June 9, 1936. A. J. BABBS 2,043,878

FLOOR CLEANING APPLIANCE

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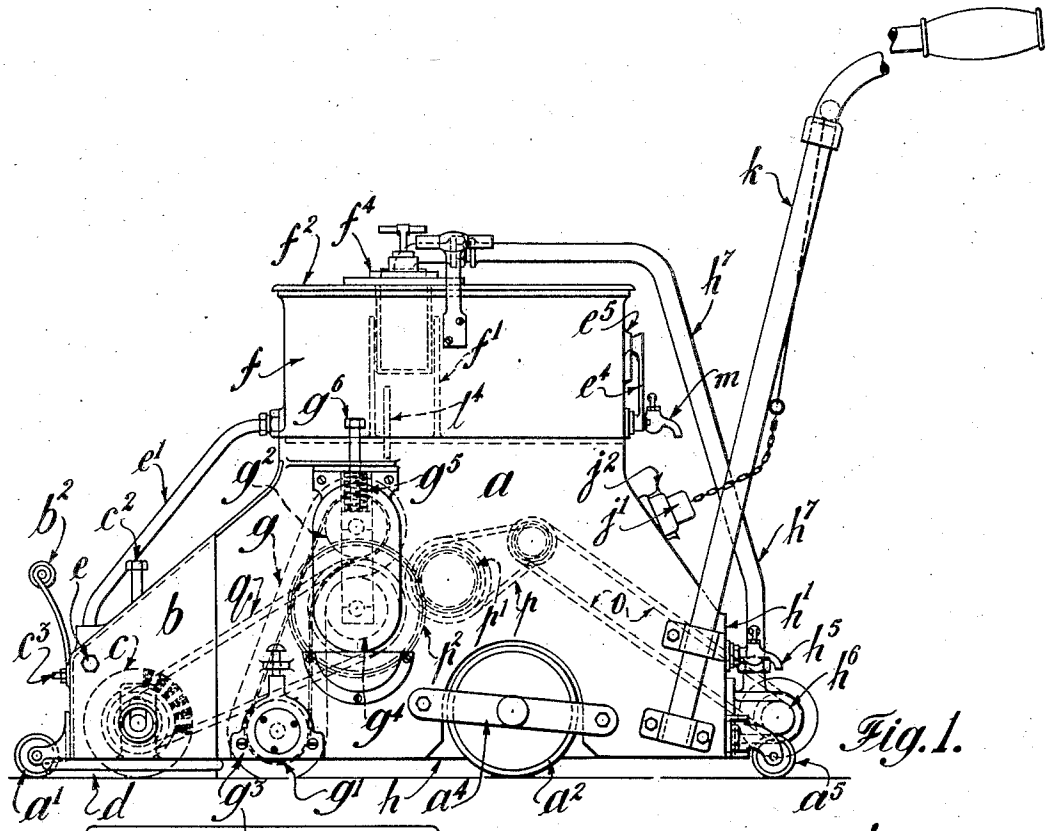


Fig. 1.

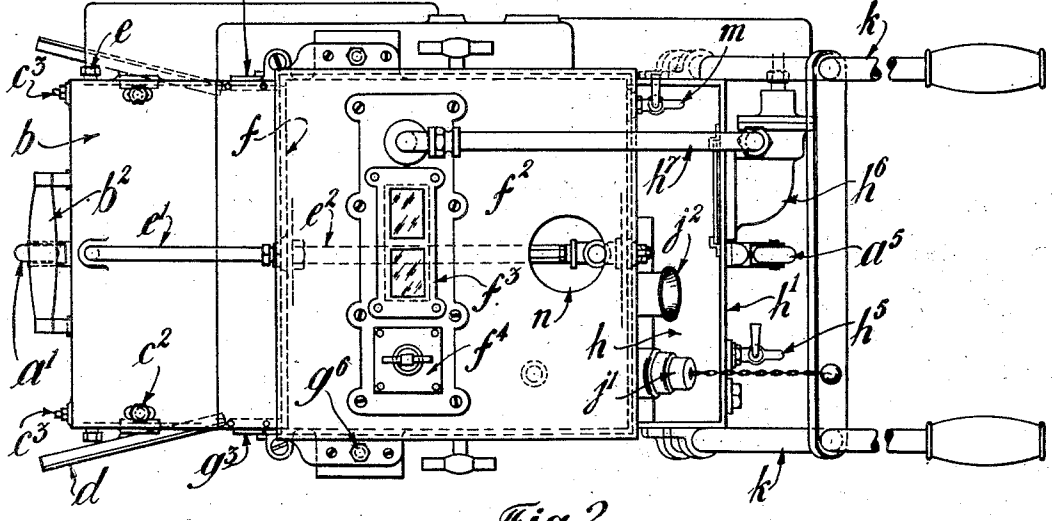


Fig. 2.

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Fig. 3.

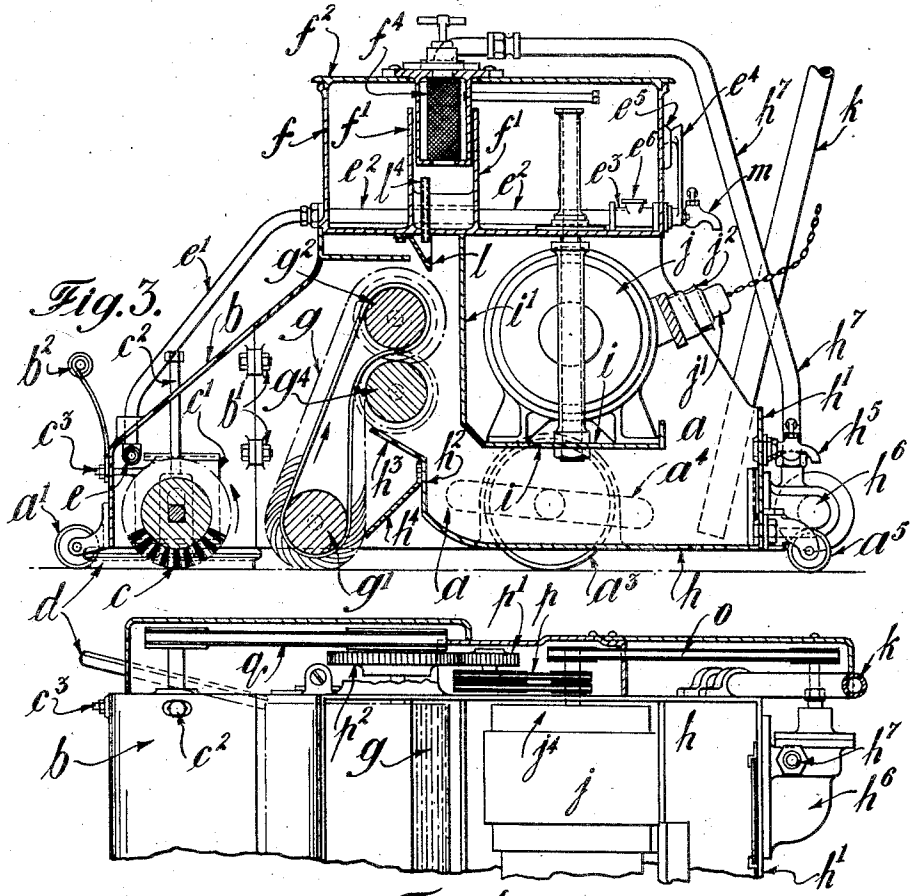


Fig. 4.

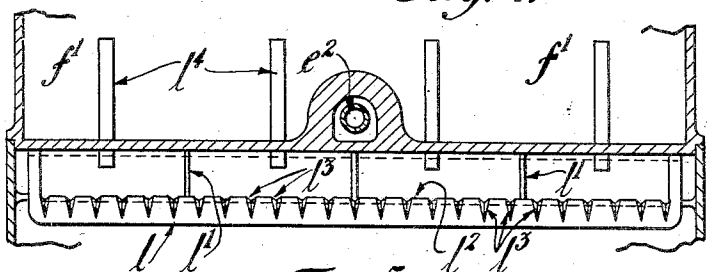


Fig. 5.

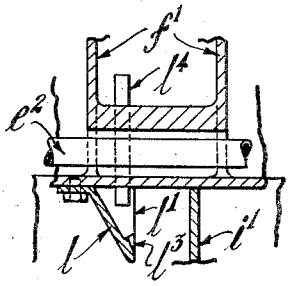


Fig. 6.

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UNITED STATES PATENT OFFICE

2,043,878

FLOOR CLEANING APPLIANCE

Alfred James Babbs, Longsight,
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Application August 21, 1935, Serial No. 37,151
In Great Britain March 9, 1934

6 Claims. (Cl. 15—51)

This invention relates to floor cleaning appliances of the kind comprising a carriage adapted to run on the floor and carrying a belt mop arranged over one or more rollers which present the mop to the floor and between two mangle rollers, one of which is an expressing roller and engages the working face of the mop to express water from the mop, the nip of the rollers being used also to drive the mop, the expressed water passing to a tank on the carriage.

Floor cleaning appliances of this kind have also been provided with rotary scrubbing brushes, with squeegees at the sides to prevent the water from spreading and a fresh-water tank with means for applying water therefrom to the floor.

The object of the invention is to provide an improved floor cleaning appliance of the above kind.

According to the invention the improved machine is characterized in that the expressing roller while engaging the working face of the mop is below the same so that the expressed water falls by gravity from the nip of the mangle rollers clear of the mop.

According to a further feature of the invention, the expressed water is filtered and used over again. The invention includes other features than those above specified which are set out in the following description and claims.

In the accompanying drawings:—

Fig. 1 is a side elevation of a preferred example of a floor-cleaning machine made in accordance with the invention.

Fig. 2 is a plan,

Fig. 3 is a sectional side elevation of Fig. 1.

Fig. 4 is a part sectional part plan showing the driving arrangement.

Fig. 5 is an enlarged sectional part plan showing the water distributor for the mop.

Fig. 6 is a central sectional end elevation of Fig. 5.

As illustrated, the machine comprises a box-like body a mounted on four running wheels of which a^1 is a small central guide wheel in fixed brackets at the front, a^2 and a^3 are the large main running wheels adjustably mounted in inclined bearers a^4 at the sides of the machine and slightly behind the centre of gravity thereof, and a^5 is a small central trailer caster wheel carried by a suitable swivel bracket attached to the rear of the machine. The body of the machine is made with a separate and detachable front portion b which is attached thereto by bolts b^1. Within the front portion b is a scrubbing brush roller c carried in suitable bearing c^1 which incorporate vertical and horizontal slides with adjusting screws c^2 and c^3 respectively, the one providing adjustment for pressure of the brush on the ground, and the other providing adjustment for tensioning a driving belt hereinafter described. At each side of the front portion b are squeegees d, the rubber portions of which engage the ground and the holders of which are suitably connected to the sides of the front portions b of the machine body. Secured to the front portion b is a lifting handle b^2 while within the front portion over the brush roller c is a sprinkler e connected by a pipe e^1 to a pipe e^2 in the bottom of a water tank f mounted on top of the body a of the machine.

The mop mechanism of the machine is mounted in the body a forward of the main running wheels a^2, a^3 and comprises an endless mop g which embraces a lower roller g^1 and an upper roller g^2. The lower roller g^1 is adjustably mounted in brackets g^3 on the sides of the body a of the machine and serves to present the mop to the floor. The adjustment, therefore, is to enable the pressure of the mop on the floor to be adjusted. The upper roller g^2 is carried by bearing blocks which are slidably mounted in vertical guides above a fixed roller g^4 and is pressed towards such fixed roller by means of springs g^5, the pressure of which is adjustable by means of screws g^6 after the known manner in a clothes mangle. The two rollers g^2 and g^4 are also geared together by large toothed pinion wheels seen at p^2 in Figure 4 which is also known practice in mangle rollers. The mop engages only the forward upper portion only of the roller g^4.

The body part a is made as a single casting including a tray having a bottom h, rear vertical wall h^1 and front wall h^2 terminating in an inclined lip h^3 which extends below the roller g^4. Attached to the front wall h^2 is a sloping plate h^4 the purpose of which is to direct any water falling off the mop after it leaves the roller g^4 onto the mop again. On the rear wall h^1 are provided an overflow and level-control tap h^5 and a water pump h^6 from which latter is a riser pipe h^7. A shelf i with vertical partition wall i^1 is also part of the casting and forms a platform on which is mounted an electric motor j fitted with a control switch j^1 and socket j^2 for an electric plug connector. Steering handles k are attached to the side of the body a.

In the water tank f is formed a transverse channel having vertical upstanding walls f^1 while as seen more clearly in Fig. 5, there is a tunnel in the bottom of the tank in which is disposed the pipe e^2. Secured to the underside of the tank is

a water distributor l which consists of an inclined back wall divided by four vertical divisions l^1 and having a lower lip l^2 formed with drip notches l^3. Water is supplied to the compartments formed by the divisions by pipes l^4 which project well up into the transverse channel of the tank f so as to minimize the risk of clogging by any solid matter which may enter and collect in the bottom of such channel. Fixed in an opening in the top f^2 of the tank is a filter assembly consisting of a settling trough with baffles and having a removable glass cover f^3 and a fine filter unit f^4 at one end through which the water flows into the transverse channel of the tank. The riser pipe h^7 is connected to the other end of the filter assembly. On the inner end of the pipe e^2 is a valve e^3 having a control handle e^4 on the outer end of the tank f, the end of which handle registers with a dial e^5 which is suitably calibrated to indicate rates of flow for the respective valve openings for certain positions of the valve handle. The valve e^3 has an inlet e^6 by which water from the tank f can enter the valve and flow through it to the pipe e^2. A drain tap m is also provided in the end of the tank f. A filling hole n is provided in the top f^2 of the tank.

The electric motor j embodies a reduction gear j^4 which is connected by a belt o to the pump h^6 and by belt p and pinion p^1 to a pinion p^2 on the shaft of the roller g^4. The brush roller c is connected by a belt q to the shaft of the roller g^4.

In operation, for filling the machine, the overflow and level control tap h^5 is opened and water is poured into the tank f through the hole n, the control handle e^4 being set to the closed position for the valve e^3. When the water rises to the level of the top of the walls f^1 it overflows into the channel, then through the pipes l^4 onto the distributor. From the distributor the water flows through the notches l^3 onto the mop g down which it runs until it meets the roller g^4, down the face of which it runs and drips off onto the sloping plate h^3, from which it runs onto the bottom h of the tray. When the tray is sufficiently full, the water overflows through the tap h^5 and the machine is then full and ready for use.

The machine is then wheeled into position for starting the cleaning operation, the valve e^3 opened to a predetermined opening allowing water to flow from the tank f through the pipe e^1 to the sprinkler e, and the switch j^1 closed to start the motor. As soon as the motor starts the mop and brush start to revolve, the brush in a direction which acts to draw the machine forward and the mop in the reverse direction. Water flowing onto the brush through the sprinkler e wets the brush which scrubs the floor but leaves it wet. The mop, following behind the brush, mops and dries the floor and the water which is picked up by the mop is expressed therefrom by the roller g^4. The clean water falling onto the mop just before the same reaches the roller g^4 helps to wash off any solid matter which may have been picked up by the mop.

Dirty water which collects in the tray is lifted by the pump h^6 to the filter unit through which it returns to the tank f.

The squeegees d of the machine are adjusted by trial so that water does not spread out sideways from the locality of the brush and sprinkler and the squeegees also help to clean the floor for that width of the machine which is greater than the mop. The floor can, therefore, be cleaned effectively right to the edge as such edge never gets dirty as the rest of the floor and the wet squeegees are sufficient to clean the same.

In some cases it is anticipated that the scrubbing brush will not be required. In such case, the machine would be supplied without the front portion b but a sprinkler would be provided in front of the mop and squeegees would also preferably be fitted in front of the body a.

What I claim is:—

1. An improved floor-cleaning appliance comprising a carriage adapted to run on a floor, a belt mop and a plurality of rollers supporting the mop, at least one of which rollers presents the mop to the surface of the floor, an expressing roller engaging the face of the mop and coacting with one of the supporting rollers to nip the mop, and a tank on the carriage to which the expressed water is returned, the expressing roller being arranged below the mop so that the expressed water falls by gravity from the expressing roller clear of the mop, means for collecting the expressed water, a filter and means for returning the water through the filter to the tank on the carriage and means for delivering filtered water from the tank tangentially onto the belt in advance of the expressing roller to wash particles of dirt from the belt before reaching the expressing roller.

2. An improved floor-cleaning appliance comprising a carriage adapted to run on a floor, a belt mop and a plurality of rollers supporting the mop, at least one of which rollers presents the mop to the surface of the floor, an expressing roller engaging the face of the mop and coacting with one of the other supporting rollers to nip the mop, and a tank on the carriage to which the expressed water is returned, characterized in that the expressing roller is arranged below the mop so that the expressed water falls by gravity from the expressing roller clear of the mop, and further characterized by means for directing a stream of water tangentially onto the face of the mop immediately before it reaches the expressing roller.

3. An improved floor-cleaning appliance comprising a carriage adapted to run on a floor, a belt mop and a plurality of rollers supporting the mop, one or more of which rollers presents the mop to the surface of the floor, an expressing roller engaging the face of the mop and coacting with one of the other supporting rollers to nip the mop, and a tank above the expressing roller on the carriage to which the expressed water is returned, characterized in that the expressing roller is arranged below the mop so that the expressed water falls by gravity from the expressing roller clear of the mop, and further characterized by means for collecting the expressed water, a filter and means for returning the water through the filter to the tank on the carriage, and means for directing a stream of filtered water by gravity from the said tank onto the face of the mop and at a tangent thereto immediately before it reaches the expressing roller.

4. In an improved floor-cleaning appliance of the character including a carriage adapted to run on a floor, a belt mop and a plurality of rollers supporting the mop, at least one of which rollers presents the mop to the surface of the floor, an expressing roller engaging the face of the mop and coacting with one of the supporting rollers to nip the mop, means for directing a stream of water tangentially onto the face of the mop immediately before it reaches the expressing roller, said means comprising a distributor divided into

a series of compartments, separate water supply means for each compartment and a distribution channel for each compartment comprising a lip having a plurality of drip notches.

5. An improved floor-cleaning appliance comprising a carriage adapted to run on a floor, a belt mop and a plurality of rollers supporting the mop, at least one of which rollers presents the mop to the surface of the floor, an expressing roller engaging the face of the mop and arranged below and coacting with one of the other supporting rollers to nip the mop, means for driving at least one of the rollers providing the nip on the belt, a tank on the carriage above the mop, means for supplying water from the tank tangentially onto the face of the mop immediately before it reaches the expressing roller, a tray to collect the water expressed from the mop, a pump for delivering the water to the tank, means for driving the pump, a filter for cleaning the water before delivery to the tank, a scrubbing brush in advance of the mop, means for supplying water from the tank to the scrubbing brush, and means for driving the scrubbing brush in the reverse direction relative to the mop.

6. In a floor cleaning machine employing an endless mop belt and means for supporting said belt and expressing moisture therefrom at one point in its travel, means for spraying cleansing fluid upon the surface of the belt, said means acting tangentially to a portion of the belt for dislodging and washing particles of dirt from the belt surface prior to the expression of moisture from the belt.

ALFRED JAMES BABBS.