

March 26, 1963

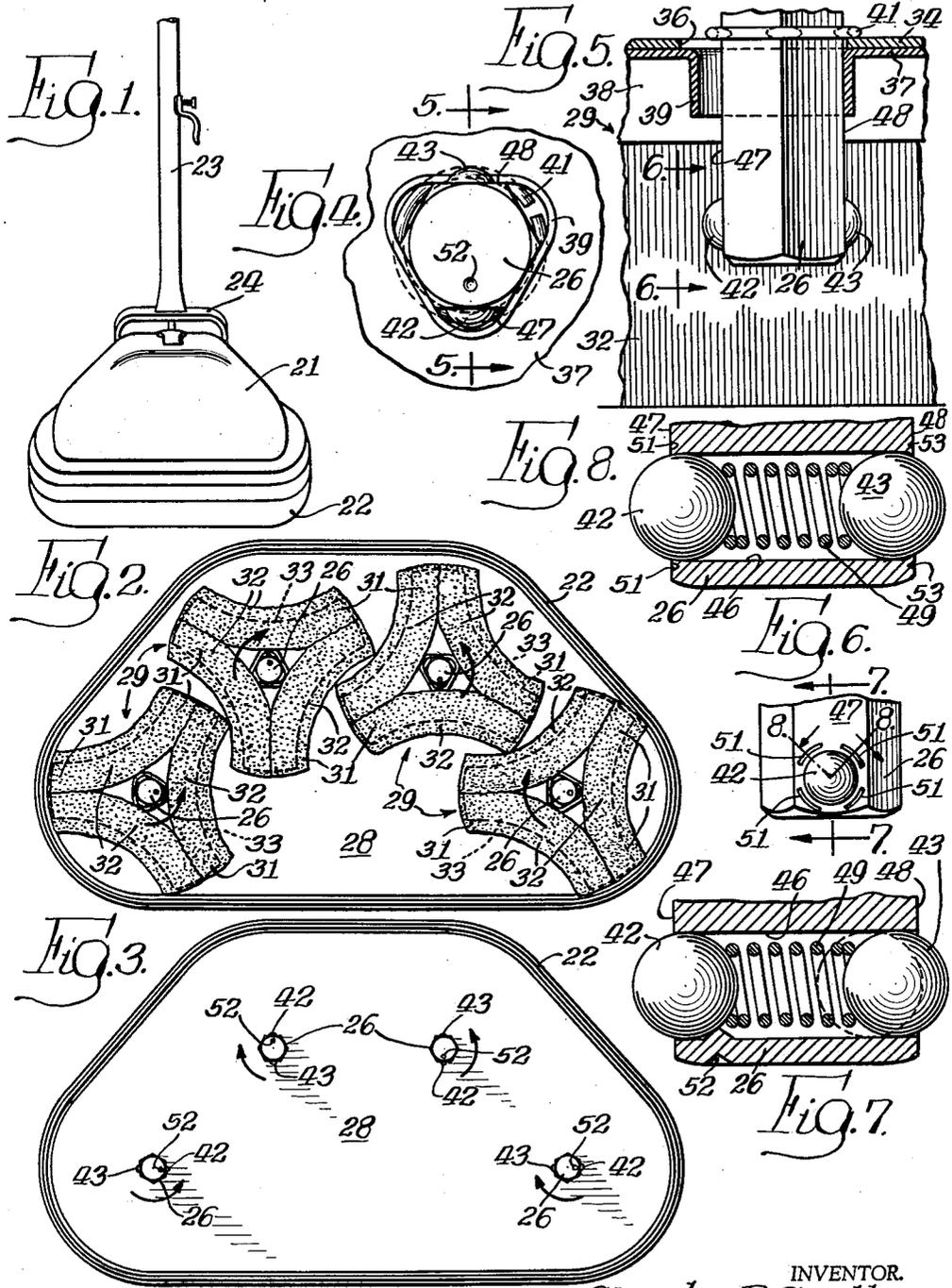
C. B. SMITHSON

3,082,451

ATTACHMENT MOUNTING FOR FLOOR POLISHER OR THE LIKE

Filed July 21, 1961

2 Sheets-Sheet 1



INVENTOR.
Charles B. Smithson,
 BY
Davis, Lindsey, Hillen & Noyes
Attys.

1

2

3,082,451
**ATTACHMENT MOUNTING FOR FLOOR
POLISHER OR THE LIKE**

Charles B. Smithson, Bloomington, Ill., assignor to National Union Electric Corporation, Stamford, Conn., a corporation of Delaware
Filed July 21, 1961, Ser. No. 125,856
6 Claims. (Cl. 15-4)

This invention relates to improvements in motor driven appliances for waxing, polishing, or scrubbing floors and more particularly to a novel and improved means for detachably mounting brushes, pads, or other attachments on such appliances.

Electric floor polishers utilizing a plurality of motor driven rotating brushes are well known. Heretofore, such appliances for home use have been provided with a plurality of round brushes which tend to leave streaks on the polished surface in the area between the brushes. In some instances a plurality of round brushes have been arranged in overlapping relation. However, in the latter case the size of the brush housing or base of the machine has been relatively large. Moreover, the difficulty with streaking persists in spite of such arrangement.

In accordance with the present invention such difficulties are overcome by utilizing unique brush configuration and a special means for detachably mounting the brushes so as to insure proper orientation of the brushes and to eliminate or minimize the streaking problem.

A primary object of the invention is to provide a novel and improved arrangement of intermeshing rotary brushes for a floor waxer and polisher or the like which eliminates or minimizes streaking of the floor surface.

Another object of the invention is to provide a novel and improved detachable mounting means for brushes of the aforementioned type whereby the desired intermeshing relationship is insured.

A further object of the invention is to provide a novel and improved means for detachably mounting brushes and other attachments on a motor driven floor polisher or the like.

An additional object of the invention is to provide a novel and improved means for mounting a flexible polishing or buffing pad on an appliance of the character described.

Still another object of the invention is to provide a novel and improved multiple brush system for a floor polisher or the like characterized by a high degree of compactness.

Other objects and advantages of the invention will become evident from the subsequent detailed description taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a small scale perspective view of a floor polisher embodying the principles of the invention;

FIG. 2 is an enlarged bottom plan view of the polisher shown in FIG. 1;

FIG. 3 is a view similar to FIG. 2 but with the brushes removed;

FIG. 4 is an enlarged fragmentary view of a portion of the structure shown in FIG. 2;

FIG. 5 is a fragmentary sectional view taken along the line 5-5 of FIG. 4;

FIG. 6 is a fragmentary side elevational view of a shaft portion of the device as seen along the line 6-6 of FIG. 5;

FIG. 7 is an enlarged cross-sectional view as seen along the line 7-7 of FIG. 6;

FIG. 8 is an enlarged cross-sectional view as seen along the line 8-8 of FIG. 6;

FIG. 9 is an exploded perspective view showing the manner of assembling and mounting a different type of attachment on the polisher;

FIG. 10 is a sectional view of the assembly of parts shown in FIG. 9;

FIG. 11 is an exploded perspective view showing a modification of the structure illustrated in FIGS. 9 and 10;

FIG. 12 is a fragmentary sectional view of the assembly of parts shown in FIG. 11 as seen along the line 12-12 of FIG. 13;

FIG. 13 is a fragmentary bottom plan view of the structure shown in FIG. 12;

FIG. 14 is a fragmentary elevational view showing another type of attachment mounting; and

FIG. 15 is a sectional view taken along the line 15-15 of FIG. 14.

Referring first to FIGS. 1 to 7, a preferred embodiment of the invention is illustrated in connection with an electric floor polisher having a base or housing 21 with a depending peripheral skirt portion 22 and an operating handle 23 mounted on a bracket 24 swungly secured to the base 21. The base 21 contains an electric motor and a gear train assembly (not shown) for rotatably driving a plurality of stub shafts 26 which project downwardly through a base plate 28 within the confines of the skirt 22. In the illustrated embodiment four such stub shafts 26 are shown but it will be understood that any convenient number of shafts may be employed. Also, the stub shafts 26 as herein illustrated are hexagonal in cross section but other polygonal shapes may also be employed.

Each stub shaft 26 is arranged to mount a brush member, indicated generally at 29, having a plurality of radially projecting brush portions 31. In this instance, each brush member 29 has three elongated brush elements 32 which are arranged in inwardly curved or arcuate fashion so that the end portions of the adjacent brush elements 32 are in side-by-side relation to provide the radially projecting brush portions 31, as seen in FIG. 2. Thus, in the illustrated embodiment each brush member 29 has a generally triangular or cusped configuration. However, it should be understood that other brush designs may also be utilized having any convenient number of radially projecting brush portions.

The brush elements 32 are securely mounted in a brush holder 33, as indicated in dotted lines in FIG. 2. Each brush holder 33 has a flat upper wall 34 (FIG. 5) provided with a central triangular opening 36. A plate 37 having depending flanges 38 is rigidly secured to the underside of the wall 34 of the brush holder and is provided with a central depending tubular boss 39 of triangular cross section aligned with the opening 36. As shown in FIG. 5, when the brush member 29 is mounted on the stub shaft 26, the lower end of the stub shaft projects through the opening 36 and the boss 39 in loosely slidable relation, and a spring ring 41 is mounted on the stub shaft 26 for engaging the wall 34 around the triangular opening 36 so as to limit the extent of upward sliding movement of the brush member 29 on the shaft 26. Although in this instance the opening 36 and the boss 39 have a triangular shape for cooperation with the hexagonal stub shaft 26, it is to be understood that the portions 36 and 39 may have other polygonal shapes to cooperate with the particular polygonal shape of the stub shaft 26.

As hereinafter explained in detail, the brush holder 33 is releasably retained on the stub shaft 26 by means of a pair of ball detents 42 and 43 which project from a pair of oppositely disposed faces of the hexagonal stub shaft 26. Thus, the brush member 29 is slidable to a limited degree on the shaft 26 between the spring ring retainer 41 and the detents 42-43.

As explained below, each brush member 29 is mountable on a stub shaft 26 in one of several predetermined positions such that the radially projecting brush portions

31 of adjacent brush members 29 are disposed in intermeshing and overlapping relationship, as shown in FIG. 2. In this manner the difficulties with streaking, as explained above, are either completely eliminated or greatly minimized. Although the intermeshing principle of the present invention is useful regardless of the number of rotating brushes employed, the particular arrangement employing four brushes as shown in FIG. 2 has special advantages. Thus, the location and spacing of the stub shafts 26 are such that two of the brushes 29 are disposed in laterally spaced relation adjacent the forward edge of the base 21 and the remaining pair of brushes 29 are located intermediate the first mentioned pair and are disposed adjacent the rear edge of the base 21 to provide a highly compact and effective brush pattern. This fore and aft arrangement provides excellent stability so that the polisher can easily stand unattended without tipping over. Furthermore, this particular arrangement of four rotating brushes appears to minimize streaking at the extreme side edges of the polisher.

In FIGS. 6 to 8 the ball detent arrangement for releasably mounting the brush holders on the stub shafts is shown in detail. Thus, the lower end of the stub shaft 26 is provided with a transverse bore 46 extending between a pair of oppositely disposed flat faces 47 and 48 of the hexagonally shaped stub shaft. The ball detents 42 and 43 are disposed at opposite ends of the bore 46 and are urged apart by means of a helical compression spring 49 interposed therebetween. The ball detent 42 is retained in fixed position at one end of the bore 46 by means of a plurality of circumferentially spaced ring stake portions 51 (FIG. 6) in the face 47 of the hexagonal stub shaft 26 and also by an axially extending staked portion 52 (FIG. 7) at the end of the stub shaft 26. Accordingly, the ball detent 42 is prevented from moving outwardly of the bore 46 by means of the staked portions 51 and is prevented from moving inwardly of the bore 46 by the staked portion 52. The center of the fixed ball detent 42 is located just inwardly of the end of the bore 46 such that somewhat less than a hemispherical half of the ball detent 42 projects outwardly from the face 47 of the stub shaft. The ball detent 43 is similarly retained against outward movement by means of ring staked portions 53 (FIG. 8) in the opposite face 48 of the stub shaft 26 but is free to move inwardly of the bore 46 against the action of the spring 49 as illustrated in broken lines in FIG. 7. When the ball 43 is in its outermost projected position, the center of the ball is disposed slightly inwardly of the end of the bore 46 so that a minor spherical portion of the ball 43 projects beyond the face 48.

In mounting a brush member 29 on a stub shaft 26, the brush member 29 must be so oriented that the fixed or immovable ball detent 42 is aligned with one of the corner portions of the triangular openings 36-39 in the brush holder so as to provide a clearance space for receiving the immovable ball detent 42. When the brush member 29 is so oriented, the face 48 of the stub shaft is aligned with one of the flat sides of the tubular boss 39, as best seen in FIG. 5, so that when the brush member is pressed axially onto the stub shaft 26 the depressible ball detent 43 is cammed inwardly by engagement with the edge of the opening 36 and the flat side of the boss 39 and is thereafter projected outwardly when the ball detent 43 has cleared the lower end of the boss 39. With the foregoing arrangement, it will be seen that the brush 29 is mountable on the stub shaft 26 in any one of three different rotary positions corresponding to the positioning of the fixed ball detent 42 in one of the three corner recesses in the aligned openings 36 and 39. The staked portion 52 in the axial end face of each stub shaft 26 also provides a readily apparent mark or index which identifies the immovable ball detent 42 thereby facilitating rapid mounting of the brushes. In other words, the user merely lines up any corner of the triangular opening 36 at the

top of the brush member with the index mark 52 on the stub shaft 26 and pushes the brush into place.

In order to insure the desired intermeshing relationship of the radially projecting brush portions 31 as illustrated in FIG. 2, the triangular openings in the brush holders 33 must be properly oriented with respect to the brush portions 31 and the stub shafts 26 must be so oriented relative to each other by means of the gear train mounting (not shown) that regardless of which of the three possible positions is used for mounting a brush 29 on a stub shaft 26, adjacent brushes will always be disposed in intermeshing relationship. In the illustrated specific embodiment, this is accomplished by locating the three corner recesses of the triangular openings 36-39 in the brush holder adjacent the central portions of the arcuate brush elements 32 and also by locating the fixed ball detents 42 of the respective stub shafts 26 in predetermined relative positions so that when a brush is mounted on any given shaft its radially projecting brush portions 31 will always intermesh with the radially projecting brush portions 31 of adjacent brushes. As viewed in FIGS. 2 and 3, the desired rotating and intermeshing relationship is obtained in this instance by providing clockwise rotation of the upper left and lower right shafts 26 and counterclockwise rotation of the upper right and lower left shafts 26. Thus, each adjacent pair of shafts 26 rotate in opposite directions. In addition, when the shafts 26 are in the positions shown in FIGS. 2 and 3, the immovable ball detent 42 on the upper left shaft 26 extends straight upwardly, the ball detent 42 on the upper right shaft 26 extends straight downwardly, and the ball detents 42 on both lower shafts 26 extend to the right. This relative orientation between the immovable ball detents 42 of the respective shafts 26 is maintained at all times by means of the internal mounting and gear train arrangement (not shown).

It will readily be understood that other arrangements can also be used dependent upon the brush and shaft configurations but in any case the arrangement is always such that the desired rotational intermeshing relationship of the radially projecting brush portions is maintained. By providing each stub shaft with a fixed detent or projection and a depressible detent or projection it is impossible for the user to install the brushes in an improper manner since the movable ball detent can be depressed only when the brush member is properly oriented relative to the stub shaft so that the fixed ball detent is received in one of the triangular corner recesses 36-39 and the movable ball detent is thereby disposed for camming engagement with a straight edge or wall of the triangular opening. In all other positions of the brush member relative to the stub shaft, the unyielding ball detent 42 makes it impossible to press the brush member onto the shaft.

Although the above described arrangement for detachably mounting the polishing brushes 29 on the stub shafts 26 is necessary in order to insure the desired intermeshing relationship between the brushes, the same detachable mounting scheme also permits the mounting of other types of attachments which do not require an intermeshing relationship. The mounting of other types of attachments is illustrated in FIGS. 9 to 13.

Referring first to FIGS. 9 and 10, a circular brush 56 is shown having a circular brush portion 57 which is rigidly secured in a U-shaped channel member 58, the latter being rigidly mounted within a flanged circular metal plate 59. The plate 59 has a triangular opening with a depending tubular boss 61 to permit detachable mounting of the brush 56 on the stub shaft 26 in the same manner as heretofore described in connection with the brushes 29. However, it will be appreciated that with the round brushes 59, there is no intermeshing requirement as in the case of the brushes 29.

FIGS. 9 and 10 also illustrate the manner in which the round brush 56 can be used in conjunction with a

5

circular buffing pad 62. The buffing pad 62 comprises an annular piece 63 of soft buffing or polishing material such as lamb's wool or the like. The portion 63 has a central opening 64 and a disk shaped leather backing 66. The leather backing 66 has a plurality of spirally shaped slits or cuts 67 which intersect at the center of the disk 66 to provide a plurality of flaps 68 which are integrally attached to the disk 66 at their outer ends and are free at their innermost or central ends. The innermost ends of the flaps 68 are provided with openings 69.

For mounting the buffing pad 62 on a stub shaft 26, a pair of flat disks or washers 71 and 72 are provided having apertures 73 and 74, respectively, for alignment with the openings 69 in the flaps 68. As shown in FIG. 10, the washers 71 and 72 are permanently affixed to the flaps 68 by means of fastening elements, such as rivets 76, extending through the apertures 69, 73 and 74 so that the free ends of the flaps 68 are sandwiched between the washers 71 and 72. The washers 71 and 72 are also provided with triangular central openings 77 and 78, respectively, which are aligned to receive the stub shaft 26 in the same manner as previously described in connection with the brushes 29 and 56.

In utilizing the buffing pad 62 the circular brush 56 is first mounted on the stub shaft 26 as illustrated in FIG. 10. Thereafter, the buffing pad 62 is mounted on the stub shaft 26 beneath the round brush 56, the central portion of the polishing material 63 and the flexible flaps 68 being bulged upwardly to accommodate this mounting arrangement, and the lower ends of the brush portion 57 bearing against the outer circumferential portion of the polishing material 63 so as to retain the latter in polishing engagement with the floor or other work surface.

FIGS. 11 to 13 show a different type of buffing or polishing pad comprising a felt disk 81 having a central aperture 82 and a plurality of spiral slits or cuts 83 extending outwardly from the aperture 82. It will be understood that the slits 83 provide a plurality of liftable or distortable flaps to permit the central portion of the felt disk 81 to be bulged upwardly in the same manner as the flaps 68 of the polishing pad 62.

A hub mounting for the felt disk 81 is provided by means of a pair of clamping elements, indicated generally at 84 and 86, and disposed at opposite sides of the disk 81. Each of the clamping elements 84 and 86 comprises a central disk portion 87 having a peripheral flange 88 with a plurality of prongs or barbs 89 extending axially therefrom. The disk portion 87 has a generally triangular opening 91 the corners of which are truncated, as at 92. A plurality of tabs 93 extend axially from the truncated corner edges 92 in the same direction as the prongs 89 and are provided with outer end portions 94 of reduced width. At circumferentially spaced locations intermediate the tabs 93, the disk portion 87 is formed with a plurality of slots 96 and a corresponding number of depressions 97 intermediate the slots 96 and the respective side edges of the triangular opening 91.

The clamping elements 84 and 86 are disposed at opposite sides of the felt pad 81 and are so oriented that, upon being pressed toward each other, the tabs 93 on one clamping element are interposed between the tabs 93 of the other clamping element and all of the tabs 93 engage the edge of the central opening 82 in the felt disk 81, as shown in FIGS. 12 and 13. After being pressed together, the prongs 89 of the respective clamping elements 84 and 86 are embedded in the felt material closely adjacent the opening 82. At the same time, the tab extremities 94 on each clamping element are received in the slots 96 of the opposite clamping element and are then bent radially inwardly so as to lie flat in the depressions 97, as best seen in FIG. 12. Thus, the pair of clamping elements 84 and 86 are secured together in unitary assembled relation with the felt pad 81 clamped therebetween.

As best seen in FIG. 13, the triangular openings 91 of

6

the respective clamping elements are symmetrically offset so as to provide a hexagonal opening in the assembled hub. The pad is then mounted on the end of a stub shaft 26 beneath a previously mounted round bush 56 to cooperate with the latter in the same manner illustrated in FIG. 10 in connection with the polishing pad 62. As shown in FIG. 12, the assembled hub is pressed on to the shaft 26 in a preoriented position such that the immovable ball 42 is aligned with one of the truncated corners of the triangular opening in the upper surface of the hub. The depressible ball detent 43 is cammed inwardly by the action of the opposite straight side of the triangular opening. However, once the ball detent 43 clears this edge, the ball detent is projected outwardly for detachably retaining the pad on the shaft. At the same time, the fixed ball detent 42 engages a straight side of the triangular opening at the lower surface of the hub so as to prevent the pad from being pressed any further onto the shaft 26. This condition is clearly seen in FIG. 12 from which it will also be apparent that the spacing between the disk portions 87 of the upper and lower clamping elements is sufficient to receive the ball detents 42 and 43 therebetween.

FIGS. 14 and 15 illustrate another means of mounting a polishing pad or the like. In this case a cup-shaped mounting or socket element 101 of triangular cross-section is provided having side walls 102 and a base 103. A retaining washer or disk 104 is secured, as by a rivet 106, to the base 103 so as to provide a laterally extending flange around the base of the cup. In use, the cup portion of the mounting element is inserted through a central opening 107 in a felt pad 108 or the like so that the pad is supported on the disk 104. The walls 102 are provided with elongated slots 109 so that the triangular cup 101 can be inserted on the end of the stub shaft 26 in any one of three positions wherein the fixed detent 42 is disposed in a corner portion of the triangular cup and the depressible detent 43 is received in a slot 109. The edge of the slot 109 provides a shoulder or abutment engaging the resiliently projected detent 43 so as to retain the cup and pad on the shaft 26, the elongation of the slot 109 permitting limited shifting of the cup axially of the shaft 26.

Although the invention has been described with particular reference to certain specific structural embodiments thereof, it is to be understood that various alternatives and equivalent structures may be resorted to without departing from the scope of the invention as defined in the appended claims.

I claim:

1. In a floor polisher or the like having a base with at least one projecting driven shaft, the improved means for detachably mounting a rotating attachment on the shaft which comprises a pad of flexible material having a central attaching portion, a pair of clamping elements disposed at opposite sides of said attaching portion, fastening means securing said clamping elements to said attaching portion with the latter sandwiched between said clamping elements, said clamping elements having aligned central openings for receiving the shaft, and means on the shaft for releasably retaining said clamping elements thereon.

2. The structure of claim 1 further characterized in that said central attaching portion of said pad comprises a plurality of flap portions having free inner ends, said clamping elements being secured to said free ends.

3. The structure of claim 1 further characterized in that said clamping elements comprise a pair of flat disks.

4. The structure of claim 1 further characterized in that said clamping elements comprise a pair of disk-shaped elements having a plurality of axially projecting prongs for embedment in said pad and a plurality of foldable tabs for interconnecting the clamping elements.

5. The structure of claim 1 further characterized in that said central attaching portion of said pad is slit

along spiral lines to provide a plurality of expandable flaps having free inner ends, said clamping elements being secured to said free ends.

6. In a floor polisher or the like having a base with a depending driven shaft, the combination of a brush member having a central hub portion detachably mountable on the shaft, a polishing pad having a central mounting portion and an outer portion, said central mounting portion being slit along spiral lines to provide a plurality of flexible flaps having free inner ends, and apertured hub means secured to said free inner ends of said flaps, said flaps being expandable away from the outer portion of said pad for detachably securing said hub means on

the shaft below said hub portion and the lower end of said brush member engaging the outer portion of said pad for reinforcing the latter and retaining the same against a work surface.

References Cited in the file of this patent

UNITED STATES PATENTS

2,148,775 Pond ----- Feb. 28, 1939
2,769,994 Sutton ----- Nov. 13, 1956

FOREIGN PATENTS

811,317 Great Britain ----- Oct. 26, 1956