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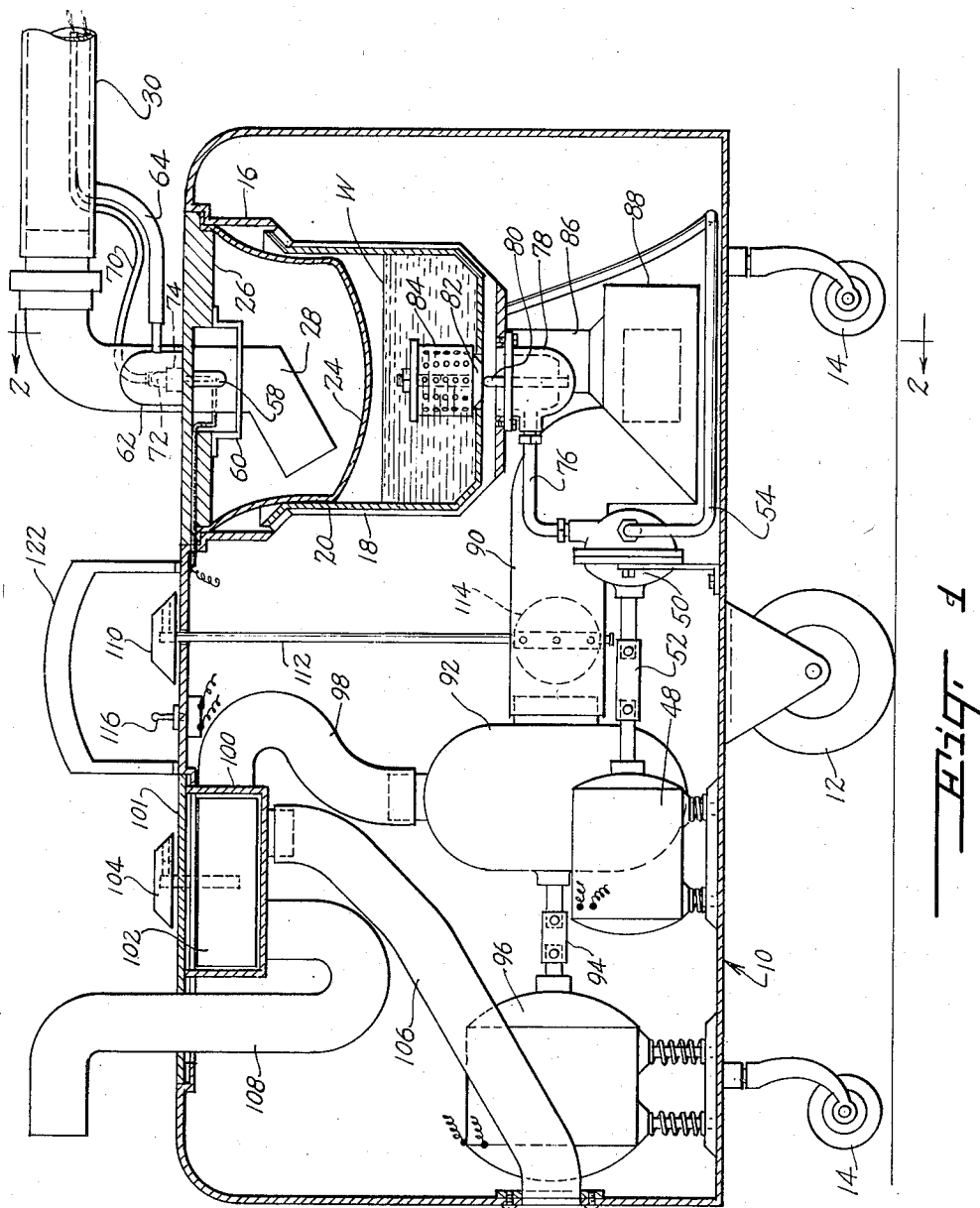
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COMBINATION WET MOP, DRY MOP AND VACUUM CLEANER

Filed April 22, 1955

2 Sheets-Sheet 1



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COMBINATION WET MOP, DRY MOP, AND VACUUM CLEANER

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1 Claim. (Cl. 15—321)

This invention relates to a portable apparatus, adapted for wet or dry mopping of floors, and for vacuum sweeping of said floors, or other surfaces, the main object of the invention being to provide apparatus of the type stated in which the mentioned functions can be selectively discharged, in any desired sequence.

Another object of importance is to provide apparatus of the type referred to which, by reason of the particular construction thereof, is especially well adapted for commercial use, such as in large office buildings, but which will be equally well adapted for manufacture in an embodiment usable in the home.

A further object of importance is to provide a compact, self-contained apparatus which will discharge a plurality of floor conditioning functions, with said functions being effectively controlled by the user through the medium of conveniently located switching and valve devices.

A further object of importance is to so form the apparatus as to permit water to be forced through a nozzle-like outlet onto the floor surface, adjacent a mop head, so that said water may be used in mopping the floor, with the flow of the water being instantaneously controlled through the medium of a conveniently located control switch for a water pump, disposed upon a wand or outlet fitting adapted to be manipulated with facility by the user.

A further object of importance is to permit, alternatively, a vacuum action to be set up in said wand, for the purpose of causing a strong flow of air over a wet floor surface, to dry said surface in a minimum of time.

A further object of importance is to provide a construction wherein the mentioned flow of air will alternatively be usable for vacuum cleaning or sweeping purposes.

Other objects will appear from the following description, the claim appended thereto, and from the annexed drawing, in which like parts throughout the several views and wherein:

Figure 1 is a longitudinal sectional view through an apparatus formed according to the present invention, taken approximately on line 1—1 of Figure 2;

Figure 2 is a transverse sectional view through the apparatus on line 2—2 of Figure 1;

Figure 3 is an enlarged top plan view of a vacuum sweeper head;

Figure 4 is an enlarged, fragmentary view partly in side elevation and partly in longitudinal section of the mopping head and the adjacent portion of the wand; and

Figure 5 is a view similar to Figure 4 showing the vacuum sweeping head of Figure 3.

The apparatus constituting the present invention includes a mobile, hollow housing generally designated 10, provided intermediate its ends with depending wheel hangers on which are rotatably mounted main wheels 12. At opposite ends of the apparatus there are provided castor wheels 14, said wheels 14, when the apparatus is horizontally positioned, being disposed slightly out of contact with the floor surface. As shown in Figure 2,

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a pair of the main wheels is provided, one adjacent each side of the housing, while a single end castor 14 is provided adjacent each end of the device medially between opposite sides thereof.

Formed in the top wall of housing 10, adjacent the front end of the housing, it a large opening, and extending about said opening is a depending flange 16 integrally formed with the top wall of the housing. The flange 16 is fixedly connected to the open upper end of an outer or main water receptacle 18, and removably seated in the receptacle 18 is an inner water receptacle 20, the open upper end of which is formed (Figure 2) with an outwardly directed lip seating tightly against a peripheral gasket 22 that is attached to the correspondingly lipped upper end of the main receptacle.

A removable dust bag, pervious to air but adapted to arrest particles suspended in the air passing through the material of the bag, has been designated at 24, and has an outwardly directed flange portion at its open upper end. The bag 24 is adapted to seat in the removable inner water receptacle 20, above the level of water W disposed in said receptacle. When the dust bag is being used as it would be during vacuum sweeping operations or floor drying operations, the outwardly directed flange portion thereof is engaged between a ledge formed upon the upper end of the flange 16, and the periphery of an openable and closable hinged door 26 mounted on the top wall of the housing to close the opening thereof.

The door 26 can be locked in closed position, bearing tightly against the upper end of the dust bag, through the medium of a locking strap 27 formed of rigid metal material and projecting laterally of the free end of the hinged door, said locking strap having longitudinally spaced notches 29 in any of which is adapted to engage a locking hook 31 pivotally mounted in a cam-provided handle 33. The arrangement is one in which, when the handle 33 is swung inwardly to the Figure 2 position thereof, the hook 31 is lowered, so as to bear tightly in the selected notch 29. When the handle is swung outwardly from its Figure 2 position, the hook is now loose in the selected notch, and can be swung out of the notch to permit the door 26 to be opened.

Referring now to the means whereby air is drawn into the housing for passage through the dust bag, there is provided an elongated, vertically disposed conduit 28, having one end disposed outside the housing and the other end discharging into the housing through the dust bag. The conduit is fixedly mounted in the door 26, and at its inlet end, has a fitting detachably connectable to one end of an elongated, flexible hose 30, the other end of which is detachably connected by a similar fitting to one end of a rigid, elongated, tubular wand 32 (Figure 4). At its inlet end, the wand 32, which is adapted to be grasped as a handle for the purpose of manipulating the head of the apparatus over the floor surface, is provided at its inlet end with a connecting fitting to which is detachably connected a hollow head 34 of inverted L-shape, having at its inlet end a transverse partition 36 below which depends a peripheral flange frictionally engaging a suction head 38, said suction head at its lower end having a flared, resilient skirt formed of soft rubber or the like.

The flexible hose 30 and wand 32 constitute conduit means connecting the upper end of the conduit 28 to the suction head 38. It is to be noted that the partition 36 does not completely obstruct air flow through the suction head 38.

Mounted for vertical sliding movement in the partition 36 is a plunger 40 spring-biased in a downward direction, and having at its lower end a flat plate provided with a peripheral series of springs 42 adapted to engage the marginal portion of the base 44 of a sponge mop 46.

Referring now to the means for forcing water through

the head of the device onto the floor adjacent the sponge mop 46, there is provided a pump motor 48 driving a pump 50 through a suitable flexible connection 52. Extending from the outlet side of pump 50 is an elongated, flexible hose 54, which as shown in Figure 2, extends into communication with a connecting hose 56 extending exteriorly of the housing, one end of hose 56 being fixedly secured in one side wall of the housing, and the other end being fixedly engaged in the hinged door 26. The connecting hose 56 opens into communication with a connecting conduit 58 of U-shaped formation, mounted in hinged door 26 and protectively enclosed by a splash guard 60. At its outlet end, the connecting conduit 58 is provided with a check valve 59, which opens to permit flow of water out of conduit 58 into a dome-shaped outlet chamber 62. Extending from the outlet chamber 62 (Figure 1) is a short length of tubing, and detachably connected to said tubing is a flexible hose 64, which is extended into the hose 30, passing through hose 30 and through wand 32 as shown in Figure 4, and discharging onto the floor surface through a nozzle 66 mounted in the transverse partition 36.

An electric switch 68 is mounted upon the wand 32, and has an elongated, trigger type handle, which can be squeezed, for the purpose of closing the switch. The switch 68 has contacts which, when bridged, close a circuit through a lead 70, terminating in an electric plug 72 adapted to be plugged into a receptacle 74 mounted in the hinged door 26.

The plug 72, it will be understood, is at one end of an electric cord, not shown, leading to a source of electric power. For example, said cord can be provided with a similar plug at its other end, capable of being plugged into a conventional wall socket.

The switch 68 controls operation of the motor 48, and in providing a suitable electric circuit, one of the two conductors of the power supply cord can be connected to the lead 70 at the location of the plug 72, with switch 68 preventing flow of current through said lead 70 when open. From the other side of the switch, the lead 70 extends to one side of the motor, and from the other side of the motor extends a lead connected to the other conductor of the power supply cord. Accordingly, whenever the trigger 68 is pressed to close the switch, electrical power is supplied to the motor 48, and the pump is caused to operate to pump water out of the inner water receptacle 20, for discharge through the nozzle 66.

Considering the flow of the water from the inner water receptacle to the inlet side of the pump, there is provided an inlet pipe 76 for the pump, connected at its inlet end to a sump 78 having a push rod 80 bearing against a drain valve disc 82 mounted at the lower end of a strainer 84. The details of the strainer are not shown herein, the strainer being a conventional device per se. The strainer plunger can be lifted manually, to raise the valve disc 82, to permit free flow of water out of the inner water receptacle 20. When, however, the plunger is lowered, it can be in one position in which it completely prevents drainage of water W out of the inner water receptacle, or in a second position in which it seats against the upper end of the push rod 80, so as to permit only a limited flow, with the limited amount of water flowing out of the inner water receptacle being pumped out through the nozzle 66. This is desirable so that an excessive amount of water will not be forced out of the nozzle 66 under ordinary circumstances. If a full flow of water is desired out of the nozzle 66, the valve disc 82 can be lifted to its uppermost position, in which event the pump will operate to pump a greater quantity of water through the nozzle.

It will be seen that the flow of water is thus effectively controlled by the trigger type switch, which is conveniently located so as to be capable of being grasped by one holding the wand 32 in a natural manner. The flow can

be cut off or started instantaneously during the mopping operation.

Referring now to the vacuum-induced flow of air into the head 34, there is provided (Figure 2) an air inlet duct 86 within the housing, the inlet end of said duct opening into communication with the upper end portion of the main receptacle 18, exteriorly of the dust bag 24, so that when air is drawn through head 34 and wand 32, it will be discharged through the connecting pipe 28, and will pass through the material of the dust bag, said air then passing into the inlet end of duct 86 with the dust particles being arrested by the bag.

At its outlet end, duct 86 is connected to a cylindrical chamber 88, discharging into a connecting duct 90, that opens into communication with the inlet side of a blower 92 driven, through the medium of a flexible driving connection 94, by a blower motor 96.

At its outlet side, the blower 92 is connected to a duct 98, opening into a compartment 100 secured to and depending from a removable door 101 mounted in an opening in the top wall of the housing. A rectangular valve plate 102 is rotatably mounted in the compartment 100, to swing about the axis of the stem equipped with a manually rotatable handle 104 disposed exteriorly of the housing. In the position of the valve plate 102 shown in Figure 1, air forced out of the compartment 100 during the operation of the blower 92 passes outwardly both through a first air outlet duct 106 and a second air outlet duct 108. The duct 108 is extended above the housing, and is adapted for connection of a suitable accessory making use of forced air, as for example, a paint sprayer or the like.

If it is desired to permit the air to be expelled only through the duct 106, the valve plate 102 is rotated from its Figure 1 position 90 degrees, and will now extend transversely of the compartment 100, so that all air flowing into the compartment 100 through duct 98 is discharged through the duct 106, which is inclined downwardly, to open through the rear end wall of the apparatus adjacent the bottom wall of the apparatus.

A main control valve for the flow of air is provided, and includes a manually rotatable valve handle 110 secured to the upper end of a vertically disposed, elongated valve rod or stem 112 rotatably mounted in the top wall of the apparatus. At its lower end, the rod 112 is rotatably mounted in the wall of the duct 90, and within duct 90 is secured to a circular valve plate 114. In the position of the valve plate 114 shown in Figure 1, air is permitted to flow through duct 90. On rotation of handle 110 through 90 degrees, the valve plate will extend transversely of the duct 90 to prevent flow of air there-through.

Referring now to Figures 3 and 5, there is here illustrated an accessory, which can be used interchangeably with the wand 32 and head 34. This includes a wand 116 adapted to be connected at its outlet end to hose 30. At its inlet end, the tubular wand 116 has a connecting fitting for detachably securing thereto a head 118 which as shown in Figure 3, is elongated transversely of the wand, the head 118 having a flared, wholly open bottom portion in which is removably engaged a correspondingly shaped vacuum brush 120.

This attachment can be used whenever the apparatus is to be employed for vacuum sweeping, the brush 120 being kept in engagement with the floor and the vacuum being established by operation of the blower 92.

As shown in Figure 1, the top wall of the apparatus is equipped with a handle 122 to facilitate lifting and rolling of the apparatus from place to place.

In use of the apparatus, and assuming that it is first desired to wet mop a floor, the motor 48 is turned on by depression of the switch 68 to close the same. Water is ejected, as a result, through nozzle 66 adjacent the mop 46, and the wand 32 is reciprocated over the floor surface, to spread the water for the purpose of cleaning

the floor. The flow of water, of course, can be fully controlled in the manner previously described herein, by opening and closing of switch 68 as desired.

When it is desired to take up excess water, the pump is kept out of operation, and a downward pressure is exerted on the wand 32, tending to compress the spring of plunger 40 and the mop 46. This permits the mop to absorb the excess water as desired.

If it is desired to speed up the drying of a wet floor, with the pump turned off, the vacuum action is established by operation of the blower 92. This causes air to be sucked in through the head 34, and said air will be caused to flow over the wet floor surface as it enters the head, thus rapidly evaporating the moisture on said surface.

For dry mopping, the mop 46 is removed, and a suitable dry mop is attached to the plunger 40 by means of the clips supported by said plunger.

It should be noted that with further reference to facilitating the drying of the floor, the mop 46 can be detached, causing the rubber, flared lower end of the head 38 to be engaged with the floor surface. The blower is now turned on, setting up a vacuum in the area circumscribed by said head, and the head can of course be manipulated slightly so as to permit flow of air under the edge thereof, to replace that drawn inwardly through the head 34.

Further, vacuum sweeping is carried out by the attachment of the brush head 120, and operation of the blower 92.

A switch 116 is used for controlling the operation of the blower motor 96, and the same arrangement can be employed, so far as a circuit through the switch and a blower motor are concerned, as that employed in connection with the water pump. In other words, from one side of a power supply there can extend a lead bridged by switch 116, said lead extending to one side of motor 96, and from the other side of motor 96 extends a lead back to the power supply. The connection to the power supply lead is made at the location of the receptacle 74. The particular electrical connections are believed well within the skill of those working in the art, and accordingly, it is not believed necessary to detail the same herein.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles, it being considered that the invention comprehends any minor change in construction that may be permitted within the scope of the appended claim.

What is claimed is:

A portable apparatus for cleaning floor surfaces comprising a mobile housing having a top wall provided with an opening, an upstanding flange positioned within said housing and extending about the perimeter of said opening and having the upper end attached to said top wall, an outer water receptacle having an open top positioned within said housing and having the open top dependently attached to the lower end of said flange, an inner water receptacle provided with an open top positioned within and spaced from the outer receptacle and having the open top removably seated on the open top of said outer receptacle, valve means in said inner receptacle for controlling the flow of water from said inner receptacle into said outer receptacle, an openable and closable door normally closing the top wall opening, a downwardly concavely curved dust bag positioned within said inner receptacle and said flange and having the upper end detachably secured to said door and said flange, a vertically disposed conduit extending through and fixedly mounted in said door and having the lower end discharging into said dust bag and having the portion adjacent the upper end exteriorly of said door, a suction head, conduit means connecting the upper end of said conduit to said suction head, said suction head being provided with means adapted to receive and hold a mop, a pump having an outlet side and an inlet side positioned within said housing, an inlet pipe connecting said pump inlet side to said outer receptacle, a connecting conduit supported in said door, conduit means connecting the outlet side of said pump to one end of said connecting conduit, conduit means connecting the other end of said connecting conduit to said suction head, a vacuum blower in said housing, and a duct having the inlet end opening through said flange and having the outlet end connected to said blower.

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