

April 23, 1968

M. MARTON

3,378,961

DISC SANDING APPARATUS

Filed Feb. 24, 1967

2 Sheets-Sheet 1

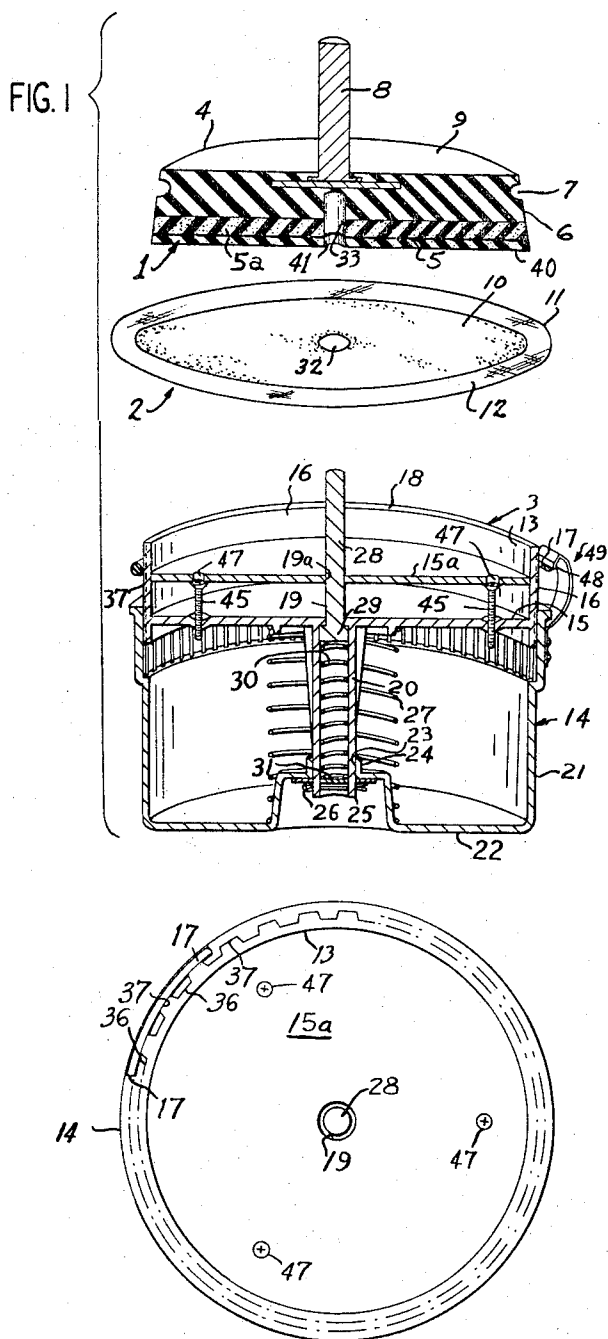


FIG. 2

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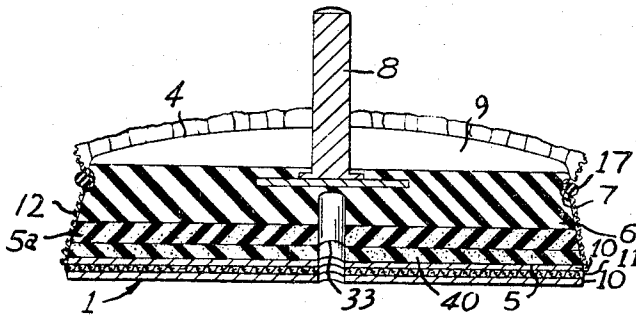


FIG. 3

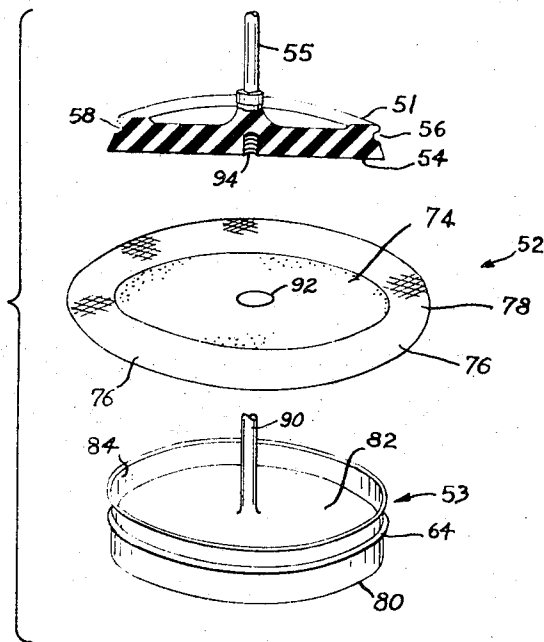


FIG. 4

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DISC SANDING APPARATUS

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Continuation-in-part of application Ser. No. 467,275,
June 28, 1965. This application Feb. 24, 1967, Ser.
No. 618,398

Claims priority, application Canada, Oct. 21, 1966,
973,694

9 Claims. (Cl. 51-275)

ABSTRACT OF THE DISCLOSURE

An apparatus for mounting an apertured circular sheet of material on a disc-shaped mounting member and including a flat base disposed inside a tubular member between the ends thereof, and being spaced a distance from one of the ends corresponding to the distance between the peripheral face of the mounting member and a groove extending around the peripheral side wall thereof. A guide pin is also provided which extends from the center of the base to a position above the above-mentioned end of the tubular member so that the sheet can be centered with respect to the mounting member.

This is a continuation-in-part of application Ser. No. 467,275 filed June 28, 1965, and now abandoned, entitled, Disc Sanding Apparatus.

This invention relates to an apparatus for mounting a sheet of material on a mounting member, and in particular to an apparatus for mounting a sheet of sandpaper on a disc sander mounting member.

In the past, two methods have commonly been used for attaching sandpaper to a disc sander mounting member. In one method a sandpaper disc was bolted to the pressure face of a mounting member by means of a bolt and washer projecting from the mounting member at its centre. In the second method, a sandpaper disc was glued to the pressure face. Since the bolthead and washer projected past the surface of the sandpaper disc, it was impossible to use the centre of the sandpaper disc for sanding, and further, the projecting bolt rendered it difficult in many circumstances to use even the edge of the disc with ease. In addition, when lighter grades of sandpaper were used, they tended to tear loose from the clamping bolt and washer. Recessing the bolthead and washer below the surface of the sandpaper disc normally required an expensive form of manufactured sandpaper, and the problem of tearing of the sandpaper still existed.

In the second commonly used method, a sandpaper disc was glued to the pressure face of a mounting member. This had the advantage that the sandpaper tended to tear and dust tended to get beneath its surface, thus weakening the glue so that the sandpaper came off the mounting member. If the sandpaper disc were glued sufficiently firmly to the mounting member to be able to resist normal sanding stresses, then it became difficult to remove the sanding disc for replacement.

It has now been found that it is advantageous to attach the sandpaper to the mounting member by means of a flexible retaining member which cooperates with an annular groove in the mounting member. The flexible ring can be placed on the mounting member manually but this is somewhat tedious and time consuming.

The object of the present invention is to provide a mounting member, an apparatus for quick and easy mounting of a sanding disc on a mounting member, and a sanding disc particularly suitable for use with the mounting member.

Accordingly, the present invention relates to an

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apparatus for mounting a circular sheet of material on a disc-shaped mounting member of the type having a circular front pressure face and a peripheral side wall extending rearwardly from said pressure face, the pressure face being of a diameter less than that of the sheet of material, the side wall having a groove extending therearound, the groove being spaced substantially uniformly rearwardly of the pressure face by a predetermined distance, and an annular retaining member for overlying the groove and urging the sheet against the side wall of the mounting member. The apparatus comprises a cylindrical lower member having an open end, a dish-shaped upper member having a bottom wall, and a cylindrical side wall extending from the bottom wall to define an open mouth for receiving the mounting member, the upper member being telescopically mounted in the open end of the lower member with a portion of the side wall projecting outwardly beyond the open end, the portion of said upper member extending beyond said lower member being adapted to receive the retaining member about its circumference whereby downward movement of the upper cylinder and the mounting member relative to the lower cylinder causes the retaining member to be urged outwardly of the upper cylinder into the groove of the mounting member. Thus the retaining member may be placed around the side wall portion, the sheet of sandpaper placed across the mouth, the mounting member placed over the sheet and forced into the mouth to press the sheet against the pressure face with the edge of the sheet folded rearwardly over the side wall of the mounting member, to cause the lower member to force the retaining member beyond the end of the side wall of the upper member and into alignment with said groove to clamp the sheet to the mounting member.

In the drawings:

FIGURE 1 is a partly sectional perspective view of one form of apparatus in accordance with the invention,

FIGURE 2 is a top plan view of the apparatus of FIGURE 1,

FIGURE 3 is a partly sectional perspective view of the disc sander with a sand paper disc mounted thereon, and FIGURE 4 is a sectional perspective view of an alternate form of the apparatus of FIGURE 1.

Referring to FIGURE 1, there is shown a preferred form of a mounting member 1, a sheet of sandpaper 2 and a mounting apparatus generally indicated at 3.

The mounting member 1 is made of relatively resilient material, such as rubber, and includes a relatively thin disc 4 with a front pressure face 5 and a peripheral side wall 6 extending rearwardly from the pressure face 5. The side wall 6 is provided with a shallow curved groove 7 extending therearound and spaced substantially uniformly from the pressure face 5. An outwardly extending spindle 8 is provided on a rear surface 9 of the member 1 for connecting the latter to a motor driven chuck, or the like, for rotation of the member.

The pressure face 5 is preferably formed of a layer of sponge rubber 5a secured to the disc 4. The sandpaper sheet 2 is circular and preferably includes a pair of sandpaper discs 10, having a diameter slightly greater than the diameter of pressure face 5. One of the sandpaper discs 10 is mounted, such as by gluing, on each face of a flexible non-abrasive backing sheet 11 made of fabric or the like. The sheet 11 has a larger diameter than the discs and thus includes a peripheral free edge portion 12. It will be appreciated of course that abrasive may be secured directly to one or both faces of the backing sheet 11.

The mounting apparatus 3 includes upper and lower members 13 and 14, respectively, in the form of concentric cylinders, the upper 13 of which is telescopically mounted in the lower cylinder 14.

The upper member 13 includes a base 15 and a peripheral side wall 16 extending upwardly from the base 15 for receiving a flexible retaining member 17. The outer end 18 of cylinder 13 is open defining a mouth for receiving the sandpaper sheet 2 and the mounting member 1. The height of side wall 16 is slightly less than, but approximately equal to the distance between the front pressure face and the groove 7 of the mounting member 1. The base 15 of the cylinder 13 is provided with an aperture 19 and an integral downwardly projecting tube 20 co-axial with the aperture 19.

The lower cylinder 14 includes a side wall 21 and a base 22. The base 22 is provided with an aperture 23 axially aligned with aperture 19 in the base 15 of cylinder 13. A collar 24, co-axial with aperture 23, projects upwardly from base 22 for receiving tube 20. The free end 25 of tube 20 is provided with a cotter pin 26 passing through suitable aligned apertures therein which limits the movement of the upper cylinder 13 outwardly from the lower cylinder 14. A coil spring 27 surrounds tube 20 and bears against bases 15 and 22 to bias the upper cylinder 13 outwardly from the lower cylinder 14.

The apparatus of FIGURE 1 further includes a guide rod 28 spring mounted in the tube 20. The inner end of guide rod 28 is provided with a base 29 having a diameter slightly less than that of the internal diameter of the tube 20. The base 29 and guide rod 28 are biased outwardly of tube 20 by a spring 30 disposed in the tube 20 between the base 29 and a disc 31 is held in the tube 20 adjacent the lower end thereof by the cotter pin 26.

With reference to FIGS. 1 and 2 it will be noted that a false bottom in the form of a circular plate 15a having a centrally located aperture 19a, is provided in the upper cylinder 13. The base 15 is provided with three or more adjustment screws 45 (two of which are shown) extending through suitable threaded apertures in bosses 46. The plate 15a rests on the heads of the screws 45. Access to the heads of the screws is facilitated by the provision of holes 47 in the plate 15a.

The sandpaper sheet 2 is provided with a central aperture 32 through which the guide rod 28 can pass to properly align the sandpaper sheet and the upper cylinder 13.

The mounting member 1 includes a cavity 33 in the centre of the front pressure face 5 for receiving the rod 28 to align the mounting member with the apparatus and with the sandpaper sheet 2.

If a softer pressure face is desired a further disc 40 of sponge rubber or the like having a centrally located aperture 41 may be provided. However the disc 40 is not permanently secured to the disc 4 as will be explained below.

It will be particularly noted that in the apparatus of FIGURE 1 and FIGURE 2 the mating faces of the walls of cylinders 13 and 14 are each provided with alternate interfitting grooves 36 and splines 37. It will also be noted that the retaining member 17 is received on the splines 37 of the upper cylindrical member 13 for reasons to be discussed below.

The use of the apparatus 3 of FIGURE 1 is as follows. The retaining member 17 is stretched and placed around the outside circumference of the upper cylinder 13 adjacent the outer end 18 thereof. The sandpaper disc 10 is placed on the mouth of cylinder 13 with the disc 10 centered with respect to the interior of side wall 16 of the cylinder by the guide rod 28 which extends through the aperture 32. The sponge rubber disc 40 and the mounting member 1 are then placed in position over the sandpaper disc 10 so that the guide rod 28 extends into the cavity 33 and is then pushed quickly down into cylinder 13 thus pressing the disc 10 against the pressure face and folding the peripheral free edge 12 of the sandpaper sheet 2 over the side wall 6 of the mounting member 1. It will be noted that the spring 30 associated with guide rod 28 permits moving of the guide rod 28 simultaneously with the upper cylinder 13. Almost simultane-

ously, the pressure face bears against the base 15a of the cylinder 13 forcing the latter into cylinder 14 against the action of spring 27. As cylinder 13 enters cylinder 14 the retaining member 17 is forced along the wall 16 of cylinder 13 by the upper edge of side wall 21 of lower cylinder 14. When the upper edges of side walls 16 and 21 are approximately flush with each other the retaining member 17 is free to move into the groove 7 and in so doing urges the sandpaper sheet 2 against the mounting member 1.

When the mounting member 1, with the sandpaper sheet secured thereto, is removed from the cylinder 13 the latter is urged outwardly of the cylinder 14 by the coil spring 27. The outward movement of the cylinder 13 is limited by the pin 26 which permits the outer end 18 of the side wall 16 of cylinder 13 to extend beyond the cylinder 14 an amount sufficient to receive ring 17, but does not permit the cylinder 13 to escape outwardly from the cylinder 14.

It will be noted that when the sandpaper sheet 10 is so installed, the peripheral portion 12 has a number of pleats formed therein as it is urged against the side wall 6. These pleats assist the clamping action of the retaining member 17 in holding the sandpaper 2 to the mounting member 1, and since the pleats do not extend over the pressure face 5 to any appreciable extent, due to the inward taper of the side wall, they do not interfere with sanding close to surfaces perpendicular to the work surface. The sandpaper when held on in the fashion shown will sustain tearing in numerous locations before coming dislodged from its mounting.

If a harder pressure face is desired the disc 40 is placed in the cylinder 13 under the sandpaper disc 10 so that the groove 7 will be aligned with the end 18 of the cylinder 13. However, the sponge rubber disc 40 will not be secured to the pad by the sandpaper disc 10 as illustrated in FIG. 3 but will remain in the cylinder 13.

Due to the fact that the retaining member 17 is preferably resilient material such as rubber the member 17 might tend to slip in between the upper cylinder 13 and the lower cylinder 14 as the cylinder 13 is forced down with respect to cylinder 14 if the splines 37 were not provided. The splines 37 of the lower cylinder 14 extend radially inwardly of the retaining member 17 thus ensuring that the retaining member 17 is forced off the upper cylinder 13.

The apparatus of FIG. 1 provides for adjustment of the depth of the upper cylinder 13 in the event that a mounting member having a thickness greater or lesser than the mounting member 1 is used. As indicated above it is important that the effective depth of the cylinder 13 be substantially equal to the distance between the front pressure face and the groove 7 of the mounting member 1. Accordingly if adjustment is required a screw driver is inserted through the holes 46, in the circular plate 15a and the height of the screws 45 advanced or retracted so that when the plate again rests on the heads of the screws 45 the effective depth of the cylinder 13 will be compatible with the mounting member to be used.

It will be appreciated that the rubber retaining member 17 for use with an eight inch diameter mounting member may have a cross-sectional diameter of approximately one quarter of an inch. Since considerable force is required to stretch such a rubber member, a hook 49 is provided to retain the rubber member at one point on the circumference of the cylinder 13 as the member 17 is being stretched therearound.

The hook 49 is preferably fabricated of spring steel and is secured to the lower cylinder 14 as by machine screws. A terminal portion 48 of the hook 49 is disposed immediately adjacent to and parallel with the upper cylinder 13 to prevent escape of the rubber member 17 until the cylinder 13 is moved downwardly during the final step of mounting the sandpaper 2 on the member 1 described in detail above.

A simplified form of the apparatus of FIG. 1 is shown in FIG. 4 including a mounting member 51, a sheet of sand paper 52 and a mounting apparatus generally indicated at 53.

The mounting member 51 is similar to the mounting member 1 described with reference to FIG. 1 and includes a front pressure face 54, a peripheral side wall 56, a groove 58 extending therearound and a spindle 55. A resilient retaining element 64 in the form of a rubber ring is shown in place on the mounting apparatus 53.

The sheet of sandpaper 52 includes at least one central sanding disc 74 of ordinary sand paper secured as by gluing to a flexible nonabrasive backing sheet 76 of fabric or tough plastic. The backing sheet 76 has a greater diameter than the sandpaper 74 and thus a peripheral portion 78 is provided.

The apparatus 53 shown in FIGURE 4 includes a shallow cylinder or application member 80 of diameter just greater than the outer diameter of the mounting member 52. Cylinder 80 preferably includes a flat bottom 82 and a generally upright rim or wall 84 joining the bottom 82 in a slightly curved area to conform to the curve that the sandpaper will make as it is folded around the peripheral edge of pressure face 54. The effective height of the rim 84 internally is approximately equal to the distance between the pressure face 54 and the peripheral groove 58 of the mounting member 51.

The use of the device shown in FIGURE 4 is as follows. The resilient ring 64 is stretched and placed in position around the outside circumference of the cylinder 80. A sand paper disc 52 is then placed on and centered with respect to the upper surface of the rim 84. The mounting member 51 is then placed in position over the sand paper disc 52 and pushed down into the cylinder 80 to a position adjacent the bottom thereof, thus forcing the peripheral portion 78 of the sand paper disc 52 to fold upwardly over the side wall 56 of the mounting member 51. The ring 64 is then rolled upwardly over the upper edge of the cylinder 80 to fall into the curved groove 58 so that it clamps the sand paper disc 52 to the mounting member 51.

Although not absolutely necessary, it is possible to provide the cylinder 80 with a guide pin 90 similar to the guide pin 28 shown in FIG. 1 thus facilitating its use in assembling a sanding disc 52 on a mounting member 1. The guide pin is received in apertures 92 and 94 respectively of the disc 52 and member 51 to align the mounting member and disc. Aligning the mounting member and the sand paper disc 52 is difficult because the latter preferably extends beyond the periphery of the pressure face 54 of the mounting member 51 to prevent the fabric backing sheet 76 from contacting the work surface. Furthermore the inside diameter of the cylinder 80 is greater than the diameter of the mounting member 51 and the cylinder 80 is hidden by the peripheral portion 78 of the sand paper disc 52, thus a centrally located aligning means is extremely desirable.

I claim:

1. An apparatus for mounting a circular sheet of material on a disc-shaped mounting member having a circular front pressure face and a peripheral side wall extending rearwardly from said pressure face, said pressure face being of a diameter less than that of said sheet of material, said side wall having a groove extending therearound, said groove being spaced substantially uniformly rearwardly of said pressure face by a predetermined distance, and an annular retaining member overlying said groove and urging a peripheral portion of said sheet against said side wall of said mounting member; said apparatus comprising a cylindrical lower member having an open end, an upper member having a base, and a cylindrical side wall extending from said base to define an open mouth for receiving said mounting member, said upper member being telescopically mounted in said open end of the lower member with a portion of said side wall

projecting outwardly beyond said open end for receiving said retaining member about the circumference of said outwardly extending portion of said upper member, the height of said side wall being approximately equal to said predetermined distance, whereby said retaining member may be placed around said side wall portion, said sheet placed across said mouth, said mounting member placed over said sheet and forced into said mouth to press said sheet against said pressure face with the edge of said sheet folded rearwardly over the side wall of said mounting member, and to cause said lower member to force said retaining member beyond the end of the side wall of the upper member and into alignment with said groove to secure the peripheral portion of said sheet to said mounting member.

2. The apparatus of claim 1 including guide means for guiding said mounting member in said upper member.

3. The apparatus of claim 2 including spring means urging said upper member outwardly of said lower member, and stop means for limiting the outward movement of said upper member from said lower member.

4. The apparatus of claim 3 wherein said sheet of material includes a central aperture, and the pressure face of said mounting member includes a central cavity, said apparatus including a guide rod projecting upwardly from the centre of the base of said upper member to beyond said mouth for aligning said sheet and said mounting member with the apparatus.

5. The apparatus as claimed in claim 1 including means for axial adjustment of said base relative to said cylindrical side wall of said base.

6. The apparatus as claimed in claim 1 wherein hook means is provided on said cylindrical lower member, said hook means having a free end portion adjacent said upper member to hold said annular retaining member against upward displacement as it is being stretched around the periphery of said upper member.

7. The apparatus of claim 1, wherein mating faces of the walls of the upper and lower cylinders are provided with alternate interfitting grooves and splines.

8. An apparatus for mounting an apertured circular sheet of material on a disc-shaped mounting member having a front pressure face, a central bore, and a groove extending around the peripheral side wall thereof and spaced a predetermined distance from said pressure face; said apparatus comprising a generally tubular member having a cylindrical inner surface; a flat base disposed inside said tubular member between the ends thereof, said base extending transversely to the axis of said tubular member and being spaced a distance from one end thereof not greater than said predetermined distance to define, together with said one end, an open mouthed receptacle for said sheet and said mounting member; and a guide pin extending from the center of said base to a position above said one end and adapted to extend into the aperture in said sheet and into said bore to center said sheet with respect to said mounting member.

9. An apparatus as claimed in claim 8, further comprising resilient means urging said guide pin in a direction away from said base.

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