

Jan. 5, 1943.

R. E. BASSETT, JR

2,307,254

CLEANING MACHINE

Filed Jan. 27, 1939

3 Sheets-Sheet 1

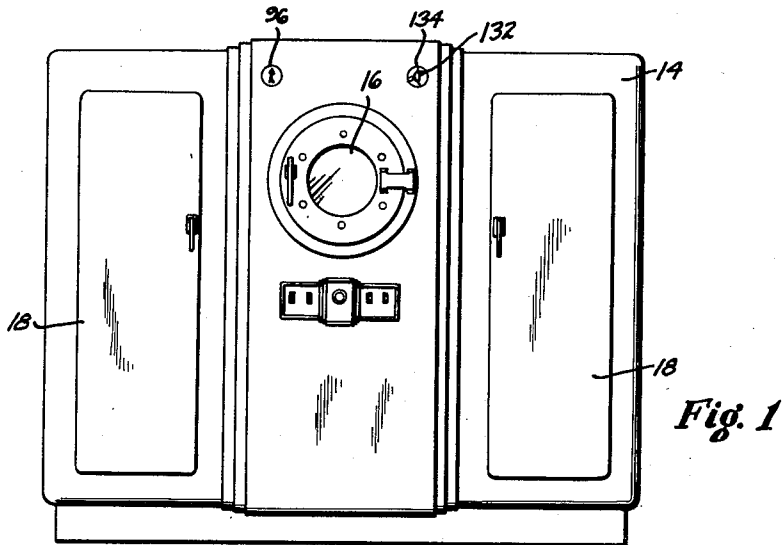


Fig. 1

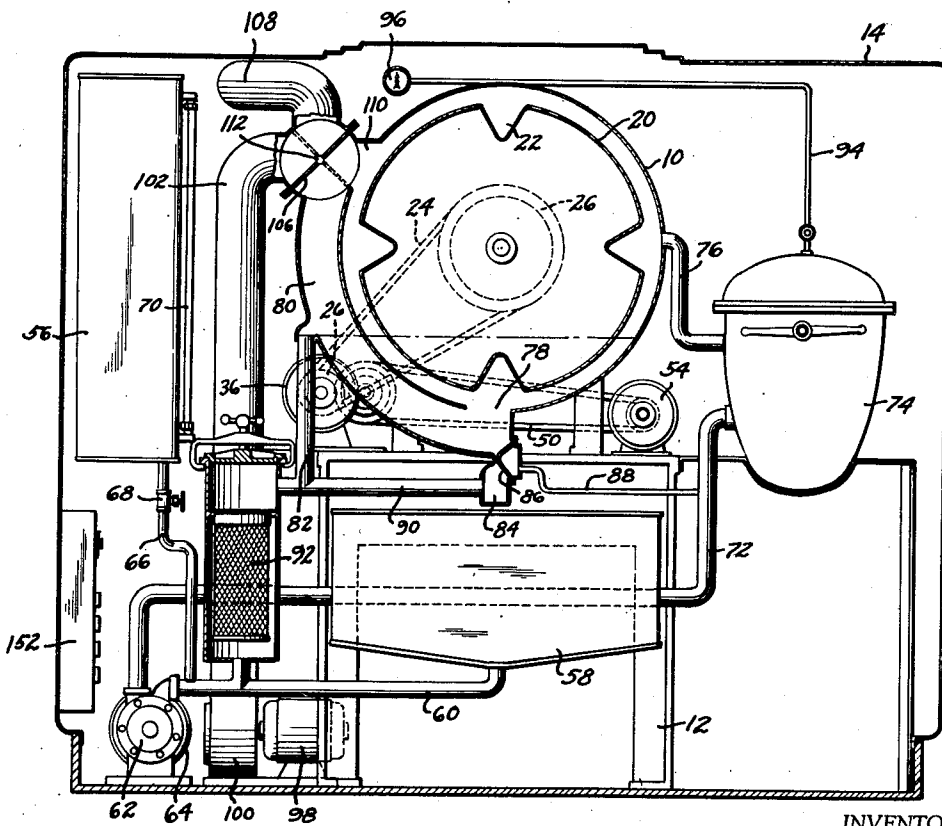


Fig. 2

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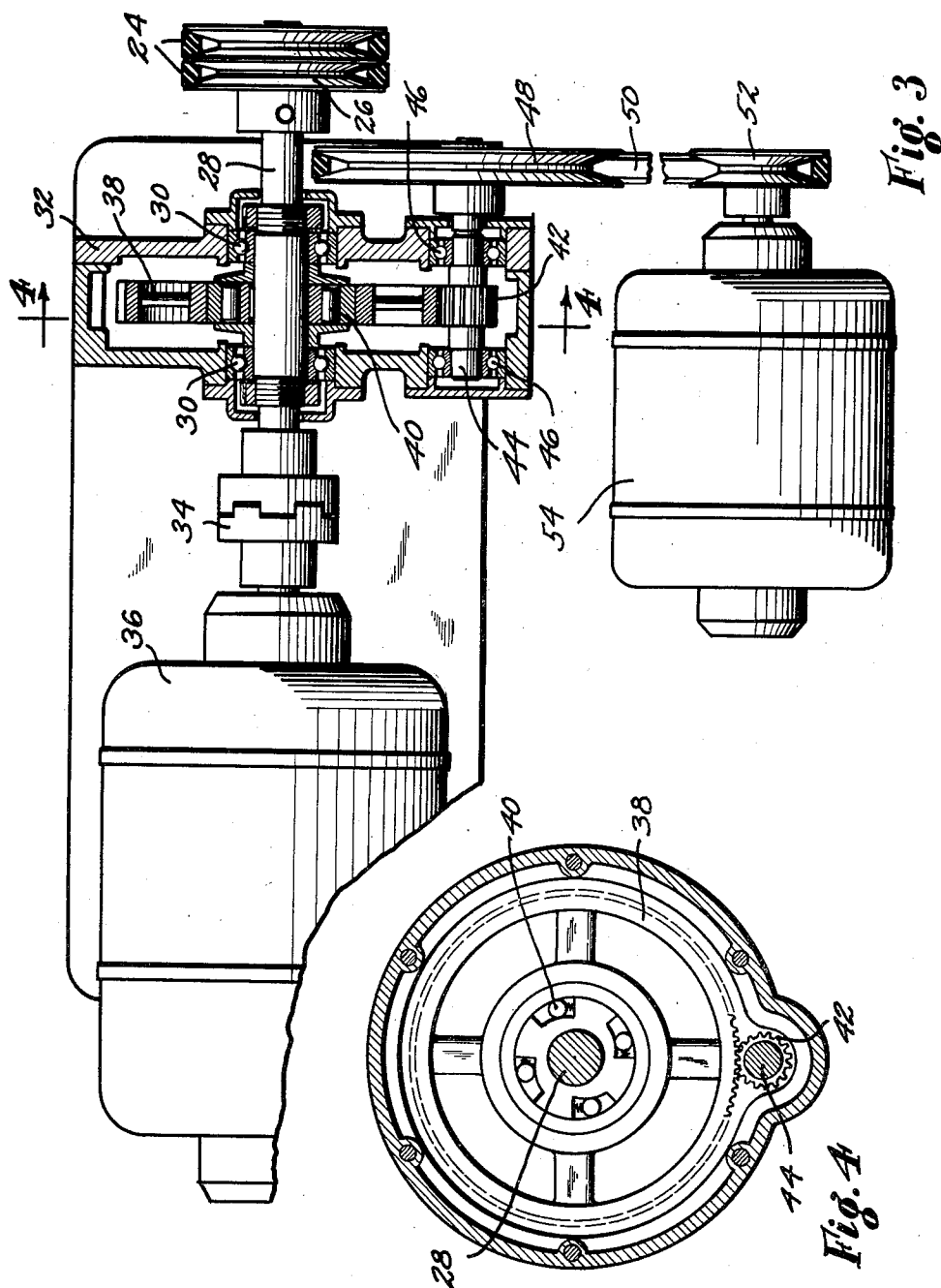
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

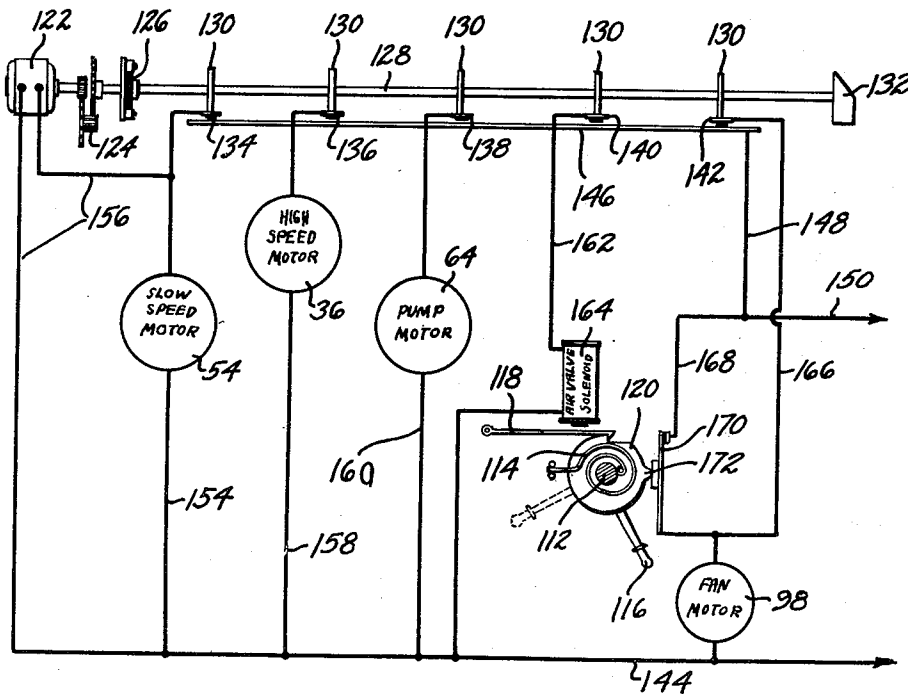


Fig. 5

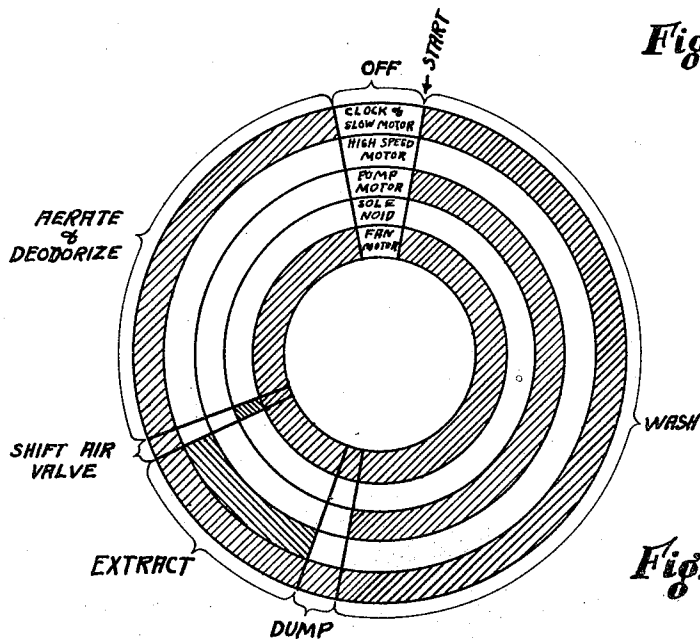


Fig. 6

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UNITED STATES PATENT OFFICE

2,307,254

CLEANING MACHINE

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by mesne assignments, to American Machine
and Metals, Inc., East Moline, Ill., a corpora-
tion of Delaware

Application January 27, 1939, Serial No. 253,037

4 Claims. (Cl. 68—20)

This invention relates to cleaning machines, and is illustrated as embodied in an automatically-controlled dry cleaning machine.

Objects of the invention are to provide simple and easily controlled means for driving the machine at low speed for a washing operation and at high speed for a drying operation, to provide air-circulating means arranged to guard against the escape of toxic vapors during washing and which is arranged to aerate the clothes after drying, and to provide a simple circulating system for the washing medium which is simple and effective and which has relatively few moving mechanical parts.

Preferably the two speeds are secured by using two different motors, adapted to drive the machine respectively at a low washing speed or at a much higher extracting speed. Since no particular harm is done by permitting the low-speed motor to drive the high-speed motor idly when it is de-energized, I prefer to connect the low-speed motor to the clothes drum of the machine through a one-way clutch or the like which overruns when the high-speed motor picks up the load.

The other objects set forth above are attained by construction and arrangements described below and illustrated in the accompanying drawings, in which:

Figure 1 is a front elevation of a dry cleaning machine embodying the invention;

Figure 2 is a vertical section transversely through the machine;

Figure 3 is a partial section in a horizontal plane showing the two motors and their driving connections;

Figure 4 is a section on the line 4—4 of Figure 3;

Figure 5 is a wiring diagram; and

Figure 6 is a cycle diagram.

The illustrated machine is intended for dry cleaning clothes and the like, but various novel features are useful in washing machines of other types. The particular machine shown in the drawings includes a cylindrical tub 10 arranged on a horizontal axis and supported on a framework 12 inside a suitable cabinet 14. The tub has a loading opening in its front wall, for which a suitable swinging glazed door or other closure 16 is provided. The cabinet 14 may have other doors 18 to afford convenient access to the mechanism described below.

Inside the tub 10 is a perforated clothes drum 20, formed with ribs or baffles 22 in its peripheral wall. This drum is driven selectively either at a low speed for washing and distributing, or at a high speed for drying by centrifugal extraction, by means such as a belt or belts 24 driving a large pulley 26 on the shaft which supports the

drum 20, and which belt is driven by a smaller pulley 26.

The pulley 26 (see Figure 3) is secured to the end of a shaft 28 rotatably mounted in bearings 30 in the side walls of a sectional gear casing 32. The shaft 28 is positively connected by means such as a coupling 34 with the armature shaft of a high-speed motor 36. The part of the shaft 28 within the casing 32 carries a large gear 38 provided with a one-way roller clutch 40 by which it drives the shaft at low speed when the motor 36 is deenergized.

When motor 36 is energized the clutch 40 overruns. The gear 38 meshes with a drive pinion 42 on a shaft 44 rotatably journaled in bearings 46 and provided with a pulley 48 connected by a belt 50 with a drive pulley 52 on the armature shaft of a low-speed motor 54. While motors 36 and 54 are for convenience designated the "high speed" and "low-speed" motors, it will be appreciated that the exact relative speeds of these motors depend on the reduction in speed in the connections between the pulley 52 and the shaft 28.

A washing medium such as carbon tetrachloride is provided in a supply reservoir 56 and a circulating reservoir 58, the latter having an outlet conduit 60 leading to the intake of a pump 62 driven by a pump motor 64. The supply reservoir is connected to the conduit 60 by a pipe 66 controlled by a manually operable valve 68, and may have a glass 70 to show the level of the washing medium therein.

The pump 62 circulates the washing medium through a conduit 72 to a filter 74 which has an outlet conduit 76 opening into the side wall of the tub 10 approximately half-way of the height of the tub. The tub 10 has a drain opening 78 communicating with a passage 80 provided with two outlets. The outlet used during the washing operation is a standpipe 82 of a height which gives an optimum depth of the washing medium in the tub 10 during the washing operation.

During this operation a sump 84 at the bottom of the passage 80 is closed by a diaphragm valve 86 of rubber material, which at this time is held against its seat by the pressure of the liquid in the conduit 72, which communicates its pressure to the diaphragm 86 by a small side conduit 88. Both the sump 84 and the standpipe 82 empty into a conduit 90 leading to a lint trap 92 emptying at its bottom into the conduit 60. The filter 74 may be connected by a small pipe 94 to a pressure gage 96.

There is also a motor 98 driving a fan or blower 100 which takes in air from the interior of the cabinet 14 and forces it upwardly through a relatively large air conduit 102. The upper end of the conduit 102 is controlled by a valve or damper 106, and during the washing operation, with this

air valve in full-line position (Figure 2) it communicates with an outlet pipe 108 which preferably empties outside the building in which the machine is installed. When, near the end of the cycle of the machine, the air valve 106 is turned to dotted-line position, the air is diverted from conduit 102 into the passage 80, upwardly through the drain opening 78 and through the clothes in the rotor 20 to aerate and de-odorize them, and thence out through an opening 110 to the exhaust pipe 108.

The air valve 106 is mounted on a shaft 112 which is urged by a spiral spring 114 (Figure 5) toward the position where the valve damper 106 is in dotted line position in Figure 2. The shaft 112 is provided, at the rear of the machine, with a handle 116 by which it may be turned manually, at the beginning of the cycle, to its other (full-line) position, where it is retained by a spring-pressed latch 118 engaging a shoulder on a cam disk 120 mounted on the shaft 112.

The machine is controlled automatically to operate in a predetermined cycle, as for example the cycle diagrammed in Figure 6, by a multiple cyclic switch including a constant-speed motor 122 driving, through reduction gearing 124 and a ratchet or one-way clutch 126, a shaft 128 carrying cams 130 and provided at its end with an indicator handle 132 which passes over a suitable dial 134 to indicate the course of the cycle. The one-way connection 126 permits the handle 132 to be advanced, to shorten one or more of the steps of the cycle when desired.

The cams 130 operate spring switch contacts 134, 136, 138, 140, and 142, connected to various circuits described below and which lead from a line 144, to cause these contacts to engage and disengage a contact bar 146 connected by a wire 148 to the other line 150. Lines 144 and 150 are brought in through a suitable fuse and relay box 152 (Figure 2).

The contact 134 controls parallel circuits 154 and 156 through the motors 54 and 122. The contact 136 controls a circuit 158 through the high-speed motor 36. The contact 138 controls a circuit 160 through the pump motor 64. The contact 140 controls a circuit 162 through a solenoid or magnet 164 which, when energized, pulls up the latch 118 to release the shaft 112 so that it is turned by its spring 114. The contact 142 controls a circuit 166 through the fan motor 98.

There is also a parallel circuit 168 for the fan motor, which by-passes the contact 142, and which includes a spring contact 170 which tends to open, but which is forced to closed position during the washing operation by a cam 172 on the disk 120. Since the handle 116 is turned to cause the latch 118 to engage, before the cycle of operations is started, this causes the fan 100 to establish a slight sub-atmospheric pressure in the cabinet 14 before the circulation of the washing medium starts. When the latch 118 is released, the contact 142 has been closed, so the fan runs continuously throughout the cycle of the machine as well as after handle 116 is turned, to insure that at no time can vapors of carbon tetrachloride escape into the room.

One desirable cycle of operations is shown in Figure 6. The clothes having been placed in the drum 20, the door 16 closed, and the handle 116 turned to cause the latch 118 to engage and the fan motor to start, the handle 132 is advanced to start the automatic cycle of the machine. The drum 20 is now driven continuously forward at a relatively slow washing speed. For a drum twenty

inches in diameter this is preferably about 59 or 60 revolutions per minute, and in general (as explained in application No. 129,429 filed March 6, 1937, by myself jointly with John W. Chamberlin and now matured into Patent No. 2,165,884) the washing speed should be in the range, in revolutions per minute, between

$$\sqrt{\frac{2500}{\text{drum radius in feet}}}$$

and about

$$\sqrt{\frac{3600}{\text{drum radius in feet}}}$$

At the end of the washing period, the pump motor 64 stops, the pressure in conduit 72 drops, and the diaphragm valve 86 opens to dump the charge of washing medium from the tub 10. The drum is next driven at high speed to extract most of the washing medium and drain it back into the reservoir 58, although in some cases it may be desirable to interpose a distributing step as explained in the above-identified Patent No. 2,165,884.

The solenoid 164 is next energized to open the circuit 168 and turn the damper valve 106 to cause the air to circulate through the clothes in the drum to aerate and deodorize them, and finally all the circuits open automatically and the machine stops.

While one illustrative embodiment has been described in detail, it is not my intention to limit the scope of the invention to that particular embodiment, or otherwise than by the terms of the appended claims.

I claim:

1. A cleaning machine comprising a cabinet, a tub in the cabinet having a drum mounted for rotation therein, an air-circulating device having an air intake opening, a four-way air valve for connecting the air-circulating device selectively either to conduct air from inside the cabinet and outside of said tub through said air-circulating device to the space outside of the cabinet or to conduct air from said air-circulating device through the interior of said tub to the space outside of the cabinet.

2. A cleaning machine comprising a cabinet, a tub in the cabinet having a drum mounted for rotation therein, an air-circulating device having its inlet opening connected with the inside of the cabinet outside of said tub, an outlet pipe to the space outside of the cabinet, means for connecting the discharge of said air-circulating device selectively either to said outlet pipe or through the interior of said tub to said outlet pipe.

3. A cleaning machine comprising a cabinet, a tub in the cabinet having a drum mounted for rotation therein, an air-circulating device having an intake opening within the cabinet, an outlet pipe to the space outside of the cabinet, a four-way air valve for connecting the discharge of said air-circulating device selectively either directly to said outlet pipe or to the interior of said tub and thence to said outlet pipe.

4. A cleaning machine having a cabinet and a tub therein, means in the tube to clean material therein, air-circulating means having a device shiftable either to connect the interior of the cabinet directly to an exhaust or to connect it to the exhaust through said tub, a spring for shifting said device from the first position to the second, a latch for holding the device in the first position, and a control having means for releasing said latch.

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