June 19, 1934. E. A. FILLEY 1,963,357

ABRASIVE OR POLISHING ROLL

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Fig. 1

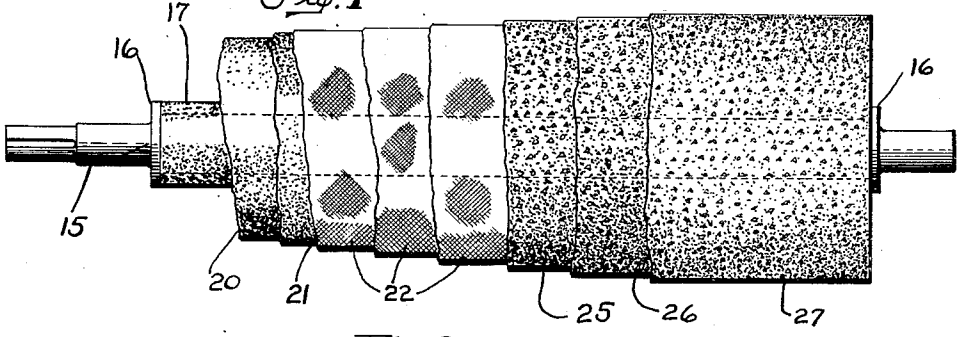


Fig. 2

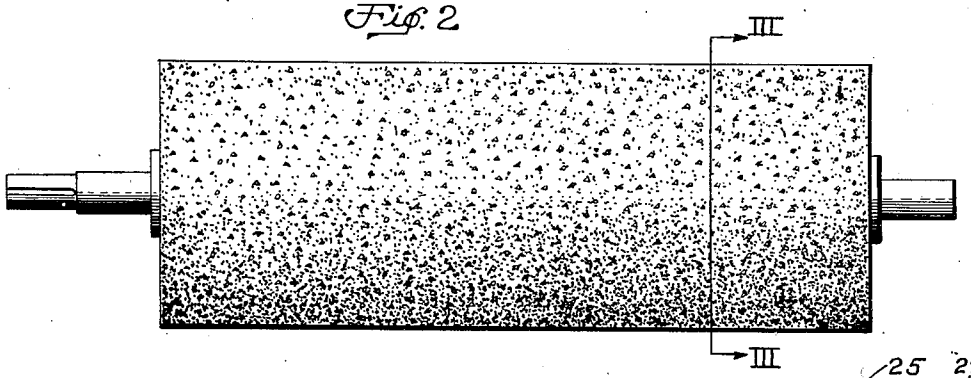


Fig. 4

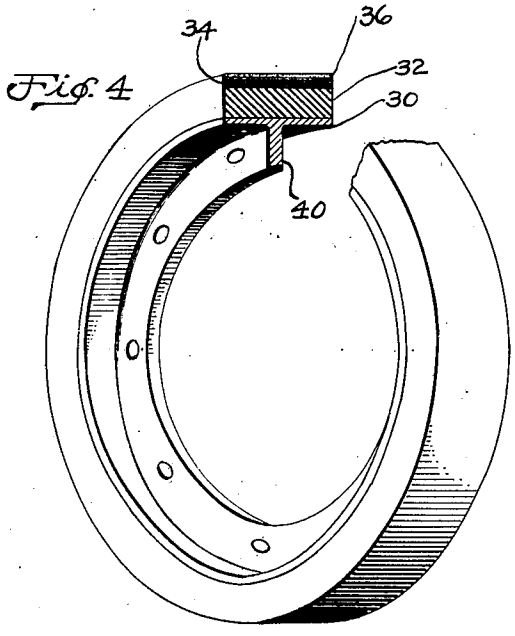


Fig. 3

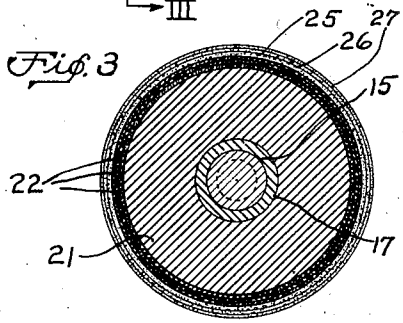
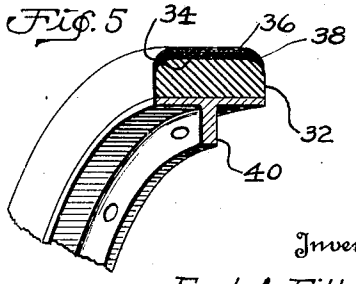


Fig. 5



Inventor

Earl A. Filley

By

Attorney

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Fig. 7

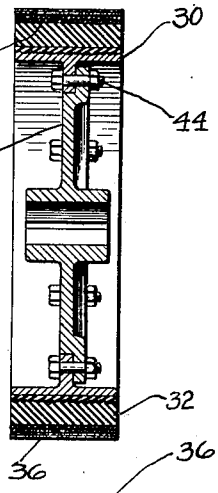


Fig. 6

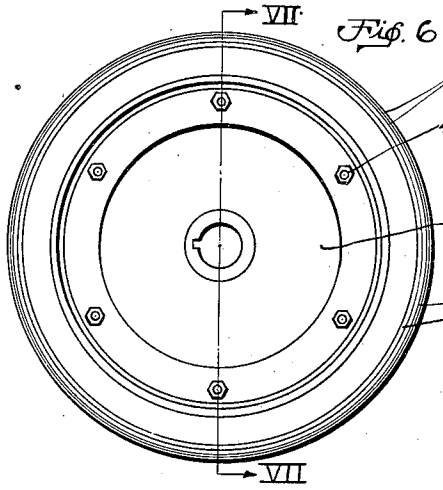


Fig. 9

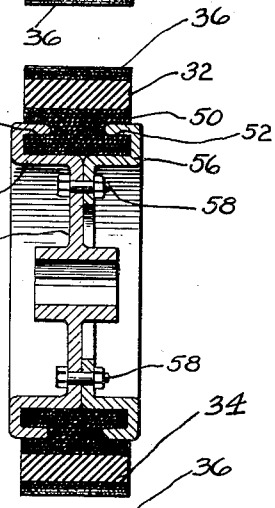


Fig. 8

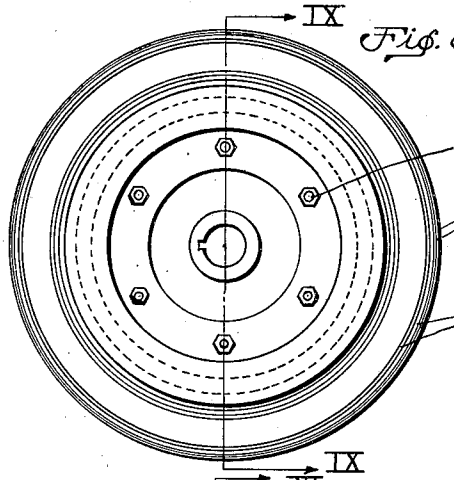


Fig. 11

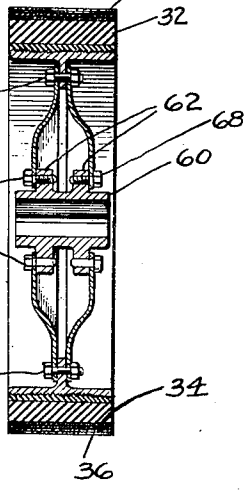
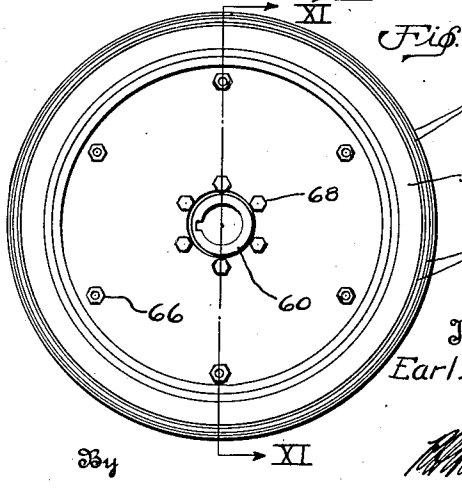


Fig. 10



Inventor
Earl A. Filley

By

Attorney

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UNITED STATES PATENT OFFICE

1,963,357

ABRASIVE OR POLISHING ROLL

Earl A. Filley, Akron, Ohio, assignor to Wingfoot Corporation, Wilmington, Del., a corporation of Delaware

Application September 2, 1931, Serial No. 560,713

9 Claims. (Cl. 51—190)

The present invention relates to surfacing apparatus such as rolls and/or wheels, adapted for abrading or polishing, and more particularly to devices of this type, wherein the abrading or polishing surfaces are supported upon resilient rubber cushions or bases.

An object of the invention is to provide a surfacing roll or wheel having a rubber cushion supporting the abrasive or polishing material, which wheel is efficient and long-wearing in service and yet is relatively inexpensive in manufacture.

Another object of the invention is to provide such a roll or wheel having an annular rubber cushion over which are applied circumferential layers of fabric adhesively coated with abrasive material. The rubber cushion functions to give a live resilient backing to the abrasive surface which particularly aids in polishing operations. This is because the rubber cushion tends to hold the abrasive surface in contact with the surface of the article being polished, regardless of surface irregularities or variations in contour. The rubber will function in this manner over long periods of use without replacement. This added function of the rubber cushioned roll has proven in actual use to materially speed up the grinding or polishing operation.

Another object of the invention is to provide a cushioned abrasive wheel having a smooth true grinding or polishing surface, wherein all lap, butt, or clamped joints are eliminated on the surface of the roll.

Another object of the invention is to provide an abrasive wheel having a polishing or grinding surface backed by resilient material, the complete unit being removably mounted upon a suitable wheel structure so that the unit, after use, can readily be replaced by a new unit without throwing away the entire wheel. This operation does not necessitate the return of the assembly to the factory as has been the practice, but can be readily performed by unskilled labor at the very machine where the wheel is used.

Another object of the invention is to provide a polishing roll or wheel of the type described, wherein the abrasive material upon the face of the wheel can be completely and readily removed after the surface has been partially worn so that the rubber base portion of the wheel can be resurfaced with a new covering of abrasive material. An important feature of the resurfacing operation thus performed is that the wheel diameter is retained the same. As surface speed of the grinding face is ofttimes quite important this feature is very desirable.

Another object of the invention is to provide an abrasive or polishing roll wherein the corners are rounded so that the roll can be used upon work wherein square corners or ridges are undesirable.

For a better understanding of the invention, reference may be had to the accompanying drawings wherein:

Fig. 1 is a side elevation of a polishing roll embodying the features of the present invention, wherein the various layers are broken away to more clearly illustrate the construction;

Fig. 2 is a view similar to Fig. 1, illustrating the roll in its entirety;

Fig. 3 is a cross-sectional view taken on line III—III of Fig. 2;

Fig. 4 is a perspective view, partly broken away, showing another form of abrasive wheel constructed according to the present invention;

Fig. 5 is a partial perspective view of a modified form of the wheel illustrated in Fig. 4;

Fig. 6 is a side elevation of the wheel illustrated in Fig. 4 showing how it is mounted upon a wheel;

Fig. 7 is a cross-sectional view taken on line VII—VII of Fig. 6;

Fig. 8 is a side elevation of another form of abrasive or polishing wheel;

Fig. 9 is a cross-sectional view taken on line IX—IX of Fig. 8;

Fig. 10 is a side elevational view of another wheel mounting for the abrasive wheel illustrated in Figs. 4, 6 and 7; and

Fig. 11 is a cross-sectional view taken on line XI—XI of Fig. 10.

The principles of the present invention are applicable to two types of abrasive and polishing wheels. The first type illustrated in Figs. 1, 2 and 3 is more properly termed a roll, and is adapted to polish or grind surfaces of considerable area. In this embodiment, the polishing roll may be of considerable length, running anywhere from six inches to six feet, or greater, depending upon the use to which it is put.

The diameter of the roll may also be widely varied, it being dependent upon the use to which it is put. A polishing or abrading roll of this type is illustrated in Figs. 1 to 3, and comprises a shaft 15 having flanges or end plates 16 which may be secured to the shaft 15, or which may be formed integrally therewith. A layer of relatively hard rubber 17 is preferably secured to the shaft 15 between the flanges 16 and serves to secure an encircling cushion or body of relatively soft rubber 20 to the shaft 15. It will be ap-

preciated that the composition and resiliency of the rubber body 20 is entirely dependent upon the grinding operation to be performed. Thus the rubber body 20 can be of any degree of softness or stiffness which functions best in the adaptation to which the wheel is put. A coating of glue or other adhesive 21 is applied over the rubber body 20, and thereafter one or more layers 22 of fabric are preferably wrapped over the coating 21.

A coating of glue or adhesive 25 is now applied over the fabric layers 22, and while the adhesive is still tacky, a suitable granular abrasive material is sprinkled thereover, examples of such materials being: sand, emery, carborundum, rouge, or the like.

The invention also contemplates making a mixture of the abrasive and glue, and simultaneously applying the mixture to the roll in the form of the coating 25. The coating 25 is allowed to dry and any number of other coatings indicated by the numerals 26 and 27 in the drawings are then applied over the first coating 25 by a similar operation.

In making the polishing roll the hard rubber layer 17 and the soft rubber body 20 are applied to the shaft 15, after which the roll thus formed is vulcanized. The hard rubber 17 serves to very positively secure the soft rubber 20 to the shaft 15. However, the hard rubber layer 17 may be dispensed with if suitable cements are employed for this purpose.

The invention also contemplates dispensing with the hard rubber layer 17 and any cements and securing the body 25 of soft rubber directly to the shaft 15 by vulcanization. To assist in the bond between the rubber body 20 and shaft 15, suitable corrugations or raised ribs, or projections, may be provided upon the shaft 15.

After the vulcanizing step above described, the rubber roll is ground by suitable means so that the periphery thereof is exactly concentric, smooth and true. The coating 21 of glue is now placed over the rubber body 20 and the fabric layers 22 and the abrasive coatings 25, 26 and 27 are now applied in the manner above described.

While the invention preferably contemplates employing fabric layers 22 in the polishing roll, these layers may be dispensed with while retaining many of the desirable features of the roll.

In a roll embodying the present invention, the glue securing the abrasive coatings 25, 26 and 27 to the surface of the roll may be of such composition that the abrasive layers can be readily removed and the roll resurfaced after use has roughened up the roll to such an extent that the resurfacing operation is desirable. For example, the glue may be readily dissolvable in water so that the roll can be placed in water to soak off the used coatings of glue and abrasive. Thereafter new coatings of glue and abrasive can be applied to the surface of the roll, whereupon the roll is again ready for service. In case the roll is to be used near water, or in conjunction with water, the glue can be a water-proof one and yet the resurfacing process can be repeated by employing a glue which can be dissolved in some other suitable solvent.

In the form of the invention illustrated in Fig. 4, instead of employing a shaft 15, a rim or wheel 30, generally of metal, is utilized. A rubber body 32 is secured to the rim 30 in any suitable manner. This may be accomplished in the manner described above in conjunction with the roll illustrated in Figs. 1 to 3. A plurality of layers of fabric 34 are preferably wrapped around the circumference of the rubber body 32, and over such layers of fabric are applied coatings of glue and abrasive 36.

As indicated in Fig. 5, the corners of the abrasive surface may be rounded, as indicated at 38. This construction is sometimes desirable in that the corners of the fabric 34 and the edges of the coatings 36 are less apt to crack or tear loose from the base portion 32 of the rubber.

The abrasive wheels illustrated in Figs. 4 and 5 are adapted to be removably secured to a suitable hub or spoke structure, which may be accomplished in a number of different ways. In the illustrated form of the invention, an inwardly extending annular flange 40 is formed integrally with the rim 30, said flange 40 being adapted for connection to any suitable wheel structure, such as that indicated at 42 in Figs. 6 and 7, through the medium of bolts 44, or other suitable fastening means.

In this construction, after the abrasive wheel becomes worn, the bolts 44 can be removed, and the rim 30 taken off the wheel 42, whereupon a new or resurfaced rim can be mounted upon the wheel 42. In this way, the entire wheel structure need not be discarded when the abrasive surface has become excessively worn. The abrasive surface proper can be removed from the fabric 34 in a manner similar to that described above, with reference to the roll illustrated in Figs. 1 to 3.

In the form of the invention illustrated in Figs. 8 and 9, the abrasive unit is similar to that illustrated in Figs. 4, 5, 6 and 7, with the exception that the rubber body 32 is secured to a base of rubberized fabric 50 instead of to a metallic rim 30. This base 50 of rubberized fabric is molded with grooves 52 at its sides, whereby the abrasive unit can be secured to a suitable wheel structure. The wheel structure mounting this form of abrasive unit comprises a main disc 53 having a flanged side 54 which extends around the bottom and side of the base 50 and into the groove 52. A side flange 56 similar to the flange 54 engages in the groove 52 at the other side of the base 50, and is removably secured to the disc 53 by way of bolts 58. In this construction, when the abrasive unit has worn out, the bolts 58 can be removed, permitting the abrasive unit to be taken from the wheel, and a new or surfaced unit to be placed upon the wheel.

The form of the invention illustrated in Figs. 10 and 11 comprises an abrasive or polishing unit similar to that illustrated in Figs. 4, 6, and 7, and described above. The unit is, however, mounted in a somewhat different manner by the provision of a hub 60, having a pair of radially extending flanges 62. Discs 64 are removably secured between the flanges 62 and the flange 40, through the agency of bolts 66 and 68.

The abrasive wheel illustrated in Figs. 4 to 11 is particularly designed for general polishing and grinding work, and, unlike the polishing roll shown in Figs. 1 to 3, is not designed for polishing flat wide surfaces, although it can be used for this purpose. The polishing wheel can be made in any desired width or diameter to provide a wheel having the characteristics desired for any particular type of polishing or grinding work. The particular manner of mounting the abrasive units can be widely varied, as will be apparent.

It will also be understood that the fineness or coarseness of the abrasive applied to the rolls and

wheels is dependent upon the type of work for which it is intended, and that, moreover, the number of coatings of abrasive upon the rubber base can be widely varied, to meet different requirements. Accordingly the terms "abrasive", "polishing" etc. in the claims are to be construed in their broadest sense.

From the foregoing it will be seen that an improved polishing roll or wheel has been provided wherein the polishing or abrading surface is cushioned upon a resilient rubber body, and wherein all overlapping or clamped edges of abrasive material are substantially avoided so that there will be no uneven wearing of the roll or any scarring of the articles to be ground and polished, due to an uneven abrasive section. A roll or wheel has been produced wherein the abrasive surfacing can be readily replaced after wear by a simple, inexpensive, and yet efficient operation. Moreover, an abrasive assembly has been produced wherein the abrasive unit can be replaced with a new unit without necessitating the scrapping of the entire wheel assembly.

Although I have illustrated only the preferred form which my invention may assume and have described that form in detail, it will be apparent to those skilled in the art that the invention is not so limited, but that various modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

What I claim is:

1. A surfacing element comprising a base member, a body of resilient rubber secured to said member by a layer of relatively hard rubber, a coating of adhesive over the rubber body, a layer of rubberized fabric over the adhesive coating and secured to the rubber body thereby, and an endless coating of adhesive and abrasive material over the fabric layer.

2. An abrasive element comprising a base member, a body of resilient rubber secured by vulcanization to said member, a coating of adhesive over the rubber body, a layer of fabric over the adhesive coating and secured to the rubber body thereby so as to be incapable of relative rotation, and a coating of abrasive material adhesively secured to the fabric layer.

3. A surfacing element comprising an annular metallic base member, a body of resilient rubber secured by vulcanization to said member, a layer of fabric secured integrally with the rubber body, and a coating of adhesive and abrasive material integrally secured to the fabric layer.

4. An abrasive wheel comprising a metallic rim, a rubber base secured to the outer periphery of the rim, a plurality of layers of fabric over the rubber base and intimately secured thereto, a plurality of layers of individual coatings of abrasive material secured to said fabric, said abrasive material being removable by soaking the coatings of abrasive material in a suitable solvent, and a wheel structure for removably mounting said rim.

5. A surfacing wheel comprising a metallic rim, a rubber base vulcanized to the outer periphery of the rim, a plurality of layers of fabric over the rubber base and intimately secured thereto, a plurality of layers of endless individual coatings of abrasive material applied directly to said fabric, and a wheel structure for removably mounting said rim.

6. An abrasive element comprising a base portion of rubberized fabric, a cushion of resilient rubber integrally vulcanized to the base portion, a plurality of coatings of glue and abrasive over the rubber cushion and means removably clamping on the base portion to support the unit in operation.

7. A surfacing element comprising a base portion of rubberized fabric, a cushion of resilient rubber integrally vulcanized to the base portion, a plurality of coatings of glue and abrasive over the rubber cushion, said base portion being formed with grooves in the sides thereof, and means removably clamping on the base portion in said grooves to support the unit in operation.

8. An abrasive element comprising a ring shaped base portion of rubberized fabric, a cushion of resilient rubber integrally vulcanized to the outer periphery of the base portion, a plurality of coatings of glue and abrasive over the rubber cushion, said base portion being formed with grooves in the sides thereof, and means removably clamping on the base portion in said grooves to support the unit in operation.

9. In a surfacing roll, the combination with a metallic shaft, a cylindrical rubber body encircling the shaft and vulcanized thereto, the ends of the shaft extending outwardly beyond the ends of the rubber body, a layer of fabric surrounding the rubber body and firmly secured thereto, and a coating of abrasive material bonded to the outer surface of the fabric.

EARL A. FILLEY.