Jan. 22, 1963 W. O. WILLIAMS 3,074,088

POWER BRUSHES FOR WASHING AUTOMOBILES AND THE LIKE

Filed Dec. 1, 1960

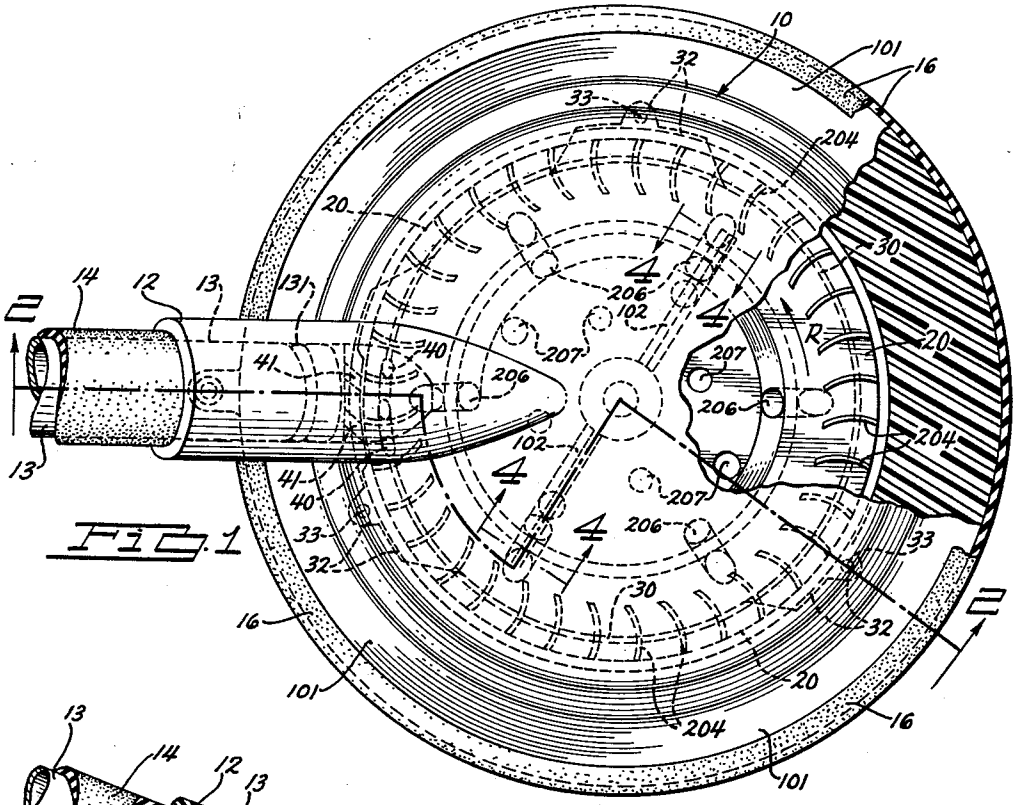

Fig. 1

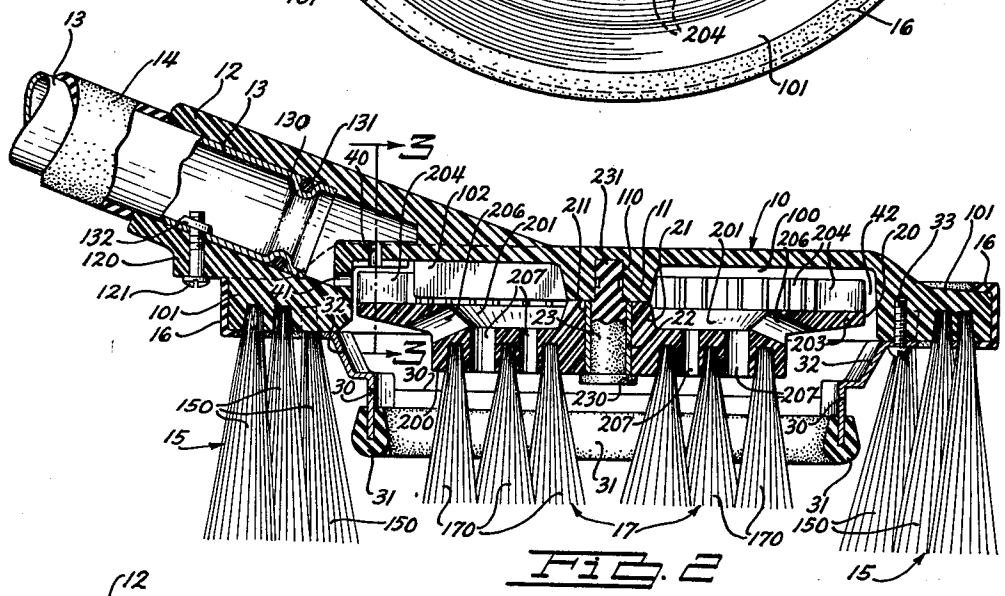

Fig. 2

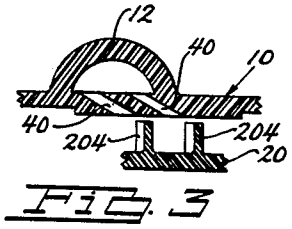

Fig. 3

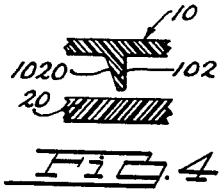

Fig. 4

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POWER BRUSHES FOR WASHING AUTOMOBILES AND THE LIKE

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This invention relates to improvements in power brushes particularly adapted for use in washing automobiles, windows and other items requiring a gentle but adequate scrubbing action for thorough cleansing, the instant invention being an improvement over the power brush disclosed and claimed in U.S. Patent No. 2,759,208 issued to Walter O. Williams, the applicant herein, on August 21, 1956.

The primary objects of this invention is to provide a power brush including a fixed and a rotary brush element for washing automobiles and the like which has improved power means for rotating the rotary brush element thereof which reduces to a minimum the stall factor of the rotary brush element when the power brush is used with relatively low water pressure, to provide an improved wash water distribution and throw-out of wash water through and around the rotary brush element within the resilient squeegee ring surrounding the said rotary brush element and to the fixed brush element, and to otherwise improve and simplify the power brush of the applicant's earlier hereinabove identified patent to the end that both infinitely greater economy in manufacture and superior performance are obtained.

Other objects of the invention will become apparent by reference to the following detailed description taken in connection with the accompanying drawing, in which:

FIG. 1 is a top plan view of a power brush embodying the invention, a portion being broken away to more clearly illustrate the construction.

FIG. 2 is a vertical sectional view taken substantially on the line 2—2 of FIG. 1.

FIG. 3 is a fragmentary sectional view taken on the line 3—3 of FIG. 2.

FIG. 4 is a fragmentary sectional view taken on the lines 4—4 of FIG. 1 showing the wash water throw-out baffles employed above and spaced from the turbine rotor.

Referring now to the drawing wherein like reference characters refer to like and corresponding parts throughout the several views, the particular power brush disclosed for illustrative purpose consists of depending relatively flat dome shaped turbine housing 10 of plastic or other suitable material having a downwardly disposed central bearing boss 11 therein forming an annular turbine chamber 100. An angularly upwardly disposed handle receiving sleeve 12 extends from the upper rear portion of said dome shaped housing 10. The lower end of a tubular metal handle 13 is telescoped in the handle receiving sleeve 12, and, as best shown in FIG. 2, the said tubular handle 13 is formed near its lower end at 130 to accommodate an O-ring seal 131 for the purpose of preventing leakage of water passing through the tubular handle 13 into the turbine housing 10 as hereinafter described. The handle receiving sleeve 12 is provided with a boss 120 to accommodate a set screw 121 threaded into a boss 132 formed in the tubular handle 13. The said tubular handle 13 is preferably covered by a resilient rubber sheath 14 to prevent marring or denting of an automobile body or the like if accidentally struck thereby.

At the free end of the tubular handle 13 is a suitable hose connection, not shown, by means of which the said tubular handle 13 may be connected to a source of water under pressure, preferably city water pressure which generally is at from 25 to 60 p.s.i., all according to the particular locale. Obviously, any suitable valve means and/or soap or detergent supply may be employed in the hose

connection or elsewhere in the hydraulic supply. However, since such means are conventional and form no part of the instant invention, they need not be described in detail herein.

The said annular depending dome shaped turbine housing 10 is provided with a laterally extending peripheral portion 101 which is bored at its bottom at suitable staggered intervals to accommodate brush bristle clusters 150 which are cemented in said bores, thus providing an annular fixed brush element 15 depending from the bottom of the said annular peripheral portion 101 of the turbine housing 10. The outer periphery of the said annular peripheral portion 101 of the turbine housing 10 is preferably covered with a suitable resilient rubber bumper 16 to prevent accidental scratching or other damage to an object being washed by a power brush embodying the invention.

A turbine wheel or impeller 20 also preferably formed of plastic is generally dish shaped and has a relatively thick bottom 200 with a central boss 21 bored at 211 to receive a sleeve type bushing 22. A bearing 23 which is headed at its lower end 230 has its upper shouldered end 231 pressed or otherwise anchored into a bore 110 provided in the central bearing boss 11 of the dome shaped turbine housing 10. The said impeller 20 has a peripheral lip 203 extending radially outwardly from the upper periphery of the said relatively thick bottom 200 thereof. Formed above the top of the impeller lip 203 are a plurality of circumferentially spaced preferably somewhat arcuate fin type impeller blades or buckets 204.

Depending from the dome shaped turbine housing 10 and preferably formed integral therewith are one or preferably a pair of baffles 102 extending radially outwardly from the central bearing boss 11 and stopping short of the radially inner edges of the impeller blades 204. By reference to FIG. 4, it will be observed that the "upstream" side 1020 of each baffle 102 is tapered to deflect water downwardly from the dome shaped turbine housing 10 against the top of the impeller 20 at the annular cavity 201 therein above the relatively thick bottom 200 thereof. The said baffles 102 are preferably located approximately 45 degrees and 225 degrees in the direction of rotation R of the impeller 20 from the handle receiving sleeve 12 and the jets 40 and 41. It is to be understood that the foregoing angular locations of the baffles 102 may be varied as much as 15 degrees to 45 degrees as found to be desirable according to impeller, jet and water outlet aperture sizes and proportions.

The said central bottom 200 of the turbine wheel or impeller 20 is provided with a plurality of downwardly open suitably spaced and staggered bores to accommodate rotary brush bristle clusters 170 which are cemented in the said bores, thus providing a circular rotary brush element 17 depending from the bottom 200 of the said impeller 20.

The impeller 20 is provided with a plurality of radially outwardly and axially downwardly outlet apertures 206 therethrough located at the outer periphery of the annular cavity 201 therein above the said bottom 200 thereof. The impeller 20 also is provided with a plurality of vertically disposed outlet apertures 207 extending through the said bottom 200 thereof and located between selected bristle clusters 170 of the circular rotary brush element 17.

Between the outer annular fixed brush element 15 and the inner circular rotary brush element 17 is an annular squeegee pressure ring 30 around the bottom of which is mounted a resilient annular squeegee 31. The said squeegee pressure ring 30 is preferably provided with a plurality of mounting ears 32 and suitable studs 33 by means of which it is mounted on the bottom of the periphery of the depending dome shaped housing 20 inwardly of the fixed brush element 15 at the bottom of the outer

annular peripheral portion 101 of the said turbine housing 10.

Water under pressure passes from the tubular handle 13, through a passage in the handle receiving sleeve 12 into the turbine housing 10 through upper diagonally downwardly disposed jets 40 and lower diagonally horizontally disposed jets 41 in the top and outer periphery respectively of the depending dome shaped turbine housing 10. The said jets 40 and 41 direct water under pressure in a counter-clockwise direction against the blades or buckets 204 of the turbine wheel or impeller 20. This drives the impeller 20 powerfully at relatively high speed in the direction of rotation indicated by the arrow R in FIG. 1. Water leaving the impeller blades 204 collects in the inverted dome shaped turbine housing 10 in the annular cavity 201 above the central portion 200 of the impeller 20 from whence it is expelled through the outlet apertures 206 and 207 in the impeller 20, as well as through the clearance 42 between the outer periphery of the impeller 20 and the inner periphery of the annular depending dome shaped turbine housing 10.

Thusly, by reference to FIGS. 1 and 2, it will be observed that a portion of the water passing through the turbine impeller 20 is directed diagonally outwardly to the annular fixed brush element 15 outside the squeegee ring 31 while another portion of the water passing through the turbine impeller 20 is directed downwardly through the rotary brush element 17 within the squeegee ring 31. This not only provides means for avoiding excess water back pressure at the turbine but it assures that water is available at all times to both the fixed brush element 15 and rotary brush element 17, but prevents an accumulation of dirt and grit in either the fixed brush element 15 or the rotary brush element 17, and thereby thoroughly prevents minute scratching of paint surfaces normally occurring in power brush washing operations.

It is important for perfection in operation of the improved power brush herein disclosed that the bottom of the fixed brush 15 be disposed at the lowest elevation, that the bottom of the rotary brush 17 be disposed a short height above the bottom of the fixed brush 15, and that the bottom of the annular squeegee 31 be disposed a short height above the bottom of the rotary brush 17, all as best shown in FIG. 2.

Although but a single embodiment of the invention has been disclosed and described herein, it is obvious that many changes may be made in the size, shape, arrangement and detail of the various elements of the invention, all within the scope of the appended claims.

I claim:

1. In a power brush of the class described, a dome shaped housing including a tubular sleeve through which water under pressure is supplied thereto, a central depending boss and an annular outer peripheral portion with a fixed brush element depending therefrom, a dish shaped turbine impeller having a flat central bottom portion with an elevated circumferential lip disposed outwardly therefrom and an upwardly disposed central boss, the said turbine impeller including a plurality of circumferentially spaced radially disposed curved blades extending upwardly therefrom at the outer periphery of said circumferential lip, means rotatably mounting said impeller at its central upwardly disposed boss to said central boss in said dome shaped housing forming an annular turbine chamber, said impeller including a rotatable brush depending from the central bottom portion thereof a distance less than the depth of the fixed brush element, a squeegee ring including a resilient squeegee thereon mounted on said dome shaped housing in depending spaced relationship therefrom with the bottom of said resilient squeegee disposed below said dome shaped housing a distance less than the depth of the said rotatable brush element, said dome shaped housing having a plurality of jets therein at said tubular sleeve directing water from said handle means to said turbine impeller blades to rotate the same, the said impeller having a plurality of diagonally outwardly and downwardly disposed water outlet apertures therethrough substantially at the juncture of the flat central bottom and said elevated circumferential lip thereof through which a portion of the water in said turbine chamber is discharged between said squeegee ring and said housing through the fixed brush element, the said impeller also having a plurality of vertically disposed water apertures therethrough in the flat bottom central portion thereof through which another portion of water in said turbine chamber is discharged through the rotatable brush element.

2. In a power brush as claimed in claim 1 including a radially disposed baffle depending from the inside of said dome shaped housing extending radially from the depending central boss thereof substantially to the turbine blades of said turbine impeller at an angle of from 30 to 90 degrees in the direction of rotation of the impeller from the location of said jets.

3. In a power brush as claimed in claim 1 including a pair of radially disposed baffles depending from the inside of said dome shaped housing extending radially from the said depending boss thereof substantially to the turbine blades of said turbine impeller, each said baffle being located respectively at an angle of from 30 to 90 degrees and at an angle of 90 to 270 degrees in the direction of rotation of the impeller from the location of said jets.

4. In a power brush of the class described, a dome shaped housing including a depending central boss, a tubular sleeve through which water under pressure is supplied thereto and an annular outer peripheral portion with a fixed brush element depending therefrom, a turbine impeller including a plurality of circumferentially spaced generally radially disposed blades extending upwardly therefrom at the outer periphery thereof rotatably mounted in said dome shaped housing at said depending central boss and forming a turbine chamber, said impeller including a rotatable brush depending therefrom a distance less than the depth of the fixed brush element, a squeegee ring including a resilient squeegee thereon mounted on said dome shaped housing in depending spaced relationship therefrom with the bottom of said resilient squeegee disposed below said dome shaped housing a distance less than the depth of the said rotatable brush element, said dome shaped housing having a plurality of jets therein at said tubular sleeve directing water under pressure from said tubular sleeve to said turbine impeller blades to rotate the same, the said impeller having a plurality diagonally outwardly and downwardly disposed water outlet apertures therethrough through which a portion of the water in said turbine chamber is discharged between the top of said squeegee ring and said housing to the fixed brush element, the said impeller also having a plurality of vertically disposed water outlet apertures therethrough through which another portion of water in said turbine chamber is discharged through the rotatable brush element, and a radially disposed baffle depending from the inside of said dome shaped housing extending radially from the depending central boss thereof substantially to the turbine blades of said turbine impeller at an angle of from 30 to 90 degrees in the direction of impeller rotation from the location of said jets.

5. In a power brush of the class described, a dome shaped housing including a depending central boss, a tubular sleeve through which water under pressure is supplied thereto and an annular outer peripheral portion with a fixed brush element depending therefrom, a turbine impeller including a plurality of circumferentially spaced generally radially disposed blades extending upwardly therefrom at the outer periphery thereof rotatably mounted in said dome shaped housing at said depending central boss and forming a turbine chamber, said impeller including a rotatable brush depending therefrom a distance less than the depth of the fixed brush element, a squeegee ring including a resilient squeegee thereon mounted on

said dome shaped housing in depending spaced relationship therefrom with the bottom of said resilient squeegee disposed below said dome shaped housing a distance less than the depth of the said rotatable brush element, said dome shaped housing having a plurality of jets therein at said tubular sleeve directing water under pressure from said tubular sleeve to said turbine impeller blades to rotate the same, the said impeller having a plurality diagonally outwardly and downwardly disposed water outlet apertures therethrough through which a portion of the water in said turbine chamber is discharged between the top of said squeegee ring and said housing to the fixed brush element, the said impeller also having a plurality of vertically disposed water outlet apertures therethrough through which another portion of water in said turbine chamber is discharged through the rotatable brush

element, and a pair of radially disposed baffles depending from the inside of said dome shaped housing extending radially from the said depending central boss thereof substantially to the turbine blades of said turbine impeller, each said baffle being located respectively at an angle of from 30 to 90 degrees and from 90 to 270 degrees in the direction of impeller rotation from the location of said jets.

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