May 23, 1933. F. E. WALTER 1,910,727

SCRUBBING MACHINE

Filed Nov. 4, 1929 3 Sheets-Sheet 1

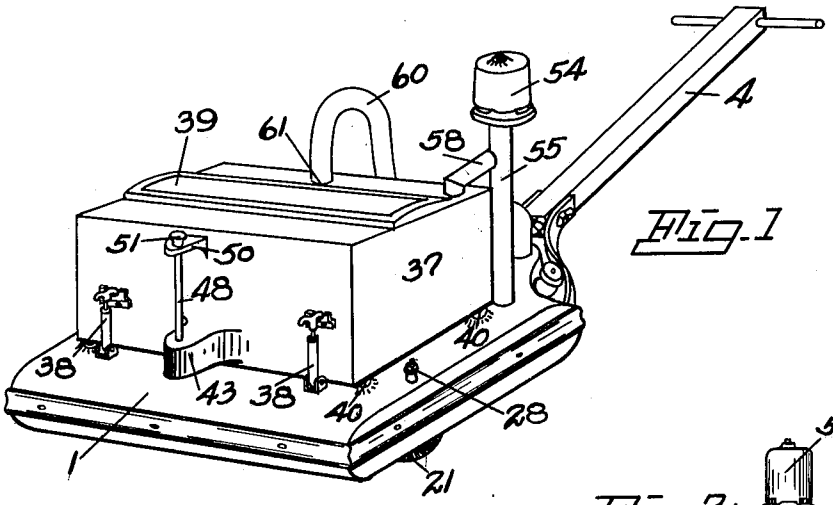


Fig. 1

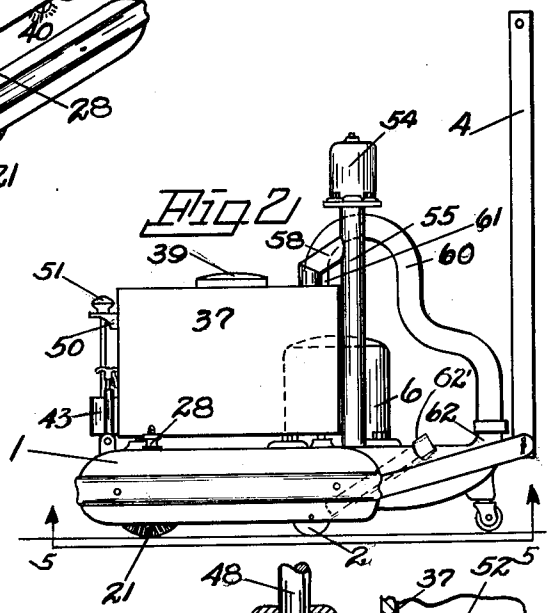


Fig 2

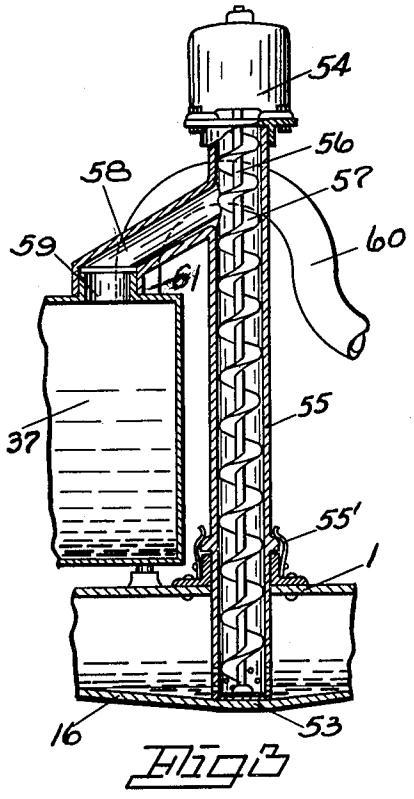


Fig 3

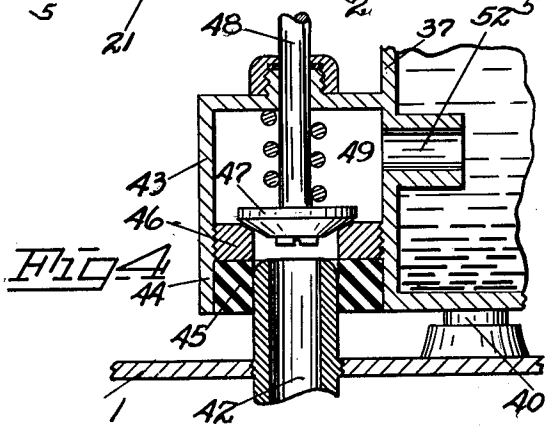


Fig 4

FOREST E. WALTER

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By Herbert E. Smith

Attorney

May 23, 1933. F. E. WALTER 1,910,727

SCRUBBING MACHINE

Filed Nov. 4, 1929 3 Sheets-Sheet 2

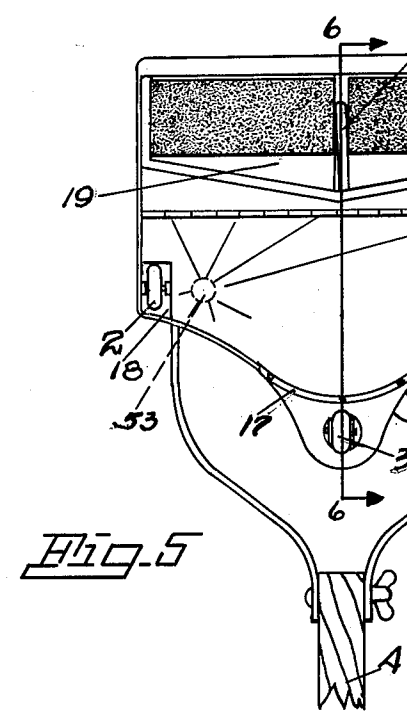


Fig. 5

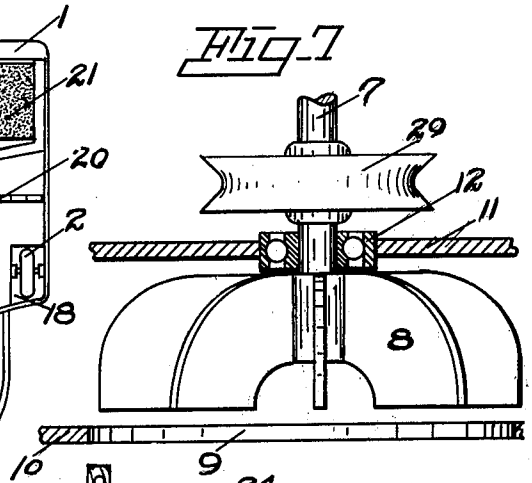


Fig. 7

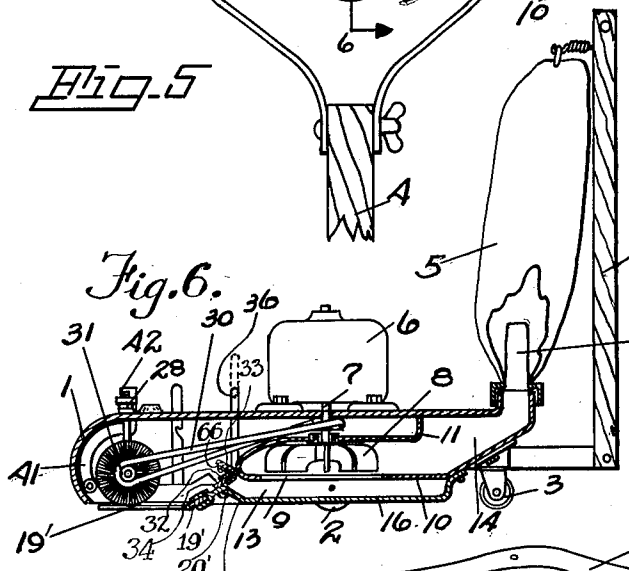


Fig. 6.

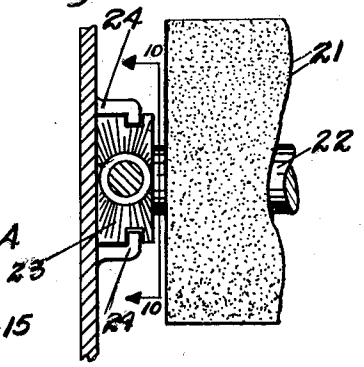


Fig. 9

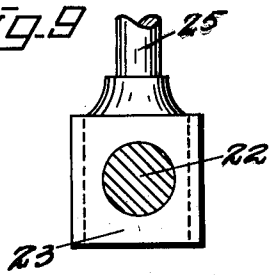


Fig. 10

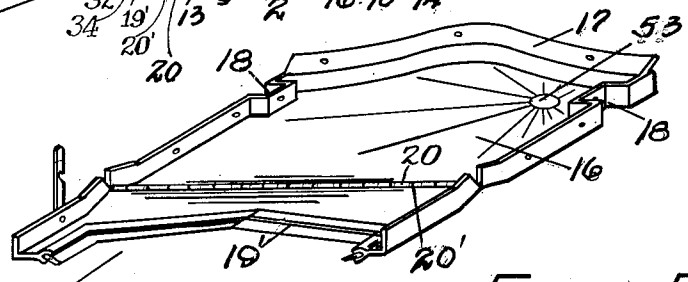


Fig. 8

FOREST E. WALTER

Inventor

By: *Herbert E. Smith*

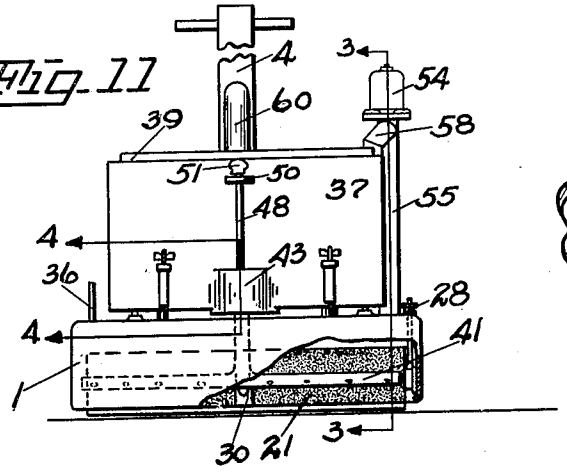
Attorney

May 23, 1933. F. E. WALTER 1,910,727

SCRUBBING MACHINE

Filed Nov. 4, 1929 3 Sheets-Sheet 3

Fig. 11



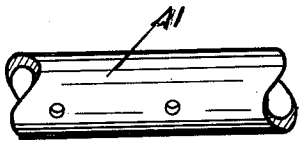
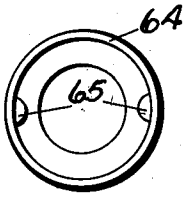


Fig. 12

Fig. 15



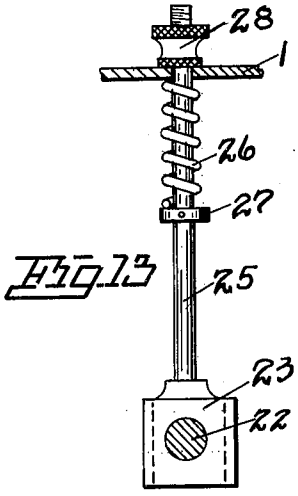


Fig. 13

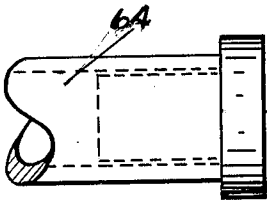


Fig. 14

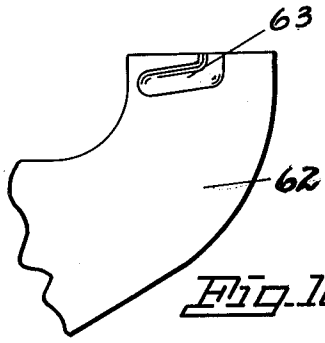


Fig. 16

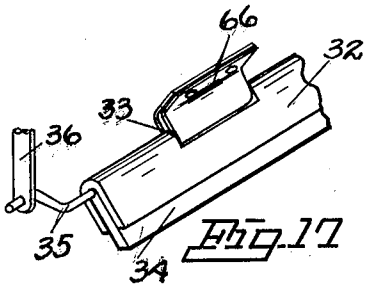


Fig. 17

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Patented May 23, 1933 1,910,727

UNITED STATES PATENT OFFICE

FOREST E. WALTER, OF SPOKANE, WASHINGTON

SCRUBBING MACHINE

Application filed November 4, 1929. Serial No. 404,687.

My present invention relates to improvements in scrubbing machines of the rotary, power operated type, and designed to be manually propelled for use in scrubbing and brushing floors, floor coverings, etc. The appliance of my invention is also equipped with accessories which adapt it for use as, a vacuum cleaner for cleaning floor coverings, drapes, etc.

By the utilization of my invention, the compactly arranged scrubbing machine may quickly and with facility be converted for use as a vacuum cleaner. The scrubbing machine is equipped with a water tank, pump, and other necessary accessories and the invention consists in certain novel combinations and arrangements of parts whereby the above features are utilized, as will hereinafter be more fully set forth and claimed.

In the accompanying drawings I have illustrated one complete example of the appliance in which the parts are combined according to one mode I have thus far devised for the practical application of the principles of my invention.

Figure 1 is a perspective view of the appliance equipped for use as a scrubbing machine. Figure 2 is a view in side elevation of the appliance of Figure 1 with the handle folded to inoperative position, as when out of use. Figure 3 is an enlarged vertical sectional detail view showing the water pump and motor and connections. Figure 4 is an enlarged detail sectional view of the valve device for the scrubbing machine, as at line 4—4 of Figure 11. Figure 5 is a bottom plan view of the appliance as seen at the line 5—5 of Figure 2. Figure 6 is a vertical, longitudinal sectional view of the machine used as a vacuum cleaner, as at line 6—6 of Figure 5, with the handle in folded position. Figure 7 is an enlarged detail view, partly in section, showing the fan, its bearing and shaft, and the pulley for driving the rotary scrubbing brush, which brush is employed either for scrubbing or for dust. Figure 8 is a perspective view of the bottom pan or bottom plate of the appliance. Figure 9 is a detail view at one end of the brush showing its adjustable or resiliently supported bearing. Figure 10 is a sectional view at line 10—10 of Figure 9. Figure 11 is a front elevation of the appliance used as a scrubbing machine with part of the front broken away to disclose the brush and part of the water distributing pipe. Figure 12 is an enlarged view showing a portion of the perforated, water distributing pipe. Figure 13 is a detail view showing one of the resilient supports for the brush-shaft. Figures 14, 15 and 16 are detail views of accessories employed for extending, as by an air hose, the use of the vacuum cleaner. Figure 17 is a perspective view of the hinged gate and squeegee used in the bottom of the appliance and hinged to the bottom plate.

In the views showing the general assembly of parts, the appliance includes a main hollow body or casing 1 that is supported on a pair of wheels 2, and a steering wheel 3 journaled under the casing, and a pivoted handle 4 is utilized to manipulate the appliance, whether it is used as a vacuum cleaner in Figure 6, or as a scrubbing machine as in Figures 1 and 2. When used as a vacuum cleaner the usual bag 5 is suspended from the handle and connected to the cleaner for collecting the dust, and a motor 6, mounted on the top of the casing is employed for operating the vacuum cleaner.

The motor shaft 7, which is vertically arranged, extends downwardly through the top of the casing and has a rotary fan 8 fixed on its lower end and located directly over an opening 9 in an elevated partition 10 that extends transversely of the casing. Above the partition 10 is another horizontal partition 11 in the casing, and a bearing 12 is provided in this latter partition for the fan shaft. These two partitions in the casing form a lower chamber 13 as an intake for the fan and an upper chamber 14 as an outlet or discharge chamber for the fan, and an outlet or discharge pipe 15 is provided at the top and rear of the casing for the attachment of the dust bag 5, as seen in Figure 6.

The pan or bottom plate 16 of the casing, forming the bottom of the intake chamber

for the fan, is fashioned with attaching flanges 17 secured to the lower part of the casing, and side notches 18 are provided in this plate to accommodate the pair of wheels or rollers 2.

As best seen in Figure 8 the front of the bottom plate or pan 16 is left open at 19, and through this opening or mouth of the appliance, the dust is drawn by suction and is conveyed by the fan to the dust bag. At the rear of the opening 19 the bottom plate is fashioned with a transversely extending rib 20 which projects upwardly in the casing, and this rib forms a dam at the front of the chamber 13 when the latter is used to collect water that has been employed for scrubbing purposes.

Within the front of the casing, and over the front bottom opening or mouth 19, a rotary brush 21 is mounted for use in sweeping the dust into the intake chamber of the fan, as well as for co-action with sprinkled water when the scrubbing machine is employed. The brush is held to the floor by resilient means under tension, and its shaft 22 is mounted at its ends in vertically movable bearing blocks 23. The bearing blocks are grooved to slide in the oppositely arranged guides 24 fixed at the inner sides of the side walls of the casing, and each block has a spring-post 25 rising therefrom and passing at its upper end through the top of the casing. A spring 26 is interposed between the top of the casing and a fixed collar 27 on the post, and an adjusting nut 28 is threaded on the upper projecting end of the post, as seen in Figure 13. By means of the nuts on the threaded ends of the posts the latter may be raised or lowered to elevate or lower the brush, and the tension of the springs 26 is also varied to change the frictional bearing of the brush on the floor, or surface to be cleansed.

The brush is rotated from the motor shaft through the instrumentality of a pulley 29 on the shaft, a belt 30, and a driven pulley 31 on the shaft 22 of the brush, and of course the brush is revolved so that it will sweep or brush the dust into the intake chamber 13 of the fan.

As seen in Figures 6 and 8 the walls of the front bottom opening 19 form a three-side closure which has in its edges a rubber strip 19′ that glides over the surface of the floor or floor covering, and is hinged at 20′ on the rib 20, to assist in the function of providing a vacuum within the opening when the appliance is used as a vacuum cleaner, and to retain the scrub-water when the appliance is used as a scrubbing machine.

At the top of the rib 20, the bottom plate is provided with a gate 32 at the front of the intake chamber 13, and the hinge 33 of the gate extends transversely of the machine and is supported in bracket 66 at the underside of the front edge of the partition 10. A rubber strip 34 is retained in the free edge of the gate for contact with the upper, rear edge of the closure at 20′ to close the chamber 13 from the opening 19, when desired. The hinge pin 33 of the gate extends transversely of the casing and at one end it is fashioned with a crank 35 upon which is pivoted a lift lever 36 that is readily accessible so that it may be manipulated to turn the gate to either open or close the front end of the intake chamber 13 in the bottom of the casing.

When the appliance is used as a scrubbing machine, it is equipped with a removable water tank 37 that is mounted on the top of the casing 1 and secured thereon by means of a number of spring hook-bolts 38 hinged on the casing and adapted to engage the tank and hold it on the casing. Water may be supplied to the interior of the tank through an opening when the lid 39 is opened.

Pads or cushions 40 are provided on the top of the casing for the water tank to insure a tight joint of the tank on the casing and to prevent rattling of parts.

Water from the tank is distributed in front of the rotary brush from a distributing pipe 41 which is perforated and extends transversely of the casing, within its front, and in front of the brush, with a feed pipe 42 communicating with the distributing pipe and projecting up through the top of the casing 1, as best seen in Figure 4. The distributing pipe and its feed pipe remain as permanent and fixed parts of the casing, and the water tank is provided with a cap device to slip over the top of the feed pipe when the tank is applied to the casing.

This cap device or coupling device includes a valve casing 43 (in Figure 4) projecting from the front of the water tank and at the lower open end of the valve casing a round nipple 44 is fashioned in the open end of which is seated a packing ring or gasket 45 and above the gasket or washer is fixed, as by screw threads, a valve-seat ring 46. A valve 47 coacts with the seat, and its stem 48 projects upwardly through the top of the valve casing. Between the valve and the casing a valve spring is coiled about the stem, and the spring tends to hold the valve in closed position. Above the valve casing the stem passes through a guide bracket 50 on the water tank, and by means of a knob or handle 51 on the top end of the stem the latter may be lifted to open the valve and permit the water flowing from the tank through a port 52 into the valve casing and thence into the distributing pipe for use in scrubbing.

The water used in scrubbing is passed to the rear by the rotation of the brush, up and over the rib 20, the gate 32 being open, and into the chamber 13 which thus becomes the

collecting chamber for water, with a sump at 53 in the bottom plate 16.

The collected scrub water is lifted from the sump by means of a pump-motor 54 (an electric motor) supported at the top of the pump tube 55. The tube 55 extends down through the top of the casing, which casing is provided with a packed opening for the tube, and spring detents 55′ on the top of the casing are used to snap over and lock the tube in its opening in the top of the casing.

The vertically arranged pump shaft 56 extends from the motor down through the tube to the sump 53, and a spiral vane or blade 57 forms a screw conveyer on the shaft for lifting the water up from the sump and through the tube. The water or liquid detergent is returned to the tank from the pump tube through a return pipe 58 which is coupled or joined to the nipple or cap 59 in the top of the tank. By the use of the pump a continuous circulation of the water or liquid detergent is accomplished, and the supply of water to the tank may be replenished when required.

While the scrubbing machine is operating the air currents from the fan are passed through chamber 14 and pipe 15 and thence through an air pipe 60. This pipe 60 is connected at 61 to the top of the water tank and to the coupling nipple 62, and the water tank is provided with suitable venting means, not shown.

When the vacuum cleaner is to be used as a stationary appliance and such equipment (not shown) is used, the tank 37 is dispensed with. The air pipe 60 is removed from coupling 62, and the dust bag 5 is connected to the coupling nipple 62. An additional nipple 62′ (which is closed when not in use) and which is mounted to one side and at the rear of the implement, opens into chamber 13 below the hole 9, as indicated by dotted lines in Figure 2. This nipple or connection 62′ has an L-shaped groove 63 similar to the groove 63 of the nipple 62 in Figure 16. When the portable extension equipment is used the gate 32 is closed to shut off the front of the casing from the chamber 13, and the dust and air currents are drawn through the hose, chamber 13 and opening 9 by the fan, and conveyed into the bag 5 in usual manner.

The changes for accomplishing the above results may be made quickly and with facility, and the three different functions of the appliance may be carried out with convenience and efficiency.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

The combination in a rotary scrubbing machine, with a casing having two spaced horizontal partitions forming an upper air chamber, a lower water compartment, and an intermediate air outlet chamber, of a rotary brush located in the mouth of the casing, a transversely extending rib in the bottom of the casing, a three-side closure hinged on said rib and bounding the open mouth of the casing, a gate hinged on a partition and adapted to contact with said hinged closure to close the lower water compartment, and means for controlling said gate.

In testimony whereof I affix my signature.

FOREST E. WALTER.