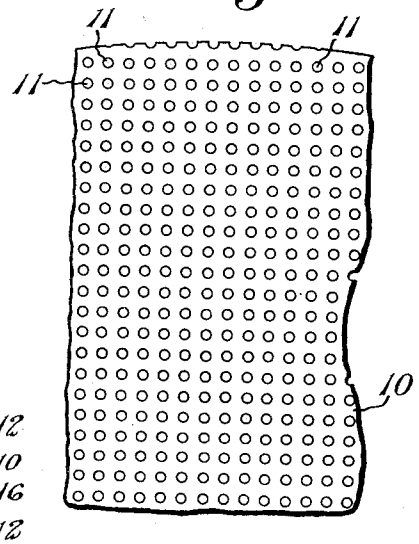
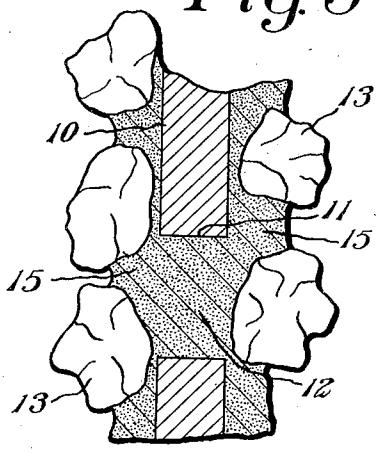
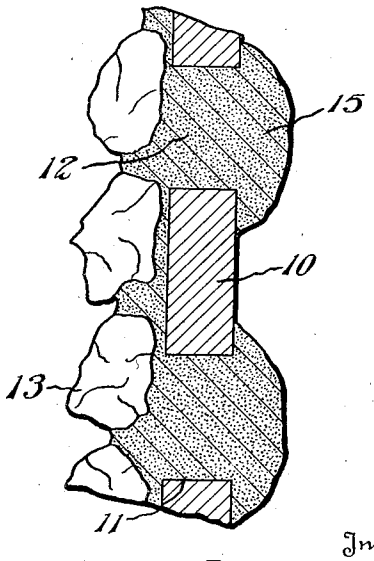


Fig. 5

Fig. 4

Fig. 3





Inventor

JOHN O. AMSTUZ

By George Crompton Jr.

Attorney

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ABRASIVE DISK

John O. Amstuz, Troy, N. Y., assignor to Behr-Manning Corporation, Troy, N. Y., a corporation of Massachusetts

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4 Claims. (Cl. 51—195)

The invention relates to coated abrasive material and with regard to its more specific features to abrasive disks.

One object of the invention is to provide an abrasive disk that can be effectively used for polishing and paint removing operations especially on sheet metal, for example to remove the paint from automobile bodies. Another object of the invention is to provide an efficient abrading disk for the abrading of wood and for the manufacture of furniture. Another object of the invention is to provide a metal abrading article effective for smoothing seams, for cleaning castings, removing burrs and the like. Another object of the invention is to provide an abrasive disk of the character indicated which is stronger and more durable than similar products heretofore made. Another object of the invention is to provide an abrasive disk of such construction that it may be readily manufactured at low cost. Another object of the invention is to provide an abrasive disk structure such that the sheet material may be made of metal. Other objects will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangements of parts, as will be exemplified in the structure to be hereinafter described and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing in which are shown three of many possible embodiments of the mechanical features of this invention:

Figure 1 is a perspective view of the abrasive disk,

Figure 2 is an enlarged plan view of the sheet metal before the abrasive is applied,

Figure 3 is a fragmentary cross sectional view on a greatly enlarged scale,

Figure 4 is a view similar to Figure 3 showing a modification of the invention in which the abrasive is applied to only one side of the disk,

Figure 5 is a fragmentary cross sectional view on a different scale, showing a further modification of the invention.

Referring now to Figure 2, I provide a piece of sheet metal 10 having regularly spaced holes 11 throughout. Because of considerations of strength I prefer to use sheet iron or steel. Furthermore, for most uses I prefer to use tempered steel that immediately springs back to its flat form whenever it is deformed. In accordance with the preferred embodiment of this invention I die out or otherwise cut the stock into disk shape with a small central hole, as indicated in Figure 1.

I now provide a quantity of abrasive grain, for example fused alumina. The size of the grain may vary within very wide limits, depending upon the specific use to which the article is to be put and, in fact, there is no limit to the invention in this respect, as for certain uses I might employ the very fine grit sizes, for example 400 fine, and on the other hand for most uses I prefer to use coarse grain in the neighborhood of 60, 40, or 24 grit size, or possibly in some cases even larger. The invention is not limited to any particular kind of abrasive grain and natural aluminous products may be used, such an emery and corundum, or garnet may be employed and for some purposes silicon carbide grain may be preferred. For some uses I may employ diamonds.

I now provide a quantity of suitable adhesive. The invention has no limitations in this respect either. For example, any one of the glues which have heretofore been used in the manufacture of sandpaper or abrasive cloth may be employed. On the other hand, phenolic resins formed by the condensation or polymerization of phenol-formaldehyde may be employed. When using glue I may tan the glue with formaldehyde as the invention has special application in connection with wet abrading operations.

Referring now to Figure 3, I apply adhesive 12 to both sides of the disk 10. This may be done with an ordinary paint brush, by means of a doctor blade or other flat tool, or I may use rollers one of which revolves in a gum bath. I then springle abrasive granules 13 upon both sides of the disk 10. The result in cross section, when the adhesive or bond has set, is as indicated in Figure 3. The adhesive extends through the holes 11 and, therefore, interlocks with the disk 10. I may, as shown in Figure 4, place abrasive grains 13 on only one side of the disk 10. I may in such cases paint only one side of the disk 10 but the glue will extend through the holes 11 and form glue rivet heads 15. These glue rivet heads 15 are also present in the embodiment of Figure 3 although they merge with the main body of abrasive. Thus, in effect, the abrasive grains are held to the steel by adhesive which is interlocked with the sheet material, the adhesive including a great number of glue rivets.

The finished abrasive disk which is shown in Figure 1 may be mounted on a suitable rotatable holder provided with a motor drive and used to clean paint from automobile bodies, or it may be

otherwise mounted or used for other purposes, as hereinbefore indicated. The abrasive disk of the invention is characterized by a superior strength of the backing material which permits the use of greater pressure in the abrading operation.

Referring now to Figure 5, the article therein illustrated comprises sheet material 10 having holes as already described and abrasive grains 13 secured in place by means of adhesive 12 which extends through the holes 11. In this embodiment, abrasive 13 is on one side only and an additional backing of paper 16, for which may be substituted cloth or other material into which adhesive will penetrate, is on the other side. This article may be most effectively prepared by first coating the paper or cloth 16 with adhesive, then placing the sheet metal 10 in position on the paper, then applying a coating of additional adhesive to the uncovered side of the sheet material 10, then adding abrasive grains by sprinkling. Many other various methods of manufacture may be adopted, such as the use of regular sandpaper machinery to apply the coatings of adhesive and add the grain. Such machinery may especially be used where the sheet metal material is initially provided in the form of a roll thereof and stamped into disks or other shapes after the adhesive and grain are applied.

So far as certain features of the invention are concerned, it may be embodied in articles other than disks, such as cones, sleeves, endless belts or, for example, perforated metal, as shown in Figure 2, may be coated with abrasive, as shown in Figure 4, and wound around a drum to produce an abrasive drum. For such uses, metals other than steel may be profitably employed. Such shapes other than disks are not limited to shapes which can be produced by merely bending the sheet material as true spherical surfaces, paraboloids, pseudo-spheres, and cylindrical annuluses or any other desired type may be produced in the steel before the abrasive is applied, by pressing, stamping, spinning, or like operations.

It will thus be seen that there has been provided by this invention an article in which the various objects hereinabove set forth together with many thoroughly practical advantages are successfully achieved. As many possible embodiments may be made of the above invention and as many changes might be made in the embodiment above set forth, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A flexible abrading disk comprising a thin piece of integral sheet metal with perforations regularly spaced having only a single layer of abrasive grains attached to one side of the sheet metal by flexible non-porous bonding material extending through the perforations and thereby anchored to the sheet metal.

2. A flexible abrading disk comprising a thin piece of integral sheet metal with perforations regularly spaced having on each side only a single layer of abrasive grains attached thereto by flexible non-porous bonding material extending through the perforations and thereby anchored to the sheet metal.

3. A flexible abrading article comprising a thin piece of integral sheet metal with perforations regularly spaced having only a single layer of abrasive grains attached to one side of the sheet metal by flexible non-porous bonding material extending through the perforations and thereby anchored to the sheet metal.

4. A flexible abrading article comprising a thin piece of integral sheet metal with perforations regularly spaced having on each side only a single layer of abrasive grains attached thereto by flexible non-porous bonding material extending through the perforations and thereby anchored to the sheet metal.

JOHN O. AMSTUZ.