Nov. 20, 1962 G. T. FILLERY 3,064,292

FLOOR-MAINTENANCE MACHINES

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Fig. 1

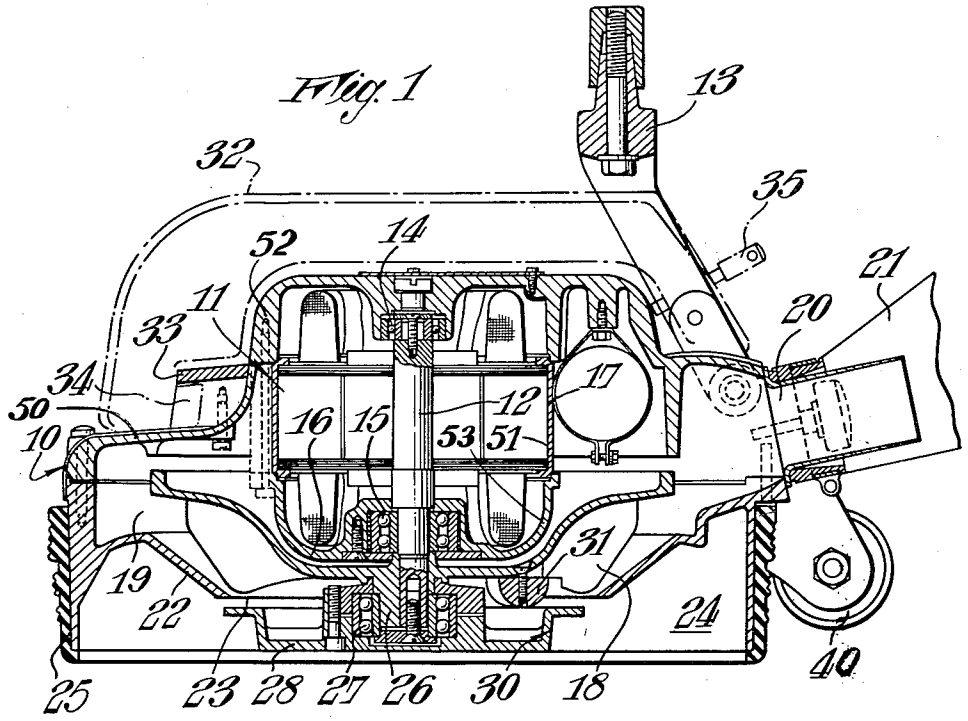


Fig. 5

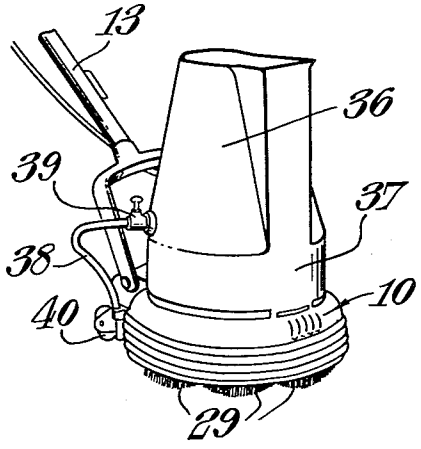
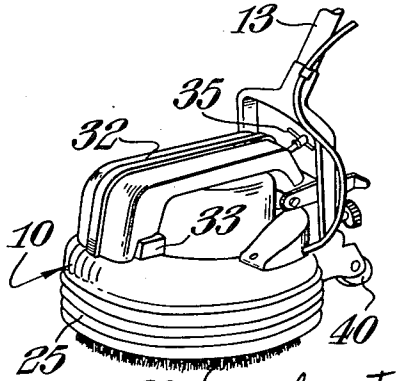


Fig. 4



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Fig. 2.

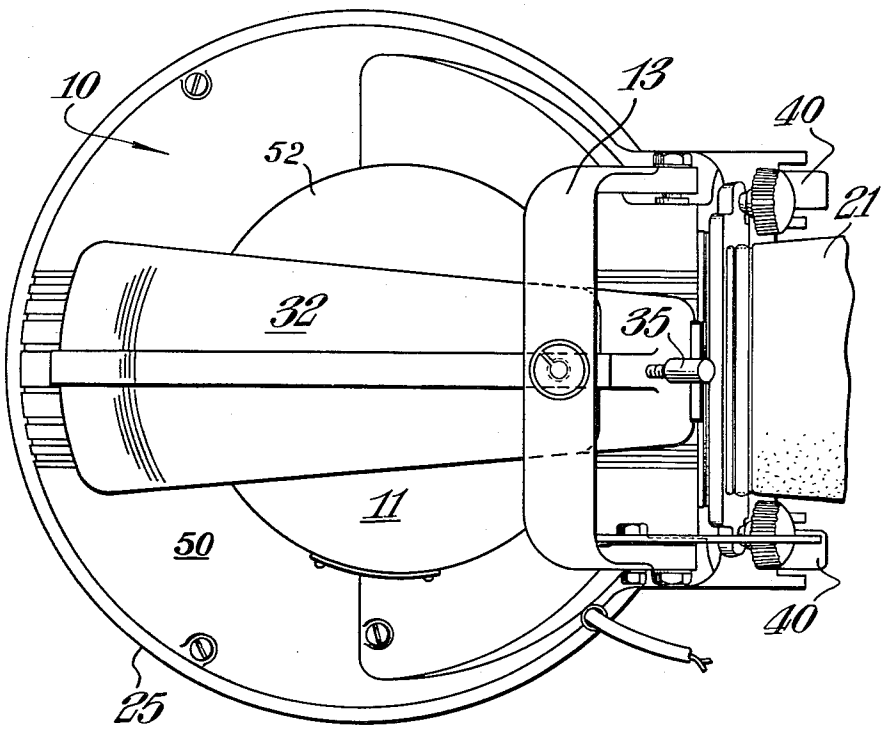
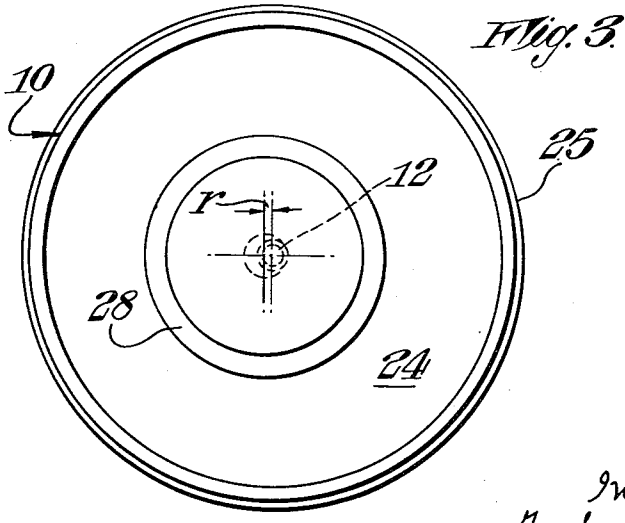


Fig. 3.



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FLOOR-MAINTENANCE MACHINES

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This invention relates to floor-maintenance machines by which is meant machines for scrubbing, polishing, sanding and similarly treating floors of offices, warehouses, factories and so on.

According to this invention a floor-maintenance machine comprises a casing, an electric motor carried by the casing, a vertical shaft driven by the motor, an eccentric secured to the shaft and a carrier for a floor-maintenance element, mounted on the eccentric for free rotation thereabout. With this arrangement the carrier (and the floor-maintenance element—e.g. an abrasive disc, polishing pad, scrubbing brush—on the carrier) performs a circular movement which is selected to be of quite small radius with the result that, without toothed or similar gearing between the motor and the carrier, the power required to drive the carrier during cleaning is greatly reduced compared with known cleaners having non-eccentric, rotary cleaning elements. Thus, a machine according to this invention is of simple construction and of small weight.

The invention may be performed in various ways and the construction of one machine according to the invention will now be described, merely by way of example. The description is made with reference to the accompanying drawings whereof:

FIG. 1 is a sectional elevation of the machine,

FIG. 2 is a plan view of the machine of FIG. 1,

FIG. 3 is an inverted plan view of the machine of FIG. 1, showing only certain parts of the machine,

FIG. 4 is a perspective view of the machine of FIG. 1, and

FIG. 5 is a view similar to FIG. 4, showing a modification.

Referring to the drawings: the machine comprises a casing, generally indicated at **10**, an electric motor **11** within a housing carried by the casing and a vertical shaft **12** driven by the motor. The motor housing is upstanding from the casing **10** and provides a marginal ledge **9**. A handle **13** is pivotally attached to the casing so that the machine may be moved across the floor for cleaning.

The shaft **12** is supported in ball bearings **14**, **15** and the lower end of the shaft projects through an end **16** of a housing **17** of the motor. A fan rotor **18** carrying fan blades **18***a* is secured to the projecting end of the shaft for rotation within a fan housing **19** having an outlet **20** which receives a removable dust bag **21** in known manner. As shown in the drawing, the fan rotor **18** is of dish shape and of smaller diameter than the housing **19**.

The housing **19** has a lower wall **22** of conical shape spaced from the fan rotor **18** and providing a lower housing wall for the fan blades **18***a* and having a central opening **23** through which shaft **12** extends. Air is drawn through opening **23** from a space **24** (defined by skirt **25** of casing **10**) and is discharged through outlet **20** into bag **21**. It will be noted that the fan blades operate within an annular duct formed between the fan rotor **18** and the conical wall **22** to drive the air into an annular space surrounding the fan and from which it is discharged into bag **21** through opening **20**.

The fan rotor **18** is concentric upon shaft **12** and a circular boss **26** projects from the lower face of the fan rotor, the boss **26** being eccentric with respect to shaft **12**. A ball bearing **27** is carried by boss **26** and a carrier **28** is mounted for free rotation on bearing **27**. Thus, the carrier **28** is eccentric, and freely rotatable, on shaft **12**.

A floor-maintenance element (e.g. the brush **29** shown in FIG. 4) is removably attached to the carrier **28**, for instance, the brush bristles are secured to a bristle holder having a tapering hole so that the holder is a push fit on the tapering face **30**.

A weight **31** is secured to the fan rotor **18** to counter balance the eccentric carrier **28** and the brush **29** or other element.

The casing **10** comprises a generally flat top portion **50** and the skirt portion **25** which depends from the top. The motor **11** comprises a housing **51** having a part **52** integral with top portion **50** and upstanding therefrom and a part **53** secured to part **52** and depending from top **50** so that about one-half of the motor is contained within the skirted portion of casing **10**.

The fan rotor **18** extends in greater part axially along the depending part **53** of the motor housing **51** while the annular wall **22** is downwardly directed from skirt **25** to extend in part axially of the fan rotor **18**.

With the described disposition of casing **10**, motor **11**, fan rotor **18** and wall **22** the motor is placed very low in relation to the casing despite the provision of the fan rotor **18**—which tends to increase the height of the motor. The motor (as is well known) is a very heavy body and by arranging the weight of the motor to be low in relation to the casing the stability of the apparatus in use is enhanced.

The polishing or other floor-maintenance element carried by carrier **28** is in part within chamber **24** i.e. can be alongside wall **22** further assisting in height reduction.

In use: having secured the brush **29** to carrier **28**, the brush **29** projecting below skirt **25**, the motor **11** when energized will drive shaft **12** and carrier **28** therefore has imparted to it by shaft **12** (due to the eccentric mounting **26**, **27**) a rotary movement of radius *r* of FIG. 3—the radius of eccentricity of boss **26**. Thus, the brush **29** will rotate at the same speed as motor **11** but each part of the brush will perform a circular path of radius *r*. As the radius is small the motor **11** can be of small horse power while the brush may be driven at a relatively high speed.

The weight **31** is removable and replaceable by a larger or smaller weight. In this way floor-maintenance elements of different size and weight and of different materials may be appropriately counter-balanced. Instead of or in addition to, replacement of the weight **31** the latter may be adjustable to vary its radius of action.

For light operations on the floor (e.g. polishing) the weight of the machine described is sufficient to apply the polishing brush or pad to the floor with the required pressure. For heavy operations (e.g. scrubbing, abrading or sanding) the weight of the machine alone may not be sufficient. Additional weight is provided by a member **32** which is secured to casing **10**, the weight **32** resting on ledge **9** and straddling the housing of motor **11**. Casing **10** has a recessed platform **33** (FIGS. 1 and 4) which receives a projection **34** (FIG. 1) of member **32**. The opposite end of member **32** has a screw **35** to engage casing **10** and thereby secure the member rigidly to the casing. The member **32** is, for example, of metal and relatively heavy. The member **32** is readily attached to, and removed from, casing **10**.

When floor scrubbing extra weight is required and at the same time water (with or without soap or detergent) is also required. These two requirements are met in the manner of FIG. 5. A water tank **36** has a skirt **37** provided with a projection and a screw as described

for the member **33**. The tank may thus be mounted securely upon casing **10**, to rest on the marginal ledge **9** and straddle the housing of motor **11**; the weight of the tank, and its contents, applying the scrubbing brushes to the floor with additional pressure. A hose **38** carries the water on to the floor. A tap **39** controls the flow of water.

The weight **32** is in greater part around the upstanding part **52** so that when the weight is fitted the height of the mass is not greatly increased so that the stability of the apparatus referred to above is not impaired. This is also so in the main when using tank **36** because the greatest volume of water (and therefore the greatest weight) is around the motor housing part **52**.

The wheels **40** enable the machine to be wheeled over the floor when not in use.

Obviously a space is provided between the periphery of the brush **29** or other element and the inside of skirt **25** to permit the eccentric rotary movement of the brush without engagement of the brush with the skirt.

I claim:

A floor maintenance machine comprising in combination: a casing having a generally flat annular top portion and a peripheral skirt portion depending from said top portion; a generally cylindrical motor housing disposed about a vertical axis at the center of said top portion, said motor housing having an upstanding part extending above said top portion and a depending part extending below said top portion, said upstanding and depending parts being substantially equal in size; an electric motor positioned in and substantially filling said housing, said motor having a vertical shaft; an annular wall portion directed inwardly of said skirt portion, said wall portion being spaced below said top portion to define with said top portion, said skirt portion and said motor housing depending part, a chamber having a circular air inlet; a suction fan rotor carried at the lower end of said motor shaft immediately below said depending part, said fan rotor being cup shaped and at least partially enclosing the depending part of said cylindrical motor housing; an eccentric boss formed on the underside of said rotor; a carrier for a floor-maintenance element mounted on said boss for free rotation thereabout; and a detachable weight resting symmetrically on said annular top portion of the casing at positions laterally of said upstanding part of the motor housing, the gravity center of the motor and of the detachable weight thereby being low in relation to the floor-maintenance element carrier.

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