Nov. 7, 1961 S. D. KENT ET AL 3,007,289

DISHED POLISHING BUFF

Filed March 14, 1960

Fig. 1

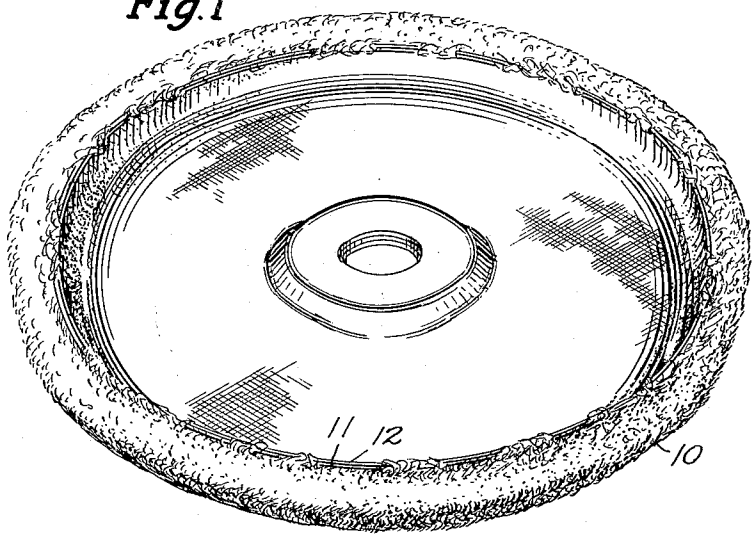


Fig. 2

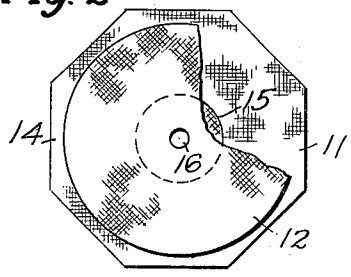


Fig. 3

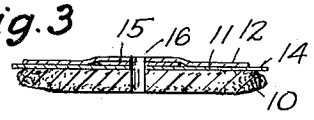


Fig. 4

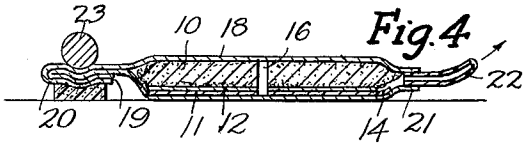


Fig. 7

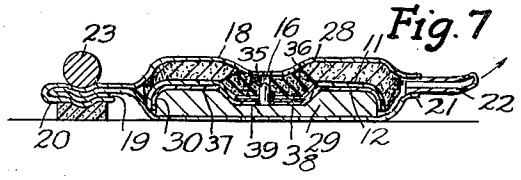


Fig. 6

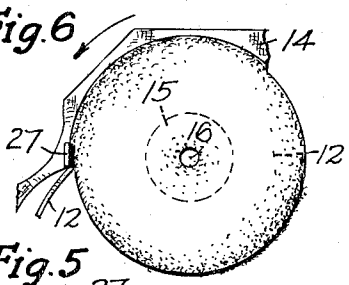


Fig. 5

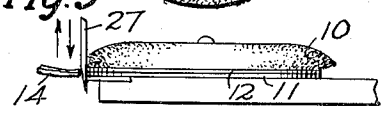
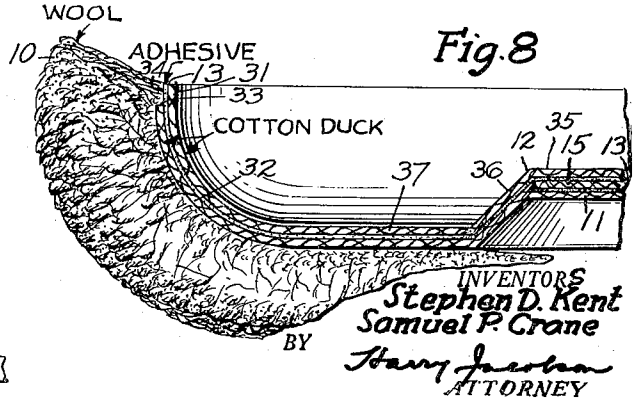


Fig. 8



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DISHED POLISHING BUFF

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This invention relates to power driven buffing pads of the wool pile type and particularly to the formation of the peripheral portion thereof.

Such pads, while flexible, have usually been made in disc form and each backed with a flexible duck or canvas sheet having a relatively hard edge. In using the buff to polish work in corners or on concave surfaces, unless great care is taken the rapidly rotating hard edge may come into contact with the work surface and instantaneously burn off the paint instead of polishing it.

Attempts have been made to prevent such contact, as by the use of a peripheral draw string, to pull the edge of the buff rearwardly around a plate or backing cushion applied to the head of a polishing machine and thereby to provide wool material at the edge of the buff ready to be interposed between the hard edge of the back sheet and the work when the outer edge part of the buff is in use. Various other more or less efficient but relatively expensive means have also been suggested for maintaining the edge portion of the buff in a dished or forwardly convex position while in operation and thereby to arrange and maintain enough wool in front of the hard edge of the canvas back sheet to prevent burning of or damage to the work surface.

Such means have proven either to be too expensive or else they are impractical or shorten the useful life of the buff too much to permit the commercial adoption thereof, or are not fool proof in that for example, they require assembly to the buff or to the head of the polishing machine and are frequently forgotten or lost.

The present invention therefore contemplates the provision of a buffing pad in the general form of a disc and having a self-sustaining but flexible dished peripheral wool-bearing portion integral with the remainder of the pad and interposing wool at all times between the work and the edges of the backing sheets regardless of the angle at which the pad is held against the work, the central portion also being dished.

The invention further contemplates the provision of a polishing pad having two one-piece backing sheets provided with registering central openings and adhesively connected face to face and permanently dished at the outer and central portions thereof respectively in opposite directions, the outer portions being bent rearwardly into the form of a yieldable generally spherical self-sustaining and resilient fillet of relatively large radius, whereby such portions resume the normal dished shapes thereof when released from working pressure and without the aid of any extraneous devices, the inner portions being countersunk rearwardly to conform to the shape of a corresponding separate cushioning member and to receive the head of the nut which secures the buff to the polishing machine.

The invention further contemplates the provision and formation of a resilient dished outer peripheral portion extending rearwardly from the intermediate normally undistorted flat body portion of the pad, and an oppositely dished central portion, the dished portions being inseparable parts of the pad free of any backing or support and permanently biased toward the normal dished shapes thereof.

The various objects of the invention will be clear from the description which follows and from the drawings, in which:

FIG. 1 is a perspective view of the pad showing the self-sustaining yieldable dished edge portion.

FIG. 2 is a plan view of the pad showing the wider front or wool-bearing sheet and the smaller rear backing sheet partly broken away.

FIG. 3 is a vertical sectional view of FIG. 2.

FIG. 4 is a vertical sectional view of the pad and of the means by which vacuum is applied to the pad during the initial or pre-drying operation.

FIG. 5 is an elevational view of the assembled partly dried and still moist pad showing the trimming operation.

FIG. 6 is a top plan view of FIG. 5.

FIG. 7 is a vertical sectional view showing the trimmed pad being shaped at its edge portion while being subjected to vacuum, and the central portion dished oppositely.

FIG. 8 is a fragmentary vertical sectional view of the finished dried and permanently set dished edge portion of the pad and the similarly set central portion.

In the embodiment of the invention illustrated herein, the wool pile or tufts **10** are stitched to the initially oversized front flexible fabric sheet **11**, of cotton duck, canvas or the like, leaving the peripheral part of said sheet bare of tufts (FIGS. 2 and 3). The similar rear backing sheet **12**, of initially lesser diameter than the sheet **11** is adhesively secured to the sheet **11** by means of a suitable viscous adhesive **13** of the moisture carrying type which is flexible when dry and set, and which is preferably, though not necessarily, resistant to dry cleaning solvents. No adhesive is applied to the excess margin **14** of the sheet **11**. The reinforcing central washer **15** is adhesively secured to both sheets **11** and **12**, both of the sheets and the washer having registering holes therein forming the central attaching hole **16** of the assembly and by means of which the pad is securable to the head of a polishing machine.

It is desirable, before trimming the sheets to size, to dry the adhesive between the sheets which have been made wet by the absorbed moisture in the adhesive. The preliminary drying is carried out under vacuum as best seen in FIG. 4 and has advantages which materially aid in the permanent shaping of the edge portion of the pad. The untrimmed pad is inserted into the plastic bag **18** of flexible air-tight material, through the normally open mouth **19** at one end **20** of the bag. The other end **21** is partially closed and communicates with the exhaust pipe **22** through which air is withdrawn from the bag by means of a suitable vacuum pump not shown. When the mouth **19** of the bag is temporarily closed as by the weight **23** and air is withdrawn from the bag, much of the moisture is also withdrawn from the adhesive **13** to make it more viscous. Some of the moisture from the adhesive penetrates and is temporarily retained in the fibers of the sheets and maintains the sheets moist enough to permit the relatively easy shaping thereof later. At the same time, the adhesive approaches its setting point and is forced by the atmospheric pressure on the bag, into the interstices of the fabric sheets to coat interior areas of the fibers thereof.

For long-drying adhesives which are highly resistant to dry cleaning solvents, the preliminary drying period may be as high as 45 minutes at room temperature. However, for adhesives of the latex type drying quickly but not resistant to such solvents, the preliminary vacuum drying step just described may be omitted and pressure applied to the sheets.

Before the adhesive has set and while it is still moist enough to permit manual sliding of the sheets to some extent over each other, the succeeding operations of trimming, adhesive-thickening and edge-shaping are performed. As shown in FIGS. 5 and 6 the marginal portion **14** of the sheet **11** as well as a small part of the margin

of the sheet 12 are simultaneously trimmed off as by means of the reciprocating blade 27, while the sheets are still flat. The diameter of both of the thus trimmed flat sheets is the same, but is greater than the final diameter of the finished dished sheets of the shaped pad.

The assembled and trimmed flat pad 28 is now ready for shaping. It is placed on the wooden form 29 with the rear sheet 12 in contact with the top of and overhanging the form. The top edge portion 30 of the form has the desired convex and generally spherical curvature. The form and flat pad are inserted into the bag 18, the mouth of the bag then closed and air exhausted therefrom. Atmospheric pressure on the bag is transmitted to the pad and forces the projecting peripheral portion thereof downwardly and inwardly against the surface of the form to shape the pad into the desired dished form. Since at this point, the adhesive, though still wet, has approached the setting point, vacuum need be maintained only for a relatively short time, or about 15 minutes at room temperature for the solvent resistant adhesive, heat being objectionable because the damp wool pile would be unavoidably distorted were it heated. The adhesive remains moist but thick enough to adhere well to the fibers, to be retained in the interstices of the fabric and to hold the pad in its dished form outside of the vacuum until drying is complete and the adhesive hardens.

It may be noted that while the sheets 11 and 12 are of relatively heavy and thick fabric, no wrinkling occurs at the dished edge part of the pad with the above described method of forming. When the extreme free edge 31 of the rear sheet 12 has been forced back into its final position in the pad, said edge is considerably reduced in diameter as are all parts of the spherical or dished edge portion to a decreasing extent in the direction toward the flat part of the sheet. However, the interstices between the fibers of the sheets are decreased in extent by the crowding together of such fibers, to compensate for the decrease in overall diameter of the pad assembly. Wrinkling is thereby avoided especially as the fibers are still somewhat damp and absorb some of the still moist adhesive and are also coated therewith.

The front wool-carrying sheet 11, initially or when flat, being of the same diameter as the sheet 12, is bent around a curve of greater radius than that of the curve of the sheet 12 while the central body portions of both sheets remain in fixed contact. Consequently, the moist dished portion of the front sheet at 32 slides on the moist adjacent dished portion of the rear sheet during the shaping operation. The extreme edge 33 in its final position no longer coincides with the edge 31, there being an exposed relatively narrow margin 34 on the sheet 12 adjacent said edge 31. Such margin is covered with adhesive. Some of the wool tufts projecting from the sheet 11 are forced against the adhesive and cover and adhere to the marginal portion 34 and prevent any possible contact thereof with the work. During the end part of the forming operation, the cross sectional shape of the fibers of the fabric may be changed from generally circular to generally oval because of the differences in the radii of curvature between the front and rear surface of each sheet, the latter being less than the former. It is thought that more crowding occurs of the fibers of each sheet at the rear surface of the dished portion than at its front surface, and that where the fibers are crowded enough to come into contact, the cross sectional width at that point is decreased.

It will be understood that the central part of the buff need not be dished, but may remain flat if desired, in which case the top surface of the shaping form as 29 also remains flat. For insuring proper shaping of said central part in order to provide a flat rearwardly depressed center 35 and a generally conical surface 36 joining the part 35 to the intermediate body portion 37, a resilient pad as 38 of foam rubber or the like is inserted into the central recess 39 of the form 29. The pad 38 transmits atmospheric pressure put on the bag 18 to the sheets 11 and 12 and presses them into the recess 39.

Since the greater part of the moisture has been removed from the adhesive during the shaping operation which is relatively fast, the adhesive, though still moist, has about set and is still enough after the shaping step to maintain the assembly in the shaped form thereof with no need for assistance in this respect, the moisture not evaporating fast enough under the vacuum to be completely extracted prior to the setting of the adhesive. The formed assembly is removed from the vacuum bag and thoroughly dried until the adhesive becomes hard enough to resist deformation of the shaped edge while retaining its flexibility. Drying may be done at room temperature or under heat depending on the type of adhesive employed, but where heat is used, no pressure is exerted on the pile, as such pile may become distorted permanently under heat and pressure.

Should it be desired to have the free edges of the sheets even with each other, the margin 34 of the sheet 12 is trimmed off to coincide with the edge 33, or both edgs are trimmed simultaneously to make the final finished edges of the sheets coplanar. If desired, the extreme edge portions of the sheets may be stitched together to insure against possible separation thereof at the edges where the stress is greatest should the adhesive bond be broken. It will be understood that the rear face of the front sheet 11 is not flat because of the reawardly projecting wool tuft bends. For that reason, the adhesive is preferably applied to the adjacent faces of both sheets 11 and 12, though in some cases, a relatively thick coat of adhesive on the front face of the rear sheet is sufficient.

It will be understood that both the edge dished portion of the buff and the central dished portion are self-maintained in position and are more rigid than the intermediate body portion. Should either dished portion yield, as when put under pressure, it resumes its normal dished shape when the pressure thereon it released, being biased permanently toward such normal dished shape. It will also be seen that the side curved area 32 around its entire circumference is provided with an adequate quantity of wool sufficient to prevent contact of any part of the sheets with the work until the buff is worn out and that the objects of the invention have been effectively attained.

While certain specific embodiments of the invention have herein been shown and described, various obvious changes may be made therein without departing from the spirit of the invention defined in the appended claims.

We claim:

1. In a polishing buff, a wool pile, a one piece fabric sheet carrying the pile, a one piece rear fabric sheet having the same initial diameter as that of the front sheet, adhesive securing the sheets together in face to face relation, said sheets having a normally flat central body portion and a dished peripheral portion having an integral bend therein joining said dished portion integrally to the body portion, the dished portion terminating in a free edge of a diameter less than said initial diameter and being permanently biased toward a rearwardly outstanding position and being self-supporting and normally self-maintained in shape and being yieldable under working pressure thereon and resuming the dished shape thereof when pressure thereon is released.

2. The buff of claim 1, the outer marginal portion of the rear sheet overhanging the outer edge of the front sheet and having some wool of the pile adhesively attached thereto and extending from and beyond the front sheet.

3. The buff of claim 1, the adhesive being flexible long-drying moisture-carrying and resistant to dry cleaning solvents and constituting the sole means for maintaining the peripheral portion in the dished form thereof.

4. The buff of claim 1, the adhesive being flexible and

constituting the sole means for maintaining the peripheral portion in the dished form thereof.

5. The buff of claim 1, the wool pile extending to the extreme edge of the front face of the front sheet, and the dished portion being of generally spherical shape.

6. In a polishing buff, a wool pile, a front fabric sheet carrying the pile, a rear fabric sheet on the back of the front sheet, adhesive securing the sheets together in face to face relation, said sheets and the pile having registering central holes therethrough and having a body portion and a peripheral dished portion integrally joined to the body portion by a forwardly convex fillet of relatively large radius, said peripheral portion being permanently biased toward a rearwardly outstanding position and terminating in a yieldable free edge arranged rearwardly of the body portion and being sufficiently resilient of itself to resume the normal dished shape thereof when freed of distorting pressure thereon.

7. In a polishing buff, a wool pile, a front fabric sheet carrying the pile, a rear fabric sheet on the back of the front sheet, adhesive securing the sheets together in face to face relation, and a peripheral dished portion on both sheets maintained in the dished shape thereof solely by the adhesive, said portion terminating in a yieldable free edge and being sufficiently resilient of itself to resume the normal dished shape thereof when freed of distorting pressure thereon, the marginal part of the rear sheet overhanging the edge of the front sheet and having part of the wool pile adhering thereto.

8. The buff of claim 6, the central portion of both sheets surrounding the holes being countersunk rearwardly to provide a recess for the reception of a fastening element.

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