Dec. 3, 1940. F. H. NADIG 2,223,963

FLOOR CLEANING MACHINE

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Fig. 1.

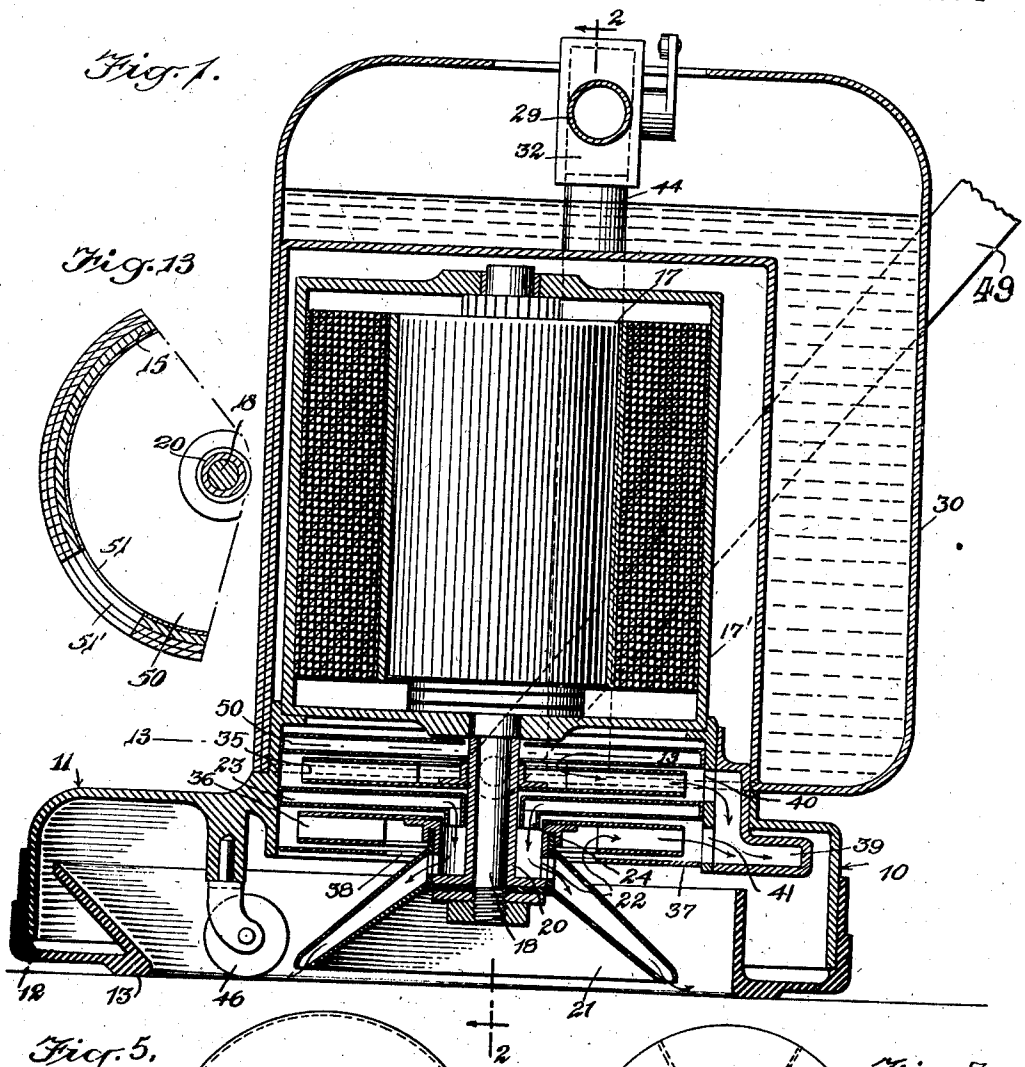


Fig. 13

Fig. 5.

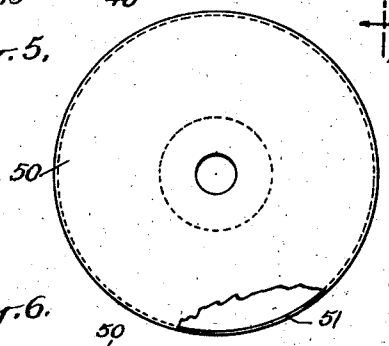


Fig. 6.

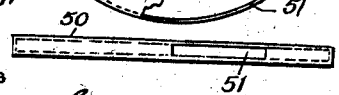


Fig. 7.

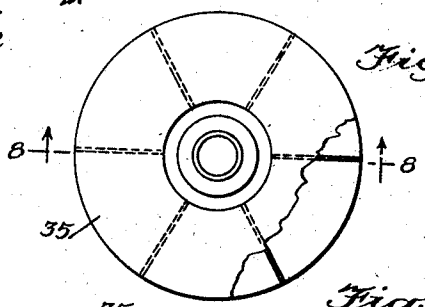


Fig. 8.



WITNESSES

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FLOOR CLEANING MACHINE

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Fig. 2.

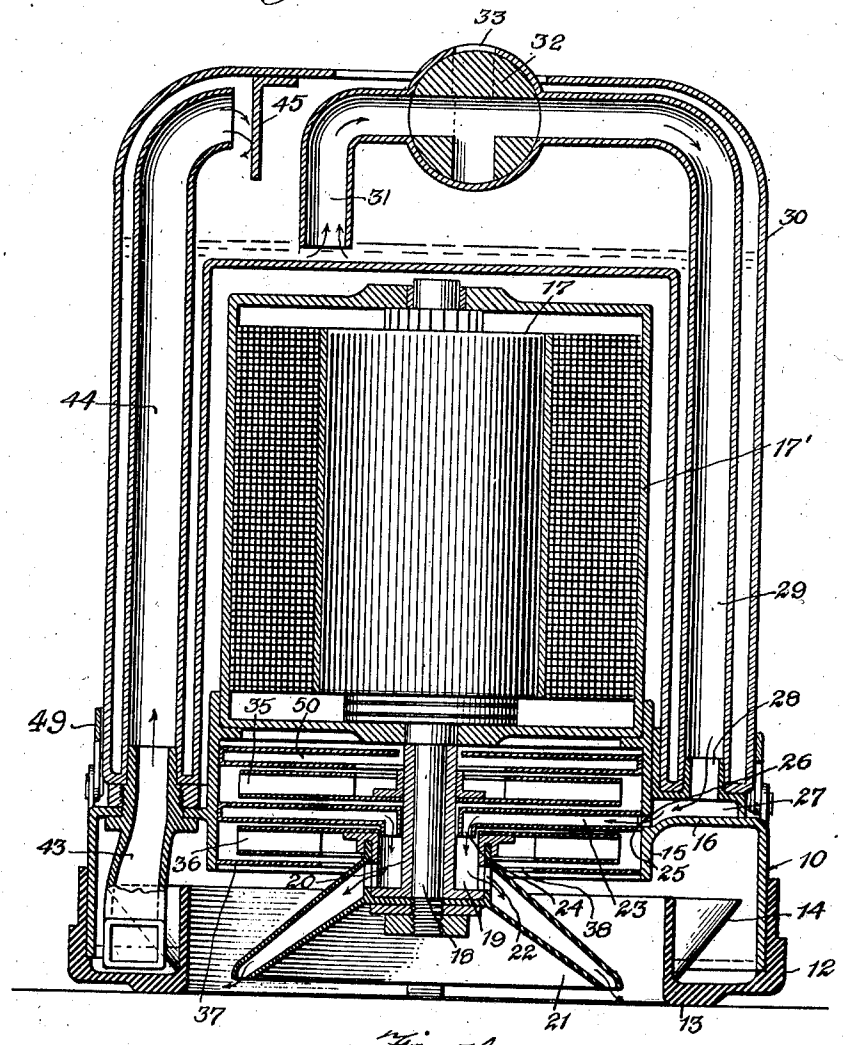
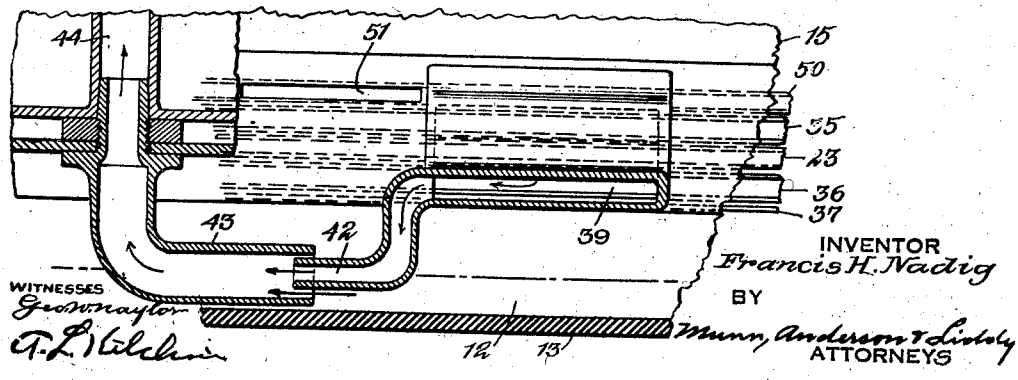


Fig. 4.



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FLOOR CLEANING MACHINE

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Fig. 3

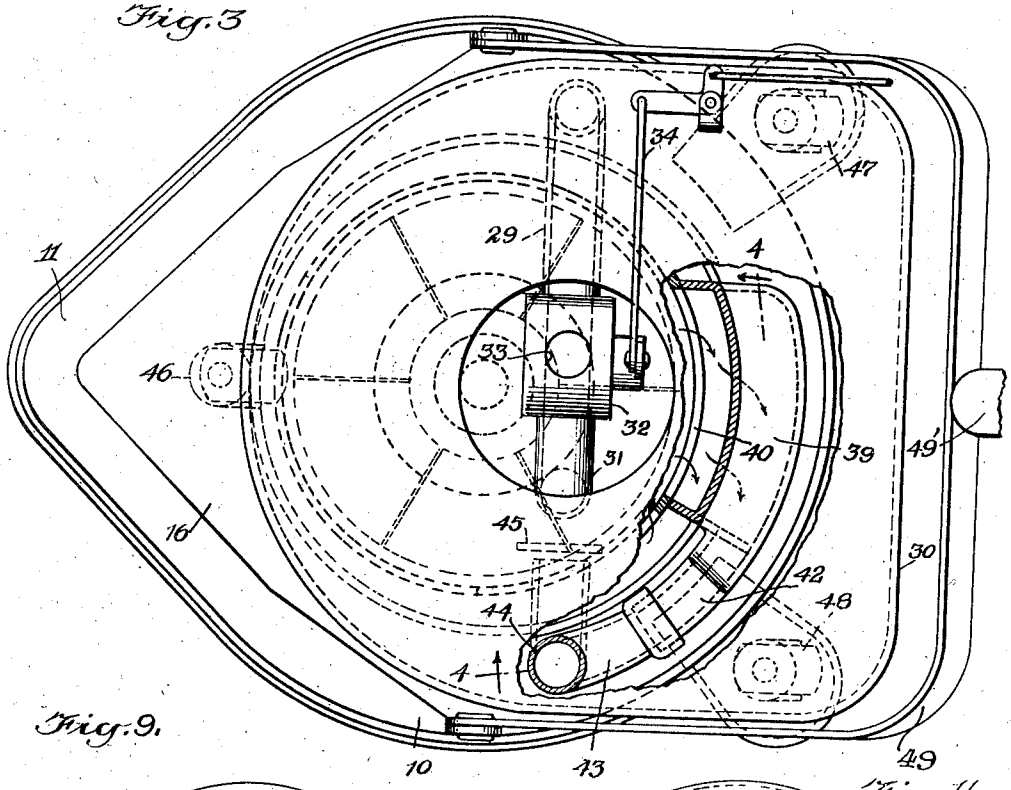


Fig. 9.

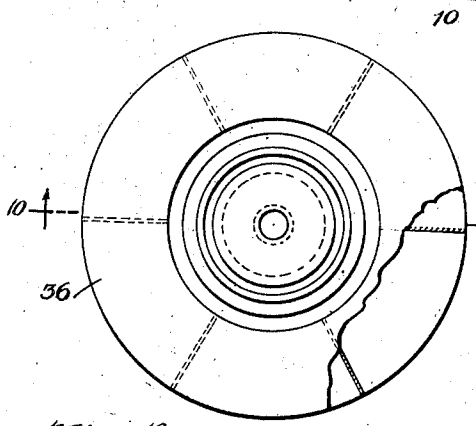


Fig. 11.

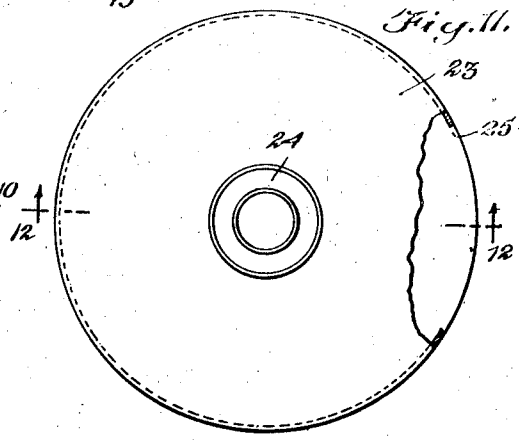


Fig. 10.

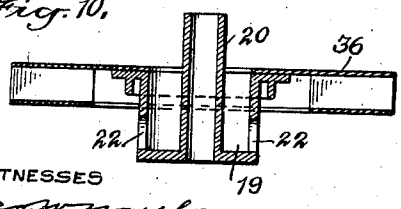
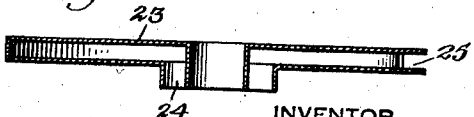


Fig. 12.



WITNESSES

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2,223,963

UNITED STATES PATENT OFFICE

2,223,963

FLOOR CLEANING MACHINE

Francis H. Nadig, Philadelphia, Pa.

Application December 10, 1938, Serial No. 244,957

2 Claims. (Cl. 141—1)

This invention relates to a floor cleaning machine and has for its object an improved construction of apparatus which causes liquid to impinge at a high velocity against the portion of the floor enclosed or confined by the apparatus and then recover the liquid used for repeated use and then effect a drying of the floor space through the medium of air under pressure.

A primary object of my invention is to provide an apparatus of this character in which, by reason of the action of the blower or blowers, the pressure in the space confined or defined by the machine is rendered lower than the atmospheric pressure outside of the machine so as to prevent any movement of the liquid under the machine to the outside thereof.

A further object is to provide in an apparatus of this character improved means for causing the liquid which has been used in the cleaning operation to be returned to the reservoir from which it came for repeated use.

A further object is to provide improved means for feeding liquid to a rotary distributor which insures a proper action of the distributor in the cleaning operation.

A further object is to improve upon the construction illustrated and described in Patent No. 2,003,216 issued to me on May 28th, 1935, with a view to simplicity of operation, economy in manufacture and economy in space and weight of the apparatus.

With these and other objects in view the invention consists of certain novel features of construction and combination and arrangement of parts, all of which will be more fully described and pointed out in the claims.

In the accompanying drawings—

Fig. 1 is a view in vertical longitudinal section through my improved machine;

Fig. 2 is a view in vertical longitudinal section, the view being taken on the line 2—2 of Fig. 1;

Fig. 3 is a top plan view with portions broken away and in section to illustrate details of construction;

Fig. 4 is an enlarged sectional detail view, the view being taken on the staggered line 4—4 of Fig. 3;

Fig. 5 is a plan view of an air-directing chamber, a portion of the same being broken away to indicate the inlet port in the chamber;

Fig. 6 is an end view taken at right angles to Fig. 5;

Fig. 7 is a plan view, partly broken away, showing the upper blower of the machine;

Fig. 8 is a view in section on the line 8—8 of Fig. 7;

Fig. 9 is a plan view partly broken away illustrating the lower blower of the machine and also illustrating the liquid distributing tube associated therewith;

Fig. 10 is a view in section on the line 10—10 of Fig. 9;

Fig. 11 is a plan view of the liquid supply chamber with a portion broken away to illustrate an inlet port therein;

Fig. 12 is a view in section on the line 12—12 of Fig. 11;

Fig. 13 is a fragmentary sectional view through Fig. 1, on the line 13—13.

My improved floor cleaner is provided with a base 10 which is open at the bottom and is of general cylindrical shape but is formed with an integral angularly shaped nose 11, which enables the cleaner to readily reach into corners and under articles of furniture and the like. A trough 12 of rubber, or other analogous material, is supported on the base and is formed with a floor sealing member 13 yieldingly engaging the surface on which the device is used and said trough and floor sealing member defining a floor space to be cleaned. The inner wall 14 of the trough 12 is inclined throughout the major portion of its length providing an inclined surface over which liquid from the floor can be readily forced into the trough.

The base 10 is cast or otherwise formed at its top with a cylindrical barrel 15 which extends above and below the top wall 16 of the base and in the upper end of this barrel 15 the lower end of a motor housing 17' is secured. An electric motor 17 or other prime mover is located in the housing 17' and its vertical driven shaft 18 is located centrally in the barrel 15 and has a cup-like hub 19 located on its lower portion. This hub 19 constitutes an integral part of a sleeve 20 located on the shaft 18 and a liquid distributing head 21 is secured to the hub 19 and is in open communication with the hub through the medium of perforations 22 so as to receive liquid from the hub, the liquid escaping from the distributor with appreciable force onto the surface being cleaned.

A hollow disc-like or cylindrical liquid supply chamber 23 is secured in the barrel 15 above the hub 19 and said chamber 23 is formed with an annular outlet 24 around the sleeve 20 directing the liquid into the hub 19. The chamber 23 is stationary and has an inlet opening 25 in its periphery which connects with an opening 26 (Fig.

2) in the barrel 15 above the base top 16 and communicating with a coupling 27, the latter having an upwardly projecting inlet nozzle 28 projecting into the outlet end of the vertical run of a liquid supply pipe 29. The pipe 29 is confined within a liquid reservoir 30 secured around the barrel 15 and to the base 10 and enclosing the motor housing 17'. The upper portion of the pipe 29 has a horizontal run and its extremity forms a depending inlet 31 projecting below the liquid level in the reservoir.

A three-way valve 32 is provided in the horizontal run of pipe 29 and may be manually manipulated to turn the valve so as to permit the passage of liquid through the same or air only through the valve, the air being admitted through a port 33. As a means of manipulating the valve I have shown a linkage indicated generally by the reference character 34, although it is, of course, obvious that other means may be employed.

A blower 35 is secured around the sleeve 20 above the liquid supply chamber 23 and a second blower 36 is secured around the sleeve 20 below the chamber 23 and a disc 37 is secured in the lower end of the barrel 15 and has a relatively large central opening 38 around the distributor 21 forming an air passage. Both of these blowers 35 and 36 discharge into a header 39, the upper blower discharging through opening 40 and the lower blower through an opening 41 in the barrel 15. The header 39 is confined in the base 10 and has a discharge nozzle 42 disposed horizontally in the lower portion of the trough 12 and projecting into a pipe angle 43 of appreciably greater internal diameter than the external diameter of the nozzle. The pipe angle 43 connects with a vertical return pipe 44 confined in the reservoir 30 and extending above the liquid level in the latter and discharging against a baffle 45 depending from the top of the reservoir. Above the upper blower 35 and secured in the barrel 15 is a hollow disc-like air-receiving chamber 50 having an inlet 51 (Fig. 5) at its periphery registering with an opening 51' and an outlet at its center in open communication with the upper blower 35.

The cleaner is preferably supported on three castor wheels 46, 47 and 48, the castor wheel 46 being located inside the base 10 and the other two castor wheels located outside of the base. A handle bail 49 is pivotally connected to the base 10 and has an operating handle 49' thereon which is grasped by the operator, causing the machine to be moved over the floor in the desired manner. It is, of course, obvious that the exact arrangement of the handle and castor wheels may vary and I do not wish to be limited in this respect.

In operation, the liquid is discharged from the rapidly revolving distributor 21 onto the floor to dislodge any surface dirt on the floor and deflects the same over the inclined wall of trough 12 and is collected in said trough. The action of the blowers 35 and 36 is to draw air and moisture from the confined space acted on by the distributor and direct the same back to the trough as above explained. This operation of drawing the air and moisture from the confined space causes the pressure in said space to be reduced below atmospheric pressure and thus prevent the liquid from being forced outwardly under the machine. These blowers exert sufficient air pressure on the nozzle 42 to suck the liquid out of the trough and direct it back through the pipe 44 into the reservoir and these operations are continuous and synchronized during the operation of the machine.

Preferably the distributing head 21 is made from a semi-rigid material, such as rubber. This is to prevent damage to the machine in the event the rotating head should strike an obstacle. Also preferably the reservoir 30 is removable to insure easy filling and emptying.

While I have illustrated and described what I believe to be a preferred embodiment of my invention it is obvious that various changes may be made with regard to the form and arrangement of parts without departing from my invention, and hence I do not limit myself to the precise details set forth but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of the claims.

I claim:

1. A floor cleaner including a casing, a base on the casing having an open lower end, an annular trough fixed to the base, open at the top and having a floor sealing member on its bottom which when on the floor defines and encloses a floor cleaning space, a motor housing in the casing, a motor in the housing, a shaft on the motor extending downwardly into the base centrally thereof, a rotary liquid distributing head in said base secured to the shaft and rotatable therewith, a liquid reservoir in the casing, said head having communication with said liquid reservoir, said head being positioned to direct liquid onto the floor space defined by the sealing member and deflect the liquid from the floor into the trough, a pair of blowers on the shaft, a header positioned to receive air under pressure from both of said blowers, and means for receiving air under pressure from said header acting as an atomizer for drawing air and liquid from said annular trough and directing the same into said liquid reservoir above the liquid therein.

2. A floor cleaning machine including an electric motor provided with a vertical extending shaft, a sleeve surrounding and rigidly secured to said shaft, said sleeve at its lower end being formed as a cup-shaped hub open at the top and provided with perforations in its sides adjacent the bottom, an annular hollow cone-shaped distributing head secured at its upper end to said hub, the interior of said head being in continuous communication with the interior of said hub through the apertures in the hub, a stationary cylindrical hollow member having an inlet opening at its periphery, an annular hollow depending portion at the center extending into said hub, a liquid reservoir, tubular means providing communication between said reservoir and said inlet opening, a rotary air blower secured to said sleeve and rotatable therewith positioned to draw air and moisture from the space surrounding said distributing head, a base surrounding but spaced from said head, a trough around the head adapted to contact with the floor and define a confined space of the floor from which said blower is adapted to draw air and moisture, a header carried by said base having communication with the discharge port of said blower, a nozzle leading from said header and an angle pipe for receiving air and moisture from said nozzle and guiding the same to a discharge point.

FRANCIS H. NADIG.