Jan. 1, 1929. 1,697,442

J. F. WEBBER

SANDING WHEEL

Filed May 12, 1926 2 Sheets-Sheet 1

Fig. 1.

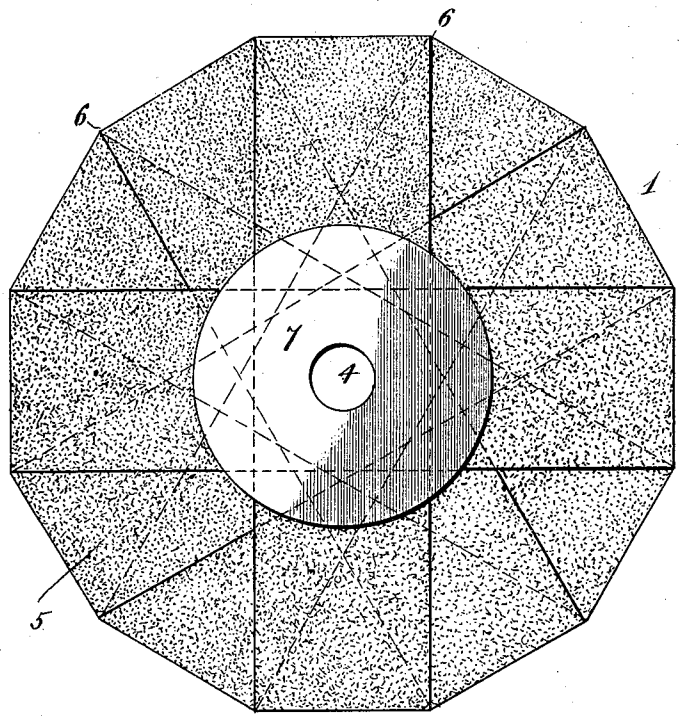



Fig. 2.

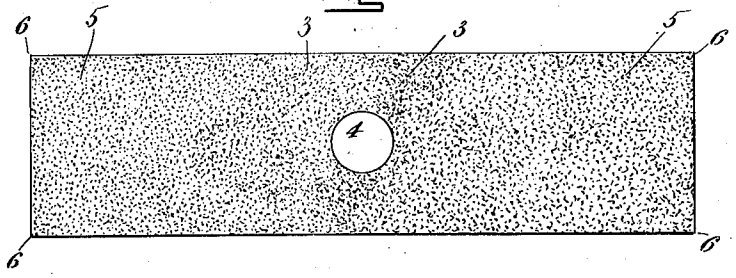
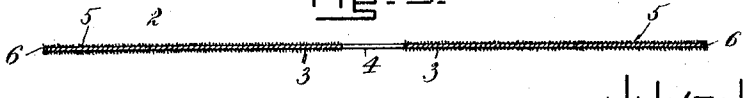



Fig. 3.




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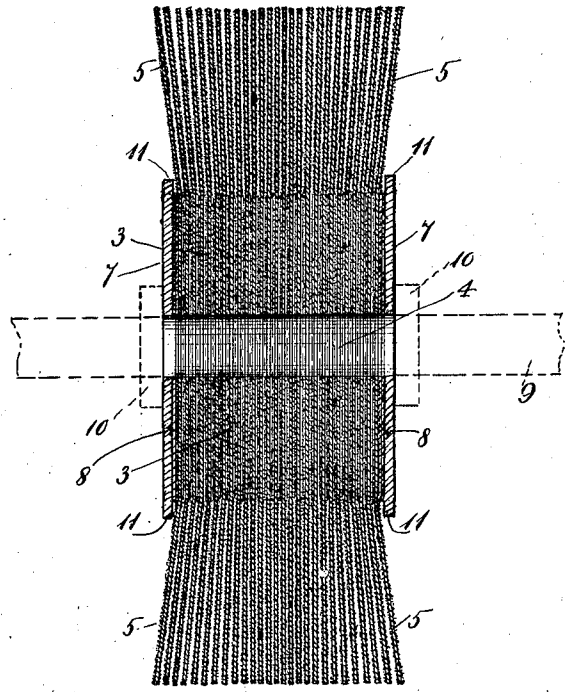
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Fig. 4.




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# UNITED STATES PATENT OFFICE.

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## SANDING WHEEL.

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The invention relates to an improvement in sanding wheels for use in smoothing down irregularly shaped surfaces especially the fashioned or moulded surfaces of articles made of wood. Usually the work performed by the wheel is done by hand, but sanding wheels mechanically driven have to a certain extent been used for the purpose with indifferent success.

As customarily made the sanding wheel is a laminated structure of generally cylindrical form composed of strips or pieces of sandpaper arranged upon an arbor which extends through the strips placed side to side and all bound or clamped together by collars on the arbor which engage the opposite sides of the wheel. Thus formed, the wheel composed as it is of flexible laminæ, possesses little or no stiffness apart from that imparted by the grip of the collars. This necessitates the employment of relatively wide collars presenting an extensive bearing surface. The employment of such wide collars, however, is altogether objectionable.

In order that the wheel may fuction effectively it is necessary that the outer portions of the strips of sandpaper, as distinguished from those portions thereof at the hub of the wheel, be left free and flaccid in order that the strips may mushroom and open up in the operation of the wheel. It should be explained in this connection that the outer surface of the wheel performs the sanding operation as the wheel is rapidly rotated, the outer edges of the strips of sandpaper breaking down to form a more or less continuous or homogeneous abrasive surface. This surface, however, should not be a stiff surface but a very yielding surface in order that the article worked upon may enter into it as it is pressed against the wheel to receive the sanding operation. Accordingly it will be seen that the use of any wide collars for binding the laminæ together acts to prevent a proper functioning of the wheel although it may work to a certain extent.

Another very important point relates to the life of the wheel. At the most the life of a sanding wheel is short, even under the most favorable conditions the wheel lasting but a few hours before it is worn away. Therefore it is very necessary that the laminæ be bound together in such manner as will ensure to the wheel as long a life as possible. The use of wide bearing collars or clamps, made as they are of metal, prevents any long life to the wheel, for as soon as the wheel has been worn down to the peripheral edge of these collars it can no longer safely be used owing to the fact that all flexibility in the working surface of the wheel is gone and the collars may mar the work if the work is accidentally brought into engagement with the collars.

The object of the invention is to obviate these difficulties and, as will hereinafter be explained, it is accomplished by providing a laminated wheel structure complete in itself without the aid of clamping collars in so far as the structure is concerned, such small clamping collars with bearing only at the hub of the wheel being employed as will ensure proper rotation of the wheel in operation. In other words, the object is attained by so forming the wheel as to impart to it such necessary flexibility of abrasive surface during the working life of the wheel and such character, also, as will enable it to be worn down substantially to the point of the hub structure, thereby prolonging the life of the wheel.

The invention can best be seen and understood by reference to the drawings, in which—

Figure 1 is a side elevation of the wheel.

Fig. 2 is a plan of one of the laminæ.

Fig. 3 is a side elevation of one of the laminæ, and

Fig. 4 is a cross section of the wheel.

Referring to the drawings:—

1 represents the sanding wheel which is of laminated structure, each lamina consisting of a strip or piece of sandpaper or sand cloth 2. Cloth or some woven fabric preferably constitutes the body of each strip to which the sand is applied, as it is stronger and lasts longer than paper. Sand is applied to both sides of the fabric body and by "sand" is meant any abradant of whatever nature, whether natural or artificial. Each strip of sandpaper or lamina is preferably of rectangular form, its essential form, however, being such as will adapt it to provide a central or hub-forming portion 3 having in it a hole 4 and outside the portion 3 a more or less extensive portion 5 which assists in forming the working portion of the wheel, as will later be explained. It is also desirable that each strip shall present at its extremities corner edges 6 as the breaking down of these

edges of all the strips assists in providing a proper abrading surface for the wheel, especially when the wheel is first used.

The strips or pieces 2 forming each lamina are laid one on top of the other to form the complete laminated structure with the holes 4 of all the strips coincident. The strips are also arranged in positions one slightly in advance of the other next adjacent it around the axis of the wheel whereby all of the strips thus progressively arranged may have collectively the general form of a wheel.

Thus arranged, the hub-forming portions 3 of the strips with holes 4 therein form collectively the hub 3 of the wheel with hole 4 extending laterally through it, and the portions 5 of the strips forming collectively the working or abrading portion 5 of the wheel. The hub-forming portions 3 of the strips are bound together by some strong adhesive such as glue which is applied to and between the abrasive coatings of adjacent strips. After the application of the glue the strips are held bound together under heavy pressure until the glue has set. By thus uniting the strips by bonding the abrasive surface of one strip to the abrasive surface of the next abrasive strip by means of an adhesive and applied pressure, such bond will be obtained between all of the strips as will resist all torsional strain which might otherwise tend to loosen or disrupt the strips from the hub during the operation of the wheel. In other words, a hub is provided of such composite structure having such inherent strength as to prevent disruption of any of its composite parts, and this without the necessity of providing any auxiliary support of clamping means such as are customarily employed. The outer portions 5 of the strips emanating from the hub, forming as they do the working or abrading portion of the wheel, are left entirely free.

For the purpose of reinforcing the opposite sides of the wheel, providing a side bearing for any mechanism that may be used for rotating the wheel, and for the purpose also of providing an edge around which the portions 5 of the wheel may mushroom or bend during the operation of the wheel, the opposite sides of the wheel are each provided with annular cheeks 7 of some fibrous material such as rather heavy cardboard or fibreboard, approximating the size but preferably slightly larger than the true hub of the wheel. Each of the cheeks 7 is applied to the side of the wheel by gluing to the cheek a backing 8 of sandpaper or sand cloth like that of which the wheel is formed, and the outer abrasive coating of this backing so applied is glued to the abrasive coatings of all of the strips which form the side of the wheel at the hub, the cheeks usually being applied under pressure when the wheel is formed.

The wheel may be rotated in any suitable manner. In practice rotation is usually effected by a rotary spindle 9 extending through the hole 4 in the wheel and the wheel fixed to the spindle by means of relatively small collars or clamps 10 on the spindle which bear against the opposite sides of the wheel or cheeks 7 reinforcing its sides and providing a bearing for the clamps as before described.

In connection with the operation of the wheel, it will first be seen that it is so formed that the abrading portion 5 of the wheel is left relatively long in a radial direction and absolutely free and unbound. As the wheel is rapidly rotated and the work is brought into contact with it, the outer corner edges 6 of the various strips forming the wheel are first broken down, the strips soon forming collectively a practically homogeneous abrasive surface but a yielding surface into which the work may be embedded so that the abrading surface can reach all parts of the work. The abrading portion of the wheel will also tend to mushroom or bend outwardly toward each side, but any excessive bending is prevented by the peripheral edges 11 of the cheeks 7 at either side of the wheel. The wheel may be used until its abrading portion has been worn down to the points of the edges 11 of the cheeks, and inasmuch as the cheeks are made of fibrous material, no harm will ensue even if the work be brought into contact with their edges, which may be worn away as the strips are worn away, the usefulness of the wheel continuing down to the point of its hub.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States:—

1. A sanding wheel of laminated character comprising in combination a collection of individual strips of fibrous material, each coated on its opposite sides with an abradant, and an adhesive bonding together adjacent abradant-coated portions of said collection of strips to form a composite hub for said wheel with other free abradant-coated portions of said strips extending from said hub.

2. A sanding wheel of laminated character comprising in combination a collection of individual strips of fibrous material, each coated on its opposite sides with an abradant, an adhesive bonding together adjacent abradant-coated portions of said collection of strips to form a composite hub for said wheel with other free abradant-coated portions of said strips extending from said hub, and cheeks of some still fibrous material bonded to the opposite sides of said wheel adjacent the hub thereof.

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