

Nov. 9, 1965

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3,216,035

SURFACE TREATING APPARATUS

Filed July 11, 1963

5 Sheets-Sheet 1

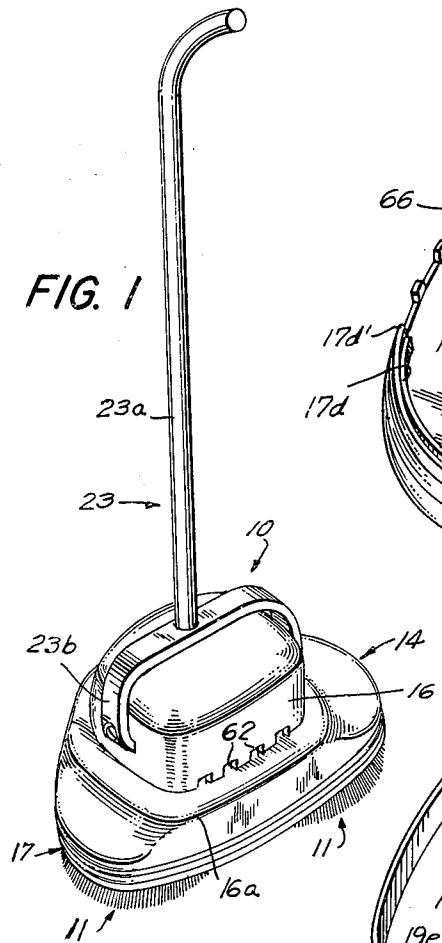


FIG. 1

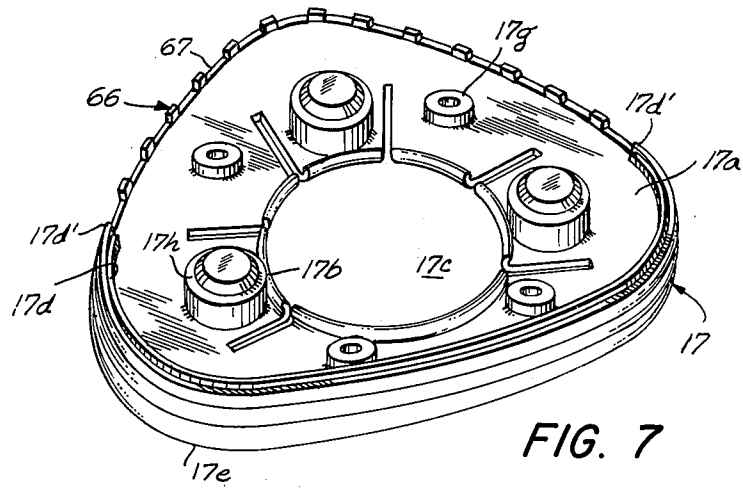


FIG. 7

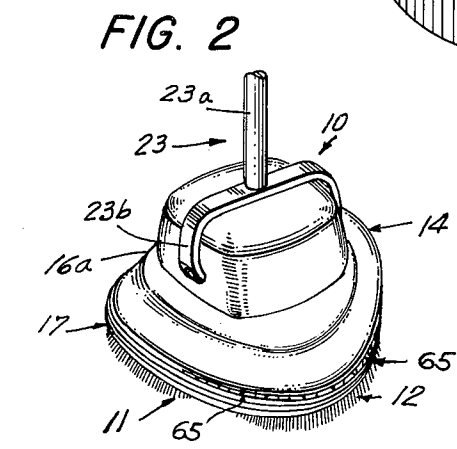


FIG. 2

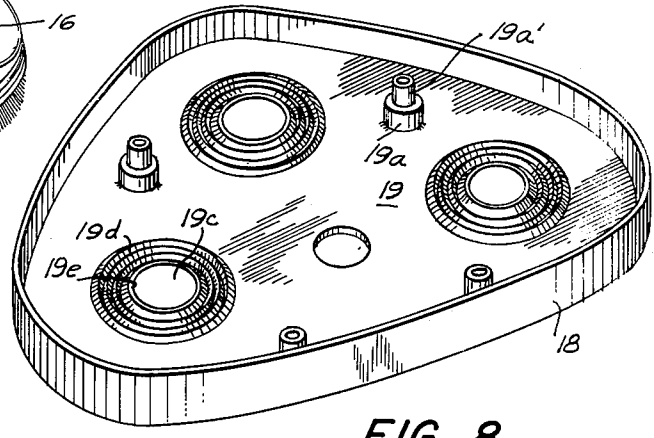


FIG. 8

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5 Sheets-Sheet 2

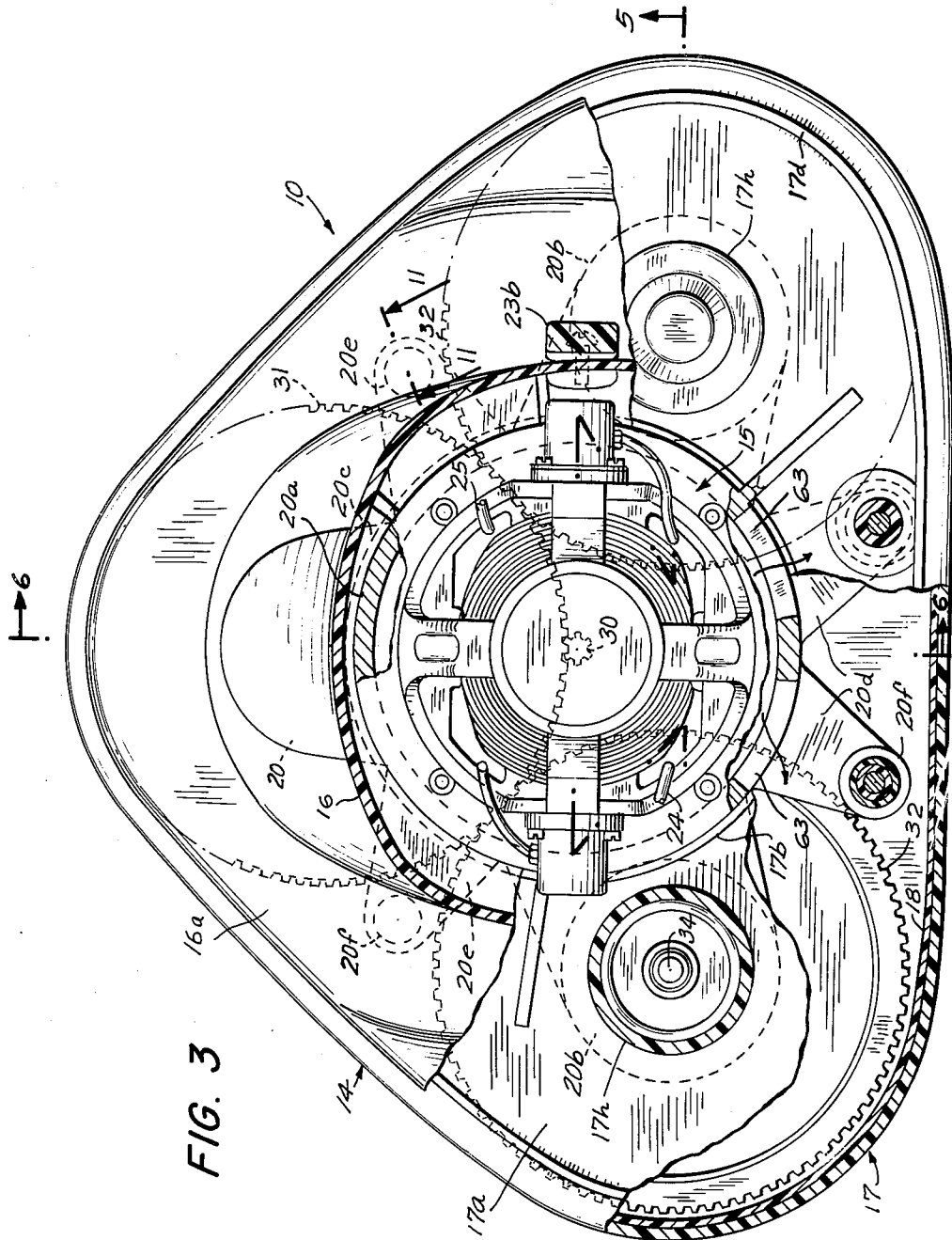


FIG. 3

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SURFACE TREATING APPARATUS

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5 Sheets-Sheet 3

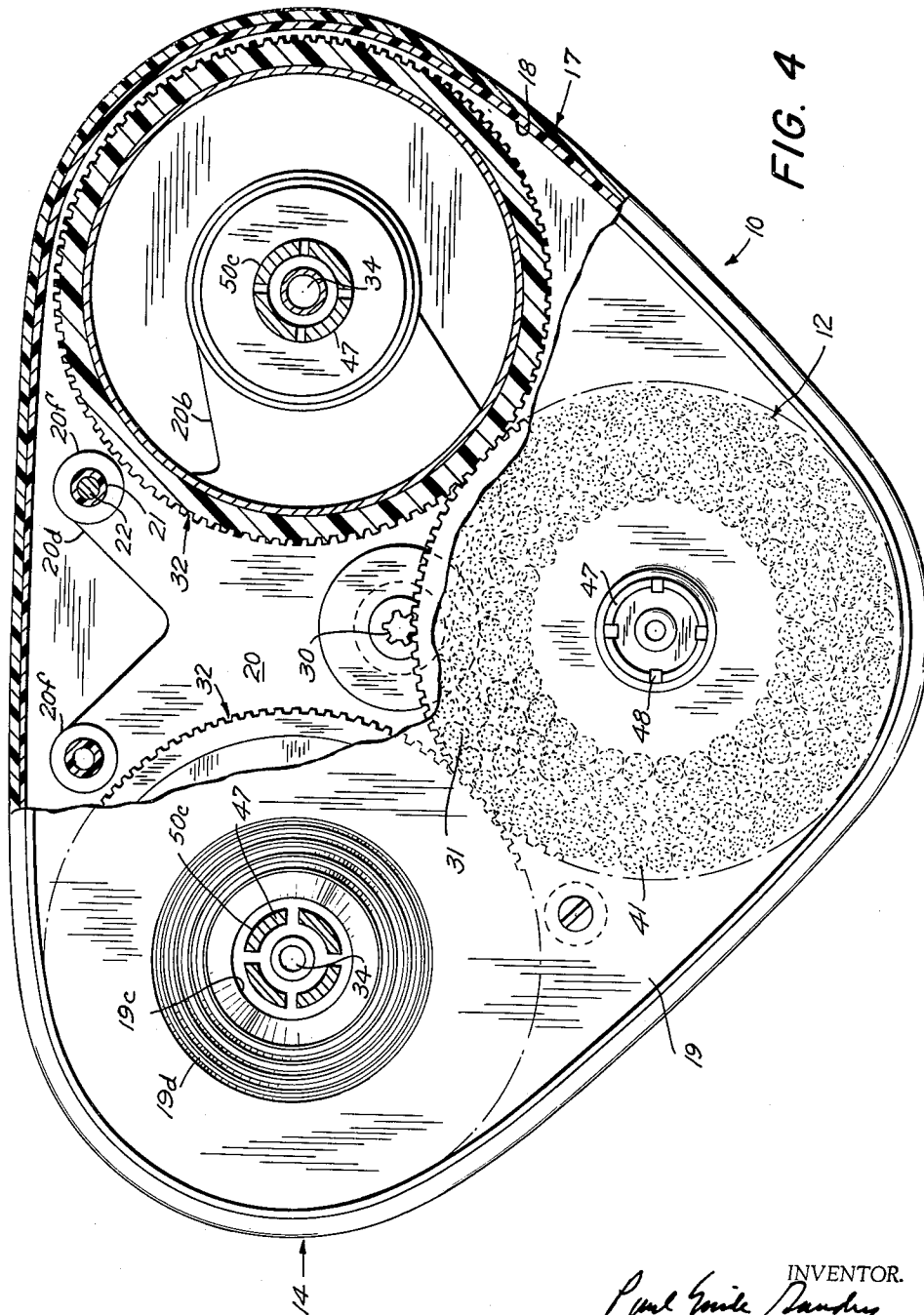


FIG. 4

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SURFACE TREATING APPARATUS

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5 Sheets-Sheet 4

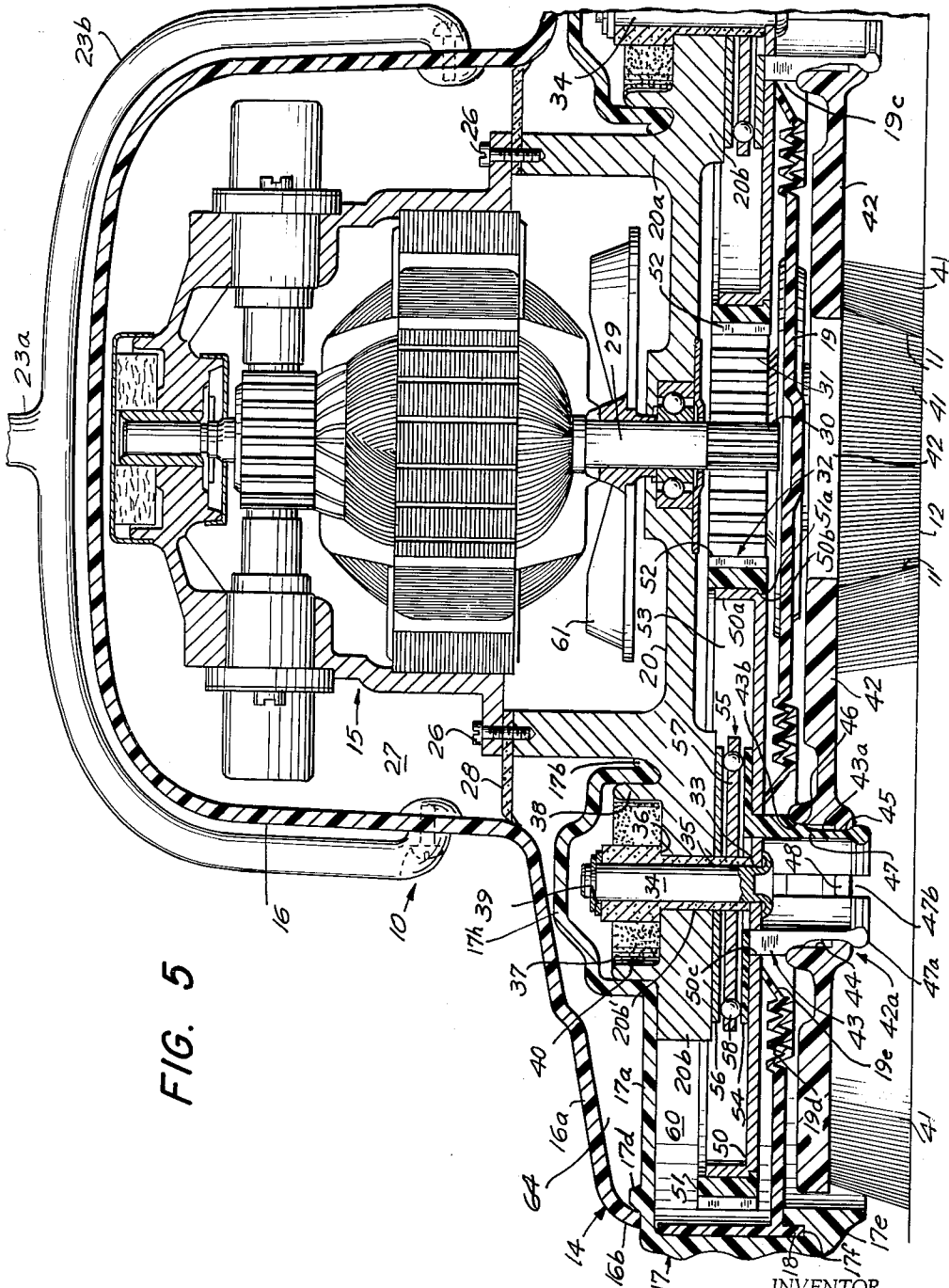


FIG. 5

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SURFACE TREATING APPARATUS

Filed July 11, 1963

5 Sheets-Sheet 5

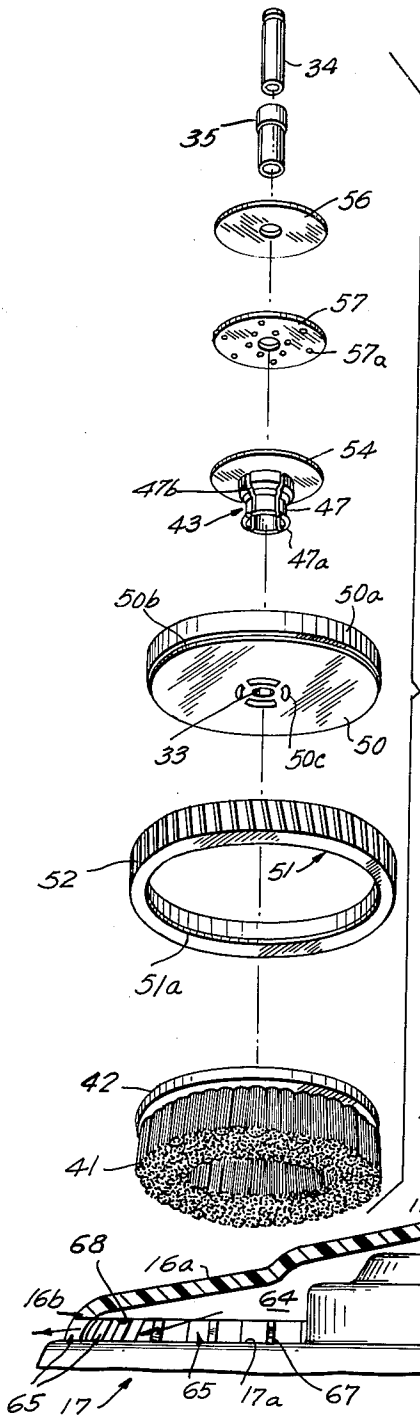


FIG. 9

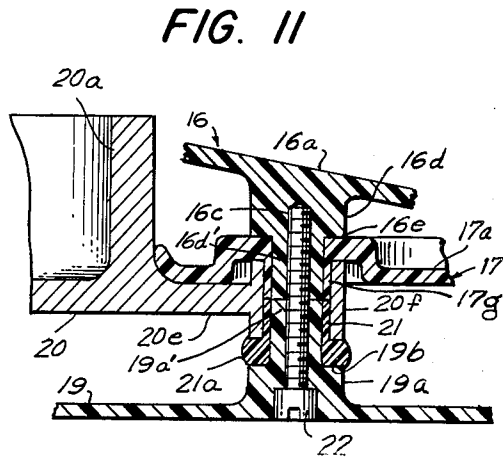


FIG. 11

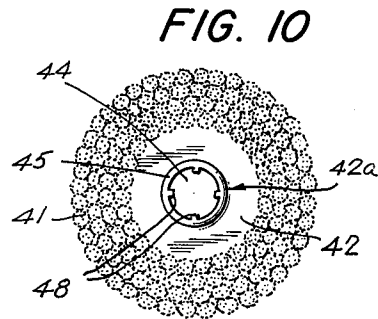


FIG. 10

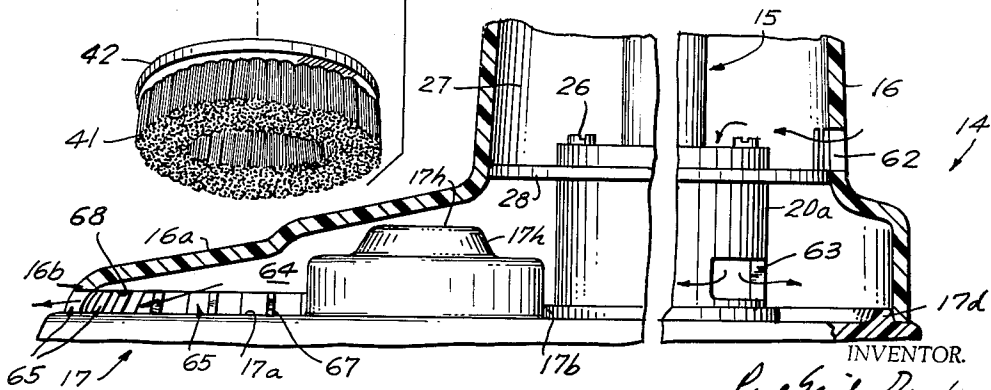


FIG. 6

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**SURFACE TREATING APPARATUS**

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Filed July 11, 1963, Ser. No. 294,381

14 Claims. (Cl. 15-49)

My invention relates to surface treating apparatus hav-  
ing one or more rotatable brushes adapted to be posi-  
tioned on a surface and moved thereover.

It is an object of my invention to provide an improved  
surface treating apparatus which is of simplified construc-  
tion and can be readily assembled.

Another object of the invention is to provide an im-  
proved gear driven surface treating apparatus having an  
improved arrangement for journaling the gears to which  
the brushes are detachably connected.

A further object of the invention is to provide in sur-  
face treating apparatus of this kind wherein the rotatable  
brushes are detachably connected to the gears, an im-  
proved arrangement for journaling the gears so that they  
will not wobble and upward thrust of the brushes will not  
be transmitted to them.

A still further object of the invention is to provide in  
surface treating apparatus of this type an improved gear  
and brush fastening structure constructed as a single unit  
in such manner that the brush fastening structure forms a  
component part of the gear and extends downward from  
its hub portion.

A still further object of the invention is to provide in  
surface treating apparatus an improved gear and brush  
fastening structure constructed as a single unit which in-  
cludes a thrust plate of a thrust bearing assembly as one  
of its components.

A still further object of the invention is to provide such  
an improved gear and brush fastening structure which  
extends axially from the gear through an opening in a  
brush back and includes a plurality of radially movable  
catches which engage an internal shoulder at the opening  
in the brush back.

Further objects and advantages of the invention will  
become apparent as the following description proceeds,  
and the features of novelty which characterize the inven-  
tion will be pointed out with particularity in the claims  
annexed to and forming a part of this specification.

For a better understanding of the invention, reference  
may be had to the following description taken in connec-  
tion with the accompanying drawing, in which:

FIG. 1 is a rear perspective view of surface treating  
apparatus embodying my invention;

FIG. 2 is a front perspective view of the apparatus  
shown in FIG. 1;

FIG. 3 is a top plan view, partly broken away and in  
section, of the apparatus shown in FIGS. 1 and 2;

FIG. 4 is a bottom plan view, partly broken away and  
in section, of the apparatus shown in FIGS. 1, 2 and 3;

FIG. 5 is a vertical sectional view taken at line 5-5  
of FIG. 3;

FIG. 6 is a fragmentary sectional view, partly broken  
away, taken at line 6-6 of FIG. 3;

FIGS. 7 and 8 are perspective views of parts shown in  
FIGS. 3, 4 and 5;

FIG. 9 is an exploded perspective view of parts shown  
in FIGS. 3, 4 and 5 to illustrate details more clearly;

FIG. 10 is a bottom plan view of the brush shown in  
FIG. 9; and

FIG. 11 is a fragmentary sectional view taken at line  
11-11 of FIG. 3.

Referring to the drawing, the invention is shown in  
connection with surface treating apparatus 10 having a  
pair of rotatable brushes 11 and a third brush 12 which

project downward beneath a lower part 14 of a hood  
and are arranged to be driven by an electric motor 15  
housed in an upright casing 16 forming an upper part  
of the hood. The upright casing 16 may be fabricated  
from a suitable rigid plastic and provided with a hori-  
zontally disposed wall or rim 16a at its lower end which  
forms a top for the lower part 14 of the hood. The rim  
16a extends about the upright casing 16 and the outer  
periphery thereof is formed with a downwardly extending  
flange 16b that extends about a part of the bottom part  
14 of the hood in a manner to be described hereinafter.

The lower part 14 of the hood, which is of triangular  
shape, is provided with an annular member 17 of elasto-  
meric material like rubber or plastic, for example, to  
prevent injury not only to the surface treating apparatus  
itself but also to furniture and wall baseboards with  
which the apparatus may accidentally come in contact  
during its manipulation over the surface being treated.  
A horizontal flange 17a extends inward from the top of  
the annular member 17 and terminates at an inner beaded  
edge 17b defining an opening 17c. The top flange 17a  
is provided with a ridge 17d which extends about the  
member 17 along the rear part thereof and along the  
opposing sides to the points 17d' and defines a shoulder,  
as best shown in FIGS. 5 and 7. The flange 16b of the  
rim 16a is the same length as the ridge 17d and bears  
against the shoulder it forms, as shown in FIG. 5.

Hence, the flange 16b coacts with the ridge 17d and  
the ends thereof are located at regions adjacent to the  
points 17d' at which the ends of the ridge are located.  
The bottom of the annular member 17 is formed with a  
collar or flange 17e which extends inward and is formed  
with an open-top U-shaped groove or recess 17f of an-  
nular form to receive the bottom of a rim 18 of an aper-  
tured bottom plate 19. When the rim 16a of the casing  
16, the flange 17a and the bottom plate 19 are fixed to  
a base or frame member 20 in a manner to be described  
presently, the rim 18 of the bottom plate 19 is held be-  
tween the recess 17f in the flange 17e and the underside  
of the flange 17a, and the annular member 17, which  
snugly embraces the rim 18, serves as a side wall or skirt  
of the lower part 14 of the hood. Also, the beaded edge  
17b of the top flange 17a snugly fits about the base of a  
hollow cylindrical collar 20a extending upward from the  
base member 20.

As best shown in FIGS. 3, 4 and 5, the base member  
20 is formed with three outwardly extending brush mount-  
ing arms 20b and 20c, the arms 20b being located at  
the regions of the brushes 11 and the arm 20c being lo-  
cated at the region of the brush 12. Further, the base  
member 20 is formed with two pairs of supporting arms  
20d and 20e which extend outward between the arms  
20b and 20c. As shown in FIG. 11, each of the outer  
ends of the supporting arms 20d and 20e is provided with  
an apertured collar 20f which is in vertical alignment  
with an apertured boss 19a in the bottom plate 19, aper-  
tured collar 17g in the top flange 17a of the member 17  
and a threaded opening 16c formed in a boss 16d at the  
underside of the rim 16a of the casing 16.

A hollow resilient member 21 which may be formed  
of rubber, for example, is disposed between the apertured  
collar 20f and apertured boss 19a. The member 21 in-  
cludes a sleeve portion which fits snugly between the  
collar 20f and the upper reduced end 19a' of the boss 19a,  
and a bottom flange 21a which is held between a shoulder  
19b on the boss 19a and the lower end of the collar 20f.  
The parts being described are secured together by a cap  
screw 22 which threadedly engages the threaded opening  
16c at the underside of the casing rim 16a. Each cap  
screw 22 functions to bring together the upper ends of the  
resilient member 21 and the lower end of the collar 17g  
of the top flange 17a and also bring together the upper

reduced end 19a' of the boss 19a in the bottom plate 19 and the lower reduced end 16d' of the boss 16a at the underside of the casing rim 16a, each boss 16d being formed with a shoulder 16e which draws the flange 17a tightly against the upper edge of the collar 20f of the base member 20. As best shown in FIGS. 4 and 5, the rim 18 forms a side wall which is disposed about and spaced from the base member 20, and the screws 22 support the bottom wall 19 and side wall 18 which form parts of a unitary body, the side wall 18 being supported so that it is essentially at the same level and coextensive with a pinion 30 and gear 32 to be described hereinafter.

The surface treating apparatus is adapted to be manipulated by a handle 23 which includes an elongated rod 23a whose lower end is connected to the closed end of an inverted U-shaped yoke or fork having spaced arms 23b, the lower ends of which are pivotally connected in any suitable manner to the upper part 16 of the hood.

The electrical circuit for the motor 15 includes conductors 24 and 25, as shown in FIG. 3. Although not shown, the conductors 24 and 25 may be connected in a circuit which includes the motor and a switch and an electrical cord which extends exteriorly of the lower part 14 of the hood and is adapted to be connected to a source of electrical supply.

The motor 15 is mounted on the upper end of the cylindrical collar 20a of base member 20 by screws 26, as shown in FIG. 5. Within the casing 16 about the motor 15 is provided a space 27 having a bottom wall formed by a partition 28. The partition 28 is fixed to the upper end of the collar 20a by the screws 26 and extends radially outward to the casing 16.

To the lower end of the vertical motor shaft 29 is fixed a pinion 30 which meshes with a gear 31, as shown in FIGS. 3 and 4. The gear 31 in turn meshes with a pair of gears 32. The gears 31 and 32 are alike and journaled in a similar manner to the ends of the brush mounting arms 20c and 20b, respectively. As shown in FIGS. 5 and 9, each of the gears 31 and 32 is formed with a central opening 33 within which is fixed the lower reduced end of a vertical shaft 34. The shaft 34 extends vertically upward within an opening 20b' in the brush mounting arm 20b forming a part of the base member 20. A sintered porous sleeve bearing 35 formed of bronze, for example, is disposed within the opening 20b' and its upper enlarged end is arranged to seat against an internal shoulder 36 defined by the bottom of an open-top recess 37 having a ring-shaped side wall 38 extending upward from the brush supporting arm 20b. The upper end of the shaft 34 is formed to receive a spring clip 39 which is adapted to rest against the top surface of the porous sleeve bearing 35. The open-top recess 37 provides a ring-shaped cavity in which is disposed absorbent material 40 impregnated with a suitable lubricant. The absorbent material 40 bears against the porous sleeve bearing 35 whereby capillary flow of lubricant is effected through the bearing to lubricate the shaft 34. The top flange 17a of the annular member 17 is formed with three raised parts or domes 17h which fit over the side walls 38 of the open-top recesses 37 and serve as covers for the lubricant impregnated material 40.

The brushes 11 and 12 are alike and detachably connected in a similar manner to the gears 32 and 31, respectively. Each of the brushes 11 and 12 includes tufts of bristles 41 and a brush back 42. Each gear is provided with a downwardly extending central portion 43 of cylindrical form having an outer peripheral surface which is bowed inwardly in an axial direction, as indicated at 43a in FIG. 5. The curved surface 43a is concave and formed to provide a round shoulder 43b at its upper end. The hub 42a of each brush back 42 is formed with a central opening 44 having an internal shoulder 45 at the side thereof facing the bristles 41 and a top portion 46 which is inclined to the vertical and slopes radially outward and conforms to the round shoulder 43b of the

central portion 43 of the gear 32, as shown in FIG. 5. With this construction, the brushes 11 and 12 can assume different angular positions with respect to the vertical axes about which the gears 31 and 32 rotate, whereby the brushes can be in intimate physical contact with surfaces that are not perfectly level.

The bottom central portion 43 of each gear 31 and 32 is slotted axially to form a plurality of axially extending fingers 47 having enlarged bottom ends 47a. The enlarged bottom ends 47a of the fingers function as radially movable catches which are arranged to engage the internal shoulder 45 in the central opening 44 of the brush back 42.

When one of the brushes is detachably mounted on one of the gears with the brush back opening 44 at the vicinity of the catches 47a and the brush is moved axially toward the shoulder 43b of the central portion 43 of the gear, the fingers 47 resiliently flex toward one another and, after passing the narrow portion of the back opening 44, flex radially outward with the catches 47a engaging the internal shoulder 45 to connect the brush to the gear.

When sufficient separating force is applied to the brushes 11 and 12 to remove them from the gears 32 and 31, respectively, the internal shoulders 45, which are inclined to the vertical, act on the catches 47a in such manner that the fingers 47 will flex radially inward to provide clearance between the catches 47a and the central opening 44 in the brush backs 42, whereby the brushes can be detached from the resilient fingers 47.

The hub 42a of each brush back 42 is formed with a plurality of lugs 48 which are disposed between the top and bottom surfaces of the brush back and extend radially inward toward one another at the opening 44 in the brush back. The lugs 48 are located in the gaps 47b between adjacent resilient fingers 47 when the brushes 11 and 12 are detachably connected to the gears. In this manner, the brushes 11 and 12 and gears 32 and 31, respectively, are interlocked, so that positive driving movement will be imparted to the brush backs 42 from the gears 31 and 32 and still permit the brushes 11 and 12 to assume different angular positions with respect to the vertical axes about which the gears 31 and 32 rotate. It will now be understood that the elongated fingers 47 are relatively stiff in a lengthwise direction and resilient and bendable in directions transverse to their length and normally assume first positions in which the catches 47a of the elements 47 engage the shoulder 45 at the opening 44. As explained above, the elements 47 are moved radially inward from the first engaging positions responsive to force applied thereto in directions transverse to their length to provide clearance between the catches 47a and the shoulder 45 whereby each brush 11 can be detached by grasping it and manually moving it axially with respect to the elongated elements 47.

The gears 31 and 32 each include a circular disk 50 having an outer flange or rim 50a and a tire 51 snugly fitting about the rim 50a and having gear teeth 52 formed at its outer periphery. The disk 50 may be formed of metal and the tire 51 molded from a suitable plastic. The ring-shaped tire 51 is expanded by heating and then shrunk on the rim 50a so as to tightly compress the circular disk 50. At the region the rim 50a joins the periphery of the disk 50, the bottom face of the disk is formed with a recess or shoulder 50b to receive an inwardly extending flange 51a at one edge of the tire 51. This construction facilitates positioning the tire 51 on the disk 50 when it is being shrunk thereon.

As shown in FIGURE 5, the disk 50 and rim 50a extending upward therefrom defines an open-top recess 53, the lower end of the shaft 34 being fixed to the central opening 33 in the disk. Each of the gears 31 and 32 further includes a top central plastic portion 54 which is fixed to the disk 50. The top central plastic portion 54 and bottom central portion 43 of each gear may be molded from a single body of plastic, as best shown in

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FIG. 9. Each gear disk 50 is formed with arcuate-shaped slots 50c which are disposed about the central opening 33 therein. The resilient fingers 47 of the bottom central portion 43 of each gear extend through the slots 50c and project downwardly from the bottom face of the gear disk 50, as shown in FIG. 5. Hence, the top central plastic portion 54 and bottom central portion 43 of each gear are integrally joined to one another and the single body of plastic comprising these parts is detachably connected to the disk 50 and interlocked therewith. With this construction, the top central plastic portion 54 bears against the top surface of the disk 50 in good physical contact therewith and forms a unitary part of each gear 31 and 32.

When the brushes 11 and 12 are being rotated during operation of the surface treating apparatus 10, the bristles 41 are carrying the dead weight load of the apparatus and there is a tendency for an upward thrust to be transmitted to the gears 31 and 32. In order to relieve the gears 31 and 32 from this upward thrust or thrust load, a thrust bearing 55 is provided for each rotatable brush and gear unit. The thrust bearing 55 includes the top central plastic portion 54 of each gear which functions as a thrust plate, a back-up disk 56 with which the top central gear portion 54 coacts, and an anti-friction member 57 therebetween which is in the form of a disk having a plurality of openings 57a therein in which ball bearings 58 are retained.

Each back-up disk or thrust plate 56, which is formed with a central opening through which a porous bearing sleeve 35 extends, bears against the underside of one of the brush supporting arms 20b and 20c of the frame member 20. Each anti-friction member 57, which also is formed with a central opening through which the porous bearing sleeve 35 extends, is rotatable with respect to the bearing sleeve. As best shown in FIG. 5, the bearing sleeve 35 is in physical contact with the disk 56 and the anti-friction member 57. With this construction, the thrust bearing 55 effectively prevents the upward thrust of the brushes 11 and 12 from being transmitted to the gears 31 and 32. By eliminating friction in this manner, the gears 31 and 32 can function efficiently to drive the brushes 11 and 12. Also, the thrust bearings 55 function to prevent wobbling of the gear disks 50 at the underside of the frame member 20.

The gears 31 and 32 and pinion 30 at the lower end of the motor shaft are disposed in a space 60 having a top wall which includes the flange 17a of annular member 17 and the base member 20, a bottom wall which includes the bottom closure plate 19, and a side wall which includes the rim 18 of the bottom closure plate 19 and the annular member 17. The bottom closure plate 19 is formed with openings 19c through which the bottom central parts 43 of the gears project downward, as shown in FIG. 5. Hence, the gears 31 and 32 are disposed above the bottom closure plate 19 and the brushes 11 and 12 are positioned beneath the bottom closure plate. The bottom closure plate 19, at the regions of the openings 19c therein, is formed with disk-shaped corrugated zones 19d having their inner peripheral edges 19e inclined upward and bearing against the bottom surfaces of the gear disks 50, as shown in FIGS. 5 and 8. The flexible or resilient corrugated zones 19d effectively seal the space 60 during operation of the surface treating apparatus, so that dust and cleaning and treating agents cannot enter within the space in which the driving mechanism for the brushes 11 and 12 is housed.

During operation of the surface treating apparatus 10, air is circulated therethrough by a fan 61 fixed to the motor shaft 29, as shown in FIG. 5. The fan 61 is effective to draw air into the space 27 through a plurality of openings 62 formed at the rear side of the casing 16 adjacent to the top of the lower part 14 of the hood, as shown in FIGS. 1 and 6. By providing the partition 28 which defines the bottom wall of the space 27, air drawn into the space can only flow vertically downward through

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the interior of the motor 15 to effect cooling thereof. As shown in FIG. 6, air is discharged from the lower end of the motor 15 through a number of openings 63 formed in the collar 20a of the base member 20 at the rear of the surface treating apparatus 10.

The air flows through the openings 63 into a space 64 of annular form which is defined by the collar 20a, flange 17a of the annular member 17, rim 16a of the casing 16, and the partition 28. The air flows through the space 64 to the front of the surface treating apparatus 10 and is discharged exteriorly of the lower part 14 of the hood through openings 65, as shown in FIGS. 2 and 6.

Referring to FIG. 7, it will be seen that the ridge 17d in the flange 17a extends rearward from the points 17d' at opposing sides of the hood and across the rear of the apparatus, as previously explained. At the front of the hood, between the points 17d', the annular member 17 is formed with an upwardly extending flange 66 having notches 67 formed therein. The flange 16b of the lower rim 16a of the casing 16 is formed with an elongated recess 68 which coacts with the flange 66 of the annular member 17 and closes the upper open ends of the notches 67 to provide the discharge openings 65.

Although a particular embodiment of the invention has been shown and described, it will be apparent to those skilled in the art that various modifications and changes may be made without departing from the spirit and scope of the invention, as pointed out in the following claims.

I claim:

1. In a surface treating apparatus (10) of the class described, a rotatable member (32) adapted to be positioned over a surface for rotation about a vertical axis and be moved over the surface, a brush (11) including a brush back (42) and bristles (41) fixed thereto, said brush back (42) having a centrally disposed opening (44) extending therethrough defining an internal shoulder (45), said rotatable member (32) including means (43) forming a unitary part thereof for detachably connecting said brush back (42) thereto, said detachable connecting means (43) comprising fastening structure (47) which is carried by and extends axially from said rotatable member (32) through the opening (44) in said brush back (42) and includes a plurality of elongated elements (47) having radially movable catches (47a), said elongated elements (47) being relatively stiff in a lengthwise direction and resilient and bendable in directions transverse to their length and normally assuming first positions in which said catches (47a) engage the shoulder (45) at the opening (44), said elongated elements (47) being movable radially inward from the first engaging positions responsive to force applied thereto in directions transverse to their length to provide clearance between said catches (47a) and the shoulder (45) at the opening (44) in said brush back (42) whereby said brush (11) can be detached from said fastening structure (43) by grasping said brush and manually moving the latter axially with respect to said elongated elements (47), and said brush back (42) and said rotatable member (32) having cooperating interlocking parts (48, 47) for imparting movement to said brush (11) from said rotatable member (32) when said brush back (42) is connected thereto.

2. Apparatus as set forth in claim 1 in which said rotatable member (32) has an apertured hub portion (50c) and said detachable connecting means (43) includes a first part (54) overlying the top face of said rotatable member (32) and a second part formed by said fastening structure (47) which extends through the apertured hub portion (50c) and axially from said rotatable member (32).

3. Apparatus as set forth in claim 1 in which said radially movable elongated elements (47) of said fastening structure comprise fingers (47) defining a split hollow sleeve, said fingers (47) having gaps (47b) therebetween, and said brush back (42) having at least one lug (48)



extending radially inward at the opening (44) therein into one of the gaps (47b) for interlocking said brush back (42) and said rotatable member (32) for imparting movement to said brush (11) from said rotatable member (32) when said brush back (42) is connected thereto.

4. In surface treating apparatus (10) of the class described, a rotatable member (32) adapted to be positioned over a surface for rotation about a vertical axis and be moved over the surface, a brush (11) including a brush back (42) and bristles (41) fixed thereto, said brush back (42) having a centrally disposed opening (44) extending therethrough defining an internal shoulder (45), said rotatable member (32) including means (43) for detachably connecting said brush back (42) thereto, said detachable connecting means (43) comprising fastening structure (47) which extends axially from said rotatable member (32) through the opening (44) in said brush back (42) and includes a plurality of radially movable catches (47a) which engage the shoulder (45) at the opening (44), said catches (47a) being movable radially inward to provide clearance between said catches (47a) and the shoulder (45) at the opening (44) in said brush back (42) whereby said brush (11) can be detached from said fastening structure (43), said brush back (42) and said rotatable member (32) having cooperating interlocking parts (48, 47) for imparting movement to said brush (11) from said rotatable member (32) when said brush back (42) is connected thereto, said radially movable catches (47a) of said fastening structure comprising fingers (47) defining a split hollow sleeve, the outer periphery of the hollow sleeve defined by the fingers (47) being bowed inward (43a) in an axial direction and providing a curved external shoulder (43b) at a region removed from the catches (47a), and the brush back (42) at an enlarged portion of the opening (44) therein having a surface which conforms to said curved external shoulder (43b) and over which it is movable to enable said brush back (42) to move angularly with respect to said rotatable member (32) when said brush back (42) is connected thereto by said catches (47a).

5. In surface treating apparatus (10), a base member (20), an electric motor (15) mounted on said base member (20), a shaft (29) driven by said motor (15) which depends downward therefrom to the underside of said base member (20), at least one gear (32) rotatable about a vertical axis at the underside of said base member (20), means including a pinion (30) at the lower end of said motor-driven shaft (29) for driving said gear (32), said base member (20) having a bearing seat (20b', 36), tion (33) of said gear (32) and extending upward into a gear shaft (34) fixed at its lower end to the hub portion (33) of said gear (32) and extending upward into said base member (20), a bearing (35) seated in said bearing seat (20b', 36) for journaling said gear shaft (34), a brush (11) including a back (42) and bristles (41) fixed thereto, said brush back (42) having a centrally disposed opening (44) extending therethrough defining an internal shoulder (45), said gear (32) including means (43) which forms a unitary part thereof and extends axially downward from its hub portion (50c) through the opening (44) in said brush back (42) and coacts with the internal shoulder (45) for detachably connecting said brush back (42) thereto, said brush back (42) and said gear (32) having cooperating interlocking parts (48, 47) for imparting movement to said brush (11) from said gear (32) when said brush back (42) is connected thereto, and a thrust bearing (55) to relieve the upward thrust transmitted from said brush (11) to said gear (32) comprising a first backing-up thrust plate (56) at the underside of said base member (20) through which said gear shaft (34) extends and with respect to which said gear shaft (34) is rotatable and a second thrust plate (54) which is disposed about the axis of

said gear shaft (34) and fixed to the top side of said gear (32), means (57, 58) at the opposing faces of said first (56) and second (54) thrust plates for reducing friction therebetween, a vertically extending side wall (18) disposed about said pinion (30) and said gear (32), said pinion (30) and gear (32) being disposed in a space (60) defined by said side wall (18) and a top wall which includes said base member (20) and a bottom wall which comprises a closure plate (19), said bottom wall (19) having an opening (19c) through which said brush back connecting means (43) extends, said brush (11) being disposed at the underside of said closure plate (19) when said brush back (42) is connected to said gear (32), and means (22) for detachably connecting said closure plate to said base member (20), said closure plate (19) including ring-shaped resilient means (19d) disposed about the opening (19c) therein which bears against the underside of said gear (32).

6. In surface treating apparatus (10), a base member (20), an electric motor (15) mounted on said base member (20), a vertical shaft (29) driven by said motor (15) which depends vertically downward therefrom to the underside of said base member (20), at least one gear (32) rotatable about a vertical axis, means including a pinion (30) fixed to said motor-driven shaft (29) for driving said gear (32), said pinion (30) and said gear (32) being disposed essentially at the same level closely adjacent to the underside of said base member (20), said base member (20) having a bore (20b') provided with an internal shoulder (36), an apertured bearing member (35) vertically disposed in the bore (20b') and seated on the internal shoulder (36) thereof, a body (40) of absorbent material accessible at the top side of said base member (20) for lubricant which contacts said apertured bearing member (35) for supplying lubricant thereto, a vertical gear shaft (34) which is fixed at its lower end to the hub portion (33) of said gear (32) and extends upward from the underside of said base member (20) through said apertured bearing member (35) which functions to journal said gear shaft (34), a brush (11) including a brush back (42) and bristles (41) fixed thereto, said brush back (42) having a centrally disposed opening (44) extending therethrough defining an internal shoulder (45), said gear (32) including means (43) which forms a unitary part thereof and extends axially downward from its hub portion (50c) through the opening (44) in said brush back (42) and coacts with the internal shoulder (45) for detachably connecting said brush back (42) thereto, and said brush back (42) and said gear (32) having cooperating interlocking parts (48, 47) for imparting movement to said brush (11) from said gear (32) when said brush back (42) is connected thereto.

7. Apparatus as set forth in claim 6 including structure at the top side of said base member (20) for supporting the upper end of said vertical gear shaft (34) on said base member (20), said supporting structure including a resilient means (39) which is held on said vertical gear shaft (34) at its upper end and bears against the upper end of said bearing member (35).

8. In surface treating apparatus (10), a base member (20), an electric motor (15) mounted on said base member (20), a vertical shaft (29) driven by said motor (15) which depends downward therefrom to the underside of said base member (20), at least one gear (32) rotatable about a vertical axis, means including a pinion (30) fixed to said motor-driven shaft (29) for driving said gear (32), said pinion (30) and said gear (32) being disposed essentially at the same level closely adjacent to the underside of said base member (20), said base member (20) having a bearing seat (20b', 36), an apertured bearing (35) seated in said bearing seat (20b', 36), a vertical gear shaft (34) which is fixed at its lower end to the hub portion (33) of said gear (32) and extends upward from the underside of said base member (20)

through said apertured bearing (35) which functions to journal said gear shaft (34), a brush (11) including a back (42) and bristles (41) fixed thereto, said brush back (42) having a centrally disposed opening (44) extending therethrough defining an internal shoulder (45), said gear (32) including means (43) which forms a unitary part thereof and extends axially downward from its hub portion (50c) through the opening (44) in said brush back (42) and coacts with the internal shoulder (45) for detachably connecting said brush back (42) thereto, said brush back (42) and said gear (32) having cooperating interlocking parts (48, 47) for imparting movement to said brush (11) from said gear (32) when said brush back (42) is connected thereto, a thrust bearing (55) to relieve the upward thrust transmitted from said brush (11) to said gear (32) comprising a first backing-up thrust plate (56) at the underside of said base member (20) through which said gear shaft (34) extends and with respect to which said gear shaft (34) is rotatable and a second thrust plate (54) which is disposed about the axis of said gear shaft (34) and fixed to the top side of said gear (32), and means (57, 58) at the opposing faces of said first (56) and second (54) thrust plates for reducing friction therebetween.

9. Apparatus as set forth in claim 8 in which said gear (32) has one or more openings (50c) at its hub portion (33) and said brush back connecting means (43) includes a first part (54) which overlies the top face of said gear (32) and forms said second thrust plate (54) and a second part (47) which extends downward through the one or more openings (50c) in said hub portion (33).

10. Apparatus as set forth in claim 8 in which said bearing (35) is in the form of a hollow sleeve which extends downward in said base member (20) through said first thrust plate (56) and is in physical contact therewith, and means (40) accessible at the top side of said base member (20) for supplying lubricant to the upper end of said bearing (35).

11. Apparatus as set forth in claim 8 in which said friction reducing means comprises ball-bearing anti-friction means (57, 58) disposed between said first (56) and second (54) thrust plates.

12. Apparatus as set forth in claim 8 which includes a vertically extending side wall (18) disposed about said pinion (30) and said gear (32), said pinion (30) and gear (32) being disposed in a space (60) defined by said side wall (18) and a top wall which includes said base member (20) and a bottom wall which comprises a closure plate (19), said bottom wall (19) having an opening (19c) through which said brush back connecting means (43) extends, said brush (11) being disposed at the underside of said closure plate (19) when said brush back (42) is connected to said gear (32), and means (22) for detachably connecting said closure plate to said base member (20).

13. In surface treating apparatus (10), a base member (20), an electric motor (15) mounted on said base member (20), a vertical shaft (29) driven by said motor (15) which depends vertically downward therefrom to the un-

derside of said base member (20), at least one gear (32) rotatable about a vertical axis, means including a pinion (30) fixed to said motor-driven shaft (29) for driving said gear (32), said pinion (30) and said gear (32) being disposed essentially at the same level closely adjacent to the underside of said base member (20), apertured bearing means (35) on said base member (20), a vertical gear shaft (34) which is fixed at its lower end to the hub portion (33) of said gear (32) and extends upward from the underside of said base member (20) through said apertured bearing means (35) which functions to journal said gear shaft (34), a brush (11) including a brush back (42) and bristles (41) fixed thereto, structure (43, 47, 48) connecting said brush back (42) to said gear (32) at the underside thereof and for interlocking said brush back (42) with said gear (32), a housing (16) for said motor (15) which overlies said base member (20) and is provided with a downwardly extending flange (16b) at its lower edge, a vertically extending side wall (18) which is disposed about said base member (20) and spaced therefrom, means (19, 22) at the underside of said base member (20) for supporting said side wall (18) vertically coextensive with said pinion (30) and said gear (32), a skirt (17) formed of elastomeric material which is disposed about and overlies said side wall (18), the upper part of said skirt (17) having a first inwardly extending flange (17a) disposed between the downwardly extending flange (16b) of said housing (16) and the upper edge of said side wall (18), and said skirt (17) having a second inwardly extending flange (17e) which acts against the lower edge of said side wall (18).

14. Apparatus as set forth in claim 13 in which said gear (32) and said pinion (30) are disposed in a space (60) defined by said side wall (18) and a top wall (17a, 20) which includes said base member (20) and a bottom wall which comprises a closure plate (19), said bottom wall (19) having an opening (19c) through which said brush back connecting means (43) extends, said brush (11) being disposed at the underside of said closure plate (19) when said brush back (42) is connected to said gear (32), said side wall (18) and said closure plate (19) forming parts of a unitary body (18, 19), and the second inwardly extending flange (17e) of said skirt (17) having a U-shaped groove (17f) which receives an edge portion of said body (18, 19) at the outer periphery of said body (18, 19).

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