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COMBINATION VACUUM CLEANER AND FLOOR SCRUBBER

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2 Sheets-Sheet 1

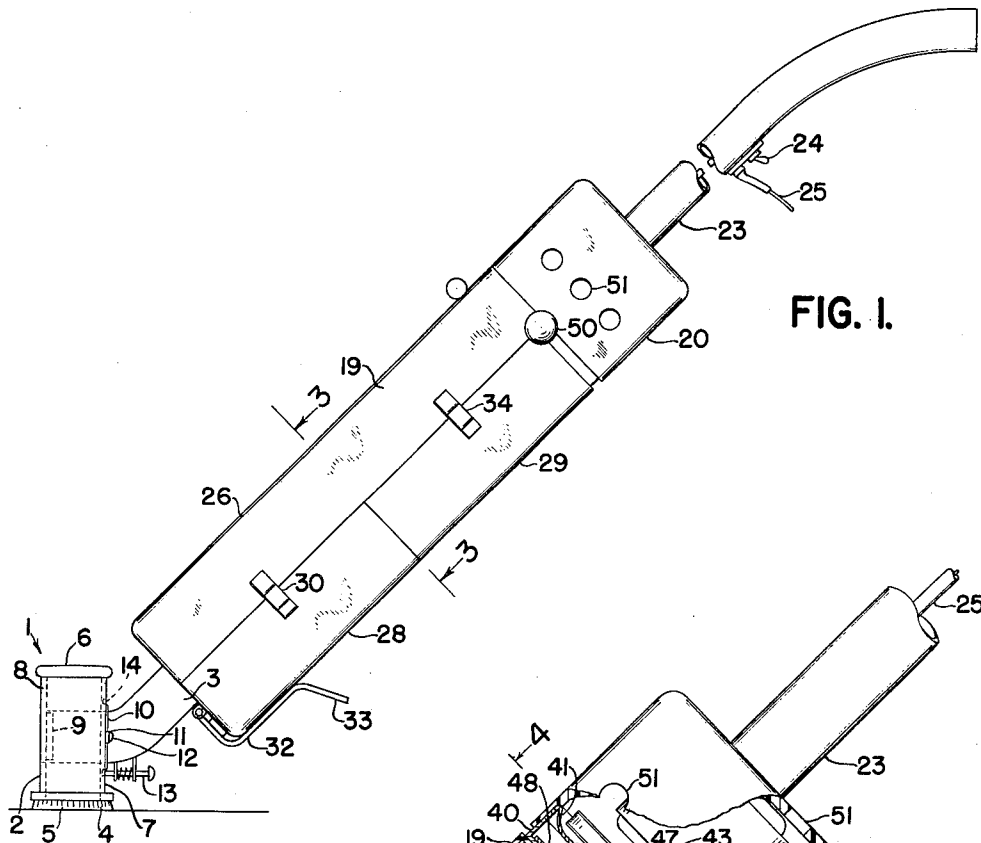


FIG. 1.

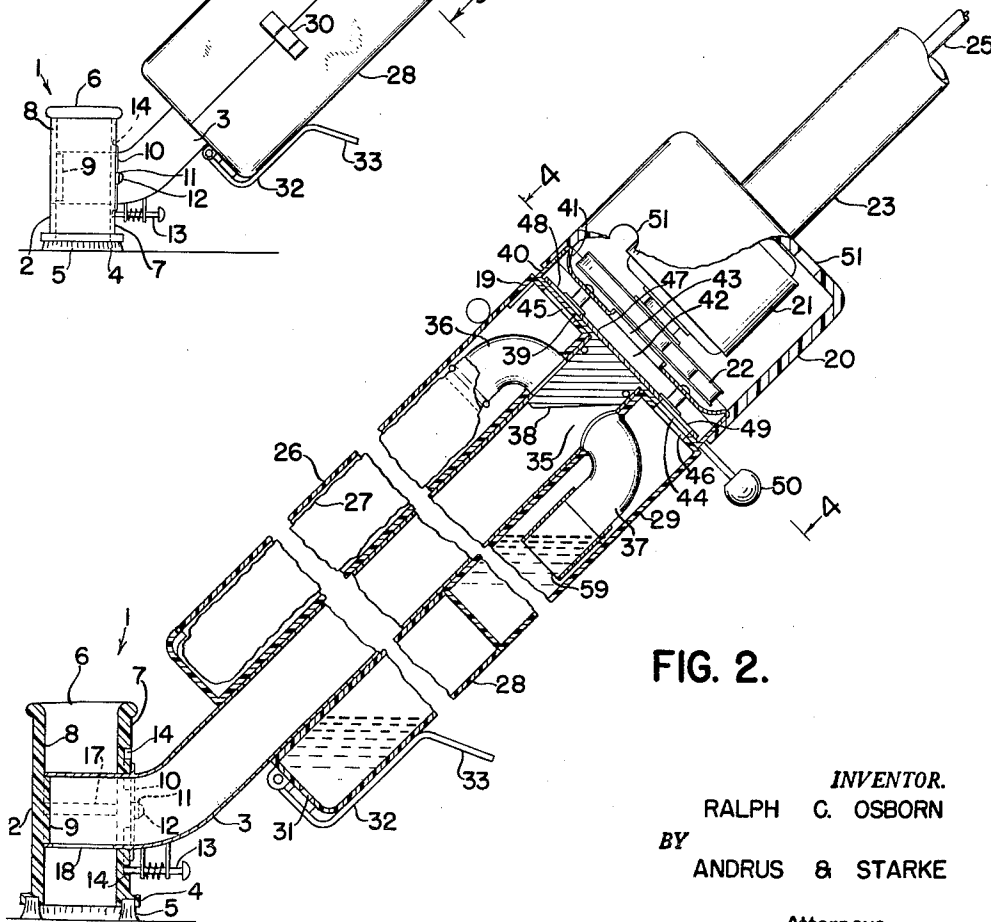


FIG. 2.

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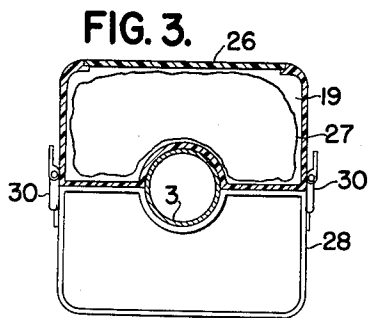
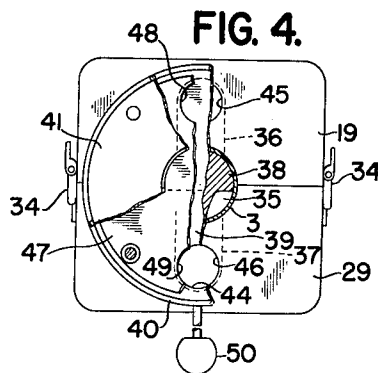
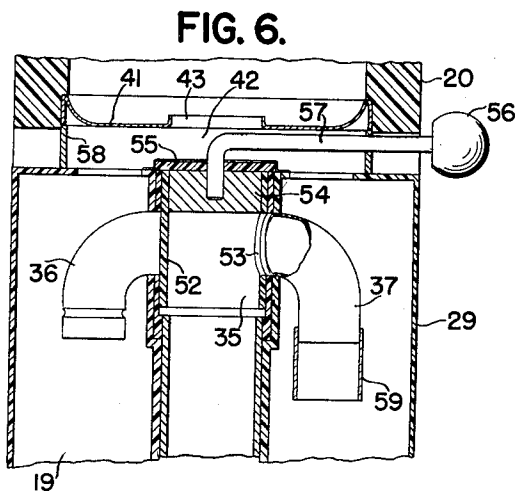
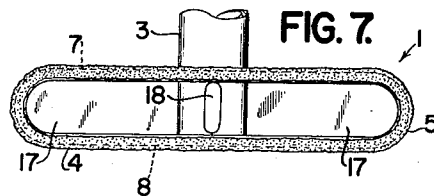
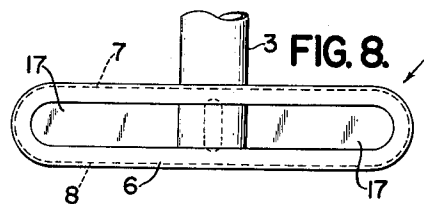
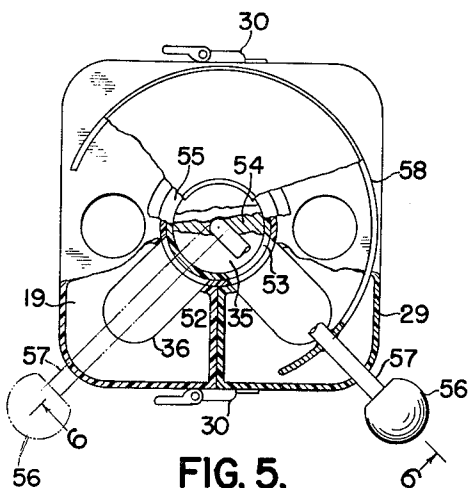
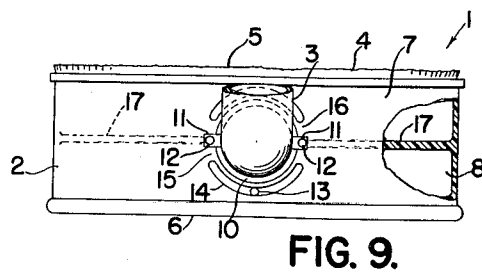
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COMBINATION VACUUM CLEANER AND FLOOR SCRUBBER

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9 Claims. (Cl. 15—320)

This invention relates to an improvement in the art of cleaning and more particularly to a combined floor scrubber and vacuum sweeping device for cleaning floors.

Heretofore, separate domestic floor scrubbing and vacuum sweeping units have been provided and it has been suggested that a common power driven suction mechanism might be adapted for selective employment with either unit.

The problems of combining the units into one device and providing a valving arrangement for alternate selective use of the device for floor scrubbing and as a vacuum sweeper, have not been solved heretofore.

In the scrubbing of floors it is desirable to provide for the application of a controlled amount of liquid detergent followed by brushing the same over an area of the floor and then to employ suction means to lift the liquid from the floor and to separate the air and liquid in a chamber collecting the liquid and allowing the air to pass through the suction mechanism.

In the vacuum sweeping of a floor it is desirable to provide for the pick-up of dust and dirt from the floor through a nozzle and to filter the same through a suitable cartridge filter bag which collects the major solids and passes the air on through the suction mechanism.

The combination of these two devices into one requires an adjustable dual nozzle, one face of which is used for floor scrubbing and the other face of which is used for vacuum sweeping.

According to the present invention provision is made for selectively directing the suction through the water separation tank when the nozzle face for scrubbing is being used and through the air filter bag when the nozzle face for vacuum sweeping is being used, all parts being combined in a single device presenting a rigid upright handle for translation of the nozzle over the floor by a standing operator.

The detergent tank and the liquid collection tanks are removably mounted on the upright handle, and an air filter chamber is provided preferably as a rigid portion of the handle and which may be opened for ready access to replace the filter bag therein.

The power and suction mechanism is preferably incorporated as a portion of the handle above the filter chamber, although it is also possible to have these in a separate unit connected to the device by a flexible hose attached at the upper end of a hollow handle.

The accompanying drawings illustrate two embodiments of the invention constituting the best mode presently contemplated for carrying out the invention.

In the drawings:

FIGURE 1 is a side elevation of the device with part of the handle broken away;

FIG. 2 is an enlarged vertical section taken centrally of the device with parts broken away to shorten the same;

FIG. 3 is a transverse enlarged section through the device taken on line 3—3 of FIG. 1;

FIG. 4 is a transverse section through the device taken on line 4—4 of FIG. 2 showing one form of valving;

FIG. 5 is an enlarged transverse section showing another form of valving;

FIG. 6 is a detail axial section taken on line 6—6 of FIG. 5;

FIG. 7 is a plan view of the scrubbing face of the nozzle;

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FIG. 8 is a plan view of the vacuum sweeping face of the nozzle; and

FIG. 9 is a rear elevation of the lower end of the device with parts broken away and sectioned to show the nozzle adjustment.

The combined scrubber and vacuum cleaner unit has a dual nozzle 1 made up of a hollow body 2 adjustably mounted on the lower end of a tubular handle portion 3.

The body 2 of nozzle 1 extends generally laterally of the unit and has a scrubber nozzle 4 adapted to be horizontally disposed and to face downwardly to engage a floor and support the unit thereon. The scrubber nozzle 4 has suitable brush bristles 5 extending downwardly around the periphery thereof to provide the necessary scrubbing action and support the body 2 spaced upwardly from the floor, to thereby prevent possible scratching of the floor by the body.

A vacuum nozzle 6 extends horizontally parallel to nozzle 4 on the opposite side of body 2 so that nozzle 6 faces upwardly as in FIG. 1 when nozzle 4 faces and engages the floor.

When it is desired to vacuum clean a rug or the like, body 2 is rotated 180° on the end of handle member 3 to dispose nozzle 6 facing downwardly in operative position at which time the nozzle 4 will face upwardly in non-operative position, as shown in FIG. 9.

For this purpose the lower end of tubular handle member 3 extends horizontally forward through a journal opening in the rear wall 7 of nozzle body 2 and across to the front wall 8 of the body where it is centered on a projection 9 for rotation relative to the body.

The tubular member 3 has a circumferential flange 10 on its outer surface immediately adjacent the rear wall 7 of body 2, and a lug 11 is removably secured to body 2 at each side of member 3 by a suitable screw 12 and extends over flange 10 to retain member 3 and body 2 in assembled relation.

The adjustability of nozzle body 2 is characterized by its rotational mounting on the lower end of tubular member 3. In the first place, nozzle body 2 may be turned so as to face either the scrubber nozzle 4 or the vacuum nozzle 6 downwardly toward the floor while handle member 3 extends upright at an angle suitable for manipulation by an operator standing on the floor. In the second place, the angular bend in member 3 provides for an operating adjustment of the handle downwardly to either side of the nozzle to provide for reaching under furniture and the like during cleaning.

It is desirable that nozzle body 2 be restricted in rotation relative to member 3 so that when a given nozzle face is made operable that face will always remain in position even though the entire device be lifted from the floor. For this purpose a spring biased detent pin 13 is mounted beneath tubular member 3 and normally enters a groove 14 in the rear wall 7 of body 2 and which groove is concentric with member 3 except that it is interrupted as at 15 and 16, at opposite sides of the member 3, respectively.

The groove 14 provides freedom for rotational adjustment of the nozzle during operation as when turning the handle downwardly to reach under furniture, and the interruptions or stops 15 and 16 limit this adjustment to provide the desired selected operation.

When it is desired to select a different nozzle face for operation the operator need only pull on detent pin 13 to remove it from groove 14 and then turn the nozzle body until pin 13 passes the corresponding stop 15 or 16 and then release the pin for entry into the groove 14 on the opposite side of the stop.

The nozzle body 2 is divided by a central partition 17 extending horizontally between the rear wall 7 and front wall 8 and from end to end of the body except for a space in the center for receiving the tubular member 3.

The tubular member 3 has a narrow suction mouth or slot 18 extending longitudinally thereof between walls 7 and 8 and in the bottom of the member so that suction into the member is always from beneath partition 17. This prevents the upper non-operating nozzle from being connected to the suction and thereby destroying the desired suction at the nozzle face on the floor.

The handle member 3 carries a vacuum chamber 19 permanently secured thereto and to which a motor housing 20 is secured at the upper end of member 3. The motor 21 and suction fan 22 are co-axial to member 3, and an upper handle member 23 extends upwardly from motor housing 20 in alignment with member 3 to provide a unitary handle of suitable length for a standing operator.

The upper end of handle 23 has a manually operable control switch 24 and electrical cord 25 extending therefrom for connection to an outlet or suitable source of electricity for the motor. The cord 25 extends from switch 24 down through the handle 23 to motor 21.

The vacuum chamber 19 has a hinged cover 26 which provides for the attachment of a replaceable air filter bag 27 inside the chamber.

In the construction illustrated, the chamber 19 is disposed above the transverse axial plane of member 3 and two longitudinally aligned separate chambers 28 and 29 are disposed beneath said transverse plane.

Chamber 28 is removably secured to chamber 19 by a pair of snaps 30 on opposite sides, and constitutes a tank for liquid detergent-water mix for use in scrubbing floors. The upper end of tank 28 is open except when closed by the bottom of chamber 29 so that when the tank 28 is removed it can be readily filled.

Detergent-water mix is discharged from tank chamber 28 through a discharge opening or port 31 in the bottom of the chamber and which is normally closed by a spring biased valve 32. A foot treadle 33 actuates the valve 32 to open position as desired by the operator.

The chamber 29 is removably secured to chamber 19 by a pair of snaps 34 on opposite sides, and constitutes a tank for receiving the dirty water from the floor after scrubbing. For this purpose the chamber 29 constitutes a filter or separating chamber so that air being sucked up through tubular member 3 and bringing dirty scrub water with it is separated from the water and passes on to the suction fan 22.

The upper end of tubular member 3 provides a manifold valve chamber 35 having two lateral discharge ports represented respectively by downwardly turned elbow 36 in chamber 19 and downwardly turned elbow 37 in chamber 29. The bag 27 is normally secured to elbow 36 as shown.

Various valve arrangements may be employed in selectively using the device for either floor scrubbing or vacuum cleaning. In the valve construction of FIGS. 1 to 4, inclusive, the tube 3 extends upwardly to the upper ends of chambers 19 and 29 and provides the valve chamber 35 at its upper end with openings leading to the elbows 36 and 37.

In the construction shown in FIGS. 1 to 4, elbow 36 is secured in the fixed chamber 19 and registers with an opening in tube member 3, and elbow 37 is secured in the removable chamber 29 and registers with an opening in tube member 3.

A rotary central valve plug 38 extends downwardly in the tube 3 and is tapered on an angle to provide for closing of elbow 36 when in one position and closing of elbow 37 when in the opposite position. The plug 38 is secured to a valve disc 39 lying on the co-planar upper ends of chambers 19 and 29, and serves to center the disc concentrically with the member 3.

Disc 39 has a peripheral upward flange 40 which generally closes the gap between motor housing 20 and chamber 29 and cooperates with shroud 41 extending across the bottom end of housing 20 beneath fan 22 to

provide a suction chamber 42 leading to the fan 22 through a central opening 43 in shroud 41.

The valve disc 39 has a single port opening 44 there-through, adapted to selectively register with an opening 45 in the upper end of chamber 19 or an opening 46 in the upper end of chamber 29 depending upon whether the device is to be operated for vacuuming a rug or for floor scrubbing and upon the corresponding position of the disc 39.

If desired, a stationary disc 47 may be secured to shroud 41 and disposed on disc 39 with openings 48 and 49 aligned with openings 45 and 46, as shown in FIG. 2.

Valve disc 39 may be turned by means of a suitable radially extending knob 50 secured to flange 40. When knob 50 turns disc 39 to the position shown in FIG. 2 the plug 38 closes elbow 36 and opens elbow 37. At the same time disc 39 registers its port 44 with openings 46 and 49 and closes openings 45 and 48, thereby providing for suction flow of air from scrubber nozzle 4 through slot 18, tube member 3, chamber 35, elbow port 37, chamber 29, opening 46, port 44, opening 49, suction chamber 42 and opening 43 to the suction fan 22 from which the air is discharged through openings 51 in housing 20.

When it is desired to adjust the device for vacuum cleaning a rug, nozzle body 2 is turned to present nozzle face 6 in operative position and valve knob 50 is turned to close elbow 37 by plug 38 and uncover elbow 36 for air flow therethrough. At the same time disc 39 registers its port 44 with openings 45 and 48 and closes openings 46 and 49, thereby providing for suction flow of air from vacuum nozzle 6 through slot 18, tube member 3, chamber 35, elbow 36, bag 27, chamber 19, opening 45, port 44, opening 48, suction chamber 42 and opening 43 to the suction fan 22.

The same general operation applies also to the valve construction of FIGS. 5 and 6, except that the disc 39 is eliminated, and a cylindrical sleeve 52 sealed against the upper end of member 3 provides the valve chamber 35. Sleeve 52 has a single opening 53 therein adapted to selectively register with elbow 36 or 37 depending upon the rotational adjustment of the sleeve.

The upper end of sleeve 52 is closed by a tight plug 54 and a cap 55 extends over it and is secured to the top of chamber 19.

A knob 56 has a shank 57 in the form of a rod bent at right angles to provide a part disposed axially of plug 54 and a part extending radially to knob 56. The axial part of shank 57 is journaled in cap 55 and extends into plug 54 to which it is secured so that movement of knob 56 circumferentially of chambers 19 and 29 effects rotary movement of plug 54 and sleeve 52 to thereby dispose opening 53 in registry with either elbow 36 or 37.

The gap between motor housing 20 and chamber 29 and in which knob shank 57 operates is closed by a ring 58 through which the shank 57 extends and which rotates as the knob 56 is moved.

In the embodiment of FIGS. 5 and 6, the elbows 36 and 37 are disposed at approximately 90° from each other instead of 180° as in the embodiment of FIGS. 1 to 4, inclusive. This means that knob 56 only needs to move 90° to move opening 53 in sleeve 52 from one elbow to the other.

For the purpose of preventing excessive sudsing of the detergent in chamber 29, an anti-sudsing cake in the form of a tubular member 59 may be secured to the end of elbow 37.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. In a combined floor scrubber and vacuum cleaner unit having separate alternative flow paths for the suction depending upon use of the unit for floor scrubbing or

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for vacuum cleaning and employing a common suction means with separate air cleaning means in said paths ahead of said suction means, a suction nozzle for reciprocation over a floor to be cleaned, a source of suction for said nozzle, means connecting said suction source to said nozzle and providing in part said separate flow paths for the suction, and a manually operable valve selectively closing either flow path and simultaneously opening the other.

2. In a combined floor scrubber and vacuum cleaner unit, a floor nozzle, a handle member comprising in part a vacuum filter chamber extending upwardly from said nozzle, a tank for detergent-water mix removably secured to said handle member and having valve means to discharge mix therefrom onto a floor, a chamber removably secured to said handle member for separating dirty water and air and providing a tank for retaining the water during drying of a floor, means connecting said filter chamber and said separating chamber to said floor nozzle, and means selectively connected to said filter chamber and said separating chamber to provide a suction therein.

3. In a combined floor scrubber and vacuum cleaner unit, a floor nozzle, a handle member comprising in part a vacuum filter chamber extending upwardly from said nozzle, a tank for detergent-water mix removably secured to said handle member and having valve means to discharge mix therefrom onto a floor, a chamber removably secured to said handle member for separating dirty water and air and providing a tank for retaining the water during drying of a floor, means connecting said filter chamber and said separating chamber to said floor nozzle, a source of suction, and valve means selectively connecting said chambers to said source of suction.

4. In a combined floor scrubber and vacuum cleaner unit, a floor nozzle, a handle member comprising in part a vacuum filter chamber extending upwardly from said nozzle, a tank for detergent-water mix removably secured to said handle member and having valve means to discharge mix therefrom onto a floor, a chamber removably secured to said handle member for separating dirty water and air and providing a tank for retaining the water during drying of a floor, a source of suction connected to both said chambers, and means selectively connecting said chambers to said floor nozzle.

5. A combination floor scrubber and vacuum cleaner comprising a nozzle body having a floor scrubber face and a vacuum cleaning face, a tubular handle member extending rearwardly and upwardly from said nozzle body and connected thereto to provide adjustment of said body to selectively position either face downwardly for contact with the object to be cleaned, means connecting only the operative downwardly facing nozzle to receive suction from said tubular member, an air filter chamber carried by said handle member and connected thereto to receive air from the nozzle, a water-air separating chamber removably carried by said handle member and connected thereto to receive air from the nozzle, a source of suction connected to said chambers, and valve means selectively controlling the suction of air through said chambers from said nozzle body to said source of suction.

6. A combination floor scrubber and vacuum cleaner comprising a nozzle body having a floor scrubber face and a vacuum cleaning face, a tubular handle member extending rearwardly and upwardly from said nozzle body and connected thereto to provide adjustment of said body to selectively position either face downwardly for contact with the object to be cleaned, means connecting only the operative downwardly facing nozzle to receive suction from said tubular member, an air filter chamber carried by said handle member and connected thereto to receive air from the nozzle, a water-air separating chamber re-

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movably carried by said handle member and connected thereto to receive air from the nozzle, a source of suction carried by said handle member and connected to said chambers, and valve means selectively controlling the suction of air through said chambers from said nozzle body to said source of suction.

7. A combination floor scrubber and vacuum cleaner comprising a nozzle body having a floor scrubber face and a vacuum cleaning face, a tubular handle member extending rearwardly and upwardly from said nozzle body and connected thereto to provide adjustment of said body to selectively position either face downwardly for contact with the object to be cleaned, means connecting only the operative downwardly facing nozzle to receive suction from said member, an air filter chamber carried by said handle member and connected thereto to receive air from the nozzle, a water-air separating chamber removably carried by said handle member and connected thereto to receive air from the nozzle, a source of suction carried by said handle member and connected to said chambers, and valve means interposed between said suction source and said chambers to selectively determine which chamber is to receive suction from said source.

8. A combination floor scrubber and vacuum cleaner comprising a nozzle body having a floor scrubber face and a vacuum cleaning face, a tubular handle member extending rearwardly and upwardly from said nozzle body and connected thereto to provide adjustment of said body to selectively position either face downwardly for contact with the object to be cleaned, means connecting only the operative downwardly facing nozzle to receive suction from said member, an air filter chamber carried by said handle member and connected thereto to receive air from the nozzle, a water-air separating chamber removably carried by said handle member and connected thereto to receive air from the nozzle, a source of suction carried by said handle member and connected to said chambers, and valve means interposed between said nozzle and said chambers to selectively control the path of suction through either chamber from said nozzle.

9. A combination floor scrubber and vacuum cleaner comprising a nozzle body having a floor scrubber face and a vacuum cleaning face, a tubular handle member extending rearwardly and upwardly from said nozzle body and connected thereto to provide adjustment of said body to selectively position either face downwardly for contact with the object to be cleaned, means connecting only the operative downwardly facing nozzle to receive suction from said member, an air filter chamber carried by said handle member and connected thereto to receive air from the nozzle, a water-air separating chamber removably carried by said handle member and connected thereto to receive air from the nozzle, a source of suction carried by said handle member and connected to said chambers, means to close the suction path through said air filter chamber when said scrubber nozzle face is operatively disposed downwardly, and means to close the suction path through said separating chamber when said vacuum nozzle face is operatively disposed downwardly.

References Cited in the file of this patent

UNITED STATES PATENTS

1,026,104	Moorhead	May 14, 1912
1,687,283	Deutscher	Oct. 9, 1928
1,711,380	Giampolni	Apr. 30, 1929
1,729,527	Titgen	Sept. 24, 1929
1,849,663	Finnell	Mar. 15, 1932
2,432,670	Lampe	Dec. 16, 1947
2,867,835	Brown et al.	Jan. 13, 1959
2,955,674	Krammes	Oct. 11, 1960