June 29, 1937. H. H. BUDDS, ET AL 2,085,211

GRINDING DISK AND METHOD OF MAKING THE SAME

Filed Dec. 10, 1934

Fig. 1.

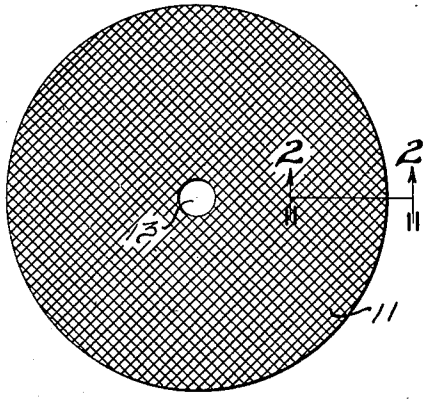



Fig. 3.

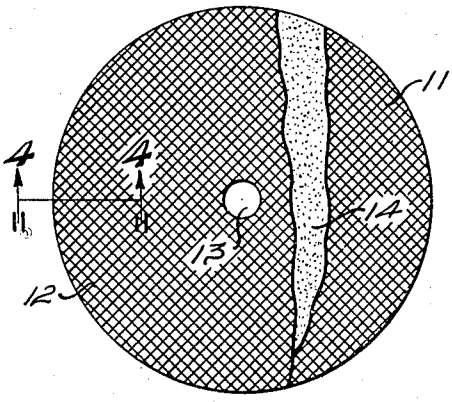



Fig. 2.

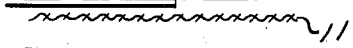



Fig. 4.

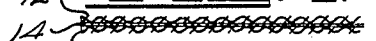



Fig. 5.

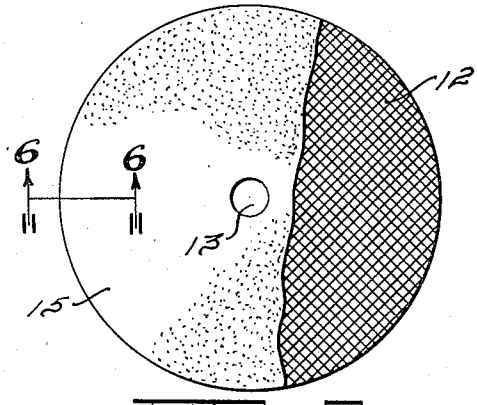



Fig. 7.

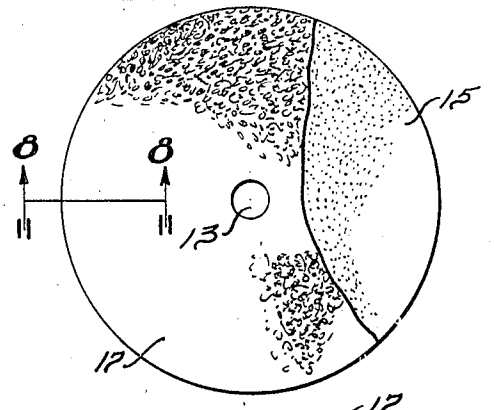



Fig. 6.

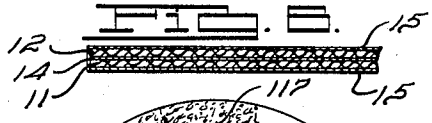



Fig. 8.

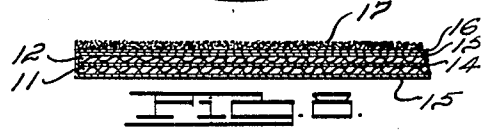
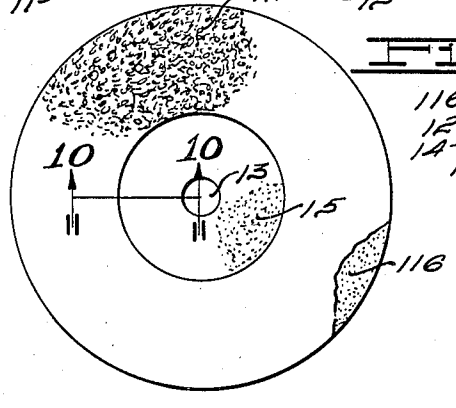



Fig. 9.



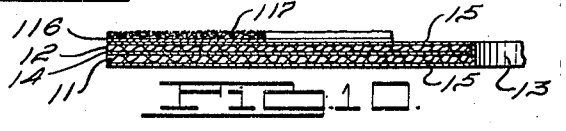




Fig. 10.

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Patented June 29, 1937

2,085,211

# UNITED STATES PATENT OFFICE

2,085,211

## GRINDING DISK AND METHOD OF MAKING THE SAME

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Application December 10, 1934, Serial No. 756,802

5 Claims. (Cl. 51—195)

This invention relates generally to abrasive devices such, for example, as grinding disks and to a method of making the same, and especially to a disk having a foundation or base of fabric as distinguished from paper or similar cellulosic material, such disks being particularly well adapted for smoothing or finishing off metal surfaces, such as the surfaces of metal panels of automobile or other vehicle bodies.

One of the objects of the present invention is to provide an abrading disk or member of the foregoing character which is relatively simple and inexpensive to manufacture, which is of a durable and waterproof nature, and which has a composition base of such permanent structure as to permit repeated removal and renewal of the abrasive material on the surface or surfaces of the foundation or base material.

Another object of the invention is to provide an improved griding disk having a fabric foundation material treated in such manner as to render it desirably tough and flexible so that it will not readily fracture, tear, or otherwise become impaired or damaged as, for example, when the edges of the disk are brought into contact, during operation, with corners or angles of the metal body.

Other objects and advantages of this invention will appear in the following description and appended claims when considered in connection with the accompanying drawing forming a part of this specification.

In said drawing:

Fig. 1 is a plan view of a single piece of fabric from which the grinding disk of the present invention is formed.

Fig. 2 is an enlarged section taken substantially along the line 2—2 of Fig. 1.

Fig. 3 is a plan view of a pair of cemented-together pieces of fabric from which the grinding disk is formed, the top piece of fabric being partly broken away to reveal the cement coating.

Fig. 4 is an enlarged section taken substantially along the line 4—4 of Fig. 3.

Fig. 5 is a plan view of the composite disk after the application of the waterproof cement or coating to its opposite faces.

Fig. 6 is an enlarged section taken substantially along the line 6—6 of Fig. 5.

Fig. 7 is a plan view of the finished disk, partly broken away.

Fig. 8 is an enlarged section taken through the line 8—8 of Fig. 7.

Fig. 9 is a plan view of a modified form of disk embodying the invention; and

Fig. 10 is an enlarged section taken substantially along the line 10—10 of Fig. 9.

In the manufacture of metal bodies, such as automobile bodies, it is desirable and necessary to smooth surface portions of the metal by removing any rough spots thereon preparatory to the application of lacquer, paint or other finishes thereto. This work is accomplished in most instances by the use of grinding or abrading disks formed from paper or fabric, and in some instances from a combination of these materials. Some disks of fabric and/or paper have been reinforced with wire and other stiffening or reinforcing materials. Other previous abrading disks have been made of some well known cellulosic material, such as vulcanized fibrous materials. Most of these various types of disks have been objectionable for one reason or another either due to their rather brittle or fragile character or because they have been undesirably expensive for general use on a large scale as is required in the automobile industry. Moreover, it is important that the disks be of sufficiently durable character so that they will not readily damage and become unfit for use during the course of the body smoothing or finishing operation. It is, therefore, an important feature of the present invention to provide an improved abrading or grinding disk by which many of these objectionable features are overcome and one which may be repeatedly recoated, thus reducing to a minimum the cost thereof.

Referring now to Figs. 1 to 8 of the drawing, there is shown in these figures, merely by way of example, one form of abrasive element or disk embodying the present invention. In this form, the disk is a composite one being formed from two pieces or disks of fabric 11 and 12, each of which is centrally apertured at 13 to receive a rotatable shaft or arbor (not shown) by which the disks are supported and revolved during use at high speeds. Each of the disks 11 and 12 is preferably formed from duck, canvas, or other suitable tough fabric and is first dipped in a suitable liquid compound and thereby impregnated so that when dry a desirable stiffness and body will be imparted to the fabric. We have found that commercial oil base baking primer soluble, for instance, in oleum spirits or naphtha may be used as an impregnating material. This primer saturates the fabric, thoroughly coats the fibers thereof, and provides an excellent bonding surface for the waterproof coating hereinafter described. After impregnation, the disks may be rapidly dried as by heating to a temperature

ranging anywhere from 400° F. to 600° F. We have found that a satisfactory baking temperature for this purpose is 475° F. and that by subjecting the treated disks to this temperature for approximately fifteen minutes the desired results may be effected.

After the foregoing steps of impregnating and drying, the two disks are bonded together by a coating 14 of glue or waterproof cement, any kind suitable for the purpose being used, such for example as commercial belt cement or a cellulosic compound dissolved in solvents such as amyl acetate, acetone, benzol and alcohol. If desired, a single and heavier piece or disk of duck or fabric may be used in lieu of the two pieces 11 and 12. The composite laminated disk, however, is preferred due to the greater strength, toughness and durability obtained.

When the cement has set, either by natural or artificial drying, preferably two successive coats of waterproof cement or lacquer of any suitable kind are applied to the backs of the laminated disk 11—12, these two coatings being shown at 15 in Figs. 5 to 8 inclusive. The waterproof coating material may be a cellulose ester such as collodion, a cellulose nitrate or acetate compound dissolved in solvents such as amyl acetate, acetone, benzol and alcohol, or commercial waterproof belt cement, or other coating material may be used which is insoluble in water. After the two waterproof coatings have dried and set, a coating of water-soluble cement or lacquer or the like 16 is applied to one face of the disk. Immediately thereafter and while this last coating is moist, abrasive material or grit 17 in finely divided or granular state is applied to the adhesive coat of water-soluble cement. When this cement sets or hardens, the abrasive material is held firmly in place upon the face of the element. If desirable, the opposite outer faces of the disk may be coated with abrasive.

By applying the abrasive material 17 by means of a water-soluble cement it will be seen that when the grinding or abrasive surface of the disk becomes worn with use, the entire article can be soaked in a water bath whereupon the bonding material for the abrasive will be washed or dissolved out thereby removing the abrasive and permitting another fresh coating of water-soluble cement and abrasive material to be applied to either one or both faces of the base or foundation material of the grinding disk. By reason of the fact that the fabric disks are entirely enclosed in a layer or layers of waterproof material the soaking process for removing the abrasive has no undesirable effect upon the backing sheet. The water bath may be maintained at room temperature or heated to temperatures between 150° F. and 200° F.

In Figs. 9 and 10 a modified form of the invention is shown. In this instance the abrasive element also comprises fabric disks 11 and 12 which are impregnated with a primer as above described, likewise baked at predetermined temperature and bonded together by means of a coating 14 of waterproof cement. The composite disk is then covered by waterproof coatings 15 as previously described. The disks, as in the preceding figures, are apertured centrally at 13. In this embodiment, only the rim of the treated fabric base is coated with a water-soluble cement 116 to which is applied a layer or coating 117 of any suitable abrasive material. Thus, when the disk becomes worn from use, the entire coating of abrasive may be removed by soaking the disk in hot water. The rim of the element may thereafter be coated again with water-soluble cement and abrasive.

The grains of abrasive material 17 and 117 which are removed by dissolving out the cement may be reclaimed and used over again, thus materially reducing the expense of materials. Moreover, by both impregnating and waterproofing the fabric material the composite base will have the required stiffness and flexibility and will not readily tear or fracture when contacting with corners or bends in the metal work being surfaced.

It is to be understood that the foregoing materials and the sequence of steps in the method of forming the abrasive element are simply illustrative of the invention and are not intended to limit the invention to the particular materials specified, and we do not desire to limit our invention beyond the scope of the appended claims nor the requirements of the prior art.

We claim:

1. In the method of making a grinding element, the steps of impregnating a plurality of fabric blanks with a liquid primer, baking the impregnated blanks, cementing the blanks together to provide a laminated sheet, waterproofing the surfaces of the sheet, and coating the waterproofed sheet with abrasive.

2. In the method of making a grinding element, the steps of impregnating a plurality of fabric blanks with a liquid primer, baking the impregnated blanks, cementing the blanks together to provide a laminated sheet, waterproofing the surfaces of the sheet, and coating the waterproofed sheet with abrasive by means of water soluble cement.

3. The method of making a grinding disk which comprises impregnating a fabric sheet with a liquid primer to stiffen the same, baking the sheet, waterproofing opposite faces of the treated sheet, and applying abrasive grit to a waterproofed surface of the sheet by a cement removable by means of a solvent ineffective to attack said waterproofed surfaces.

4. A grinding disk comprising a plurality of fabric sheets impregnated with a primer to impart increased stiffness thereto and cemented together, said laminated sheet having waterproofed surfaces and having a layer of abrasive material bonded to a waterproofed surface which is removable in water.

5. An abrading element comprising a pair of centrally apertured fabric disks impregnated with a primer to impart increased stiffness thereto, a layer of cement interposed between the disks to secure the same together, a coating of waterproof material enveloping said disks, and a layer of abrasive material bonded to the face of one of said disks by adhesive material adapted to be softened in hot water.

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