

April 27, 1937.

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2,078,437

ABRASIVE WHEEL

Filed Oct. 25, 1935

Fig. 1

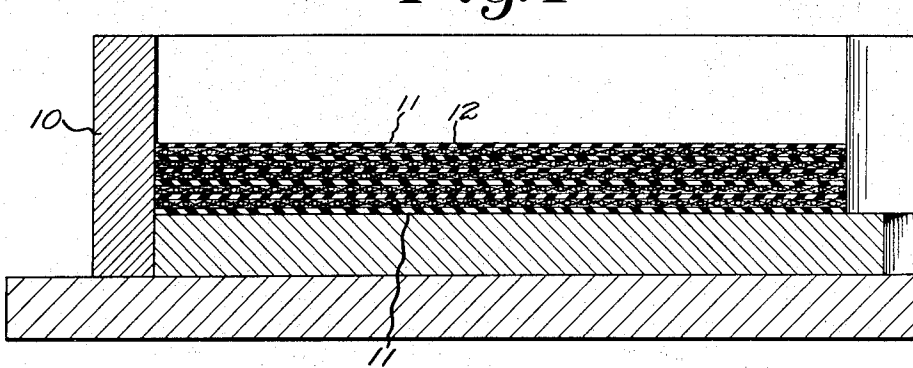
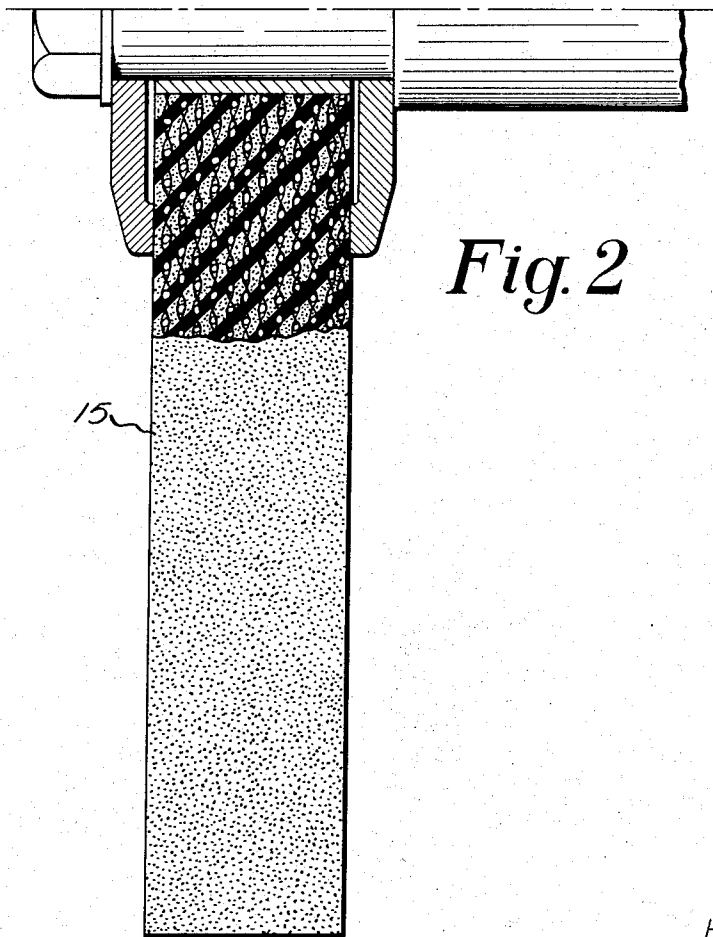


Fig. 2

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2,078,437

ABRASIVE WHEEL

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Application October 25, 1935, Serial No. 46,830

1 Claim. (Cl. 51—193)

The invention relates to grinding wheels and a method of producing the same.

One object of the invention is to provide a reinforced grinding wheel. Another object of the invention is to provide a flexible grinding wheel. 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, arrangements of parts, and in the several steps and relation and order of each of said steps to one or more of the others thereof, all as will be illustratively described herein, and the scope of the application of which will be indicated in the following claim.

In the accompanying drawing, in which is shown one of many possible embodiments of the mechanical features of this invention,

Figure 1 is a vertical sectional view of one half of a mold, partially filled with material for the manufacture of an abrasive wheel, illustrating the manner of making an abrasive wheel according to the invention.

Figure 2 is a view partly in axial section and partly in peripheral elevation of one half of the wheel and a mounting therefor.

I provide a quantity of open mesh cloth, such as leno cloth. The leno weave is adapted to the manufacture of a mesh which shall hold its spacing accurately. Because of its absorptive qualities, low cost, and relatively high tensile strength I prefer to use a cotton leno.

The invention can be carried out with leno of various mesh sizes and I do not care to be limited to any particular mesh size, but for the production of a fairly dense wheel having grain well distributed therethrough I prefer to use rather fine mesh leno cloth of the order of 15 picks to the inch, or finer. I provide a quantity of abrasive grain, for example silicon carbide, aluminum oxide, garnet, diamonds, quartz, boron carbide or other carbide grains, or any abrasive grain which may be desired. I prefer to use a fairly fine mesh size of grain such as 100 mesh or finer. This is because the individual particles are to be embedded in a bond adhering to the warp and the weft of the leno and for reasons which will presently appear it is desired to keep the mesh holes clear.

I provide a suitable adhesive substance, which may be of any usual or known variety such as glue, casein, shellac, but I prefer to use an artificial resin of the phenol-formaldehyde type, and I prefer to use the resin in a liquid stage. Taking for example, the varnish type of phenol-form-

aldehyde resin, I apply it to a considerable quantity of the leno cloth, add a suitable amount of resin powder and sprinkle both sides thereof with abrasive grain. After lifting this treated cloth to allow excess grain and resin to drop off, and making sure that the meshes are not completely clogged, I heat treat in the open air for one or two hours at in the neighborhood of 140° C. or, if other adhesive substance is used, I otherwise cause it to harden.

I now die out a number of annular disks of the leno cloth with adhesive and abrasive on both sides thereof, the diameter of the disks being the diameter of the ultimate grinding wheel. I now provide a thin rubber sheet with enough sulphur to vulcanize to a resilient rubber. I die out a number of annular disks of this sheet rubber of the same size as the annular disks of leno cloth which was treated. Preferably there should be one more disk of rubber than there is of leno cloth.

I now place the disks in a mold 10, first a disk of rubber 11, then a disk of the treated cloth 12, then another disk of rubber 11, and so on, ending with a disk of rubber 11 on top. I now press the whole together with a pressure of for example 100 pounds to the square inch. I then heat treat the resultant disk to a neighborhood of 280° F. for about an hour. This vulcanizes the rubber to a soft rubber.

I may also load the soft rubber sheet with abrasive grain which should be abrasive grain of a size considerably larger than that adhering to the mesh cloth, for example 25 mesh abrasive grain may be used for this purpose.

The pressing operation forces the rubber between the meshes of the leno cloth and forms the several layers into an integral body. Heat treatment vulcanizes the rubber to a soft rubber which extends continuously through the wheel. Therefore the wheel as a wheel is flexible, because the thin disks of mesh fabric despite the rigidity of the adhesive substance will give in all directions. Although the rubber is a soft rubber nevertheless on account of the reinforcement it is stiffer than it otherwise would be. The abrasive grains are held in a strong bond. The large size abrasive grains, if such be used at all, are held in place less strongly than the others, and it is to be expected that some of them will fly out during the grinding action. Nevertheless they are to a certain extent entrapped between the meshes of the reinforcing leno cloth.

The wheel 15 of the invention has good grinding properties and may be used where a rigid

wheel could not successfully be used. Having a certain amount of flexibility and resilience it will conform itself to slight irregularities of a surface being abraded. It may be used to abrade recesses that could not otherwise be reached. Nevertheless the abrasive granules are held in the wheel with greater tenacity than they could be by embedding in soft rubber alone.

It will thus be seen that there has been provided by this invention a method and an article in which the various objects hereinabove set forth together with many thoroughly practical advantages are successfully achieved. As various possible embodiments might be made of the

mechanical features of the above invention and as the art herein described might be varied in various parts, all without departing from the scope of the invention, it is to be understood that all matter hereinbefore set forth is to be interpreted as illustrative and not in a limiting sense.

I claim:

An abrasive article comprising layers of open mesh flexible textile material, abrasive grain stuck to the material with an artificial resinous bond, and a soft rubber matrix uniting the said layers and the abrasive grain into an integral whole.

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