

Dec. 30, 1941.

F. E. BROBERG

2,268,015

FLOOR POLISHER

Filed Jan. 3, 1941

2 Sheets-Sheet 1

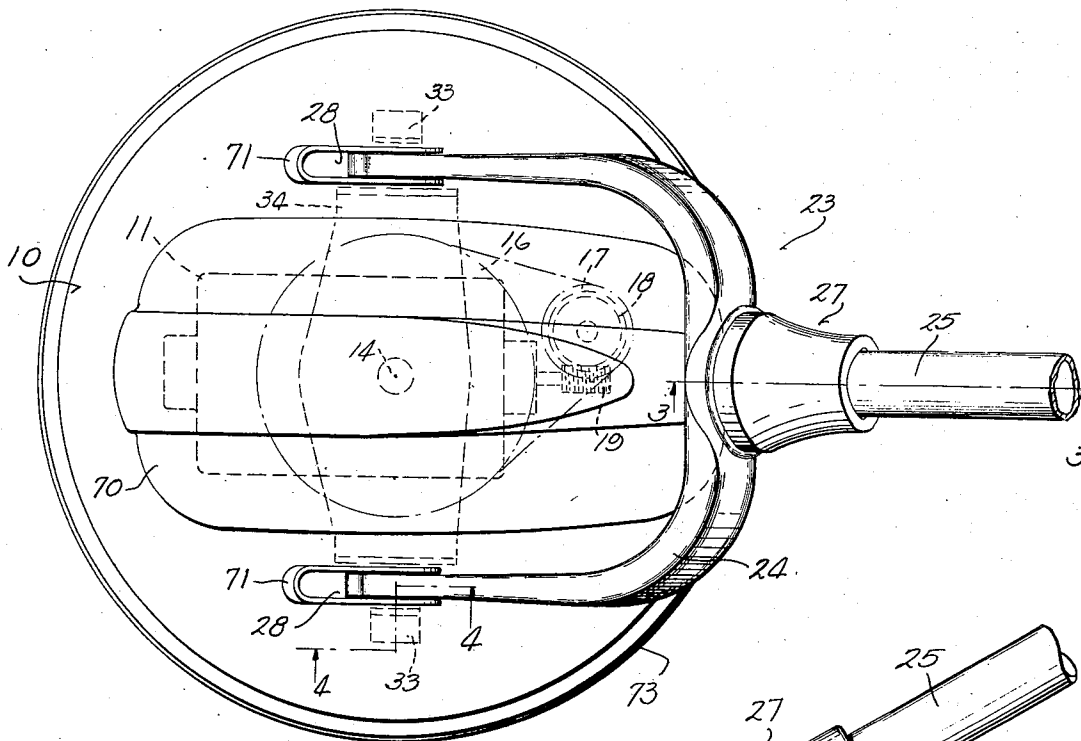


Fig. 1.

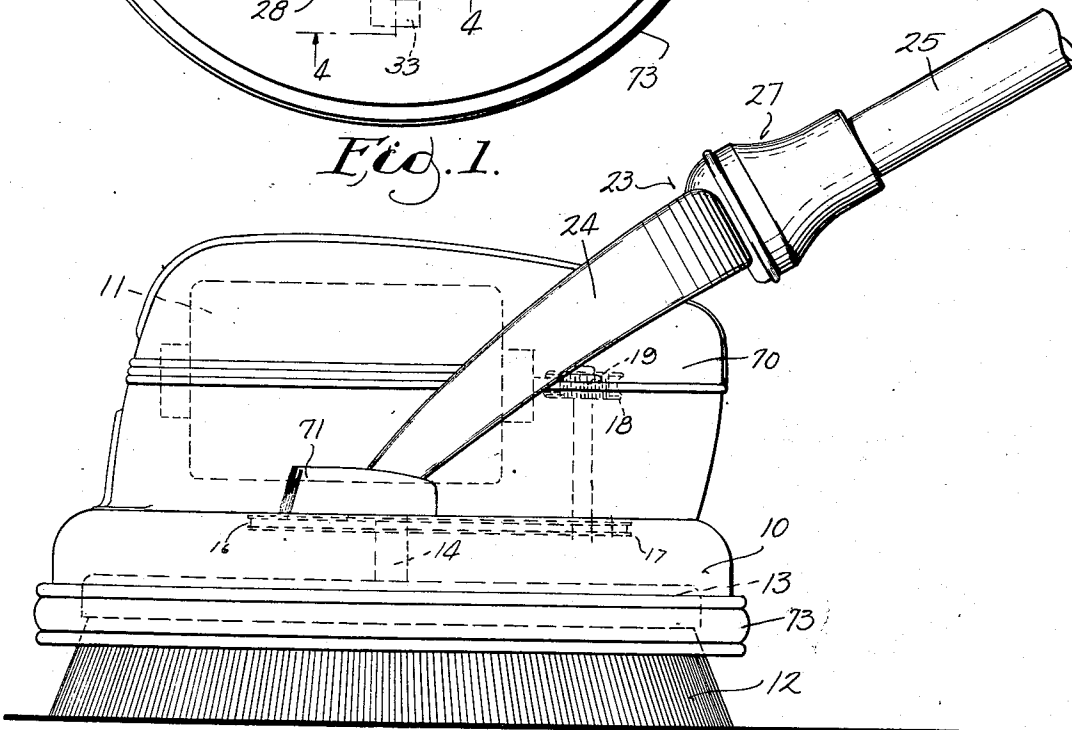


Fig. 2.

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2 Sheets-Sheet 2

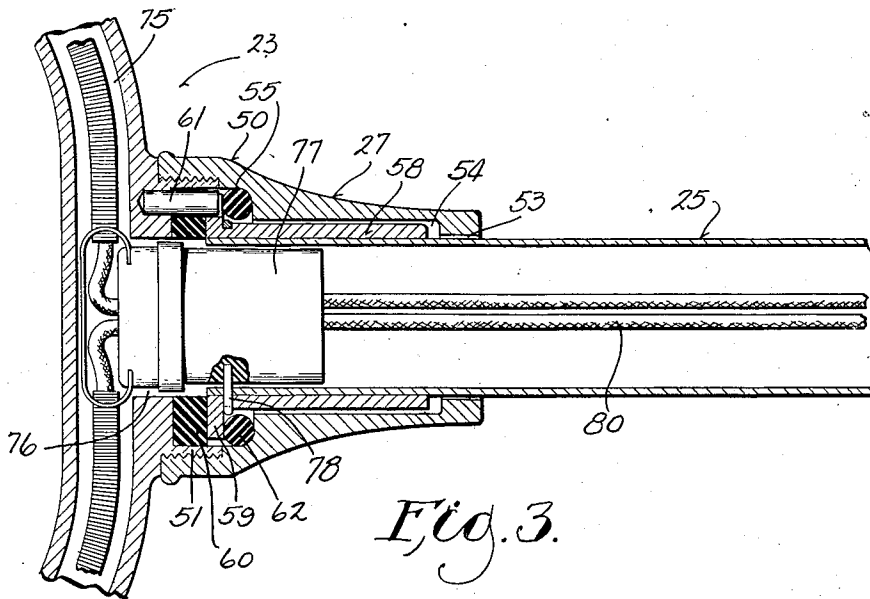


Fig. 3.

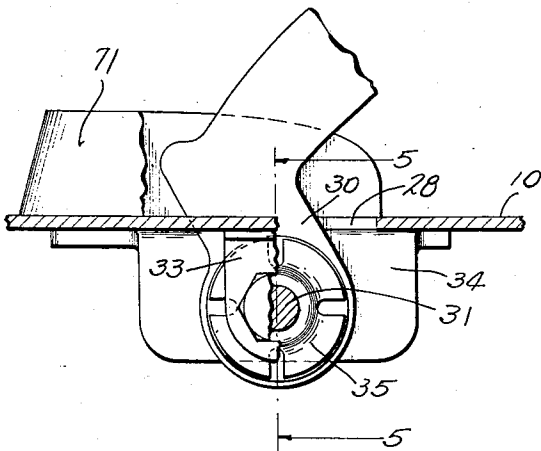


Fig. 4.

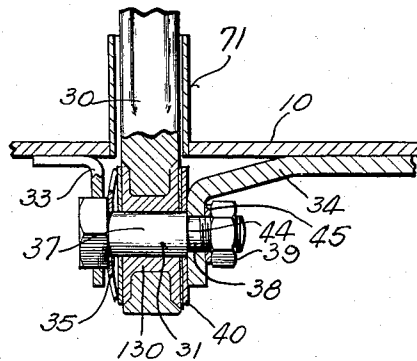


Fig. 5.

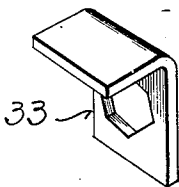


Fig. 6.

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UNITED STATES PATENT OFFICE

2,268,015

FLOOR POLISHER

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Application January 3, 1941, Serial No. 373,019

13 Claims. (Cl. 15—49)

This invention relates to polishers and in particular it relates to improvements in high-speed motor driven floor polishers.

Floor polishers may be conveniently grouped into slow speed heavy devices and relatively light weight devices adapted to operate at higher speeds. Heavy polishers are unwieldy of manipulation and require a large motor with its accompanying high cost of manufacture and maintenance. High speed disk brush polishers of relatively light weight, while economical of manufacture, have not thus far been entirely satisfactory.

It is therefore a primary object of my invention to provide an improved light weight polisher of the type employing a brush which rotates about a vertical axis and wherein the brush provides the sole support for the motor and its mounting structure, whereby higher brush speeds than have heretofore been thought practical may be safely employed with a resultant increase in the work capacity of the device.

A further object of the invention resides in the provision of improved means for the manual control of a high speed polisher of the disk brush type.

More specifically it is an object of this invention to provide a polisher of the single disk type with an improved handle which permits stabilization of the polishing brush during its high speed rotation in contact with surfaces which set up unbalanced torsional stresses within the brush.

A still further object is to provide a handle controlled polisher of the above type with resilient means within the handle to allow relative movement between portions thereof for the absorption of torsional stresses and vibrations which, if unabsorbed, tend to amplify to the extent that the polisher becomes uncontrollable.

And still another object of the invention is to provide a polisher of this type with improved means for pivoting the handle to the polisher frame in a manner whereby said pivotal mounting cooperates with resilient means within the handle to provide stabilization and improved control of the device during use.

A further object is generally to simplify and improve the construction, arrangement and operation of polishers for one or more of the purposes mentioned, and still other objects will be apparent from the specification.

The invention includes the construction and arrangement of parts as herein illustrated, described and claimed and, since various modifications thereof are contemplated, it will be un-

derstood that the invention also includes such modifications as are equivalent to the claims.

The same reference characters have been used for the designation of like parts throughout, and in the drawings:

Fig. 1 is a top plan view of a floor polisher.

Fig. 2 is a side elevation of the device shown in Fig. 1.

Fig. 3 is an enlarged sectional view on the line 3—3 of Fig. 1.

Fig. 4 is an enlarged sectional view on the line 4—4 of Fig. 1.

Fig. 5 is a sectional view on the line 5—5 of Fig. 4; and

Fig. 6 is a perspective view of the mounting bracket shown partially cut away in Fig. 4.

As shown in Figures 1 and 2, the device includes a downwardly opening housing or frame 10, a motor 11 mounted thereon, a disk type rotary brush 12 provided with a rigid brush block 13 and disposed within housing 10, and a shaft 14 carried by block 13, said shaft being suitably journaled for rotation with respect to frame 10 and connected to motor 11 through drive mechanisms 16 and 17 and reduction units 18 and 19.

A handle, generically designated by reference numeral 23 includes a rigid forked portion 24 having its fork arms pivoted to frame 10 on opposite sides of motor 11 as hereinafter described, an elongated rigid portion 25 adapted to be gripped by an operator and a universally yieldable connector 27 between fork 24 and handle portion 25.

As shown in Fig. 1, housing 10 is provided with a pair of slots or openings 28 disposed on opposite sides of the motor to allow extension therethrough of the lower fork arm portions.

As best shown in Figures 4 and 5, the end of each fork arm is provided with off-set portion 30 which carries an insert 130 of hardened material, said insert being provided with a transverse bore through which a pintle bolt 31 carried by frame 10 projects to permit pivotal movement of the fork arm through a vertical plane with respect to frame 10. Bolt 31 is carried intermediate a pair of brackets 33 and 34 which are welded to the bottom wall of housing 10 to depend therefrom. Bolt 31 is provided with a hexagonal head and the depending arm of bracket 33 is provided with a complementary aperture, as best shown in Fig. 6, to receive the bolt head in axially slidable but nonrotatable relation thereto.

A dish-like resilient washer 35 is disposed intermediate the bolt head and the adjacent surface of insert 130 to provide frictional thrust engagement between the fork arm and bracket 34

when clamping pressure is applied to the bolt as hereinafter described. Bolt 31 includes a cylindrical bearing portion 37 on which the fork arm pivots and a reduced portion 38 having a nut 39 in threaded engagement therewith. A washer 40 is disposed between bracket 34 and the adjacent side of insert 130. Bearing portion 37 of bolt 31 projects through washer 40 whereby annular shoulder 44 between bearing portion 37 and reduced portion 38 of bolt 31 abuts bracket 34 to limit the compression of washer 35 when nut 39 is tightened, whereby a predetermined thrust is obtained which is determinative of the yielding pivotal resistance between the fork arm and its mounting.

Lock washer 45 is provided between bracket 34 and nut 39 to prevent loosening of the nut and it is apparent that when the bolt is drawn up to the extent that shoulder 44 abuts bracket 34 further tightening of nut 39 does not increase the thrust which washer 35 exerts on the fork arm to provide the desired yieldable frictional engagement between the arm and bracket 34. It is therefore possible to rapidly assemble the structure without trial and error adjustments to obtain the exact amount of thrust desired.

Universal connector 27 includes a housing 50, threadedly engaging an annular shoulder 51 which may be an integral extension of fork arm 24. Shoulder 51 projects upwardly from a flattened upper portion of the fork 24 in a position midway between the fork arms. Housing 50 is provided with an interior chamber including a cylindrical passageway 53 leading from the outer end thereof into an enlarged cylindrical passageway 54 which in turn leads into a further enlarged cylindrical portion 55. Elongated handle portion 25 has a cylindrical end section projecting through chamber portions 53 and 54 and into portion 55 to terminate at a point spaced from the ends of said chamber portion. A sleeve 58 is carried by that section of the handle disposed within chamber portions 54 and 55. Sleeve 58 is preferably in press fit engagement with handle 25 and may be welded thereto to prevent relative movement between the sleeve and handle. A flange 59 extends radially from sleeve 58 at the handle terminus, said flange being an integral portion of the sleeve. The outer wall of flange 59 is in spaced relation to the inner side wall of chamber portion 55, and the periphery of sleeve 58 and handle 25 are in spaced relation to the inner walls of chamber portions 54 and 53 respectively, whereby to allow relative movement between the handle and sleeve assembly and the housing 50.

An annular resilient bumper 60, rectangular in cross section, is disposed between the bottom wall of chamber portion 55 and the bottom surface of flange 59, and an annular resilient bumper 62 which may be circular in cross section is disposed between the top wall of chamber portion 55 and the top wall of flange 59. A pin 61 is anchored in the flat portion of fork 24 to project through suitable bores in bumper 60 and flange 59 respectively, whereby to constrain the bumper and flange against rotation relative to the fork and housing 50.

The mounting of handle portion 25 between resilient bumpers within the chambered housing and the provision of space between the chamber walls and adjacent portions of the handle and its attached sleeve 58 permits limited movement in all directions between the rigid handle portion 25 and the rigid fork 24 whereby vibrations and

torsional stresses initiated by the brush through frictional contact with the surface upon which it rotates are absorbed or substantially dampened within connector 27 and hence not transmitted to handle portion 25. Conversely, movements of handle portion 25 which are initiated by the operator and which would adversely affect the polisher brush balance are absorbed or substantially dampened within the connector to arrest their effective transmission to the brush.

I have found that the device works well when the distribution of weight of the brush and the structure directly supported thereon is such that the horizontal axis about which the fork arm pivots is preferably somewhat below the center of mass.

A housing 70 is removably attached to frame 10 to protect the motor from dust and injury and to add an attractive appearance to the device. A pair of shroud-like guards 71 are mounted to frame 10 to project marginally from fork arm opening 28, whereby to provide bumper means for limiting the pivotal movement of the fork arm. A protective bumper 73, which may be of rubber, encircles the lower margin of frame 10 to provide cushioning means during contact of the device in operation with objects such as furniture.

The arms of fork 24 are provided with a passageway 75 which extends from the flat top portion of the fork to points below the top wall of frame housing 10. A bore 76 leads through shoulder 51 and into passageway 75. A detachable connector plug 77 is partially disposed within the lower end of tubular handle 25 and partially disposed within bore 76 and passageway 75, whereby to provide convenient disassembly of the electrical connections upon removal of housing 50. Bore 76 is of sufficient size to allow substantial space between the walls thereof and the periphery of plug 77, whereby the plug will not bind in respect to offset portion 51 during flexing of connector 27. Plug 77 is preferably pinned at 78 to handle member 25 and sleeve 58. Electrical leads 80 extend through handle 25 and are electrically connected to plug 77 to be divided and separately extended through the fork arms to points below the frame where they are connected by suitable means to motor 11.

Uneven pressures at various parts of the disk brush with respect to the surface to be polished are encountered in the ordinary operation of the polisher by virtue of an uneven floor or as the result of the polisher coming into contact with objects such as furniture or showcases. The torque reaction at the point of increased brush pressure tends to lift the entire polisher at this side and to depress the opposite side of the polisher whereby a corresponding condition of increased unbalanced brush pressure is produced. The action therefore repeats itself with rhythmic regularity and with increasing amplitude until the polisher capsizes.

The above described improvements co-act to prevent an increase in amplitude of said rhythmic vibrations by allowing the brush and the structure superposed thereon to absorb or stabilize the effects of unbalance during brush contact with surfaces having uneven frictional properties or during other conditions which set up unevenly distributed frictional resistance.

The resilient universal joint herein described serves as a yielding resistance which also functions as a shock absorber while the yielding resistance applied to the pivotal connection of the

handle fork arms prevents the rhythmic vibration of the polisher about its horizontal axis. The effect of the cooperation of the yieldingly resistant universal joint with the restricted movement of the polisher about the fork mounting axis provides a polisher of high efficiency which operates smoothly and which can readily be moved about by the operator. The entire construction is compact and of distinctly improved appearance.

Having thus described the invention, I claim:

1. In a device of the character described, the combination of a frame, a polishing member journaled thereto to rotate about a substantially vertical axis and mounted beneath said frame, a motor mounted on said frame, drive means intermediate the motor and polishing member, and a handle pivotally connected to the frame, said handle comprising a pivoted fork portion, an elongated rigid portion, and resilient universal joint means intermediate the fork and elongated handle portions.

2. In a device of the character described, the combination of a frame, a polishing member journaled thereto to rotate about a substantially vertical axis and mounted beneath said frame, a motor mounted on said frame, drive means intermediate the motor and polishing member, and a handle connected to the frame, said handle comprising a fork portion pivotally engaging said frame in clamping relation thereto, an elongated rigid portion, and resilient universal joint means intermediate the fork and elongated handle portions.

3. In a device of the character described, the combination of a frame, a polishing member journaled thereto to rotate about a substantially vertical axis and mounted beneath said frame, a motor mounted on said frame, drive means intermediate the motor and polishing member, and a handle comprising a rigid portion connected to the frame, a second rigid portion extending from said first mentioned portion, and resilient universal joint means intermediate the handle portions.

4. In a device of the character described, a handle adapted to stabilize torsional stresses initiated in the device during operation and comprising a rigid fork provided with a chamber positioned substantially midway between the fork arms, a rigid elongated member having one end loosely disposed within said chamber for relative movement between the fork and elongated member, and means disposed within the chamber for the retention of the end portion of said elongated member therein in resilient engagement with said fork.

5. A device as set forth in claim 4 wherein said resilient engagement means includes a flange carried by the elongated member to extend radially therefrom within the chamber, resilient members disposed on opposite sides of said flange, and means maintaining said resilient members in contact with said flange whereby to permit relative movement of said elongated member in respect to said fork.

6. In a device of the character described, a frame, a motor mounted on such frame, a disk type brush disposed beneath the frame in bearing relation therewith for rotation about a vertical axis and to provide the sole support for said motor and frame, a handle comprising a forked section and an elongated section and a flexible connection between the handle sections, said fork section pivotally engaging the frame on op-

posite sides of the motor along an axis at right angles to the axis of brush rotation, and clamp means intermediate the frame and fork handle section whereby to yieldingly resist pivotal movement of the handle with respect to the frame.

7. A device as described in claim 6 wherein the clamp means includes a pair of bracket arms mounted to the frame, a pintle bolt supported by said arms and pivotally engaging the forked handle section, a spring washer carried by the bolt, and clamp means carried by the bolt for pressure engagement of the handle section and one of the bracket arms under distortional pressure of the washer, said bolt being provided with a shoulder for engagement with said bracket arm upon a predetermined distortion of said washer whereby to limit the pressure engagement between the handle section and said bracket and to maintain a predetermined pressure therebetween.

8. In a high speed floor polisher of the type in which the entire weight of the polisher rests upon the brush, a frame, a polishing member mounted for horizontal rotation beneath the frame, a motor mounted upon said frame in operative connection with said member, and a handle including a fork and an elongated member, said fork being pivoted to the frame along a horizontal axis extending below the center of mass of the frame, brush and motor, and said elongated member being resiliently mounted on said fork at a point substantially midway between said fork arms, and means to yieldingly resist the pivotal movement of the fork arms with respect to the frame.

9. A floor polisher including a brush journaled for horizontal rotation in respect to a frame in superposed relation thereto and supported on the brush, an electric motor mounted on said frame, drive means connecting the motor to the brush for the rotation thereof, a handle comprising a lower forked tubular section and an upper elongated tubular section, said lower section being pivoted to the frame, and said upper section being connected therewith through a resilient universal joint, a chamber extending centrally through said universal joint and connecting said tubular sections to provide a passageway throughout the handle, electrical connections extending through said passageway and connected to said motor, said connections including a detachable plug mounted in said passageway and having a portion attached to said upper section and a portion projecting into said chamber in spaced relation to the walls thereof whereby to prevent engagement between the plug and the chamber walls during flexing of said universal joint.

10. In a device of the character described, a frame, a pair of brackets mounted thereto, a pintle bolt supported by said brackets, and a handle disposed between the brackets in pivotal engagement with the bolt, said bolt including a flat sided head, a cylindrical bearing portion and a reduced threaded portion to provide a shoulder therebetween, one of said brackets being provided with an aperture complementary to said flat sided bolt head, said head being disposed therein in axially slidable and nonrotatable relation thereto, the other bracket being provided with a bore through which said reduced portion projects, a thrust washer carried by said bolt intermediate one of the brackets and the handle, and a nut threadably engaging said reduced portion for the

limited clamping engagement of the handle as predetermined by the shoulder on the bolt.

11. A floor polisher comprising a frame, a polishing member rotatably mounted on the frame, a motor carried by the frame and in operative driving connection with the member, and a handle for said frame comprising a first section in pivotal connection with the frame and a second section universally connected to the first section, together with resilient means opposing relative universal movement between said sections.

12. A floor polisher comprising the combination with a rotary polishing brush, of a motor support having bearings for said brush and having its weight carried by said brush, a motor on said support in operative driving connection with said brush, and a guiding handle for said polisher comprising a plurality of universally jointed sections, one of which is pivotally connected to said

support, said handle having an elastic centering means mounted on one of said sections and engaging the other to resist universal movement therebetween.

13. A motor driven floor polisher comprising the combination with a rotatable polishing brush, a motor support carried by said brush and having bearings therefor, a motor mounted on said support and in operative driving connection with the brush, a handle for guiding the polisher comprising a plurality of sections in resiliently yieldable universal connection, one of said sections being pivoted to said support on an axis having a major horizontal component, and means frictionally resisting pivotal change of angle between said motor support and the handle section connected therewith.

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