Jan. 16, 1940. L. M. HAGUE 2,187,602

WAVE FORMING DEVICE FOR BUFFS

Filed June 23, 1938 2 Sheets-Sheet 1

FIG. 1.

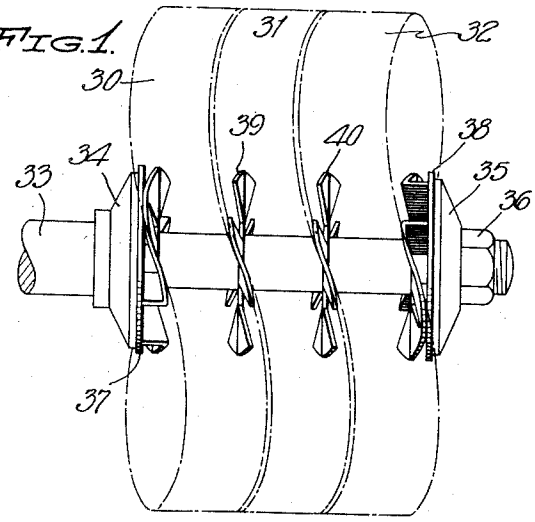


FIG. 2.

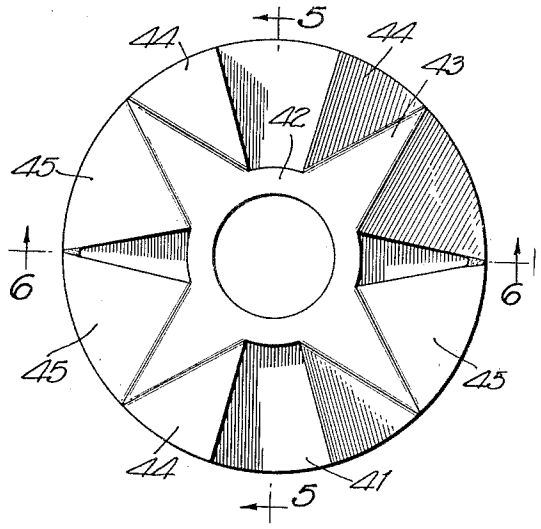


FIG. 3.

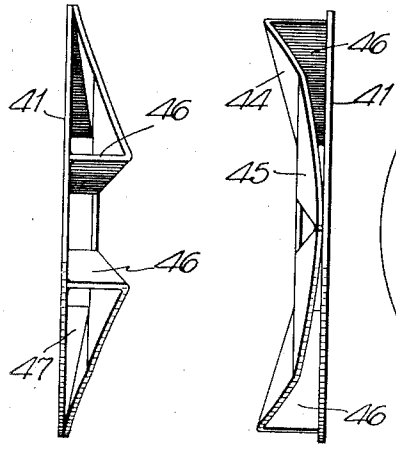
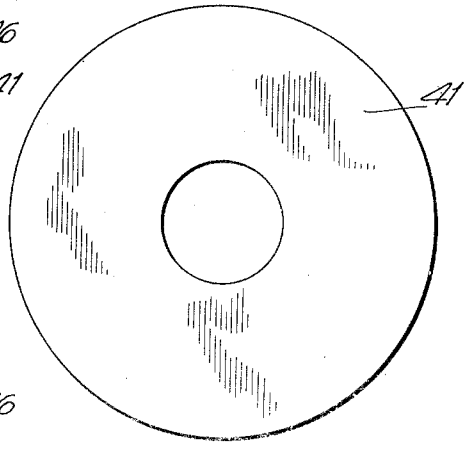


FIG. 4.



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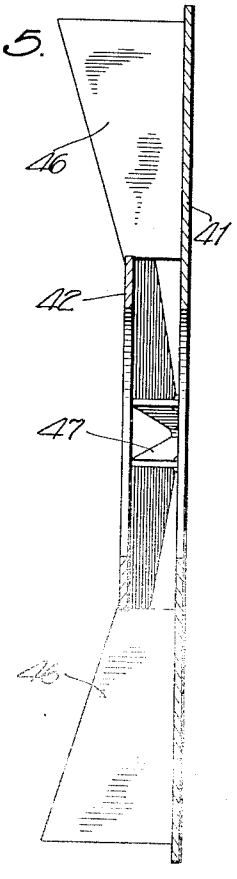
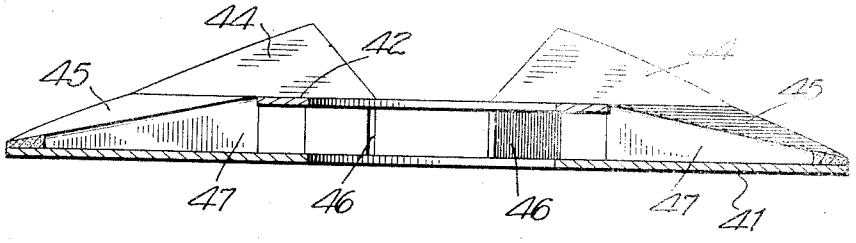


FIG. 6.



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WAVE FORMING DEVICE FOR BUFFS

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FIG. 10.

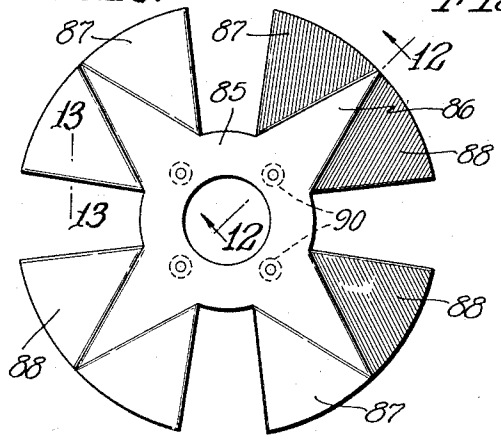


FIG. 11.

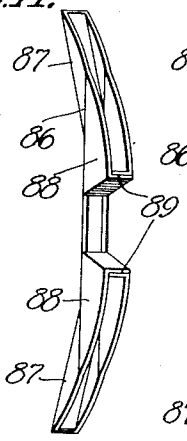


FIG. 12.

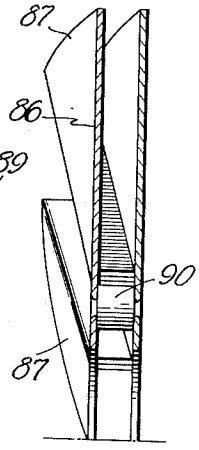


FIG. 13.

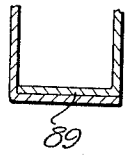


FIG. 14

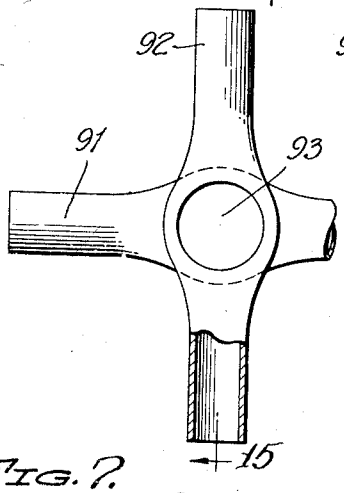


FIG. 15.

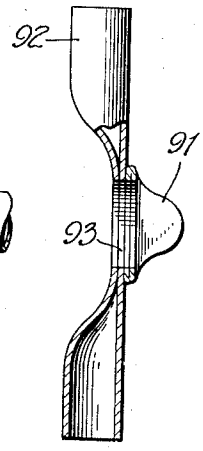


FIG. 7.

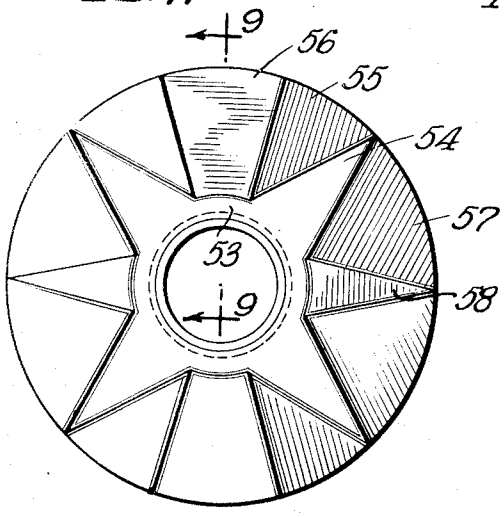


FIG. 8.

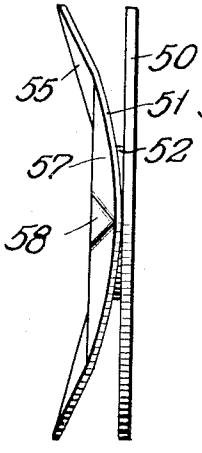
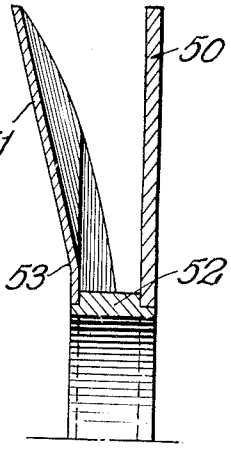


FIG. 9.



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Patented Jan. 16, 1940 2,187,602

UNITED STATES PATENT OFFICE

2,187,602

WAVE-FORMING DEVICE FOR BUFFS

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Application June 23, 1938, Serial No. 215,338

6 Claims. (Cl. 51—193)

This invention relates to flexible buffing and polishing wheels, hereinafter referred to as buffs, and more particularly, although not exclusively, to buffs comprising a plurality of sections.

An important object of the invention is to improve the efficiency and quality of work done on such buffs. Another important object of the invention is to improve the wearing quality of buffs and to reduce a tendency to become overheated in operation.

Buffs are commonly made of woven cloth, such as muslin, various types of fabrics or sheet material. In accomplishing the objects of my present invention, the buff, whether made of but one section or a plurality of sections, is mounted and held upon the buffing spindle in such manner that its periphery is sinuous or waved back and forth in an axial direction. As the buff rotates with its spindle, the work piece is thus subjected to the usual friction or abrasion in the plane at a right angle to the axis of the spindle, while at the same time being subjected to a transverse wiping action, back and forth, which eliminates or obscures any abrasion lines or marks left by the travel of the buffing surface in the plane of its rotation. This distribution of the buffing action in the two directions is not only beneficial to the quality of the work, but it is much more efficient in bringing the work surface to a satisfactory luster and is more economical of the material of the buff and the compositions applied thereto. In the case of buffs made of a plurality of sections, the sections may be directly contiguous or they may be spaced apart. When spaced apart, I prefer to employ intervening spacers of such form as to maintain the sinuous contour or periphery of the sections in conformity with that of the wheel as a whole. The spacing of the sections has important advantages in that such buffs with spaced sections ordinarily run cooler in operation by reason of the air circulating between the sections, and the intervening spaces may furthermore constitute air passages in buffs of the ventilated type where special provision is made for admitting air at an interior portion of the assembly, to be thrown radially outward by centrifugal force due to the rotation of the buff. Where definite spacing is thus provided between a plurality of sections, the sinuous periphery is of special importance in avoiding the grooving, ridging or streaking effect which separated sections tend to produce in the work.

To illustrate the invention, I have shown several embodiments in the accompanying drawings.

Figure 1 is a side elevation showing the relative arrangement of the wave-forming external deflectors and a pair of wave-forming intervening spacers, with three buff sections shown diagrammatically in assembled condition on a buffing spindle.

Figure 2 is an inner face view of one of the external wave-forming deflectors.

Figure 3 is a side elevation of a pair of external deflectors.

Figure 4 is an outer face view of one of the external deflectors.

Figure 5 is a central section of one of the external deflectors, taken on the line 5—5 of Figure 2, and

Figure 6 is a similar view taken on the line 6—6 of Figure 2.

Figure 7 is an inner face view of a second form of one of the external deflectors.

Figure 8 is a side elevation thereof, and

Figure 9 is a fragmentary section thereof on the line 9—9 of Figure 7.

Figure 10 is a face view of another form of intervening wave-forming spacer to be employed between sections, and

Figure 11 is a side elevation thereof.

Figure 12 is a fragmentary section on the line 12—12 of Figure 10.

Figure 13 is a detail section on the line 13—13 of Figure 10 showing a type of joint employed in the spacer illustrated in Figures 10, 11 and 12.

Figure 14 is a face view of an intervening spacer formed of crossed sections of pipe, a part being shown in section.

Figure 15 is a side elevation with part in section on the line 15—15 of Figure 14.

Referring particularly to Figure 1, the buff shown for illustration in this view is composed of three sections 30, 31, 32 mounted on a spindle 33 which has the inner flange 34 and the outer flange 35, with securing nut 36, of any ordinary or approved construction. An external deflector 37 is interposed between buff section 30 and the inner flange 34, and an external deflector 38 is interposed between the buff section 32 and the outer flange 35. Wave-forming spacers 39 and 40 are interposed between the buff sections 30, 31 and 31, 32, these spacers being diagrammatically indicated as sheet metal discs provided with four radial arms distorted into conformity with the curvature to be conferred upon the buff sections by the external deflectors 37 and 38.

The external deflectors illustrated in Figures

1 to 6 inclusive are represented as of sheet metal construction embodying an outer base plate 41 in the form of an annulus or ring, against the inner face of which is positioned the wave former or deflector proper. This wave former comprises an annular hub portion 42 in the plane of which are four, or some other even number of radial extensions 43, which define a median plane, to either side of which the buff is to be deflected in wave form. For this purpose, the metal contiguous with each radial extension 43 is given an upward bend 44 at one side, and a downward bend 45 at the other side of each radial extension. The metal is slit midway between the upturned surfaces 44 and around the hub 42, to facilitate the bending of the metal out of the median plane, and to provide the braces 46 which are turned down and seated against the base plate 41. Similarly, the metal is slit midway between the downturned surfaces 45 and around the hub portion 42, to provide the braces 47 which are turned down to abut against the base plate 41. These braces 46 and 47 may be welded to the inner face of the base plate 41 to permanently attach the wave former with its base plate.

The two external wave-forming deflectors are assembled on the spindle 33 as already described, with the raised surfaces 44 of the one in registry with the depressed surfaces 45 of the other, so that the wheel flanges 34, 35, when drawn together under the influence of the nut 36, will cause these external deflectors to distort the buff into peripheral waves, as clearly illustrated in Figure 1. The spacers 39 and 40 are arranged in proper registry with these external deflectors, so that they cooperate in obtaining this result.

It will be apparent that by the use of sufficiently heavy stock, the base plates 41, with their associated wave formers, may themselves serve as wheel flanges, and thus either or both of the wheel flanges 34 and 35 may be eliminated.

In Figures 7, 8 and 9, the external deflector has in general the facial contour of that described in connection with Figures 1 to 6, but is shown as constructed of a heavy base plate 50, a deflector plate 51 and a bushing 52. The deflector plate 51 is assumed to be of sufficiently heavy stock to render unnecessary the provision of the braces, such as the braces 46 and 47 in the form previously described, and hence the slitting or recessing of the metal may be omitted. By reference to Figure 7, it will be observed that the inner face will thus comprise the hub 53 and radial extensions 54 in the median plane from which the metal is sloped upward along the surfaces 55 to the plane of the wave crests 56, and downwardly along the surfaces 57 to the plane of the wave troughs 58.

In any of the embodiments of external deflectors, whether constructed of sheet metal or in the form of solid castings or forgings, the waves may be either in the angular form or in the continuously graduated form, both of which have been illustrated in the several views already described.

The wave-forming intervening spacers, to be used between the buff sections, may be constructed in a variety of forms within the scope of the present invention. In general, the deflection or wave formation to be conferred upon the buff sections by the intervening spacers is the same as that which is to be given by the external deflectors, and hence the contour of the intervening spacers may be substantially the same as that of the wave formers on the external deflectors.

In some cases it is desirable to provide for a wider spacing of the sections, and this may advantageously be done by a double-walled construction which at the same time provides ventilating passages when used in conjunction with recessed spindles by which air is admitted to the interior of the buffing wheel. Examples of such spindles are shown in the U. S. patent to Zucker, No. 1,573,961, and the U. S. patent to Hall, No. 2,094,650. A two-walled, hollow spacer is illustrated in Figures 10 to 13, by way of example. In this embodiment, each wall comprises a hub portion 85 from which the radial extensions 86 project outward in the same plane, constituting the median plane of the wall. From these radial extensions 86, the metal of each wall slopes upward (with respect to the plane of Figure 10) in the segments 87 and downward in the segments 88, the metal of each wall being slit midway between each pair of segments and around the hub portion 85, and bent inwardly and overlapped to form the seams 89, illustrated in detail in Figure 13. These seams may be spot welded or otherwise fastened. They act as braces to maintain the hollow space between the front and rear walls of the spacer. Additional braces may be employed around the center or hub portion 85, such as for example the shouldered pins or studs 90, the reduced ends of which pass through perforations in the spacer wall at each side and may be riveted in position. In connection with the embodiment illustrated in Figures 10 to 13, it is to be observed that the spaces between the upwardly sloping segments 87 and the downwardly sloping segments 88 constitute radial passages, and for this reason are preferably in communication with the central aperture of the spacer through which ventilation may be maintained when desired. Such ventilation may similarly be supplied radially outward through the hollow spaces between the upper and lower walls of the respective segments 87 and 88, as will be clearly apparent from inspection of Figures 11 and 12.

Figures 14 and 15 illustrate examples of structural metal sections which can readily be adapted to the production of wave-forming spacers. In Figure 14, two lengths of ordinary metal pipe 91 and 92 are flattened in the middle and superposed in crossed relation, where they are welded and perforated to provide the central aperture 93 by which they may be fitted over the buff wheel spindle. The flattening and arrangement of the pipes at their cross-over should preferably be carried out in such manner that the pipe 91 will project to one side of an assumed median plane and the pipe 92 to the other side thereof, thus adapting the spacer to its function of deflecting the buff sections into waves when the parts are assembled on the spindle.

All embodiments of the invention have been illustrated in forms which would create four half waves in the circumference of the buff. In most cases this number of half waves is satisfactory and indeed preferable, but any desired even number of waves or half waves may be employed within the same principles. As previously explained, these waves may be continuously graduated or in angular steps and their amplitude should exceed the width of the spaces between the buff sections. Radial air passages or spaces are desirable in many cases in the intervening spacers, to provide outward passages in ventilated buffs.

Similarly, passages or spaces are in many cases desired in the end deflectors, to provide inlets for air in connection with certain types of ventilating construction. The invention, however, is not limited to such passages, either in the intervening spacers or the external deflectors. It is also to be understood that the spacers and deflectors are adapted to be used either on the normal buffing spindle in connection with the ordinary or common circular type of buff section, or on spindle adapters or hub members in connection with ring type buff sections. It will be obvious that most of the designs illustrated as intervening spacers may also be used as end deflectors, either with or without the usual wheel flanges. The deflection of the buff into peripheral waves naturally has a slight tendency to cause a variation in the radius of the buffing wheel at different phases of the wave. This difference, however, is relatively slight and can, of course, be entirely eliminated, if desired, by "dressing down" the wheel after it is assembled and secured on the spindle. For certain types of work, as for example in "cutting down" operations, a properly graduated slight change in radius in passing around the circumference of the wheel is even advantageous, as long as the buff is in correct balance.

From the foregoing description of several embodiments of my invention, it will be seen that both the external deflectors and the intervening spacers constitute wave-forming members having substantially rigid circumferentially undulatory surfaces to engage the buff or the buff sections for the purpose of imparting thereto a peripheral undulation or wave of at least two half-wave lengths and preferably two complete wave lengths. These waves extend to either side of an assumed median plane, and their amplitude is preferably greater than the space between adjacent buff sections in the case of buffs comprising a plurality of spaced sections. By having all of the wave formers, end deflectors and intervening spacers in the same phase relation or registry, the maximum wave amplitude is obtained. By adjusting the several members in varying degrees out of strict phase registry, varying degrees of wave amplitude may be obtained, and where the successive wave formers are 180° out of phase, zero amplitude of wave form is obtained. In such relation of the parts, the wave formers would still constitute ventilating members and maintain well defined air passages leading into and out of the buff.

I claim:

1. A wave-forming member for buffs, comprising a hollow body provided with a circumferentially undulatory buff-engaging face, said hollow body having ventilating openings at its inner and outer peripheries.

2. An end deflector for forming waves in buffs, comprising an outer plane wall and an inner circumferentially undulating buff-engaging wall, said outer and inner walls being spaced apart.

3. An end deflector for forming waves in buffs, comprising an outer plane wall and an inner circumferentially undulating buff-engaging wall, said outer and inner walls being spaced apart and braced in rigid fixed relation with respect to each other.

4. An end deflector for forming waves in buffs, comprising an outer plane wall and an inner circumferentially undulating buff-engaging wall, said outer and inner walls being spaced apart, the space between said walls having openings at the inner and outer peripheries.

5. An intervening spacer for use between buff sections, comprising a hollow member formed with spaced apart walls having circumferentially-extending buff-engaging undulations.

6. An intervening spacer for use between buff sections, comprising a hollow member formed with circumferentially-extending buff-engaging undulations, said hollow member having openings at its inner and outer peripheries.

LOUIS M. HAGUE.