J. McINTOSH AND J. R. NEILL.

ABRASIVE STRUCTURE AND METHOD OF MAKING SAME.

APPLICATION FILED AUG. 23, 1920.

1,435,721. Patented Nov. 14, 1922.

Fig. 3.

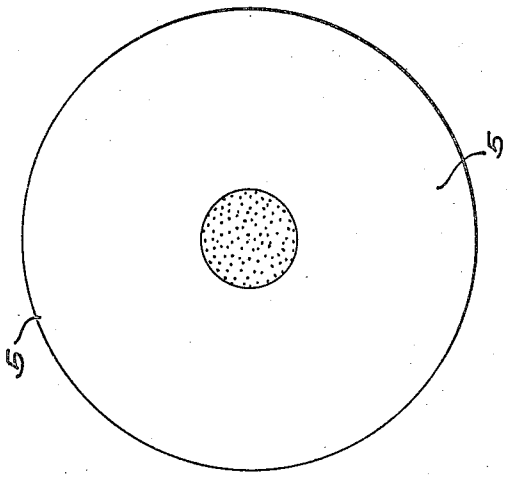
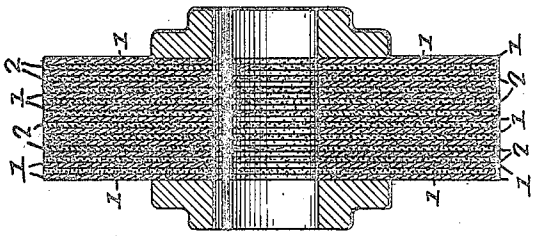


Fig. 2.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Patented Nov. 14, 1922. 1,435,721

UNITED STATES PATENT OFFICE.

JAMES McINTOSH AND JOSEPH R. NEILL, OF NORRISTOWN, PENNSYLVANIA, ASSIGNORS TO DIAMOND STATE FIBRE COMPANY, OF ELSMERE, DELAWARE, A CORPORATION OF DELAWARE.

ABRASIVE STRUCTURE AND METHOD OF MAKING SAME.

Application filed August 23, 1920. Serial No. 405,498.

To all whom it may concern:

Be it known that we, JAMES McINTOSH and JOSEPH R. NEILL, citizens of the United States, residing in Norristown, Pennsylvania, have invented Abrasive Structures and Methods of Making Same, of which the following is a specification.

One object of our invention is to provide a novel abrasive body or material possessing certain characteristics especially fitted for though not limited to use in the form of high speed abrasive wheels, it being particularly desired to make an abrasive wheel which will not be subject to breakage when operated at the highest required speeds of rotation.

The invention further contemplates a novel method of procedure for making abrasive wheels and other structures, which in addition to possessing high tensile strength, shall acceptably meet the requirements for high grade abrasive bodies; that is, shall have long life, high cutting capacity, etc.

These objects and other advantageous ends we attain as hereinafter set forth, reference being had to the accompanying drawings, in which,

Fig. 1 is an end elevation of an abrasive wheel made in accordance with our invention; and

Fig. 2 is a vertical section on the line 2—2, Fig. 1; further illustrating the structure shown in said figure; and

Fig. 3 is an end elevation of a slightly modified form of the invention.

In making an abrasive structure such as a wheel, we first treat a series of discs or other suitably formed sheets of fibrous material or fabric such as canvas, muslin, paper or the like, with a solution of a synthetic gum such as the material known to the trade as Condensite, loaded with abrasive in powdered form in a typical case soaking a series of canvas discs in a solution of Condensite in acetone, to which the material known to the trade as powdered Carborundum has been added until the discs are thoroughly impregnated with said solution. They are then transferred to an oven where the solvent is driven off and they are dried;—the abrasive powder being mechanically held by the dried gum to the surface of said discs.

The discs 1 are then built up in a pile of substantially cylindrical form and between each pair of adjacent discs is placed a layer 2 of a more or less finely divided abrasive such as Carborundum, the material known to the trade as Aloxite, or the like, providing a structure consisting of alternate layers of fibrous impregnated material and abrasive; the latter being in the proportion of ten to twenty parts by weight to one of the fibrous synthetic material, or in a typical case being in a layer whose thickness is substantially equal to that of the fibrous material. The built up structure is then subjected to a temperature such as that of steam at one hundred and twenty-five pounds pressure, in a mold or form where it is at the same time subjected to a pressure of about one thousand pounds to the square inch, for a period of about one-half hour. By this means the synthetic gum is caused to flow and harden to its final solid, infusible, dense form so that the finished mass is in the form of a solid, dense structure of practically uniform composition, possessing the qualities desired in a high class abrasive.

By any suitable means the completed cylindrical or other mass may be bored for the reception of a hub or bushing and may be suitably formed to serve as an abrasive wheel or other desired structure. If it be required that this latter shall be relatively light and with a view to facilitating its manufacture, instead of discs of fabric we employ rings 5 as indicated in Fig. 3, which as before are impregnated with the synthetic gum or equivalent material with or without the suspended abrasive powder and are built up into a structure with alternate layers of abrasive powder or granules. The hollow centers of the rings are filled with molding powder or other suitable easily removable solid, which after the treatment necessary to change the synthetic gum to its final solid form, may be easily and quickly bored out without subjecting the boring tool to the injurious effects of the abrasive, as would be the case in the structure shown in Fig. 1 where the layers of abrasive 2 were substantially continuous from the center to the edge of each disc 1.

We claim:—

1. The method which consists in placing fibrous sheet material in a solution of a synthetic gum to impregnate said sheet material with the gum; drying the sheet material;

forming a structure of alternated layers of said sheet material and finely divided abrasive; and subjecting said structure to heat and pressure to cause the gum to assume its final solid form.

2. The method which consists in placing fibrous sheet material in a solution of a synthetic gum containing suspended finely divided abrasive material to impregnate said sheet material with the gum and obtain deposits of the abrasive on the surface; drying the sheet material; forming a structure of alternated layers of said sheet material and finely divided abrasive; and subjecting said structure to heat and pressure to cause the gum to assume its final solid form.

JAMES McINTOSH.
JOSEPH R. NEILL.