May 31, 1932. F. A. SCHUMACHER 1,860,724

POLISHING AND GRINDING MATERIAL AND PROCESS FOR MAKING SAME

Filed March 26, 1928

Fig. 1.

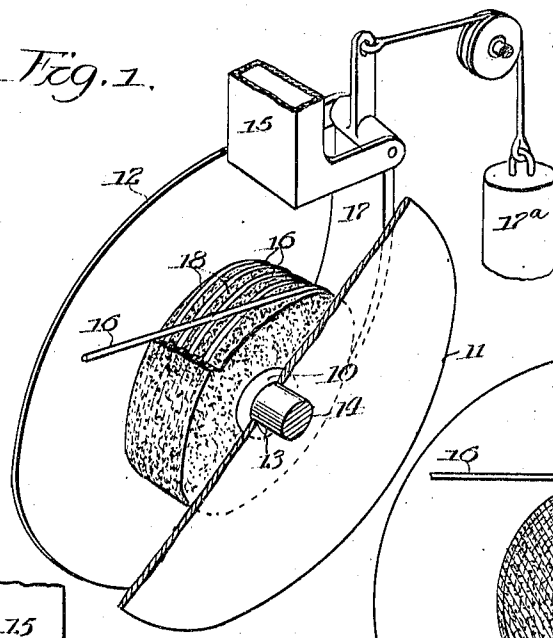


Fig. 2.

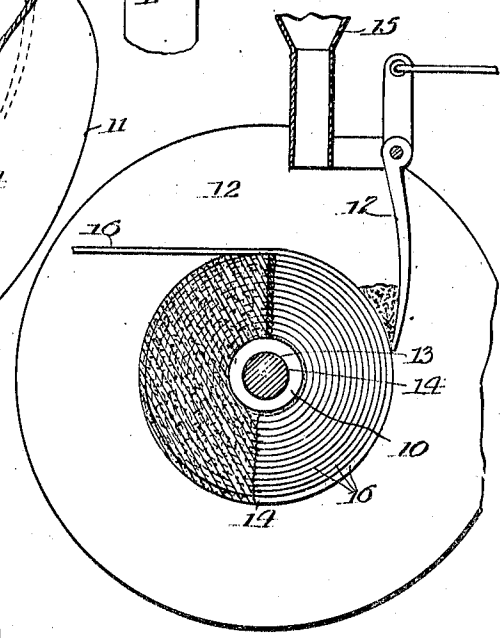


Fig. 3.

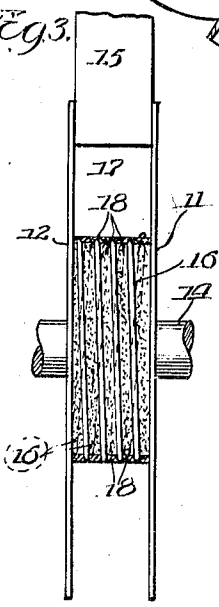


Fig. 4.

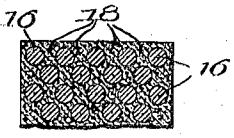
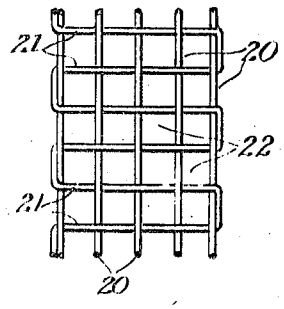


Fig. 5.



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UNITED STATES PATENT OFFICE

FRANZ A. SCHUMACHER, OF EVANSTON, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO TRUSTEES OF THE SECURITY GRINDING WHEEL CO., OF CHICAGO, ILLINOIS, A TRUST ESTATE

POLISHING AND GRINDING MATERIAL AND PROCESS FOR MAKING SAME

Application filed March 26, 1928. Serial No. 264,721.

The invention relates to a product whereby articles, particularly articles of a metallic character, may be simultaneously ground and polished. The invention also relates to the process for making said product.

The invention contemplates the production of an article having the above characteristics, which may be produced of a material which is of a plastic nature, and which solidifies when dry and has embodied therein both an abrasive and a polishing material or element, whereby the simultaneous grinding and polishing of an article may be accomplished.

It is an object of the invention to combine an abrasive, such as silicon carbide, an adhesive, such as magnesite and chloride of magnesium and water, and a polishing material, such as fibre, either animal or vegetable, the latter being disposed within the mixture of abrasive and adhesive, so that when the mixture solidifies and the element which is to be ground is subjected to the article, the simultaneous grinding and polishing of the element results.

It is also an object to employ a fibre which is in the form of a thread or strand, or which is either of a knitted, netted or woven character, the fibre being arranged in said abrasive, so that strata of combined polishing and grinding material is produced throughout the article formed by the combination of these elements.

In addition to the above, it is an object of the invention to arrange the fibre within the mixture, so that the fibre will reinforce the produce and thus allow a grinding wheel to be produced which will withstand centrifugal force when the wheel is rotated, and which will also prevent breakage of the wheel or stone should it be accidentally dropped. To provide the necessary strength to the wheel, the fibre, which may, as before stated, be in the form of a single strand, or be of a knitted, netted or woven character, is wound upon a core, to which the plastic material is also fed during the winding operation, which results in the formation of strata or layers of combined abrasive and polishing material.

In addition, it is an object of the invention to employ a polishing element, such as wool or cotton fabric or strands of this or similar material, and to combine it with a cutting or grinding compound to effect the simultaneous grinding, cutting and polishing of an article, and to further arrange the polishing material so that the layers or strata of combined cutting and polishing material will result, the resultant product being of a relatively hard or solidified character so that it may be employed either as a wheel or stone.

It is also an object of the invention to produce a wheel or stone by what may be termed a cold process which will not require the baking of the product to solidify it.

The invention has these and other objects, all of which will be explained in detail and more readily understood when read in conjunction with the accompanying drawings which illustrate one method of producing the article, and also illustrate certain forms of fibre which may be employed, it being obvious that either the mechanism for performing the process or the fibre employed may be changed or substituted without departing from the spirit of the appended claims forming a part hereof.

In the drawings,

Fig. 1 is a perspective view illustrating one manner of manufacturing a grinding wheel;

Fig. 2 is a central section of the structure shown in Fig. 1;

Fig. 3 is an edge view of the device shown in Fig. 1;

Fig. 4 is an enlarged section of a fragment of the wheel produced by the construction and process performed by the device illustrated in the drawings;

Fig. 5 is a plan view of a fragment of another form of fibre which may be employed.

One method or process and mechanism whereby a combined grinding and polishing wheel may be produced includes the use of a core 10, having the discs 11 and 12 secured at the opposite ends of the core, the core having an opening 13, through which a shaft 14 is passed to provide a means upon or by which the discs and core with its associate elements are rotated, and a hopper 15 in which is confined a mixture of the abrasive and adhesive, the hopper being arranged to feed the mix-

ture to the core as the strand of fibre 16 is wound thereon. A wiper 17 is arranged between said discs and is provided to bear upon and force the mixture between the strands of fibre of each winding as it is wound upon the core. To cause this action of the wiper, a weight 17ª is secured by means of a cable to the wiper. When fibre in the form of a strand is wound upon the core, the strand is preferably wound thereon with one wrap of each winding in longitudinal spaced relation to an adjacent wrap, so as to provide a space 18 within which the mixture fed thereto from the hopper may be lodged. It is manifest from this that the innermost or previous winding is covered by the material located between similar spaces 18 of the next winding, and that the material will thus cover the strands of the foremost winding, which results in a wheel having circumferential strata of combined grinding and polishing material, in which said fibre in addition to providing the polishing element acts to reinforce the wheel. It is manifest from this that a wheel is produced in which the several windings cooperate to hold the abrasive of one strata in combined relation to that of another, which adds to the strength of the article, which in the case of a wheel will provide a wheel which will withstand centrifugal force when the wheel is rotated, and will prevent the breakage of the wheel or stone should it be accidentally dropped.

In applying the several windings of a single strand to the core, all windings in one plane are wound so that they incline slightly to the right with all the succeeding windings of the next plane inclined toward the left; in other words, each alternate winding is inclined in the same direction to thus provide openings between the strands in which the material may be lodged. As before stated, the fibre employed, instead of being in the form of a single strand, may if so desired be formed of material which is of either a knitted, netted or woven character. When a band or strip of netted fabric or fibre, such as that shown in Fig. 5, is employed, this will be wound upon the core and be of a width substantially corresponding to the space between the discs 11 and 12. This fabric or fibre includes strands 20 and 21, which will, when wound upon the core produce a wheel in which the polishing material extends both circumferentially and transversely of the wheel with the abrasive material located in the openings 22 produced between the strands.

One abrasive which may be employed includes silicon carbide, emery or any other suitable granular abrasive material combined with a binder or adhesive, such as for instance magnesite, chloride of magnesium and water in the following proportions by weight,—abrasive 50%, magnesite 25% and chloride of magnesium solution 25%, which when dry, solidifies and produces a relatively hard grinding product.

It has been found that the application to the wheel or stone of some suitable vegetable or animal oil during the grinding and polishing of a metallic article will protect the article against rust, and produce a better polish.

It is manifest from the foregoing description that a wheel or stone may be produced without baking, and in which the fibre combined with an abrasive will produce a combination whereby the simultaneous grinding and polishing of an article may be effected.

It is also evident that the fibre, which is preferably wound upon the core from the core to the periphery of the wheel, will act to reinforce the wheel and prevent its breaking under relatively high speeds of rotation, or should the wheel be accidentally dropped.

Having described the invention what I claim and desire to cover by Letters Patent is:

1. The process of producing a combined polishing and cutting wheel which consists in winding fibrous material circumferentially and longitudinally of the axis of said wheel, and simultaneously applying a material consisting of particles of grinding material and adhesive to said fibre at said windings of said fibrous material to thereby imbed said fibre in said grinding material.

2. A grinding wheel composed of a thread of fibrous material, an abrasive, magnesite, chloride of magnesium and a fluid, the fibrous material being wound circumferentially of and at an incline to the axis of the wheel.

3. A wheel composed of a thread of fibrous material and a mixture of adhesive and abrasive, the fibrous material being arranged circumferentially of the wheel and being embedded in the mixture of abrasive and adhesive and wound and inclined in opposite directions relatively to the axis of the wheel.

4. A wheel composed of a thread of fibrous material and a mixture of adhesive and abrasive, the thread being embedded in said mixture and arranged in spaced relation lengthwise of the axis of the wheel.

5. A wheel composed of a strand of fibrous material and a mixture of abrasive and adhesive, the strand being arranged in spaced relation circumferentially and longitudinally of the axis of the wheel and embedded in said mixture.

6. A wheel composed of a strand of fibrous material, abrasive and adhesive, the strand of fibrous material being embedded in said abrasive and adhesive and continuing from the center to the periphery of the wheel and providing means comprised of combined fibrous material an abrasive which is simultaneously presented to the material to be cut.

7. A wheel composed of a strand of fibrous material, abrasive and adhesive, the fibrous

material being embedded in said abrasive and adhesive and continuing from approximately the center to the periphery of said wheel and being inclined relatively to the axis of the wheel.

8. A grinding material composed of cords of fibrous material and a mixture of abrasive and adhesive which solidifies when dry, said cords being arranged in spaced relation to each other and separated by said mixture.

9. The process of manufacturing a grinding wheel which consists in winding a wool yarn around the axis of the wheel to provide spaces between said yarn and simultaneously applying a mixture of abrasive and binder to said spaces.

10. The process of manufacturing a grinding wheel which consists in winding a wool yarn in spaced relation around the axis of the wheel and applying a mixture of abrasive and binder and pressing said mixture into the spaces between said windings.

11. The process of manufacturing a grinding wheel which consists in winding a yarn of fibrous material around the axis of the wheel and from one side of the wheel to the opposite side and reverse, and simultaneously applying a mixture of abrasive and binder, and applying pressure to said yarn and mixture.

In witness whereof, I hereunto subscribe my name.

FRANZ A. SCHUMACHER.