ABRASIVE FACED WHEEL

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.
This invention relates to abrasive faced wheels, namely polishing wheels and buffing wheels. The particular improvements contemplated by the present invention include an improved abrasive wheel of this general type, a novel method of preparing such polishing and buffing wheels, and a novel composition of material for sizing the wheel, or for securing the abrasive or abrasive compound upon the wheel.

Polishing wheels and buffing wheels are commonly made of cloth, leather, wood faced with leather, felt and other materials of varying degrees of rigidity or pliability, and are coated with a peripheral coating of glue and abrasive powder. The glue is soaked in water, heated, and applied to the periphery of the wheel with a brush. While the glue is still fluid or tacky, the wheel is rolled in powdered emery or other abrasive, which is thus embedded in the glue and thereby becomes firmly united with or secured to the wheel when the glue dries. The drying of the glue in this usual method of preparing the polishing wheel is permitted to continue for twenty-four to forty-eight hours before the wheel is considered ready for use. When the working surface is worn down by use, the process of setting up is substantially repeated as before described, with perhaps a preliminary dressing down or removal of the old surface to fit it for the reception of the new head. Often the setting up of a polishing wheel is even more complicated by the application and setting of a plurality of coats of glue, with consequent increase in the length of time that the wheel remains out of service. The practice which now prevails requires the equipping of the plant with a considerably greater number of wheels than those which are in use or ready for use at any one time.

An important object of our present invention is to eliminate the great loss of time ordinarily occasioned by the prevailing methods of restoring the working face or head of such polishing wheels and hence reduce to a minimum the time required for obtaining adequate equipment for the polishing room. According to our invention, once the polishing wheel has been initially set up, it may be restored to effective working condition as often as necessary by the expenditure of a few seconds' time to transfer to the working periphery an abrasive compound which sets to a good hard condition within a minute or two. The abrasive compositions which we prefer to employ for this purpose are of the type ordinarily known in the trade as greaseless compositions. They are made up essentially of a special glue and abrasive powder with little or no lubricant, and have heretofore been extensively used in dressing flexible or pliable buffs or polishing wheels for abrading and obtaining brushed or satin finishes of varying degrees of luster. Examples of such greaseless compositions are set forth in the U. S. patents of Robert S. Leather, Nos. 1,748,778 and 1,822,596.

Such greaseless compositions are thermoplastic, so that they transfer by friction and pressure to the surface of the buff or the like while the wheel is being rotated. It is usually uneconomiical to cause more than a limited amount of the composition to transfer to the bare face of the ordinary buff or polishing wheel, and ordinarily it is not very practical to directly build up a continuous solid body of sufficient thickness, strength and tenacity to serve as a rigid or semi-rigid polishing surface. We have discovered that this difficulty can be effectively overcome by a preliminary coating of the wheel periphery with a glue or sizing composition, and allowing this coating to set for a few hours or overnight, after which the thermoplastic abrasive composition can be quickly transferred to the periphery of the wheel by friction and pressure while the wheel is rotating. The thermoplastic abrasive composition will unite readily with the glue face to form a continuous surface which may be built up to the desired depth or thickness by applying the abrasive composition at intervals, with intervening periods of a few seconds to a minute or so to permit each new layer to dry and set to a substantially non-plastic condition.

While the above method may be employed with any of the usual glue compositions, we have further discovered that especially satisfactory results are obtained by the use of a special sizing composition comprising as essential ingredients glue, water and carbon black. With these ingredients we may also include materials for conferring upon the composition special properties, such as for example, paraffin or other waxes, or glycerine to retard the setting or hardening and ethylene glycol or diethylene glycol to
plasticize the glue, beta naphthol or para chlor meta cresol to serve as a preservative, and oil of sassafras to mask the unpleasant glue odor. The function of the carbon black is not entirely clear. It appears to promote better bonding of the sizing coat to the wheel and quite definitely improves the application and adhesion of abrasive composition to the wheel, as well as improving the application and adhesion of abrasive powder under the usual method of rolling before the adhesive has set. There are indications that it provides minute key spaces or semi-volds in the glue for the abrasive or abrasive compound to penetrate under the applied pressure in setting up the wheel. One specific formula which has proved satisfactory for our purpose is given, by way of example, in the following:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hide glue</td>
<td>28.4</td>
</tr>
<tr>
<td>Water</td>
<td>70.8</td>
</tr>
<tr>
<td>P. chlor M. cresol</td>
<td>3</td>
</tr>
<tr>
<td>Oil of sassafras</td>
<td>1</td>
</tr>
<tr>
<td>Carbon black</td>
<td>4</td>
</tr>
</tbody>
</table>

The sizing composition is made up and preserved in sealed containers to prevent undue drying until wanted for use. In using the sizing composition, a quantity of it is heated carefully to a moderate temperature, in the neighborhood of 125° to 150° F., at which temperature it becomes quite fluid. The wheel to be sized is trued with a wheel trimmer or carborundum stone until there is a good smooth surface free from vibration as the wheel rotates. The melted sizing composition may then be applied to the surface of the wheel with a brush, slowly rotating the wheel until a good even coat of the liquid size is obtained. This is allowed to dry for several hours, preferably overnight. The resulting dry and semi-hard sizing coat will have a rather glossy surface, which it is usually advisable to take down to a dull surface by a carborundum rub or other dressing stone while the wheel is being run on the machine. This operation will also tend to assure a true surface for the reception of the abrasive composition, and probably leaves fine particles of carbon more or less exposed at the surface.

The wheel is now ready to receive the abrasive composition, which is essentially made up of aqueous glue solution having abrasive powder thoroughly distributed throughout its mass. This composition is thermoplastic and ordinarily employed in the form of a bar, so that it may readily be applied to the surface of the wheel. In this operation, the wheel is rotated and the thermoplastic abrasive compound is pressed rather firmly against the rotating wheel so that by friction the bar is melted, and by the pressure the compound is forced into the surface of the sizing. The setting of the abrasive compound starts immediately as it is transferred to the wheel periphery, and in a very few seconds the sizing coat is covered. This is probably due to considerable extent to the highly abrasive character of the solid material pressed against the sized wheel, which has a slight tendency to scratch the glue surface and rapidly develop heat which not only melts the abrasive compound but develops a tacky surface on the glue coat. We attribute the superior bonding of the abrasive compound to the sizing coat partly to this effect, as even in the case of an ordinary aqueous glue sizing, without the carbon black, there is a very marked bonding of the one layer to the other.

Having back a moderate coat of the abrasive compound which practically conceals the sizing coat, the wheel is permitted to run for a short period of time, and when deemed advisable a second coating of abrasive compound is then applied. Here again the highly abrasive character of the compound probably develops sufficient heat in the surface of the already applied layer to promote its uniting with the new layer. The process of building up the coat of abrasive compound in successive stages, with intervening drying as described, may continue until the desired thickness is obtained. If any irregularity of the surface develops, it is readily corrected by the carborundum rub after a few minutes of drying.

The drawing illustrates one example of a polishing wheel in the successive stages of setting up according to the present invention. In said drawing—

Figure 1 is a perspective view of a stitched muslin buff or polishing wheel.

Figure 2 is a face view thereof after the application of the carbon black and glue.

Figure 3 is a side view of the finished wheel with parts broken away, and

Figure 4 is a face view of the same.

The polishing wheel is assumed in the present case to be made up of muslin disks #10 stitched together at #11, coated as at #12 with the heated carbon black and glue, and finally having built up thereon the coating #13 of the abrasive and glue constituting the working face of the finished wheel.

The polishing face built up as described has great tenacity, and can be treated in any of the usual ways in dressing a polishing wheel surface. It responds readily to the rotary star wheel dresser, the ordinary carborundum and emery sticks, pumice, etc. After a period of use, when it is desired to restore the working surface, it may be dressed down to the desired point without disturbing the sizing layer, and rebuilt with successive applications of the thermoplastic abrasive compound. It is, of course, obvious that the working surface may quickly be converted from one character to another by merely applying the desired compound over the previous layer.

We have referred to the abrasive compound as “thermoplastic,” meaning to indicate more particularly its property at the time of its application to the sizing coat. Once the compound has been transferred to the wheel and allowed to dry, its property of flowing under elevated temperature is practically eliminated.

Whenever the expression “polishing wheel sizing adhesive” is employed in the claims, it will be understood to mean an adhesive to be applied to the periphery of a polishing or buffing wheel to size the wheel and cement the abrasive thereon.

We claim:
1. An abrasive faced wheel comprising a wheel body having a peripheral firmly adherent sizing coat of glue and carbon black, and a layer of thermoplastic abrasive compound superposed on said sizing coat in firm adherence therewith and set to substantially non-plastic state.
2. An abrasive faced wheel comprising a wheel body having on its periphery a coating of glue, carbon black and abrasive.
3. An abrasive faced wheel comprising a wheel...
body having a peripheral sizing coat of glue and carbon black, and a layer of glue and abrasive powder disposed on and firmly adherent to said sizing coat.

4. A method of setting up abrasive faced wheels, which comprises coating the periphery of the wheel body with an adhesive sizing coat of glue and carbon black in fluid state, permitting the sizing coat to set to a substantially non-fluid state upon the periphery of the wheel, thereafter transferring to the sizing coat by friction and pressure, while the wheel is rotating, a thermoplastic glue and abrasive powder composition and permitting it to set to a substantially non-plastic and tenacious state in firm adherence with said sizing coat.

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