United States Patent

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[54] **FLOOR MAINTENANCE MACHINE**
2 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** ..... **15/50 C,** 15/384
[51] **Int. Cl.** **A47l 11/18**
[50] **Field of Search** ..... 15/49, 49 C, 49 R, 50, 50 C, 79, 98, 320, 384

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ABSTRACT: A floor maintenance machine having a casing defining a bottom opening and a handle at the rear end of the frame, the casing having two front rollers and two back rollers mounted for rotation about transverse axes. There is a reservoir for liquid in the casing and a compressed air sprayer with a suction inlet in the reservoir and a nozzle outlet disposed to spray the liquid on the supporting surface between the rollers. The casing further comprises a compressor unit connected to the sprayer to provide it with compressed air.

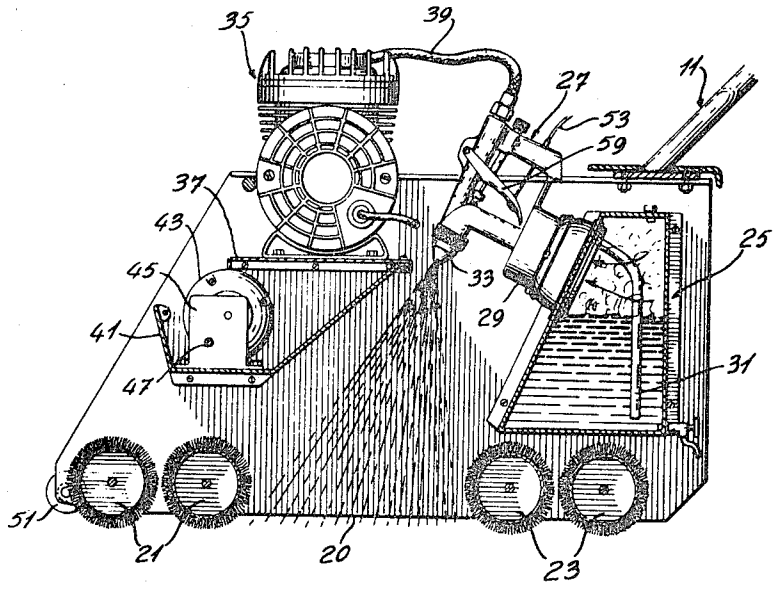
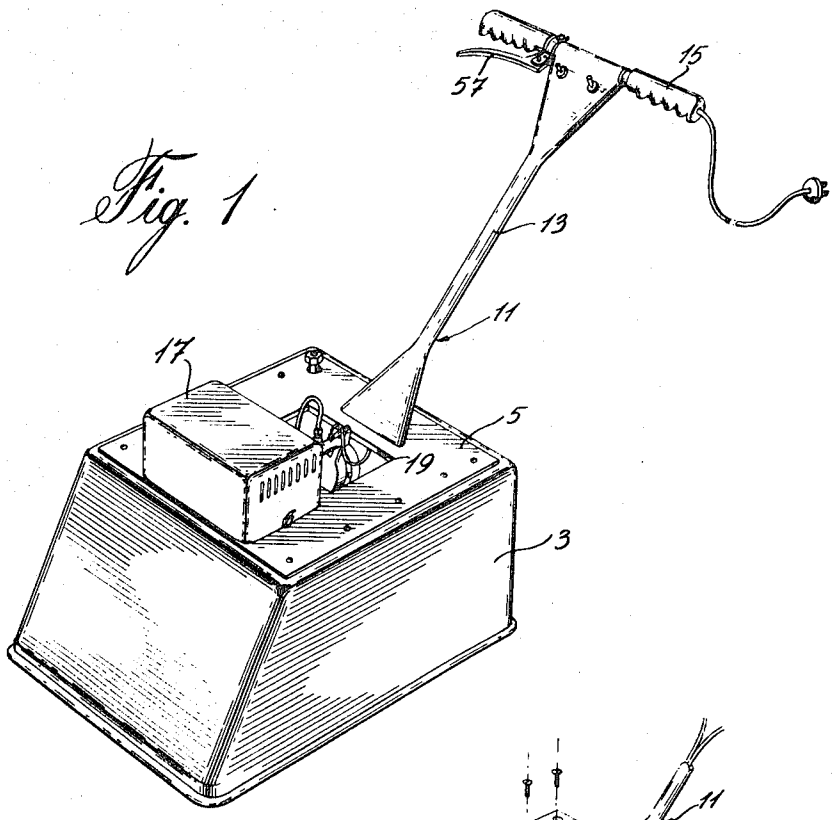


Fig. 1



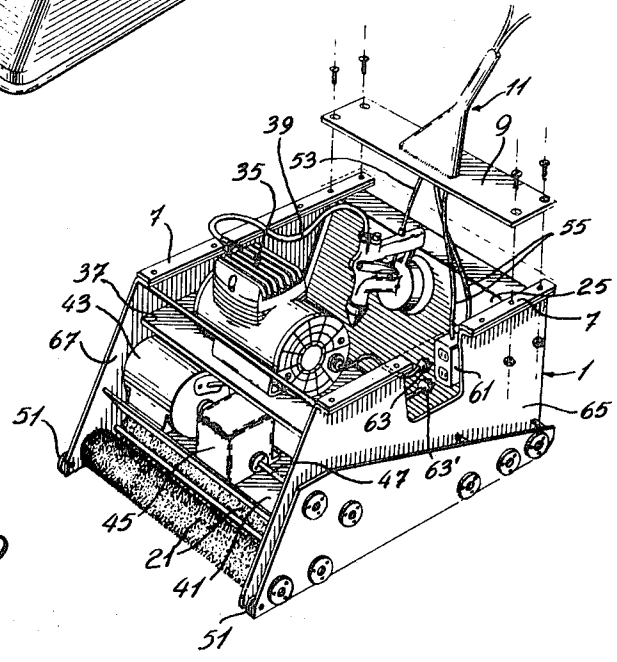


Fig. 2

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Fig. 3

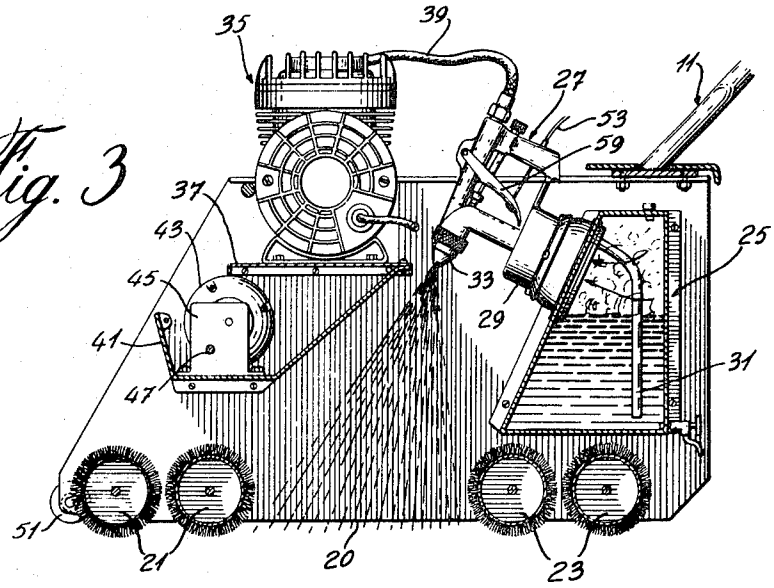


Fig. 4

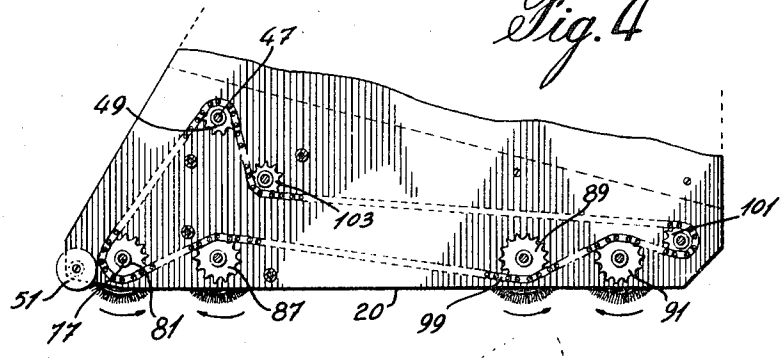
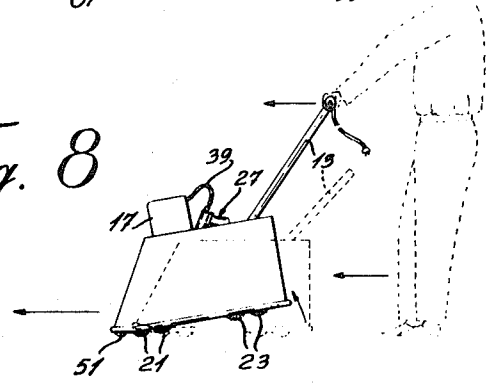


Fig. 8



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Fig. 5

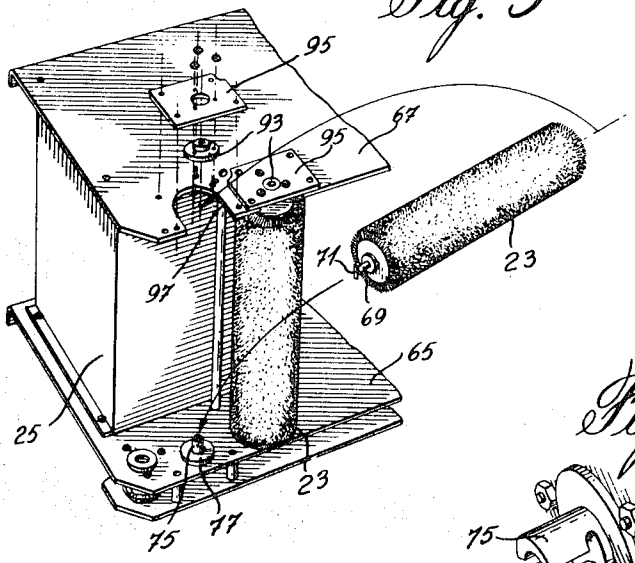
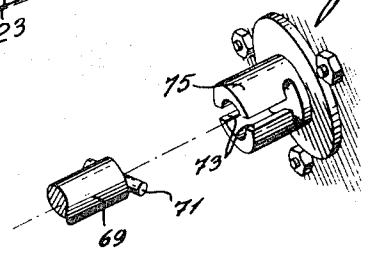


Fig. 7



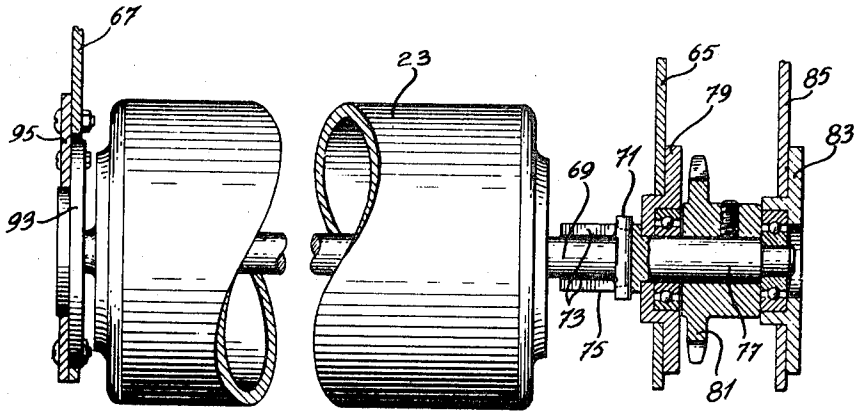


Fig. 6

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FLOOR MAINTENANCE MACHINE

The present invention relates to a floor maintenance machine, that is, to a machine for waxing, buffing, scrubbing, shampooing and generally servicing floors or carpets, the machine being of the heavy-duty type, particularly adaptable for commercial use.

A main object of the invention lies in the provision of a floor maintenance machine, for either wooden or carpeted floors, adaptable for various cleaning and finishing operations and provided with means to spray cleaning or waxing liquid or even paint, the said spraying means being mounted directly on the machine and easily operable by a maintenance man.

Another object of the invention lies in a machine as above described provided with novel means for easily moving the machine about when not in use.

The above objects may generally be obtained with a machine made according to the invention which comprises an enclosure frame defining a bottom opening adapted to face a supporting surface such as a floor to be cared for; handles means at the rear end of said frame to push the machine on the floor; a pair of first maintenance rollers for engaging the floor and mounted in parallel relationship at the front end of the frame for rotation about axes extending transversely of the frame; a pair of second maintenance rollers for engaging the floor and mounted at the rear end of the frame at a distance from the first rollers; the second rollers being rotatable about an axis transversely of the frame; compressed air-spraying means including a reservoir for liquid fixed in the enclosure frame; and a spraying device in the enclosure frame having a suction inlet in the said reservoir to draw liquid therefrom and a nozzle outlet disposed to spray said liquid on the floor between said pairs of rollers, and a compressor unit in the enclosure frame having compressed air conduit means connected to the said spraying means to provide compressed air thereto for operation. The machine also comprises a driving wheel fixedly mounted at one end of each of the rollers and a driving belt operatively engageable with each driving wheel to bring it into rotation, the belt alternately engaging the bottom and top portions of the successive driving wheels whereby to cause rotation of the rollers of a pair in reverse directions.

It is believed that a better understanding of the invention will be afforded by the description that follows having reference to the appended drawings wherein:

FIG. 1 is a perspective view of the complete machine;

FIG. 2 is a perspective view, partially exploded, of the machine with the cover removed;

FIG. 3 is a cross-sectional view in side elevation of a machine made according to the invention;

FIG. 4 is a partial side elevation view illustrating the driving mechanism for the maintenance rollers;

FIG. 5 is a perspective partial view of a maintenance roller-mounting assembly, partially shown as exploded to illustrate the manner of mounting one of the maintenance rollers;

FIG. 6 is a side elevation view, partly in cross section, of the mounting of a maintenance roller;

FIG. 7 is a perspective view of the coupling of a maintenance roller shaft into a driving bearing;

FIG. 8 is a side elevation view of the machine shown tilted forwardly for displacement when not in use.

Referring now to the drawing, the machine generally comprises a frame 1 defining a generally quadrilateral enclosure for the mounting of the parts, frame 1 being circumscribed by a lateral casing 3 over which is mounted a top cover plate 5, casing 3 and plate 5 being screwed over upper flanges 7 of the frame 1 with the interposition of a transverse metal strap 9 to which is secured the handle means 11 comprising an upwardly inclined handle stick 13 at the upper end of which is the usual transverse handle bar 15. The top cover plate 5 is provided with a housing 17 for the compressor unit to be referred to again later and is formed with an opening 19, if necessary, for the projection of the nozzle assembly also to be referred to again later.

The enclosure frame 3 defines a bottom opening 20 (FIGS. 3 and 4) adapted to face the supporting surface or floor to be serviced.

The handle means 11 projects from the rear end of frame 1 and serves, in the usual manner, to push the machine around on the supporting surface or floor.

Within the enclosure formed by frame 1 and near the bottom thereof so as to project partially from the opening 20 is a pair of removable first or brushlike maintenance rollers 21 mounted at the front end of frame 1 for rotation about axes extending transversely of the frame.

Two other similarly removable rollers 23 are also provided which are mounted at the rear end of frame 1 at a distance from the first rollers 21. The said rollers 23 are also rotatable about axes extending transversely of frame 1.

A compressed air-spraying means is provided within casing 3 to spray a cleaning, waxing or other type of liquid over the floor. This spraying means comprises a reservoir 25 adapted to contain a liquid used for the maintenance of the floor and fixed within the enclosure frame 1 preferably at the rear end thereof and above the rearward rollers 23. It also comprises a compressed air-operated spraying device or gun 27 mounted within the enclosure with the suction inlet connection 29 secured to the forward wall of reservoir 25, the said inlet connection having a suction inlet tube 31 dipping into the liquid in reservoir 25 to near the bottom thereof. The spraying device or gun 27 also has a nozzle outlet 33 disposed to spray the liquid of reservoir 25 on the supporting surface between the rollers 21 and 23.

An air compressor 35 is provided forwardly of frame 1 and preferably secured on a horizontal-supporting bracket 37 fixed to the two side members of frame 1 in any known manner.

A compressed air conduit means 39 or air hose connects the air compressor 35 to the spraying device or gun 27 to provide compressed air thereto.

Below bracket 37 is a second supporting bracket 41 for the mounting of the driving unit comprising a motor 43 and a speed reducer 45, the driving shaft 47 of the latter being connected to a driving gear 49 (FIG. 4) for the driving of the maintenance rollers in a manner to be described hereinafter.

By the generic term "maintenance roller" is meant any roller adapted for waxing, buffing, scrubbing or shampooing and generally any type of rollers used in the maintenance of floors, either wooden or carpeted with floor tiles or rugs.

Forwardly of frame 1 and as best illustrated in FIGS. 3, 4 and 8, the machine preferably includes freely rotatable wheels or rollers 51 mounted for free rotation about a transverse axis at the front end of frame 1, forwardly of the first rollers 21 and normally out of contact with the supporting surface or floor but coming in contact with the said supporting surface or floor upon forward tilting of the frame 1 by the handle means 11 to thus free maintenance rollers 21 and 23 from the said surface or floor.

Further constructional features of the machine of the invention will now be given.

Referring back to FIGS. 1 and 2, it will be seen that handle 13 is hollow and serves for the passage of a bowden cable 53 as well as two electrical cables 55. The bowden cable 53 operatively connects at the upper end to a control lever 57 and, at the lower end, to a control lever 59 (FIG. 3) for the operation of the control valve of nozzle 33. It will thus be understood that depression of the operating lever 57 will cause likewise depression of operating lever 59 and operation of nozzle 33 to thus spray whatever liquid is contained in the reservoir 25. It will be remembered that this liquid may be a cleaning liquid, wax or even paint.

The two electrical cables 55 connect into an electrical outlet box 61 for the reception of the plugs 63, 63' at the end of the leads from the motor 43 and the compressor 35.

The driving assembly for the maintenance rollers may be described as follows, reference being had to FIGS. 2 and 4 through 7.

As mentioned previously, all of the maintenance rollers **21** and **23** are removably mounted on the frame **1** in the manner more particularly illustrated in FIGS. **5**, **6** and **7** with reference to the rollers **21**.

Each roller is secured on a shaft **69** having at one end thereof a transverse pin **71** adapted to register into a keyhole slot **73** on opposite sides of a cylindrical bearing **75**, the latter being further provided with a stub shaft extension **77** extending through a roller bearing assembly **79** fixed to one of the sideplates **6** of frame **1** and over which shaft extension is fixed for rotation therewith a roller drive sprocket wheel **81**. The extreme end of stub shaft **77** journals in a roller bearing assembly **83** mounted on a sprocket supporting plate **85** parallel to the sideplate **65**. Three other roller drive sprocket wheels **87**, **89**, **91** (FIG. **4**) corresponding to each of the other rollers **21**, **23** are likewise mounted between the two parallel plates **65** and **85**.

The shaft at the other end of the roller **3** is received in a bearing **93** fixed as by means of screws on a plate **95** likewise screwed to sideplate **67**, outwardly thereof. Bearing **93** fits into a stirrup-shaped groove **97** along the bottom edge of sideplate **67** in the manner shown in FIG. **5**. It will thus be appreciated that by simply removing plate **95** and appropriately rotating roller **23** so that the transverse pin **71** thereof can slide in the longitudinal passage of the keyhole slot **73**, roller **23** may easily be removed.

A sprocket chain **99** (FIG. **4**) or driving belt operatively engages each of the roller drive sprocket wheels **81**, **87**, **89**, **91**, winds around guiding sprocket wheels **101**, **103** and the driving sprocket wheel or gear **49** in such a manner as to alternatively engage the bottom and top portions of the successive roller drive wheels **81**, **87**, **89**, **91** driving the corresponding rollers and as illustrated in FIG. **4**. In this manner, it is ensured that the roller of each pair of rollers will rotate in reverse directions in the manner indicated by the arrows of FIG. **4** for a more efficient maintenance work.

FIG. **8** illustrates the easy manner in which the machine may be moved about on the supporting floor simply by forwardly tilting it so that it may rest on the supporting rollers **51** with the maintenance rollers **21**, **23** out of engagement with the floor to be serviced.

Although a specific embodiment has been described, it will be understood that various modifications may be made without departing from the spirit of the invention, the scope of which is set forth in the appended claims.

I claim:

1. In a floor maintenance machine, the combination comprising:

a. an enclosure frame defining a bottom opening adapted to face a supporting surface;

b. handle means at the rear end of said frame to push said machine on said supporting surface;

c. a pair of first maintenance rollers for engaging said supporting surface and mounted in parallel relationship at the front end of first frame for rotation about axes extending traversely of said frame; coming

d. a pair of second maintenance rollers for engaging said supporting surface and mounted in parallel relationship at the rear end of said frame at a distance from said first rollers; and second rollers being rotatable about axes extending traversely of said frame;

e. compressed air-spraying means including a reservoir for liquid fixed in said enclosure and a spraying device in said enclosure frame having a suction inlet in said reservoir to draw liquid therefrom and a nozzle outlet disposed to spray said liquid on said supporting surface between said pairs of rollers;

f. a compressor unit in said enclosure frame having compressed air conduit means connected to said compressed air-spraying means to provide compressed air thereto; and

g. roller drive wheels fixedly mounted one on one end of each of said rollers, coaxially therewith and a driving belt operatively engageable with each drive wheel to bring it into rotation; said belt alternatively engaging the bottom and the top portions of the drive wheels on successive rollers whereby to cause rotation of the rollers of a pair in reverse directions, and

h. means to drive said driving belt.

2. A combination as claimed in claim **1**, including freely rotatable wheels at the front end of said frame, forwardly of said first roller and normally out of contact with said supporting surface but coming in contact with said supporting surface upon forward tilting of said frame by means of said handle means to free said rollers from said surface.

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