July 13, 1937. H. ZIMMERMAN 2,087,012

BUFFING WHEEL

Filed March 12, 1936 4 Sheets-Sheet 1

Fig. 1.

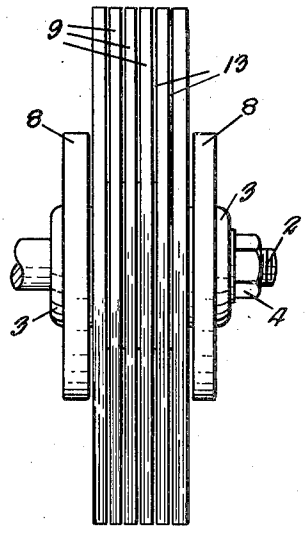


Fig. 2.

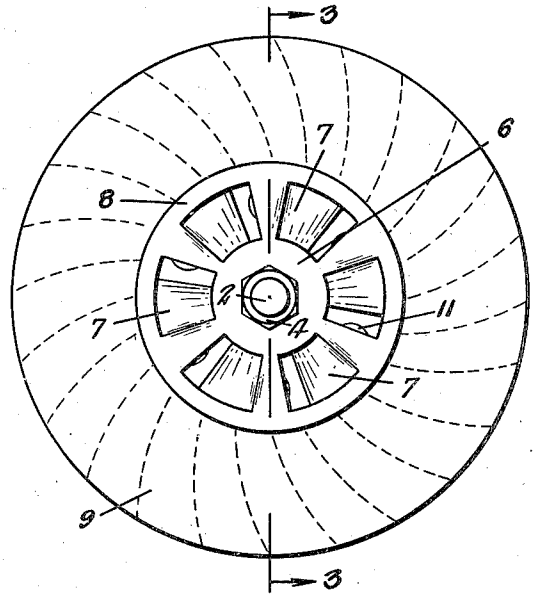


Fig. 3.

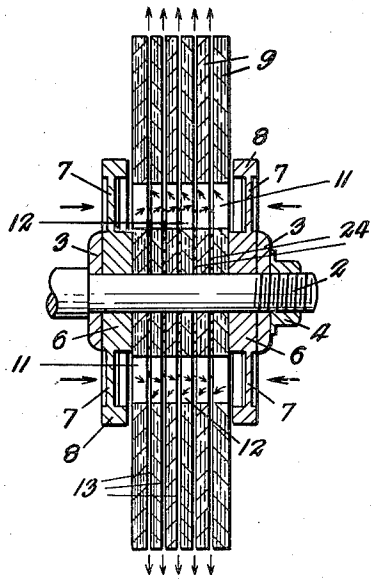
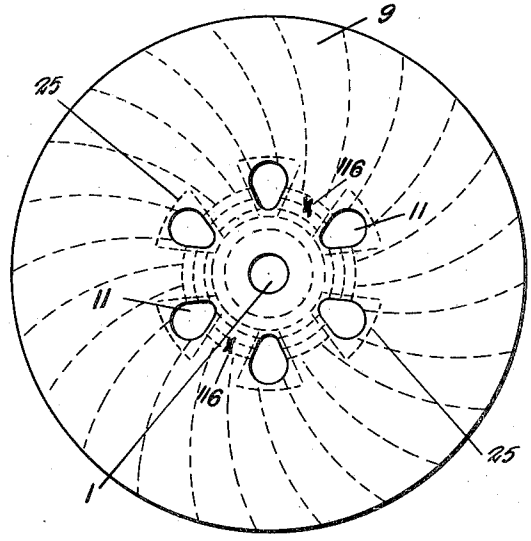


Fig. 4.



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BUFFING WHEEL

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Fig. 7.

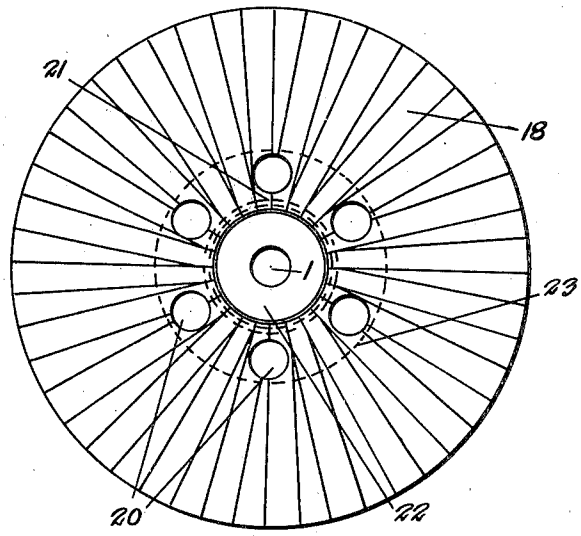

Fig. 5.

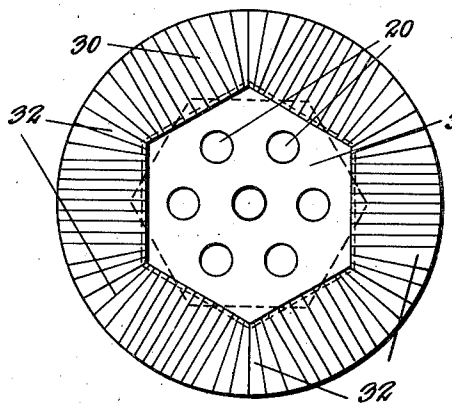

Fig. 6.

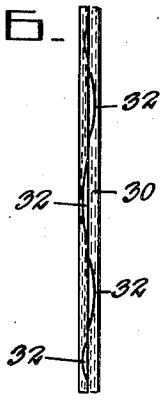

Fig. 8.

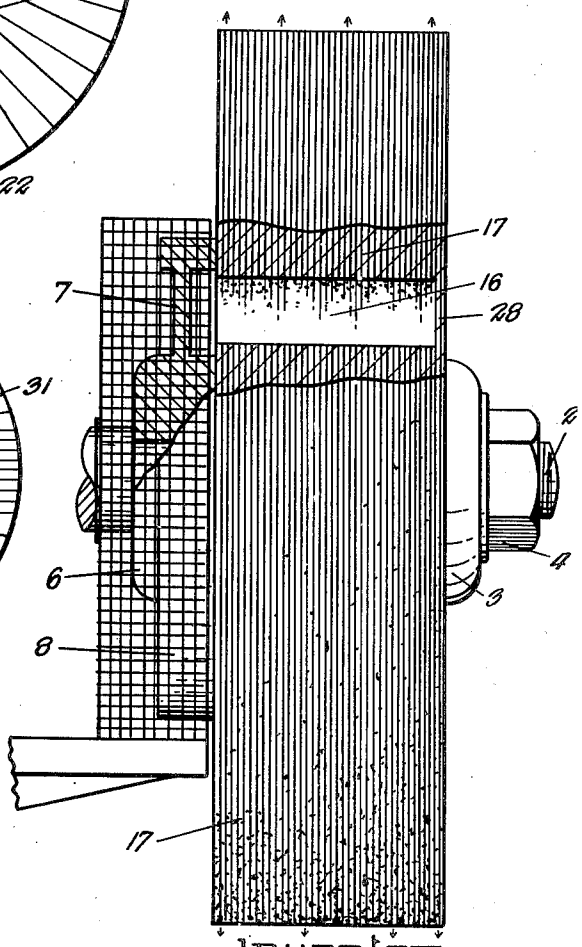

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Fig. 9.

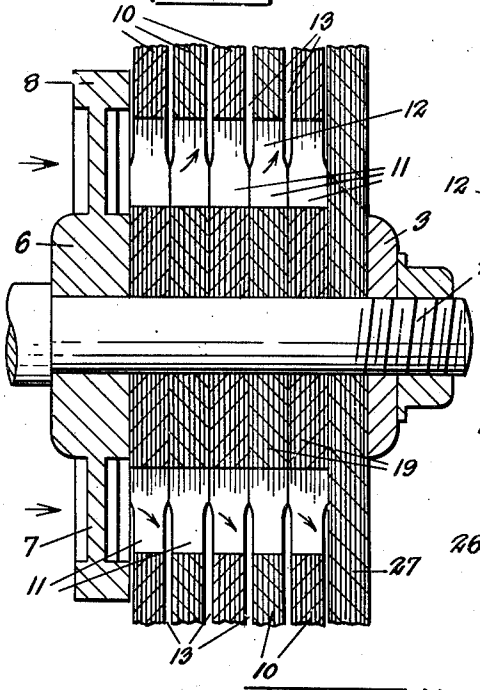


Fig. 10.

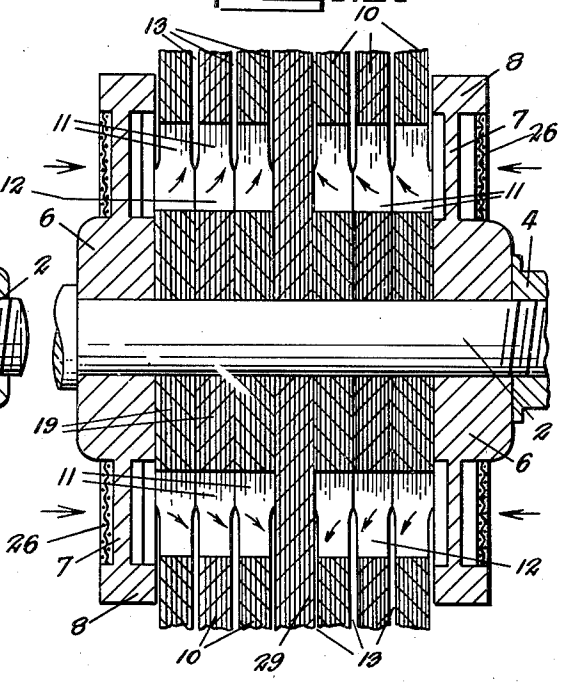
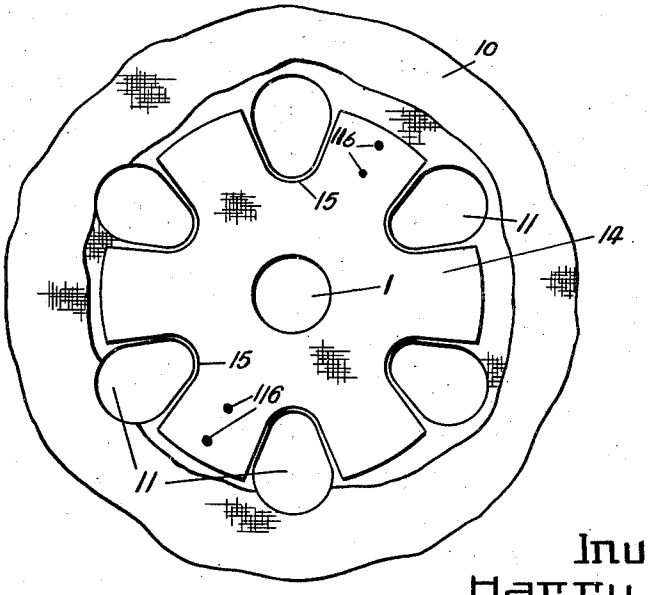


Fig. 11.



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BUFFING WHEEL

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Fig-12.

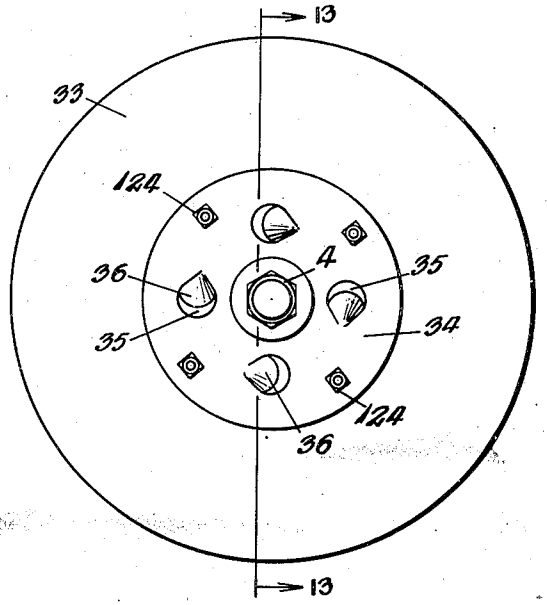


Fig-13.

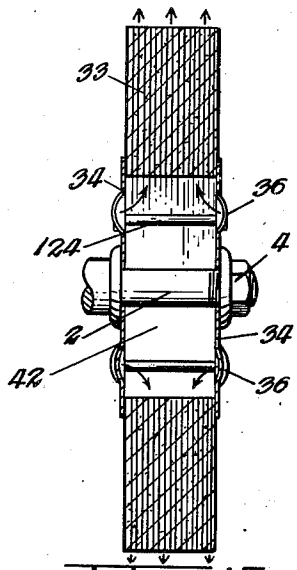


Fig-14.

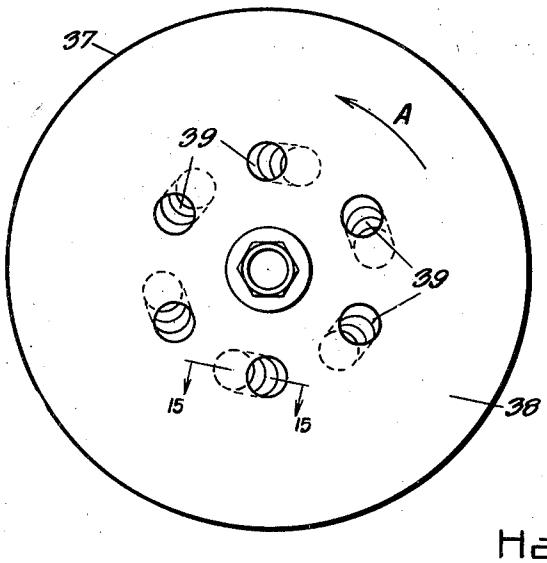


Fig-16.

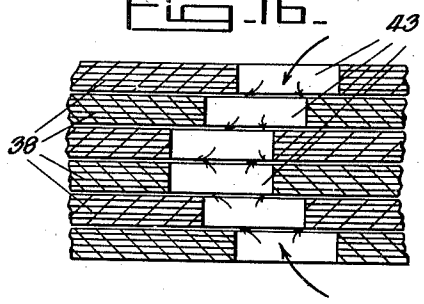
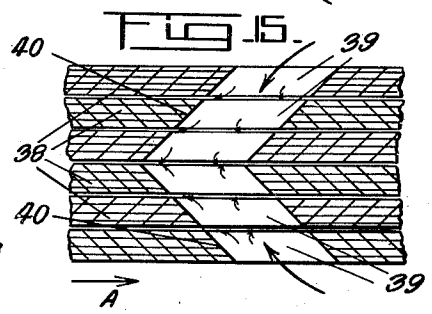


Fig-15.



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Patented July 13, 1937 2,087,012

UNITED STATES PATENT OFFICE

2,087,012

BUFFING WHEEL

Harry Zimmerman, Toronto, Ontario, Canada

Application March 12, 1936, Serial No. 68,403

11 Claims. (Cl. 51—193)

My invention relates to improvements in buffing wheels and the object of the invention is to provide a ventilated wheel wherein air is injected into the central portion of the wheel and passes outwardly between either the buff sections or plies of the wheel to dissipate the frictionally generated buffing heat and thus eliminate burning or scorching of the buff.

A further and particular object of my invention is to provide a fan or similar draft creating element rotatable in conjunction with the buffing wheel for creating the air draft.

Another and important object of my invention is, in cases where an augmented air draft through the buffing wheel is required, to furnish a fan element at each side of the buffing wheel whereby a current of air is injected into both sides of the wheel.

A still further object of my invention is to so design my ventilating means that it can be incorporated in either sewn or loose ply buffs.

My invention consists in the provision of ventilated buffing wheels, all as hereinafter more particularly described and illustrated in the accompanying drawings, in which:—

Figure 1 is a front elevational view of a buffing wheel incorporating my invention.

Figure 2 is a side elevational view of the wheel illustrated in Figure 1.

Figure 3 is a cross-sectional view through the wheel, being taken through the line 3—3 Figure 2.

Figure 4 is an end elevational view of one of my buffing wheel sections removed from the supporting spindle and showing the ventilating orifices therein.

Figure 5 is a plan view of part of a buffing wheel section of the pleated ring type, wherein the inner edge of the ring is secured to its supporting disc by a plurality of straight lines of stitching, as described in my co-pending United States patent application Serial No. 2,196.

Figure 6 is an edge elevational view of several ring plies of the type shown in Figure 5.

Figure 7 is a plan view of a buffing wheel ply of my circular pleated ring type.

Figure 8 is an enlarged side elevational view of a buffing wheel formed of loose plies, part of the wheel being broken away to disclose one of the ventilating passages extending therethrough, the fan positioned at one side of the wheel being shrouded in a screen cage to catch lint or other foreign matter that may be floating in the air and drawn into the fan.

Figures 9 and 10 are also enlarged cross-sectional views through fragmentary portions of buffing wheels showing different buff section and fan assemblies.

Figure 11 is also an enlarged plan view of a fragmentary portion of a buff section showing the provision of a small ply for thickening the section at the central portion thereof.

Figure 12 is an end elevational view of a buffing wheel, made up entirely of rings of fabric spaced away from their supporting spindle, and supported by fan end plates.

Figure 13 is a cross sectional view of the wheel shown in Figure 12, being taken through the line 13—13, Figure 12.

Figure 14 is an end elevational view of a buffing wheel of an alternative construction, wherein the draft creating fan elements are formed in the fabric plies.

Figure 15 is an enlarged cross sectional view through such alternative type, being taken through the line 15—15, Figure 14, and

Figure 16 is a similar view to Figure 15, showing a slightly different assembly form of the draft creating orifices.

Like characters of reference indicate the corresponding parts in the different views in the drawings.

The buffing wheels illustrated in Figures 3, 9 and 10 of the drawings are made up of sections in which the plies of material constituting each section are sewn together to make up what are known as "hard" or "cutting buffs".

In the buff illustrated in Figure 8, the buffing portion of the plies are not sewn together and this type of buff is generally known as a "loose" or "coloring buff".

The buffing wheels are provided with spindle receiving arbour holes 1, and are adapted to be clamped upon the usual rotatable spindle 2 between clamping plates 3, which are drawn together by a nut 4 threaded upon the end of the spindle.

In my invention I provide either one or two fans which are positioned upon the spindle and abut the sides of the wheel. The fans of my preferred type each consist of a hub 6, a plurality of fan blades 7 radially extending from the hub and surrounded by a rim 8, which is principally furnished to confine the air drawn through the fan, and also as a protection for the operator's hands against injury from the fan blades. The fans are either positioned between the clamping plates 3 and the sides of the wheel as illustrated in Figure 3, or the hubs of the fans

may be used as the clamping plates as illustrated in Figures 9 and 10.

The sewn sections 9 making up the buffing wheel illustrated in Figures 1 to 4, and the sewn sections 10 making up the major portion of the buffing wheels shown in Figures 9 and 10 and also shown in Figure 11, are pierced with a plurality of orifices 11 equi-distantly disposed around the arbour holes 4 and substantially in alignment with the blade containing portions of the fans 5. The fan blades 7 are so inclined that the fans, in rotating with the buffing wheel, force currents of air into the passages 12 formed by the aligned orifices 11 in the assembled sections of the wheel.

In order to permit the created air drafts in the passages 12 to escape between the sections and ventilate the buffing wheels for the dissipation of frictional heat, I form the central portions 13 of the sections between the orifices 11 and the arbour holes 4 of greater thickness than the outer portions of the sections, so that such outer portions are spaced away from each other to form annular air passages 13. Upon rotation of the buffing wheel, the air is forced into the passages 12 and thrust outwardly between the sections through the passages 13, as indicated by the arrows in the various figures.

The central portions of the sections can be thickened in any suitable manner, as by the provision of the small central plies 14 illustrated in Figure 11. These plies are preferably of slightly greater diameter than the diameter of the buff clamping members, i. e. the clamping plates 3 or the fan hubs 6, as the case may be, and are also of a diameter greater than the distance between two diametrically opposite ventilating orifices 11, so that when the sections are clamped together the clamping action does not have any tendency to press the outer thinner portions of the sections together and close the passages 13. In the buffing wheel shown in Figure 3, the plies are not individually thickened at their central portions, but are spaced apart by spacing rings 24 placed between the sections whereby the annular air passages are formed. In order that the thickening plies 14 do not block the passage of air through the orifices 11, such plies are formed with the cut-away portions 15 around the orifices. To retain the orifices 11 in the various sections making up a buffing wheel in alignment to form the passages 12 before and during the operation of clamping the buffing wheel upon the spindle, I secure the sections together in their proper arrangement by the use of laces 116 threaded through the assembled sections. To secure passages 12 of maximum area without weakening the centre of the buffing wheel, I preferably form the orifices 11 of pear shape as illustrated, though of course, round orifices can be used.

In Figure 8 wherein a loose ply buff is illustrated, passage-ways 16 similar to the passage-ways 12 are provided to extend through the plies 17 of the section, and in this case where the plies are made up of plain discs, it is not necessary to thicken the buff at the centre as the loose plies will freely permit the passage of air therebetween.

Fig. 5 illustrates a ring ply 30 attached to a plain disc ply 31, as disclosed in my co-pending United States application Serial No. 2,196, and wherein the inner edge of the ring follows a plurality of straight lines. As described in my co-pending application, the pleats of the ring are distended at the corner portions 32, where the thickness of the ring ply is reduced. By staggering the corners of a plurality of assembled ring plies or sections as illustrated by dotted lines in Figure 5, and also shown in Figure 6, the distended or reduced in thickness corner portions, which in one ply or section overlap the thick non-distended pleated portions in an adjacent ply or section, produce a free air venting construction.

In Figure 7 I illustrate a pleated ring ply 18 attached to a plain ply, as disclosed in my United States Patent No. 1,927,862, and as the pleating of the ring 18 at its inner periphery thickens the buff at this point, it is not necessary to provide any extra thickening means as before described, irrespective of whether such pleated construction is used in loose or sewn sections. In this construction, the circular ventilating orifices 20 cut through the ring 18 at the thickest portion of the buff, and as the provision of the orifices would release the pleats at the orifice points beyond the lines of stitching 21 securing the ring 18 to its disc 22, I furnish a second ring of stitching 23 around the outside of the orifices, thus firmly securing the ring in place at the orifice points and preventing the outwardly passing air draft from billowing the pleats at the orifice points. In the sewn sections, such as illustrated in Figure 4, I also sew the plies with lines of stitching 25 around the orifices 11 to draw the plies tightly together, as billowing of the outer plies of the sections might conceivably increase the sections in thickness at the orifice points and reduce the free venting of air through the passages 13.

In cases where there is a possibility of lint or other foreign matter floating in the air of the room where the buffing operation is taking place, I can either cover the air orifices of the fans with a wire screen 26 to catch any foreign matter entering the fan, as illustrated in Figure 10, or in cases where it is found that the screen becomes rapidly clogged, I can, as illustrated in Figure 8, surround the entire fan in a stationary wire screen cage 27, whereby a larger screen area is afforded.

Upon reference to Figures 8 and 9, it will be seen that only one fan is used and in these instances the section 27 or plies 28 at the other end of the wheel to the fan, are unpierced so that the ends of the air draft passage-ways are closed and the air only escapes between the sections or plies as the case may be. In Figure 10 I illustrate a buffing wheel provided with two fans, but wherein the central section 29 is unpierced so that the air drafts do not meet. The central section is cooled by both air drafts, as indicated by the arrows.

While the hub 6 of the fan is used either in conjunction with or in place of the clamping plate 3 and is drawn tightly against the buffing wheel, it is essential that the blade rim 8, while it may be in close proximity to or abut the end face of the wheel, must not squeeze the sections or plies of the wheel together, as any squeezing action would tend to close the annular air draft passages and defeat the purpose of my invention. The fan can be made from a stiff material such as metal, wood or composition, or can be molded from either hard or soft rubber. In cases where the fan is made from a stiff material, the inner edge of the blade rim 8 may be formed to

carry a lip of soft rubber which would engage the face of the buffing wheel and prevent the escape of the air draft without any squeezing action of the wheel at this point.

Figures 12 and 13 illustrate the application of my invention to a wheel wherein the buffing plies **33** are in the form of rings surrounding and spaced apart from the spindle **2**. In this case, the fans are incorporated in the buffing ring supporting metal discs **34**, which are clamped upon the spindle by the usual nut **4**. Draw bolts **124** clamp the buffing rings between the discs. The discs are pierced with orifices **35** formed with inclined lips **36** to constitute vanes which force an air draft into the central passage **42** and out between the buffing sections or plies, as indicated by the arrows.

An alternative construction for a forced draft ventilated buffing wheel is shown in Figures 14 and 15, wherein the wheel **37** or sections **38** making up the wheel, are pierced with orifices **39** inclined in respect to their plane of rotation, so that the walls **40** of the orifices constitute vanes, and in the rotation of the wheel, as indicated by the arrows A, pick up air and force an air draft, as indicated by the other arrows, between the sections or plies as the case may be. Figure 16 is a similar section to that illustrated in Figure 15, and wherein the orifices **43** are similarly disposed to the orifices **39**. The orifices **43** are not each inclined, but are staggered in relation to one another.

What I claim as my invention is:—

1. In a buffing wheel, a plurality of plies of material mounted side by side and wherein some of the adjacent plies are so positioned in relation to each other that an air draft can pass therebetween, said adjacent plies being pierced with air circulating orifices, and fan means rotatable in conjunction with the buffing wheel to create a forced draft through the orifices and between the plies for the purpose specified.

2. A buffing wheel including a plurality of buffing wheel sections mounted side by side to form a wheel and so positioned in relation to each other that an air draft can pass therebetween, and fan means rotatable in conjunction with the buffing wheel for creating a forced draft between the plies for the purpose specified.

3. A buffing wheel including a plurality of buffing wheel sections mounted side by side to form a wheel and so positioned in relation to each other that an air draft can pass therebetween, said sections being pierced with air circulating orifices, and fan means rotatable in conjunction with the buffing wheel to create a forced draft through the orifices and between the plies for the purpose specified.

4. In a buffing wheel, a plurality of plies of material mounted side by side and wherein some of the adjacent plies are so positioned in relation to each other that an air draft can pass therebetween, said adjacent plies being pierced with air circulating orifices and means for creating a forced draft through the orifices and between the plies for the purpose specified.

5. In a buffing wheel, a plurality of plies of material mounted side by side and wherein some of the adjacent plies are so positioned in relation to each other that an air draft can pass therebetween, said plies having an air passage extending through their central portions and communicating with the air draft passages between the plies, and fan means rotatable in conjunction with the buffing wheel to create a forced draft through the passage and between the plies for the purpose specified.

6. A buffing wheel including a plurality of sections, a plurality of fabric plies in each section and the outer portions of which constitute the working portion of the wheel, means for arranging some of said plies so that an air draft can pass therebetween, a plurality of orifices piercing the sections and arranged around the arbour holes to form air passages through the wheel which communicate with the air draft passages between the plies, means inserted between the central portions of the sections for spacing the pierced portions of the sections apart, and fan means rotatable in conjunction with the buffing wheel to create a forced draft through the passages and between the plies for the purpose specified.

7. A buffing wheel including a plurality of buffing wheel sections mounted side by side to form a wheel and so positioned in relation to each other that an air draft can pass therebetween, and a fan mounted beside the buffing wheel and rotatable therewith for creating a forced draft between the plies for the purpose specified.

8. In a buffing wheel, a plurality of plies of material mounted side by side and wherein some of the adjacent plies are so positioned in relation to each other that an air draft can pass therebetween, said plies having an air passage extending through their central portions and communicating with the air draft passages between the plies, and a pair of fans mounted concentrically with the buffing wheel at either side thereof and rotatable therewith for creating an air draft between the plies for the purpose specified.

9. In a buffing wheel, a plurality of plies of material mounted side by side and wherein some of the plies are in the form of gathered rings and so positioned in relation to adjacent plies that an air draft can pass therebetween to the periphery of the wheel, said plurality of plies including plies having an air passage extending through their central portions and communicating with the air draft passages extending to the periphery of the wheel, and fan means rotatable in conjunction with the buffing wheel to create a forced draft through the passage and between the plies for the purpose specified.

10. In a buffing wheel, a plurality of plies of material mounted side by side and wherein some of the plies are in the form of gathered rings and so positioned in relation to adjacent plies that an air draft can pass therebetween to the periphery of the wheel, said plurality of plies including plies having an air passage extending through their central portions and communicating with the air draft passages extending to the periphery of the wheel, and a fan mounted concentrically with the buffing wheel and rotatable therewith for creating a forced draft between the plies for the purpose specified.

11. In a buffing wheel, a plurality of plies of material mounted side by side, and wherein some of the adjacent plies are so positioned in relation to each other that an air draft can pass therebetween, a passage extending inwardly into the wheel from one side thereof, and forced air draft creating means positioned exteriorly of the wheel for creating a forced air draft in the passage for the purpose specified.

HARRY ZIMMERMAN.