May 24, 1927. 1,629,801

W. L. LINDGREN

BRUSH MOUNTING FOR VACUUM CLEANERS, ETC

Filed Dec. 8, 1924 2 Sheets-Sheet 1

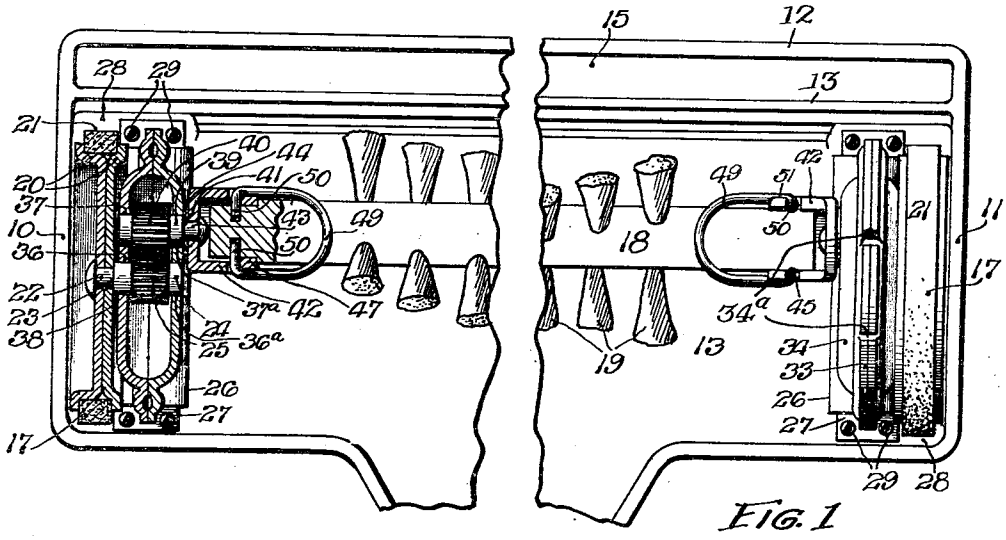


FIG. 1

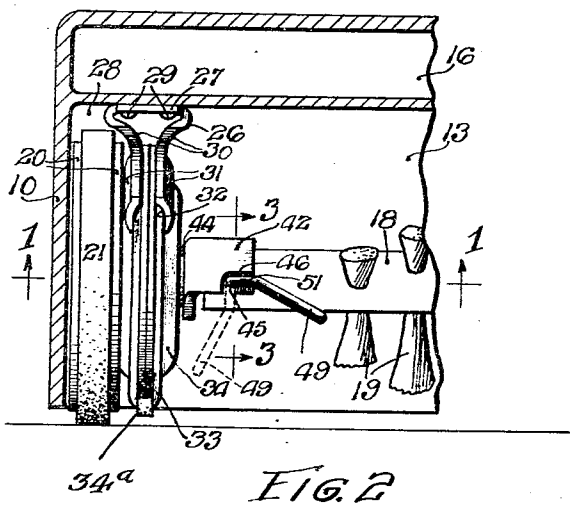


FIG. 2

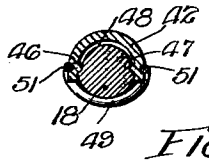


FIG. 3

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Waldemar L. Lindgren
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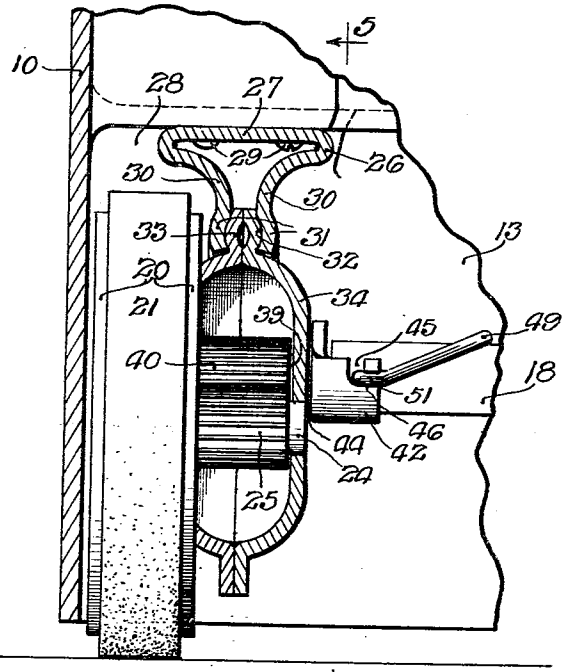


FIG. 4

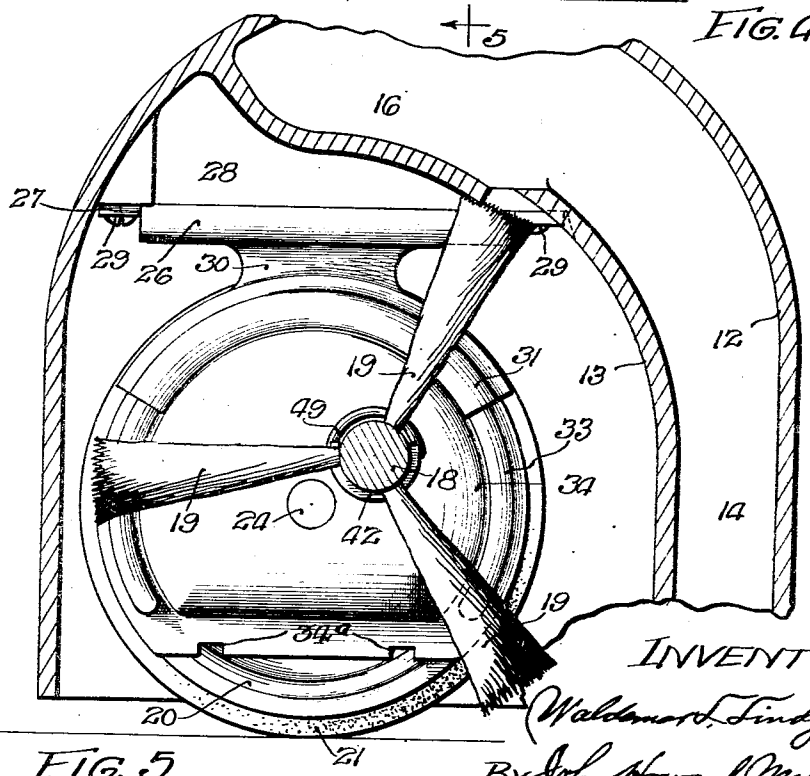


FIG. 5

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Patented May 24, 1927. 1,629,801

UNITED STATES PATENT OFFICE.

WALDEMAR L. LINDGREN, OF CHICAGO, ILLINOIS, ASSIGNOR TO ALFRED A. NORTON, TRUSTEE, OF CHICAGO, ILLINOIS.

BRUSH MOUNTING FOR VACUUM CLEANERS, ETC.

Application filed December 8, 1924. Serial No. 754,505.

My invention is concerned with rotary brush mountings, and more especially with such mountings designed for use with vacuum cleaners, carpet sweepers, etc., and is designed primarily to produce such a mounting in which the height of the axis of the brush can be readily varied so as to regulate the friction of the brush on the floor or pavement.

It is also designed to produce a device of the class described in which the brush can be readily removed and put back in place, as may be necessary for cleaning, repairing or replacement.

It is further designed to produce a device of the class described in which the mounting for the wheels and brush shall be simple in its construction, yet highly efficient in operation.

To illustrate my invention, I annex hereto two sheets of drawings, in which the same reference characters are used to designate identical parts in all the figures, of which,—

Fig. 1 is an inverted plan view of a portion of a vacuum cleaner embodying my invention, a portion thereof at one end being in horizontal section on the line 1—1 of Fig. 2;

Fig. 2 is a vertical section through the casing, showing the novel portion of the structure in elevation;

Fig. 3 is a detail in section on the line 3—3 of Fig. 2;

Fig. 4 is a section similar to Fig. 2, but on a larger scale, and showing some of the parts in section which are shown in elevation in Fig. 2; and

Fig. 5 is a view in section on the line 5—5 of Fig. 4.

I have shown my invention as applied to a vacuum cleaner, and have shown a portion of the casing of said cleaner, said casing having the ends 10 and 11, the front 12 spaced in advance of the partition 13 forming the suction passage 14 leading upward from the nozzle portion 15 to the vacuum chamber 16. In this type of vacuum cleaner, it is customary to employ within the casing a pair of ground wheels 17 which are suitably journaled in brackets and associated with a brush 18 which carries the brush tufts 19, suitable gearing being interposed between the ground wheels 17 and the brush so that as the cleaner is shoved over the floor, the rotation of the ground wheels will impart the desired rotation to the brush, and my invention is concerned with certain novel features and combinations associated with these parts.

The ground wheels 17 may be of any desired construction, but I preferably form them of the two shallow, cup-shaped disks 20, which grip the rubber tire 21 between their peripheral flanges, and which are secured by the swaged end 22 against the shoulder 23 formed on the short shaft 24 carrying at its center the spur-gear pinion 25.

To mount this wheel 17 so that it can be readily raised or lowered, I employ the supporting mechanism best shown in Figs. 4 and 5, where it will be seen that I form, preferably from a piece of sheet metal, the stationary portion 26 of a support, which is preferably made up of the central base portion 27 secured to the partition 28 of the frame by screws 29, together with the two yoke portions 30, preferably formed integral therewith and from spring metal, and of the shape best shown in Fig. 5. The lower ends 31 of these yoke portions are formed as segments of a circle, and on the interior are formed the grooves 32, the two grooves combined forming a spring channel within which is mounted the circular rib 33 formed on both sides of the adjustable portion 34 near its periphery and extending through a few degrees less than the difference between the number of degrees through which the lower ends 31 of the yoke portions extend and three hundred and sixty degrees, so that by turning the portion 34 to a position diametrically opposite to that shown in Fig. 5, said portion 34 may be withdrawn, thereby removing the ground wheels and the brush from the cleaner. To facilitate moving the portion 34 to adjust the position of the brush to and from the floor relative to the framework, I place in its periphery the notches 34ª best seen in Fig. 5. This adjustable portion is made of two symmetrical sheet-metal disks which are brought together, as shown in Fig. 4, after the enclosed pinions have been put in place and spot-welded together. The outermost of the two disks or cups forming the portion 34 has formed therein the apertures 36 and 37, the aperture 37 forming the bearing for the adjacent portion of the shaft 24, the wheel 20 preferably having the felt washer 38 inter-

posed between it and the surface of the hollow bracket to keep out the dust. The aperture 37 forms a bearing for the adjacent end of the shaft 39, which has at its central portion the spur-gear pinion 40 meshing with the spur-gear pinion 25, and having secured on its outer end against the shoulder 41 the brush cup 42, which is secured in place by swaging the end 43 of the shaft 39. A felt disk 44 is preferably interposed between the brush cup and the adjacent surface of the hollow bracket to keep out the dust, and it will be understood that the inner half of the bracket 34 is provided with the apertures 36^a and 37^a to furnish bearings for the adjacent ends of the shafts 24 and 39, respectively. With the construction shown, it will be readily understood that as the carpet sweeper or vacuum cleaner is pushed forward, the rotation of the ground wheels 17 acting through the pinions 25 and 40 will serve to rotate the brush in the proper direction to lift the particles adhering thereto and deliver them to the auxiliary slot in the cleaner, my invention being designed primarily to be applied to the vacuum cleaner shown in my Patent No. 1,458,714, dated June 12, 1923.

In order that the brush shaft 18 may be readily removed without the necessity of also removing the supports 34 and the wheels 17, I preferably construct the brush cup and the associated end of the brush shaft in the manner shown in Figs. 1, 2 and 3, where it will be seen that a considerable portion of the lower side of the cup, as seen in the position of Fig. 2, is cut away, while a recess 45 is formed in each side of the remaining portion of the cup, and extending axially from the end of the recess 45 to the outer end of the cup is a shallow recess 46, which is preferably stamped in the body of the metal forming the cup, with the result that there is a rib 47 formed on the other side of the cup, and to accommodate these ribs 47, I cut away, as at 48, a portion of the adjacent end of the brush shaft 18. In the end of the brush shaft I place the inturned ends of the bail 49, the main portion of which is curved, as best shown in Fig. 1, but between said main portion 49 and the turned-in ends 50 are the two locking portions 51, which co-operate with the grooves 46 when the parts are swung to the full-line position shown in Fig. 2. This serves to lock the brush shaft in place, and when it is to be removed all that is necessary is to swing the bail to the dotted-line position of Fig. 2, when the brush shaft can be lifted out of the cups. While I have shown this detachable end construction applied to both ends of the brush shaft, it will be understood that it need be applied to only one end and a simpler connection can be used at the other end.

While I have shown and described my invention as embodied in the form which I at present consider best adapted to carry out its purposes, it will be understood that it is capable of modifications, and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

What I claim as new, and desire to secure by Letters Patent of the United States, is:

1. In a device of the class described, the combination with a framework, of bearing supports having the central portion thereof provided with hollow spaces which dust cannot enter carried thereby, ground wheels secured on shafts journaled in said supports, a brush shaft having the ends thereof journaled in said supports, and gearing in the hollow spaces of the supports and fully protected thereby from dust and connecting the shafts of the ground wheels and the brush shaft to rotate the latter as the ground wheels revolve.

2. In a device of the class described, the combination with a framework, of a hollow support extending therefrom, a gear shaft journaled in the support having a gear pinion secured thereto in the interior of the support and a ground wheel secured at one end thereof outside of the support, a second gear shaft journaled in the support having a gear pinion secured thereto inside the support and meshing with the first mentioned pinion, both of said pinions being thereby fully protected from dust and a brush shaft cup secured to the end of said last mentioned shaft on the other side of the support from the ground wheel.

3. In a device of the class described, the combination with a framework, of a hollow support extending therefrom, a gear shaft journaled in the support having a gear pinion secured thereto in the interior of the support, and a ground wheel secured at one end thereof outside the support, a second gear shaft journaled in the support having a gear pinion secured thereto inside the support and meshing with the first-mentioned pinion, and having a brush shaft cup secured to its outer end on the other side of the support from the ground wheel, said gear shafts being reduced adjacent their pinions to form bearings in the opposed walls of the support.

4. In a device of the class described, the combination with a framework, of hollow bearing supports carried thereby and rotatable therein about a fixed line, ground wheels journaled on said supports having their axes coincident with said fixed line, a brush shaft journaled in said supports eccentrically of said fixed line, and gearing in the supports connecting the ground wheels and the brush shaft to revolve the shaft as the ground wheels revolve, the position of the supports being adjustable by

rotation about said fixed line, thereby to vary the height of the brush shaft from the floor without affecting the position of the ground wheels relative to the framework.

5. In a device of the class described, the combination with a framework, of bearing supports carried thereby, ground wheels journaled on said supports, a brush shaft journaled between said supports, and gearing carried by the supports connecting the ground wheels and the brush shaft to rotate the shaft as the ground wheels revolve, said supports each comprising a stationary part with curved retaining grooves therein and a rotatable part with correspondingly curved ribs concentric with and cooperating with the grooves to hold the rotatable part in any desired angular adjustment relative to the stationary part.

6. In a device of the class described, the combination with a framework, of bearing supports carried thereby, ground wheels journaled on said supports, a brush shaft journaled between said supports, and gearing in the supports connecting the ground wheels and the brush shaft to rotate the shaft as the ground wheels revolve, said supports each comprising a stationary part with curved retaining grooves therein and a rotatable part with correspondingly curved ribs cooperating with the grooves to hold the rotatable part in any desired angular adjustment relative to the stationary part, said rotatable part being provided in its periphery with notches to facilitate its relative movement.

7. In a device of the class described, the combination with a framework, of bearing supports carried thereby, ground wheels journaled on said supports, shaft cups permanently journaled in said supports, one of said shaft cups being open on one side, gearing between the ground wheels and the shaft cups, a brush shaft adapted to have its ends fit in said cups, and connecting means between the open sided shaft cup and the adjacent end of of the brush shaft, said connecting means being operable to permit the removal of the brush shaft while the shaft cups remain journaled in the supports.

8. In a device of the class described, the combination with a framework, of bearing supports carried thereby, ground wheels journaled on said supports, shaft cups journaled in said supports, gearing between the ground wheels and the shaft cups, a brush shaft, and detachable connections between the shaft cups and the brush shaft, said connections at one end comprising a bail journaled in one end of the brush shaft and adapted to cooperate with locking recesses in the adjacent shaft cup.

9. In a device of the class described, the combination with a framework, of hollow bearing supports carried thereby, ground wheels journaled on said supports, a brush shaft journaled between said supports, and gearing in the supports connecting the ground wheels and the journals of the brush shaft to rotate the latter as the ground wheels revolve, said supports each comprising a stationary part with circularly curved retaining grooves therein and a rotatable part with correspondingly curved ribs cooperating with the grooves to hold the rotatable part in any desired angular adjustment relative to the stationary part, the length of the grooves and ribs being such that by sufficient relative rotation, the rotatable parts of the supports, together with the brush shaft and ground wheels may be removed.

10. In a cleaner, the combination with a brush casing, of a downwardly projecting supporting bracket at each end provided with curved retaining grooves therein, a bearing member having correspondingly curved ribs mounted in the grooves and having a brush shaft bearing journaled therein with a pinion on it, a brush shaft connected with the brush shaft bearings, a ground wheel at each end having a bearing stud journaled in said bearing member and having a pinion secured thereto meshing with the adjacent bearing pinion, and means for adjusting each of the bearing members in different positions to determine the position of the ground wheels relative to the brush shaft.

In witness whereof, I have hereunto set my hand this 29th day of November, 1924.

WALDEMAR L. LINDGREN.