

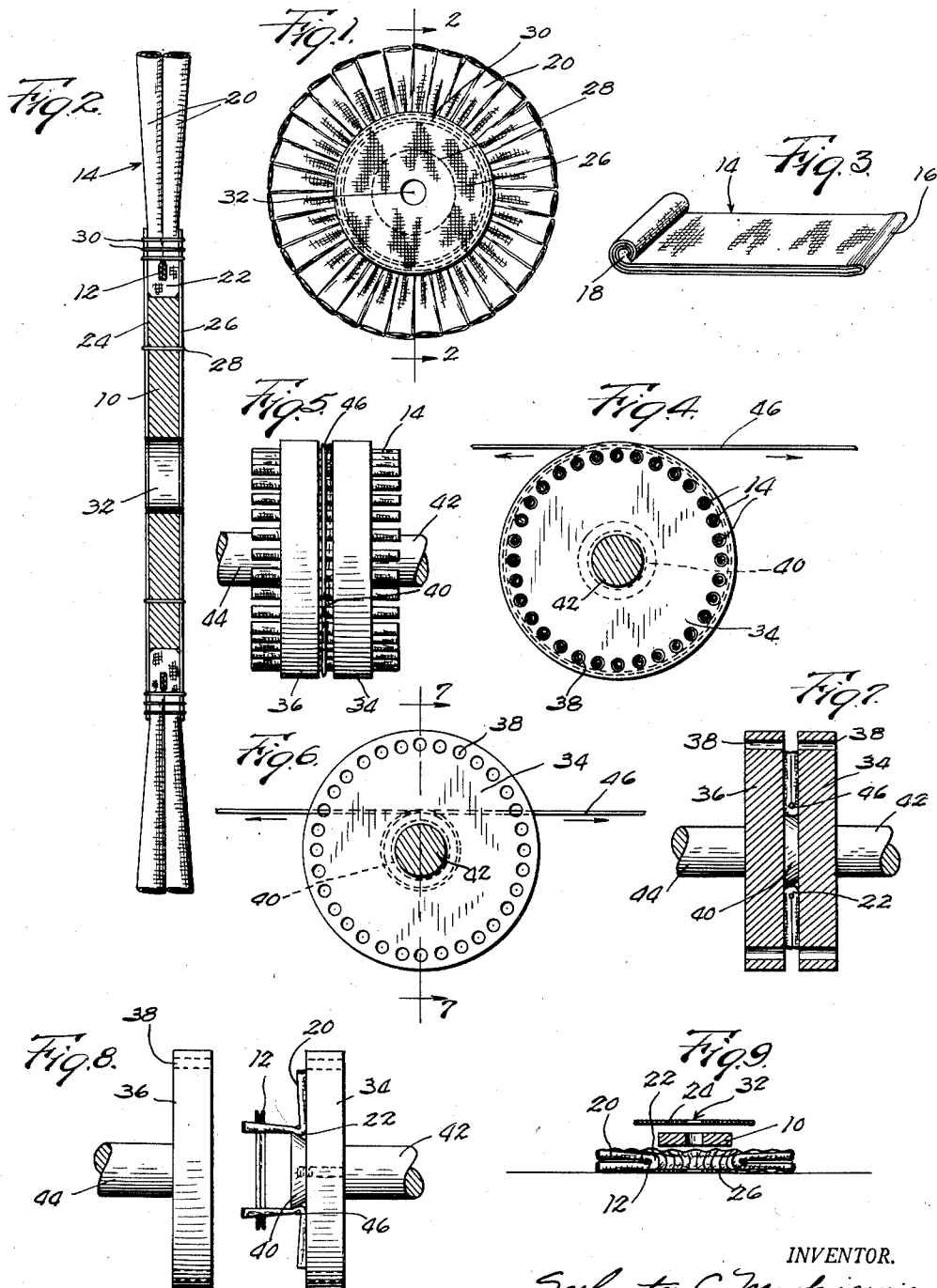
Nov. 22, 1949

S. C. MOCKIEWICZ

2,489,193

PROCESS OF MAKING BUFFING WHEELS

Filed March 27, 1948



INVENTOR.

Sylvester C. Mockiewicz

BY

Thos. Oka & Muelkenburger

[Signature]

UNITED STATES PATENT OFFICE

2,489,193

PROCESS OF MAKING BUFFING WHEELS

Sylvester C. Mockiewicz, Chicago, Ill., assignor to
American Buff Company, Chicago, Ill., a cor-
poration of Illinois

Application March 27, 1948, Serial No. 17,467

1 Claim. (Cl. 51—193)

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This invention relates to a buffing wheel and a process of making same and more particularly this invention relates to a buffing wheel of the spoke type.

Buffing wheels suitable for use in polishing and grinding operation are well known in the art. Satisfactory buffing wheels have been prepared from various textile fabrics by a number of different methods and various means have been proposed for arranging the textile material and mounting it on a hub section of the wheel. In the manufacture of buffing wheels of this type it is important that they be constructed in such a manner that they will stand up during use in high speed buffing operations. It is also desirable that they will be air-cooled so that they will not become overheated during use. Accordingly it is one object of this invention to provide a buffing wheel which may be easily constructed and which will stand up well under all conditions of use.

A further object of this invention is the provision of a buffing wheel of the spoke type in which the several spokes of fabric material providing the main body portion of the wheel are firmly anchored to the hub section in such a manner that the spokes will not be pulled loose by centrifugal force when the wheel is rotated at high speeds.

A further object of this invention is the provision of a buffing wheel of the spoke type having a solid hub section in which the spokes are firmly secured to the hub section and are so arranged as to permit self-cooling of the wheel during operation at high speeds.

A still further object of this invention is the provision of a process for readily assembling a buffing wheel of the spoke type which may be inexpensively and readily carried out.

Further and additional objects will appear from the following description, the accompanying drawing and the appended claim.

In carrying out this invention in one form a buffing wheel is provided which comprises a ring support and a plurality of pieces of multi-layered fabric in elongated form embracing the ring support wherein a longitudinal axis of each piece of fabric extends generally outwardly from the ring in a manner simulating the spokes of a wheel. Each piece of multi-layer fabric may take the form of an elongated strip cut on the bias and rolled into the form of an elongated piece. This elongated piece is doubled upon itself at a point adjacent the mid-section thereof in such a manner that it embraces the ring support and in such

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a manner that the opposite sides of each piece extend outwardly in a radial direction to form a pair of spokes. In a preferred form a large number of these elongated pieces are spaced circumferentially around the ring so that the plurality of spokes thereby formed make up the main body portion of the buffing wheel. The peripheral surface of the resulting buffing wheel is formed of the open ends of the rolls of the various pieces of fabric. Each spoke is thus separately supported on the supporting ring and is flexibly mounted so that during use air has an opportunity to circulate between the several spokes, thus affording a desired cooling action.

The ring support for the spokes of the buffing wheel is radially spaced outwardly from the peripheral edge of a central hub section and this hub section and the ring support are spaced apart by the fabric material of the spokes adjacent the doubled-over end portions thereof. The hub section is preferably formed of a suitable stiff material such as laminated cardboard and is of substantially the same thickness as the combined thickness of the ring support and the spokes that overlie it on either side. In the complete assembly, a pair of relatively stiff fabric discs arranged co-axially may be secured to either side of the wheel and serve to embrace the hub section, the ring support and at least a portion of the spokes. Suitable stitching or other securing means is provided through the fabric discs and the hub section to hold the various elements of the wheel in assembled relationship. If desired, the stitching may be supplemented by a suitable adhesive and the central section of the fabric discs and the hub section may be provided with a suitable aperture for mounting the assembled wheel on a suitable spindle for use.

One feature of the present invention is the method by which the spoke buff is assembled. In accordance with one embodiment, this process may be effected by arranging a plurality of the elongated pieces of multi-layered fabric about a common point with their longitudinal axes substantially parallel and with their mid-sections being spaced in a substantially common plane perpendicular to the axes. The mid-sections of the several pieces are then simultaneously gathered toward a common point whereby each of the pieces is doubled upon itself to form the spokes of the wheel. Thereafter the ring support is inserted between each pair of spokes, the hub section is inserted in the resulting aperture and the composite assembly is secured together between the two fabric discs.

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For a more complete understanding of this invention, reference will now be made to the accompanying drawing, wherein

Fig. 1 comprises an elevational side view of a buffing wheel constructed in accordance with one embodiment of this invention;

Fig. 2 is an enlarged sectional view taken substantially along the line 2—2 of Fig. 1;

Fig. 3 is a perspective view of a folded piece of fabric in the process of being rolled up to form an elongated rolled piece of multilayered fabric which ultimately will form a pair of spokes in a wheel of the character shown in Figs. 1 and 2;

Fig. 4 is an elevational side view of a device employed for making a buffing wheel in accordance with one embodiment of this invention showing the rolled pieces of fabric in place and the means for gathering the mid-sections thereof in the manner to be hereinafter more fully described;

Fig. 5 is an end elevational view of the device shown in Fig. 4;

Fig. 6 is similar to Fig. 4, further indicating the manner in which the rolled fabric pieces are gathered to form the spokes of the wheel;

Fig. 7 is a sectional view taken substantially along the line 7—7 of Fig. 6;

Fig. 8 is an end elevational view of the buffing wheel forming device illustrating that stage of the process wherein the supporting ring is inserted between the spokes of each pair in the wheel; and

Fig. 9 is a composite view illustrating the process of finally assembling the buffing wheel after it has been removed from the gathering device shown in Figs. 4 through 8.

Referring now more particularly to Figs. 1, 2 and 3, there is provided a buffing wheel having a central hub section 10 in the shape of a disc which may be formed of a relatively stiff material such as laminated cardboard or the like. Spaced peripherally from the hub section 10 is a metal ring support 12 which serves to support a plurality of double-over pieces of rolled fabric 14 which are circumferentially spaced around the periphery of the hub section 10 and between said periphery and the ring support 12. Each of the multi-layered fabric pieces 14 is initially formed from an elongated strip of fabric in the manner indicated in Fig. 3. This strip of fabric is cut on the bias, folded transversely along the line 16 and then rolled with the free end edges 18 being arranged within the center of the resulting roll. Thus when the roll is complete the fabric piece 14 exposes only the end edges of the roll and the longitudinal side folded edge 16. Rolling in this manner and having the material of the initial strip cut on the bias prevents the several spokes of the wheel from fraying during use. It will be understood that when the piece shown in Fig. 3 is fully rolled to form an elongated piece of multilayered or rolled fabric, it is then doubled about its mid-section over the support ring 12 to provide a pair of outwardly extending radial spokes 20 for the buffing wheel. It is a plurality of these spokes arranged side by side in pairs which go to make up the main body portion of the buffing wheel. The peripheral buffing surface of the wheel is thus formed by a large number of open rolled ends of the spokes arranged around the periphery of the wheel in the manner indicated in the drawings.

It will be noted that the central hub section 10 serves to compress the doubled portion 22 of the rolled fabric piece 14 against the ring 12. A pair of fabric discs 24 and 26 are positioned con-

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centrically to either side of the hub section 10 and embrace the hub section, the ring support 12 and at least a portion of the spokes 20. Suitable stitching 28 is provided to secure the discs 24 and 26 to the hub section 10 and a plurality of rows of stitching 30 are provided between the fabric discs 24 and 26 through the spokes 20 firmly to secure the spokes together and to the discs whereby an integral one piece unit is formed. The hub section 10 and the fabric discs 24 and 26 may be provided with a central aperture 32 so that the buffing wheel may be mounted on a suitable spindle for use. It is the usual practice to clamp a plurality of buffing wheels on a spindle in side by side relationship for use during buffing operations.

It will thus be apparent that the buffing wheel constructed as indicated above is very sturdy and does not have a tendency to fly apart even under the most rigid conditions of use. The support ring firmly anchors the spokes 20 and they do not have a tendency to fly off during operation at high speeds since a single piece of fabric is doubled around the ring support 12 to form a pair of spokes 20 of substantially equal length. Thus, the centrifugal force acting upon one spoke of each pair is substantially the same as that acting upon the other spoke and there is little or no tendency for the spokes or elongated pieces to pull out between the ring support and the hub section during rotation of the wheel at high speeds. The primary stress is placed upon the metal ring support 12 and not upon any stitching in the composite assembly. It will be noted that all of the spokes are independently mounted so that they may freely flex during operation of the wheel, thus permitting free circulation of air and automatic cooling of the wheel during operation.

A convenient method of making the buffing wheel disclosed in Figs. 1, 2 and 3 is indicated in Figs. 4 through 9 and this method constitutes an important feature of the herein disclosed invention. The apparatus which may be employed in connection with this method comprises a pair of axially separable drums 34 and 36 having a plurality of circumferentially spaced registering apertures 38 positioned adjacent the peripheral edges thereof. These apertures 38 are of such a size that they may readily receive the pieces of rolled fabric 14 which eventually form the spokes of the buffing wheel. The number of apertures 38 in each of the drums corresponds to the number of pairs of spokes that are to be formed in the buffing wheel. The drums 34 and 36 are spaced from each other by means of an outwardly flared hub 40 which is secured to the drum 34 in the manner indicated in Fig. 8. The spacing of the drum 34 from the drum 36 permits the rolled fabric pieces to be supported in the several apertures 38 with the mid-sections of each fabric piece being exposed between the drums. This spacing will be determined by the thickness and flexibility of the fabric material 14 as will be come apparent hereinafter. The drums 34 and 36 are mounted as shown on any suitable shafts 42 and 44, at least one of which is movable axially from the position shown in Fig. 7 to the position shown in Fig. 8. It will be apparent that any means may be employed for supporting the drums 34 and 36 in axially separable relationship.

In order to form a buffing wheel in accordance with this phase of the present invention, the drums 34 and 36 are brought together to the position indicated in Fig. 5, being separated only by the distance represented by the thickness of

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the flared hub 40. The drums are further positioned so that the circumferentially spaced apertures 38 of the two drums are in registering relationship. Thereafter a plurality of rolled pieces of fabric which are to form the spokes of the buff are formed in the manner indicated in Fig. 3 and inserted through each of the registering apertures 38 to form a composite assembly of the character indicated in Figs. 4 and 5. The mid-sections of each of the fabric pieces 14 are arranged to lie within a single plane between the opposing surfaces of the drums 34 and 36 and the longitudinal axes of the pieces 14 are substantially parallel. Thereafter a wire or cable 46 is wrapped around the composite assembly of mid-sections of the fabric pieces in the manner shown in Figs. 4 and 5, one complete revolution of the wire 46 being necessary so that the wire engages the mid-section of every piece of rolled fabric. The ends of the wire 46 are then pulled in opposite directions as indicated by the arrows in Figs. 4 and 6. This causes the several mid-sections of all of the pieces of the rolled fabric to be gathered tightly around the hub 40 between the drums 34 and 36.

As will be apparent from inspection of the drawing, each end of the rolled fabric piece 14 is pulled inwardly through the opposing apertures 38 in the drums 34 and 36 so that each piece becomes doubled upon itself over the wire as best shown in Fig. 7. Inasmuch as the wire gathers the mid-sections of all of these rolled pieces together, the resulting spokes 20 formed in pairs from each fabric piece are of substantially the same length.

After the wire has been tightly drawn, thereby gathering the pieces of fabric material tightly against the flared hub 40, the drums 34 and 36 may be separated to the position indicated in Fig. 8. The compression of the fabric of the several pieces 14 by the wire into the groove formed by the flared hub 40 and the drum 34 prevents the resulting composite assembly from falling apart. After the drum 36 has been separated from the drum 34 and while tension is maintained on the wire 46, one of each pair of spokes which lies closest to the separated drum 36 is bent downwardly in the manner indicated in Fig. 8. Thereafter the metal ring 12 is slipped over all of the bent down ends of the spokes and pushed up tightly against the drum 34. It will be noted that the ring 12 has an inside diameter slightly greater than the maximum diameter of the flared hub 40. After the ring 12 has been placed in position as indicated, the fingers that were bent outwardly are again bent back into their original position. The tension on the wire 46 is then relaxed and the wire is removed. The flexible nature of the fabric of the spokes causes them to press outwardly against the inner peripheral surface of the ring support 12.

It has been found that the ring and spokes arranged around the peripheral edge thereof may be lifted from the flared hub and drum 34 if done carefully. This is done and the composite assembly of spokes and ring support are then placed upon a disc 26 as indicated in Fig. 9. The upper surface of the disc 12 is preferably provided with a suitable adhesive. In the placement of the ring support and spoke assembly upon the disc 12 it has been found desirable to make the placement in such a manner that those spokes which had been bent down for the initial

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placement of the ring support be placed in the downward position on the support for the disc 26. If this placement is effected in this manner, it has been discovered that the spokes adjacent the top surface will not have a tendency to flop up to a vertical position during subsequent manipulations. At this point in the procedure there is thus formed a composite assembly comprising the ring support and spokes adhesively secured to one side of the fabric disc 26. Thereafter the hub section 10 is pressed into the central aperture of the composite assembly, thereby tightly wedging the several spokes or fabric pieces against the ring support 12 and a second suitable fabric disc similar to fabric disc 26 is placed in position as indicated in Fig. 9 and then secured to the resulting assembly. Suitable adhesives are employed preliminarily to hold the several elements in their assembled position. After the adhesive has hardened, stitching 30 is provided between the fabric discs 24 and 26 and the spokes 20 and additional stitching 28 is provided between the fabric discs 24 and 26 and the hub section 10.

Thus it will be seen that a convenient method has been provided for readily assembling the buffing wheel disclosed in Figs. 1, 2 and 3. If desired, the adhesive may be dispensed with in practicing the process of assembly. However, the use of a suitable adhesive is preferred because it imparts rigidity and strength to the composite assembly and assists in the assembling process. It will be apparent that the central aperture 32 extending through the discs 24 and 26 and the hub section 10 may be formed before assembly as indicated or may be punched in the composite assembly upon completion.

I claim:

A process of making a buffing wheel having radially extending fabric spokes constituting the main body portion thereof which comprises inserting a plurality of elongated pieces of multi-layered fabric through registering apertures spaced about two circles in parallel planes in a pair of spaced support members, each of said fabric members being arranged so that their respective mid-sections define substantially a circle between said support members, gathering said mid-sections simultaneously toward the common axis of said circles whereby each of said pieces is pulled through said apertures and is doubled upon itself to form a pair of spokes, inserting a ring support between each pair of spokes, and thereafter securing said spokes of each pair to the spokes of other pairs and together in embracing relationship to said ring support.

SYLVESTER C. MOCKIEWICZ.

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