Nov. 21, 1950 F. W. LITTLEFIELD 2,530,530

BUFFING AND POLISHING WHEEL

Filed Oct. 29, 1947

Fig. 1

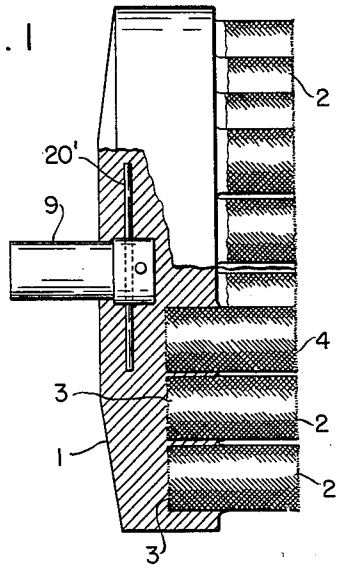


Fig. 2

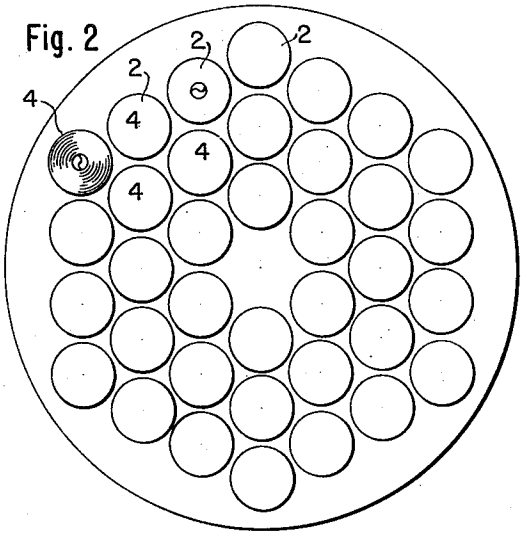




Fig. 3

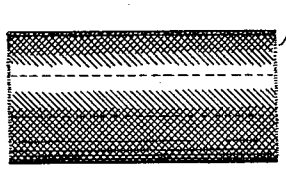


Fig. 4

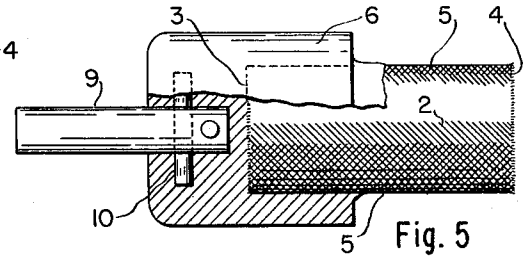


Fig. 5

Fig. 6

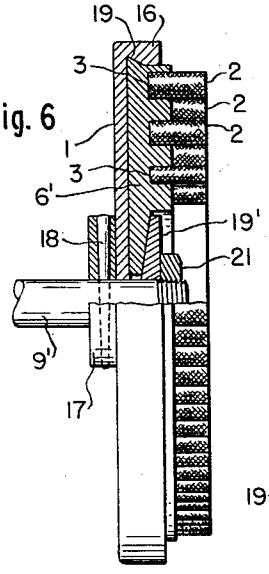


Fig. 7

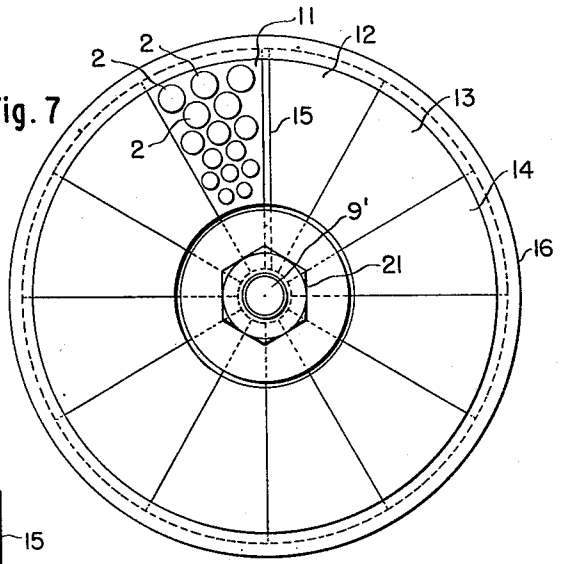
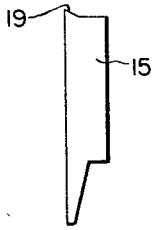


Fig. 8



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BUFFING AND POLISHING WHEEL

Frank W. Littlefield, Lynn, Mass.

Application October 29, 1947, Serial No. 782,823

1 Claim. (Cl. 51—195)

1

The present invention relates to polishing or buffing wheels of the type intended to be rotated by a suitable member such as a spindle, the latter being driven by a convenient source of power while the wheel is in contact with the work to be polished or buffed.

An object of my invention is to build a wheel of the type herein described, of simple construction, economical to manufacture and having desirable flexibility without sacrificing stability. While, in its simplest form, the invention comprises a wheel made of a single disk, it may also comprise a wheel made up of a plurality of segments constituting the body of the wheel and in each segment a plurality of rolls or tufts of bias-cut fibrous material having preferably circular or disk-shaped ends.

One of the most important objects of my invention is to provide a bonding means for securing the polishing roll in such a manner that the latter will not "telescope" or unwind outwardly.

Another object of my invention is to embed the tufts of which the wheel is comprised in a thermosetting plastic so that the embedded ends are rigidly held in the thermosetting plastic, whereas the outer face of the wheel formed by the tufts may be soft and flexible.

A further object of my invention is to anchor the spindle or rotating actuating member in the plastic so that said spindle will not itself turn in the plastic.

Still another object of my invention is to provide appropriate cooling means for the wheel by subjecting the latter to the maximum amount of air circulation consistent with the design of the polishing wheel.

Still another object of my invention is to provide a polishing or buffing wheel comprised of a plurality of segments so arranged that the individual segments may be replaced when worn without necessitating replacement of the entire wheel.

The above and further objects of my invention will be more clearly described in the accompanying specification and claims.

Referring to the specification, Figure 1 is a view of the polishing or buffing wheel partly in section; Fig. 2 is a side elevation of the polishing wheel; Figs. 3 and 4 are detail views of the bias-cut fibrous material; Fig. 5 is a view of a single roll polishing buffing tool or wheel; Fig. 6 is a modified form of polishing wheel partly in section; Fig. 7 is a side elevation of the modified form showing segments (one only being shown complete with rolls); and Fig. 8 is a view of a

2

part of the closing wedge utilized in the modified construction illustrated in Fig. 7.

Referring more specifically to the drawings, 1 (Fig. 1) represents a base (partly in section) of a plastic material, the latter being preferably of the thermosetting class well known in the plastics art, and which has sufficient tensile strength to be self supporting. An example of such a thermosetting plastic made by well known manufacturers of plastic materials is a phenol formaldehyde liquid casting resin having a specific gravity of 1.244, tensile strength of 4000 to 8000, resistance to heat of 160–176° F. The thoroughly mixed resin is poured into moulds and cured at 175° F. from 4–12 hours, depending on the degree of hardness desired. A plurality of rolls or tufts 2 of fibrous material are embedded solidly at one of their ends 3 into the plastic material while the outer ends 4 of each roll are disk-shaped and free to flex. The tufts 2 are fibrous in character and cut on a bias as illustrated at 5, Fig. 5. Cotton, wool, rayon, nylon or other suitable fibrous materials may be used provided they are of sufficient gauge and size to present a soft and partly yielding aggregate surface. The reason for cutting this material on a bias is so that there will not be undue fraying of the ends of the tufts presented to the work. Because of the manner in which the material is rolled, and because the diameter of the roll is of a size directly proportional to the length protruding from the plastic, the roll will not collapse notwithstanding its soft and partly yielding outer surface. Then, again, in the modified form comprising a plurality of rolls the spacing of said rolls is calculated so that each roll 2 while in use actually supports the roll adjacent. Since the preferable design is a wheel this partial support is never absent during rotation or use of the wheel. The natural resilience of this fibrous material used in the rolls enables it to be restored to its original position before it again comes into contact with the object being buffed or polished. As illustrated in Fig. 3 the rolls are formed by spirally winding the fibrous material in the shape of the letter S to provide spaces 6 and 7 on either side of the S-spaced walls 8 and 8' of the inner spiral of end 3 of the roll, whereby these spaces may be later filled with the plastic and bonded to both sides of the walls 8, 8'. This construction prevents the inner spiral from telescoping or unwinding outwardly during use. Thus there is a septum between the spaces 6 and 7. Such a septum may be formed in other ways than by the specific means illustrated, but I prefer for con-

venience to form the septum in the form of an S.

In the simplest form of the invention illustrated in Fig. 5 I embed the roll 2 in a foundation or base 6 of the thermosetting plastic material and set the latter by properly curing the same. The thermosetting material fills the end 3 of the roll between spaces 6 and 7 and when it sets, the walls 8 and 8' of the inner spiral are bonded to the plastic material. A spindle 9 having a cross arm 10 integral therewith or attached rigidly thereto is provided so that the spindle will not turn in the plastic when the spindle is driven by a suitable source of power.

Referring to Figs. 1 and 2 on the drawing, these figures illustrate a construction of wheel involving a plurality of rolls. In this case the rolls 2 are embedded in plastic 1 and shaft or spindle 9 is provided with a cross-arm 20' at right angles to the shaft 9. This cross-arm 20' may be attached to the shaft 9 in any suitable manner provided it is rigidly connected to said shaft or the shaft 9 may be cast in one piece having the cross-arm as an extension to the main casting. The purpose of this cross-arm is to prevent the shaft 9 from turning in the plastic material when the shaft 9 is being driven from a source of power to rotate the polishing wheel. It will be noted that the rolls 2 are so arranged that there is ample clearance between the respective rolls to afford channels for air circulation between the rolls. This arrangement constitutes a very effective air-cooling means to overcome excessive heating due to the friction of polishing. Nevertheless, this cooling arrangement does not interfere with the potential supporting ability of any particular roll or rolls from assisting in supporting each other because of their slight flexibility. While these particular rolls are in juxtaposition to the work at their particular area of contact with the latter, it is the slight flexing characteristic of these rolls which permits these objectives to be achieved notwithstanding the fact that one end of each roll is rigidly embedded in the thermosetting plastic material. The construction of the rolls as previously described contributes to these objectives. In addition to the above recited air cooling means the absence of any roll or segment in the central area of the polishing wheel induces the flow of air into said central area and outward through the several rolls of the wheel.

The modification of my invention shown in Figs. 6 and 7 is comprised of a base 1, preferably disk-shaped and provided with a plurality of segments 11, 12, 13, 14, etc. these segments being sufficient in number to complete the 360 degree circular area of the wheel with the exception of the last slice which is filled by a wedge 15, Figs. 7 and 8. If this wedge 8 is not provided it would be difficult to insert the last segment in the wheel. Therefore each segment is inserted separately

and adjacent to each other and when the last segment is inserted in the wheel the wedge 15, Fig. 8 is inserted and this completes the procedure of assembling the segments in the wheel.

The arrangement of the rolls embedded in each segment is best illustrated in Fig. 7 where one segment shows the ends of the rolls in side elevation. Of course any staggering arrangement of rolls in these segments may be employed which is best calculated to fit in with the particular design of segment used. The wheel is provided with a driving spindle or shaft 9', one end of the shaft extending outwardly from the wheel a sufficient length to be driven by any suitable source of power, and the segments are assembled in the wheel 16. Each segment is provided with a ledge 19 so that they are individually inserted in the wheel by entering the ledge 19 into a corresponding recess provided therefor in the wheel rim as illustrated in Fig. 6. On the inner end of shaft 9' is a retaining washer 19' which seats in a cut-away portion of the plastic segments 6'. This arrangement of parts affords a simple, rigid and secure holding means for the assembly of wheel and segments when nut 21 is tightened.

In accordance with the provision of the patent statutes, while I have described the specific arrangement of structure illustrated in the accompanying specification and drawing, I do not wish to be limited thereto, and it is to be understood that other suitable modifications of my invention may be employed which do not depart from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

A polishing and buffing wheel comprised of a rigid revolvable member, of thermo-setting plastic material such as a phenol formaldehyde liquid casting resin, and a plurality of spirally-wound rolls of bias-cut fibrous material carried by said member each roll having a center portion in the form of the letter S and the S like portion of all the rolls embedded in the thermosetting plastic material in proximity to its neighboring adjacent rolls and adapted to support the latter under the pressure of use.

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