Nov. 9, 1965 S. W. LIPSON 3,216,043

FLOOR MOUNTED DUST MOP CLEANING DEVICE

Filed Jan. 14, 1964 4 Sheets-Sheet 1

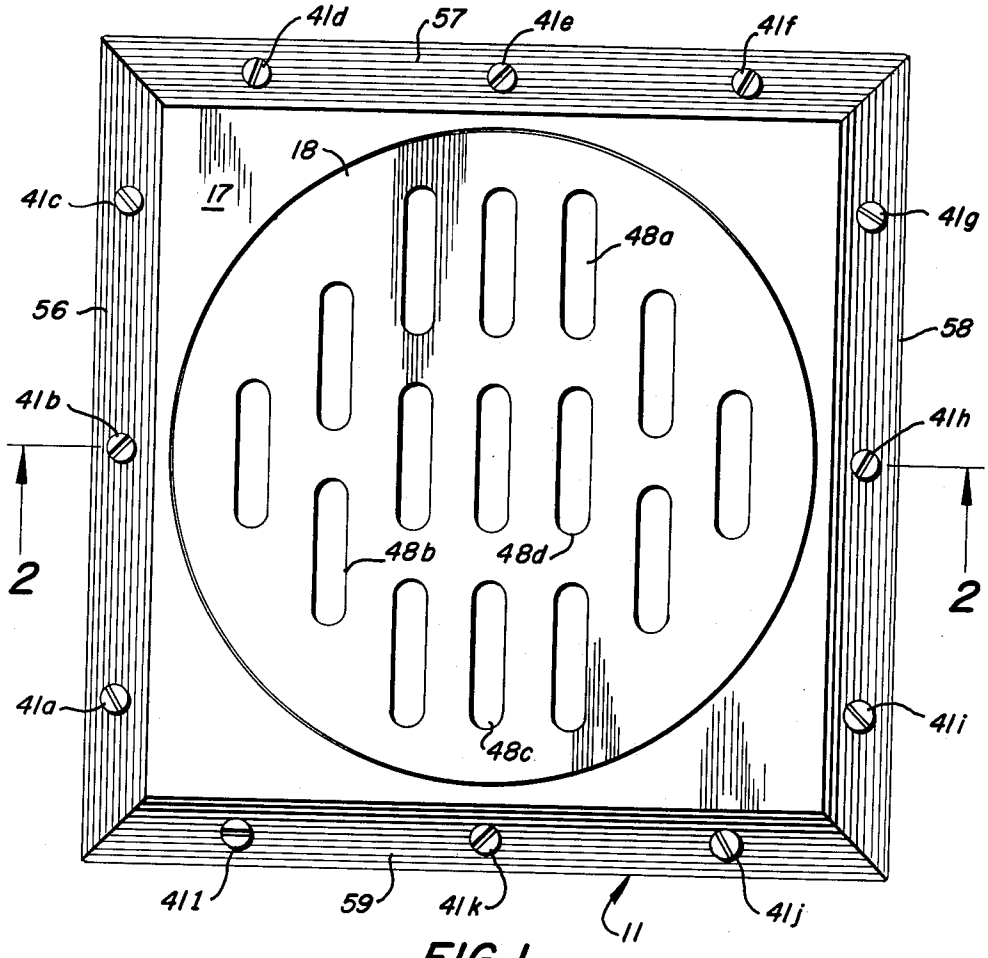



FIG. 1

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FLOOR MOUNTED DUST MOP CLEANING DEVICE

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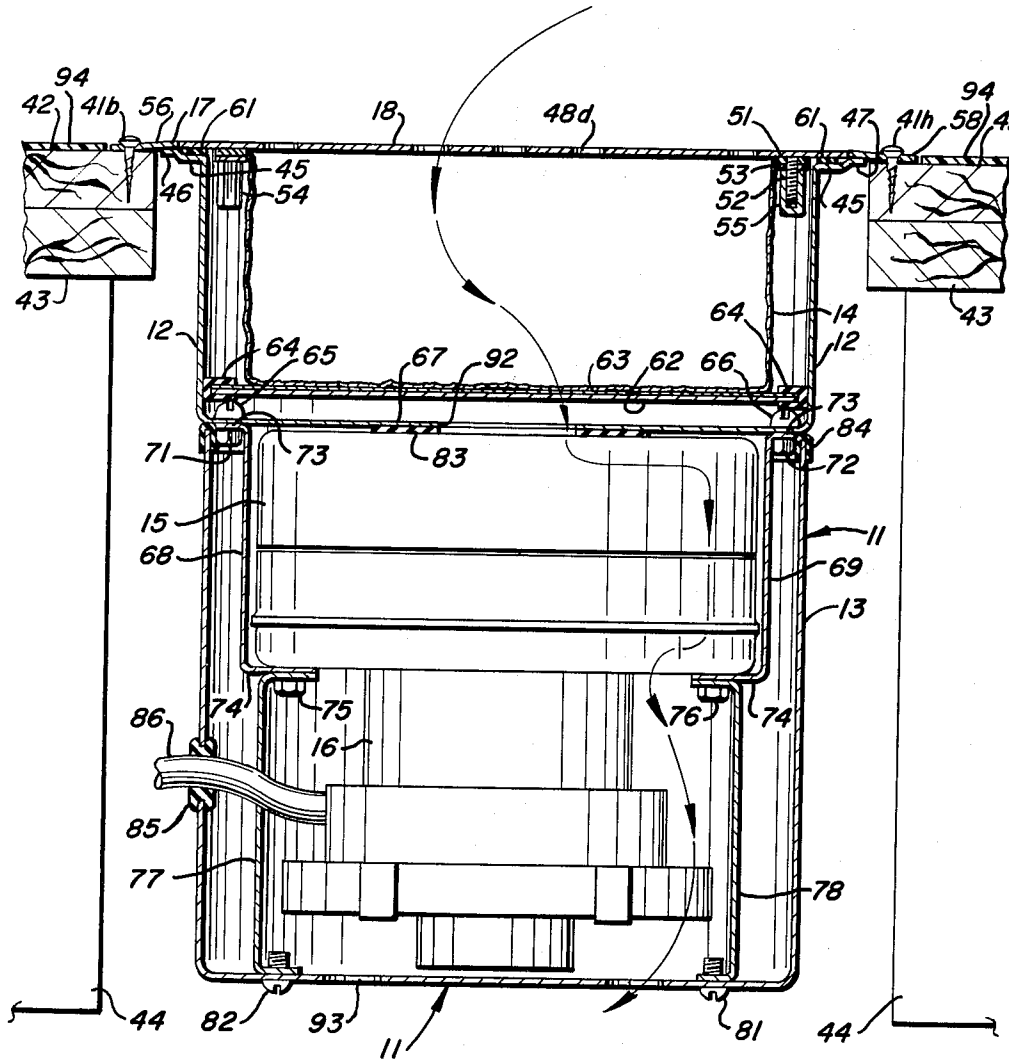



FIG. 2

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Nov. 9, 1965 S. W. LIPSON 3,216,043

FLOOR MOUNTED DUST MOP CLEANING DEVICE

Filed Jan. 14, 1964 4 Sheets-Sheet 3

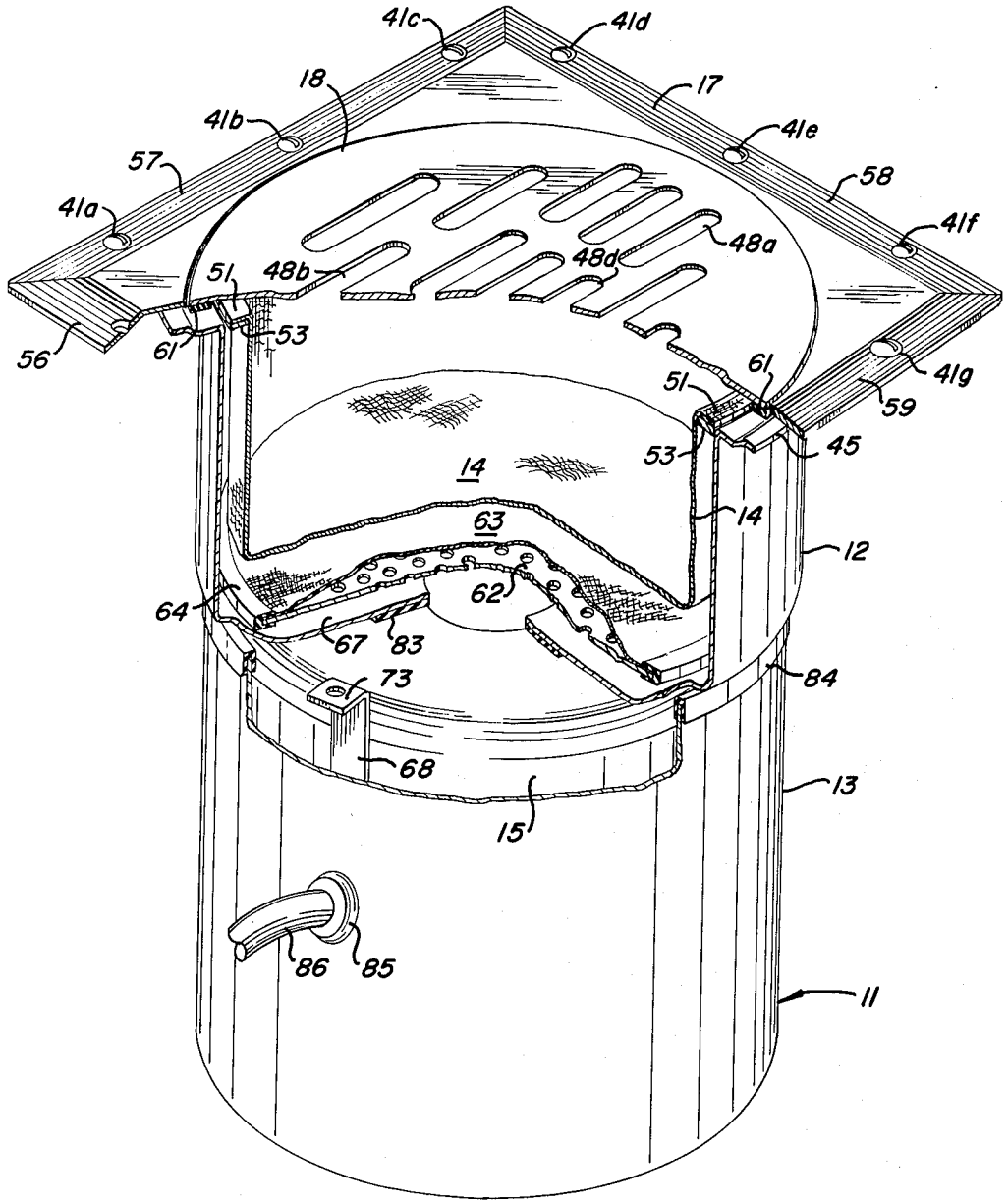



FIG. 3

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Nov. 9, 1965 S. W. LIPSON 3,216,043

FLOOR MOUNTED DUST MOP CLEANING DEVICE

Filed Jan. 14, 1964 4 Sheets-Sheet 4

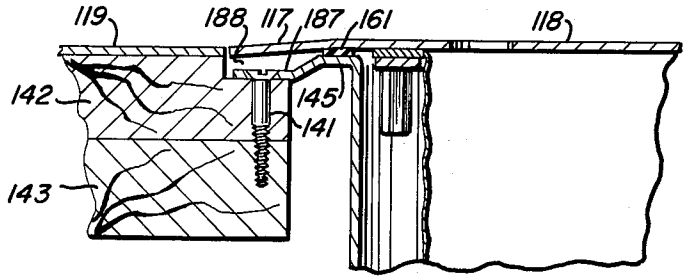



FIG. 5

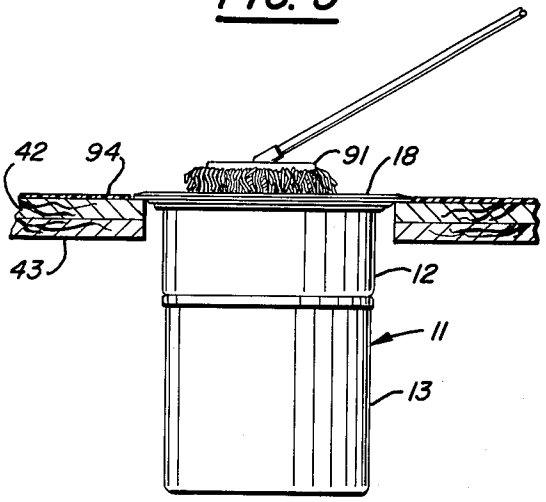



FIG. 4

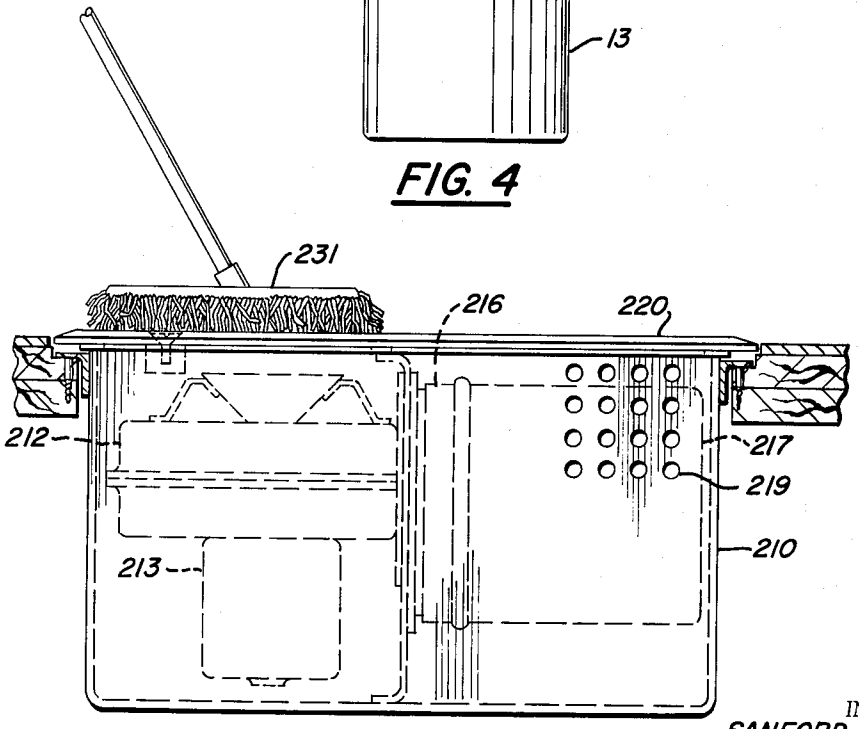



FIG. 6

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# 3,216,043 FLOOR MOUNTED DUST MOP CLEANING DEVICE

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Filed Jan. 14, 1964, Ser. No. 337,666
7 Claims. (Cl. 15—310)

This application relates to floor mounted dust mop cleaning devices and is in part a continuation of my Patent No. 3,122,772 issued March 3, 1964, on my application, Serial No. 142,163, filed October 2, 1961, by me, Sanford W. Lipson, for Floor Mounted Dust Mop Cleaning Devices, said application having been co-pending with this application.

My inventions disclosed and claimed herein relate to improvements in cleaning devices. The embodiments of my invention illustrated and described herein are floor mounted cleaning devices designed to receive and dispose of dirt and dust swept or pushed into the cleaning devices embodying my invention and clean mops, etc., which have become dirty with use.

While conventional vacuum floor cleaning devices are suited to the purpose of cleaning floors, yet it is highly desirable for thorough cleaning purposes to use also a dust mop or duster or other similar manually operated device. But when such a device is used, the dirt is usually transferred from the corners of the rooms or walls or other inaccessible places to the mop or duster. The mop or duster is then often shaken or beaten out of doors in the air to remove the dirt from it. This is not always convenient, even if there are not laws or ordinances prohibiting such a practice. Several mop cleaning devices have been previously proposed. Some of these are conventional floor cleaning vacuum devices which have been adapted for mop cleaning operation. Many such devices are portable and merely add one more cleaning device to move around the house, to connect and disconnect, and store.

In my prior copending application and herein in FIG. 6, I have shown and described a cleaning device including a suction unit provided with an impeller, an electric motor driving the impeller, and a dust collector bag unit secured to the suction unit and having a dust collector bag with its open end secured to such suction unit to receive dust laden air driven into it by the suction unit. In the device so previously disclosed, the suction unit draws the dirt and dust laden air from the floor mop and delivers it through the suction device to the dust collector bag. All of the device is mounted on the floor of a house in a properly shaped opening so that the impeller, the electric motor, the dust collector bag are all located below the floor surface and so that the upper surface of the top of the device is substantially at the same level as the adjoining floor surface.

In the device disclosed herein, similar parts are all similarly mounted below the floor level with the top at substantially the same level as the floor level. However, the parts are arranged one above the other with the motor at the bottom, the suction unit and impeller above it and with the dust collector bag above the suction unit. Thus the device may be mounted in a much smaller floor opening and the dirt laden air is first drawn through the dust collector bag and cleaned and divested of dirt, etc., and further strained through other screening devices before it is delivered to the suction impeller.

One of the objects of the inventions disclosed herein is the provision of a new, suitable, practical and convenient cleaning device.

A further object of the invention disclosed herein, is to provide a cleaning device which can be operated when permanently installed in the floor, at a location convenient to the areas generally cleaned with a dry dust mop,



to clean mops and dispose of other dirt and dust. Moreover, the user is not required to unwind and connect a cord to an electric outlet or attach the cleaning device to a conventional vacuum cleaner for suction each time that the cleaning device is used. This important feature makes the unit instantly available for use.

Another object of the invention is the location of the operating mechanism below the floor level so that no storage space is required. The design permits the device to be walked upon without loss of floor space.

A further feature of the invention is the location of dust receiving slots substantially flush with the floor, thus making it possible for dust, lint, and sweepings to be pushed directly into the suction openings for deposit into the dust collector bag.

Another object of the invention is to provide a mop cleaning appliance having a suction unit within the appliance, which is powered by an electric motor, arranged so that the movement of air will draw dust and lint from a dirty mop through a disposable dust collecting bag made of air pervious material and retain such dust and lint in said bag.

A further object of this invention is to provide an appliance of the nature referred to with a cover that can readily be lifted from the floor together with the dust collecting bag so that the bag may easily be removed and replaced.

Another object of this invention is to provide a device of the character described which is of simple and practical construction, which will be highly efficient, reliable, and inexpensive to operate, and which will be economical to manufacture.

A further object of this invention is to provide a device for the purposes described that can easily be installed in new construction or in existing homes, apartment buildings, office buildings, or other places where its use is desired.

A further more specific object of my invention is the provision of a cleaning device in which a suction impeller or fan driven by a motor draws dust, dirt, and lint laden air through a removable container which filters the air before being drawn in and through the suction impeller thus preventing clogging of the impeller by lint, dirt, etc., and prevents the abrasive action of sand and other dirt particles causing wear on the impeller.

A further object of my invention is the provision of a mounting for the dust container or bag directly under a relatively small removable cover plate, thereby reducing the overall size of the unit, making it easier to install, and providing better access to the dust bag for simple replacement.

These and other objects of the invention will become apparent from a study of the detailed description of the several specific embodiments of my inventions which follow, from a study of the claims appended hereto, and from a study of the accompanying drawings illustrating these embodiments.

In the drawings:

FIG. 1 is a plan view of the top of a dust mop cleaning device embodying my invention, the devices being shown mounted in a floor;

FIG. 2 is a vertical sectional view of the appliance of FIG. 1 taken through lines 2—2 in FIG. 1, the appliance being shown mounted in the floor;

FIG. 3 is a fragmentary view in perspective showing the device of FIGS. 1 and 2 removed from the floor and having parts broken away so that the interior construction may be more readily seen and described;

FIG. 4 is a view partially in section and partially in elevation and showing the operative relationship between a dust mop to be cleaned, the floor, and the cleaning device illustrated in FIGS. 1, 2 and 3;

FIG. 5 is a fragmentary view in section showing an alternative mounting for the device illustrated; and

FIG. 6 is a view similar to FIG. 4 illustrating the same relationships between a mop, the floor and an alternative form of cleaning device.

As an example of one form in which the invention may be embodied, I have shown in the drawings (referring especially to FIGS. 1, 2, 3, 4, and 5), a dust mop cleaning device **11** including an upper casing or housing **12** and a lower casing or housing **13** secured to such upper casing **12**.

Included in the upper casing **12** (see especially FIGS. 2 and 3) is a dust collector bag **14**. Included in the lower casing **13** is a suction impeller **15** and an electric motor **16** which drives the suction impeller. These parts just described are secured to and mounted under a steel floor mounting plate **17** and are positioned directly under a slotted steel top **18** associated with the steel floor mounting plate **17**.

The steel floor mounting plate **17** is secured to the floor as by screws **41***a*, **41***b*, **41***c*, **41***d*, **41***e*, **41***f*, **41***g*, **41***h*, **41***i*, **41***j*, **41***k*, and **41***l*. While I have shown 12 screws, a greater or lesser number may be used and in fact I prefer to use only eight screws, dispensing with screws **41***b*, **41***e*, **41***h*, and **41***k*, these four screws being added and shown mainly for purposes of easier illustration and explanation. The screws **41***a*, etc., secure the plate **17** to the top flooring **42** which is laid on and supported by the subflooring **43**, the latter being supported by floor joists such as **44**.

The upper casing **12** is secured to the floor mounting plate in any appropriate manner as for example by welding and as for more specific example by electric spot welding an annular flange **45** to the floor plate **17** as indicated at **46** and **47**.

The steel top **18** is slotted. As shown, there are fifteen slots, although more or less can be use if desired. Several of the slots are designated as **48***a*, **48***b*, **48***c*, and **48***d*, but it is deemed unnecessary to designate all of the slots as the number of slots used is not critical. The bag **14** is secured to the steel top **18** so that if the top is removed from the opening in the steel floor mounting plate **17**, the bag **14** is removed with it. To this end the bag **14** is made with a stiff cardboard ring **51** around the openings. The cardboard ring **51** has four holes spaced to fit over threaded studs such as studs **52** welded to the bottom of slotted top **18**. A steel ring **53** is fitted under the cardboard ring **51** to support it and the entire unit, including the bag **14**, the cardboard ring **51**, and the steel ring **53**, is held fast to the slotted top **18** by four hexagon hand nuts such as nuts **54** and **55**.

The mounting plate **17** is provided with a slight taper as at **56**, **57**, **58**, and **59**, which serves to keep any water (which might be spilled or used during cleaning) from entering the slotted top **18**. The slotted top **18** rests on a rubber top seal **61** which is cemented to the flange **45** on the upper casing **12**.

Within the upper casing **12** a perforated steel turbine guard **62** fitted with a cloth over **63** and edged with a rubber turbine guard seal **64** rests on four screws such as the screws **65** and **66**. The screws **65**, **66**, etc. extend through appropriately positioned openings in a lower bottom **67** of the upper casing **12**. This assembly distributes the concentrated suction from the direct center of the upper casing **12** so that the paper bag **14** is not damaged by concentrated suction at any one location.

As stated above, the lower casing **13** encloses a suction impeller **15** and an electric motor **16** which drives the impeller. The lower casing **13** is supported as will now be described by the upper casing **12**. I provide four motor mounting brackets such as the brackets **68** and **69** shown in FIG. 2 which are secured to the four screws illustrated by the screws **65** and **66** by nuts such as the nuts **71** and **72**. Each of the brackets illustrated by the brackets **68** and **69**, has at its upper end an outwardly projecting extension **73** and at its lower end an inwardly extending projection **74**. The outwardly extending projection **73** is formed with a hole through which the lower portion of one of the above mentioned screws (e.g. **65** and **66**) extends and when the nuts (e.g. **71** and **72**) are tightened they hold the brackets (e.g. **68** and **69**) tightly against the bottom **67** of the upper casing **12**. The impeller **15** rests upon the inwardly extending projection **74** of the four brackets (e.g. **68** and **69**) and is secured to these brackets by cap screws such as **75** and **76**. The cap screws (e.g. **75** and **76**) also secure a plurality (as for example four) of lower casing mounting brackets such as the brackets **77** and **78**. The lower casing **13** is secured to the lower end of these four brackets (illustrated by brackets **77** and **78**) by screws such as screws **81** and **82**, and the lower casing **13** is thus supported on the upper casing **12** by means of brackets such as **68** and **69**, **77** and **78**, and screws such as **65**, **66**, **75**, **76**, **81** and **82**, and nuts such as **71** and **72**. A rubber spacer such as **83** cemented to the bottom of the upper casing **12** serves to insulate vibration noises between the motor and impeller unit and the upper casing **12**. The lower casing **13** is fitted with a rubber molding **84** around the opening at its top also to insulate against noise. A hole through the side of the lower casing **13** is fitted with a rubber grommet **85** through which the electric power cord **86** enters the lower casing **13** to connect a source of electric power with the motor **16**, it being understood that the motor **16** is semi-permanently connected with the impeller **15** to drive it and is suspended from the impeller.

In FIG. 4 the cleaner of FIGS. 1–3 inclusive is shown in side elevation, the flooring being shown in section. Associated with the cleaner is a dust mop **91** which is in position to be cleaned. A suitable floor or floor covering such as a vinyl floor tile **94** is flush with the leading edges **56**, **57**, **58**, and **59** of the mounting plate **17**, which permits floor sweepings to be pushed directly into the openings of the slotted top **18**. For this purpose I arrange the mounting plate **17** and the slotted top **18** so that the edges are substantially flush with the floor or floor covering. In fact, the mounting plate **17** and the slotted top **18** jointly comprise a cover for my cleaning device and are sometimes referred to hereinafter in this specification and in the claims as a "cover" or "perforate cover" and the edges of this unit **17–18** is substantially flush with the top of the floor.

In the modification shown in FIG. 5 the flange **145** has tabs or ears **187** which extend into recesses **188** formed in the upper section of the subflooring **142** and is secured thereto by screws such as **141**. The upper section **142** rests on a lower section **143**. The steel top **118** is extended outward to incorporate the square outer floor plate **117** which is thus substantially level with the upper or veneer flooring **119**. The top **118** rests on the rubber top seal **161**.

In FIG. 6 is shown in side elevation a different embodiment of my invention. Therein there is shown a housing **210** which houses an impeller **212** driven by an electric motor **213** and a dust collector bag **217** connected to the impeller by a dust collector adapter **216**. The housing is perforated with holes **219** to allow filtered air to escape the unit. A top **220** for the housing **210** and a dust mop **231** to be cleaned are shown positioned above the suction unit **212** which draws a large volume of air through suction slots and from the dust mop **231**.

*Operation*

In operation the unit **11** is controlled by a wall mounted toggle switch or by an appropriate foot switch (neither of which are shown) providing electrical energy to the motor **16** through the electric cord **86**. The rotating motor drives a turbine fan in the impeller or suction unit **15**, the motor being connected directly to the fan. The suction created draws air through the opening **92** in the base of the upper casing **12**.

By reason of the suction created by the fan, the dust

laden air from above the slotted top **18** is drawn through the openings in the slotted top **18** then into dust bag **14**. The suction created by the fan pulls the air through the minute openings in the dust bag. Filtered air then passes through the cloth cover **63**, perforations in the turbine guard **62** and into the suction inlet of the casing or housing of impeller **15**, then out through the exhaust opening in the base of the impeller casing, past the motor **16** and out through the openings in the base of the lower casing. A soiled dust mop **91** moved across the perforated top **18** partially blocks the free movement of air into the unit creating concentrated suction through one or more of the slots. This concentrated suction draws the lint and dust from the mop into the paper dust bag **14**. Filtered air is passed through the turbine fan of the suction impeller **15** and out the perforations **93** in the bottom of the lower casing **13**. When the paper dust bag **14** is full of floor sweepings, lint and dirt, the perforated top **18** is lifted out of the opening in the floor mounted plate **17**. The filled paper dust bag may then be removed by removing hand nuts (e.g. the hand nuts **54** and **55**) and releasing the dust bag retaining steel ring **53**. This permits the paper dust bag **14** to be withdrawn. A new paper dust bag may then be installed by reversing the procedure.

The embodiment shown in FIG. 5 operates almost identically except that the dust bag unit is removed with the one-piece square cover consisting of the floor plate **117** and the slotted steel top **118**. In the embodiment shown in FIG. 6 a hinged door which forms a part of the top cover **220** is opened and the dust collector bag **217** is disconnected from the dust collector bag adapter **216** and removed and replaced. The embodiment of FIG. 5 indicates that the steel floor mounting plate **117** and the slotted steel top **118** may be in effect (where convenient) a single unitary slotted or perforated cover supporting the suction unit, the motor and the dust bag, etc. So also the cover **117–118** and the top **220** are unitary slotted or perforated covers.

Various structural modifications relating to size, shape and arrangement of parts might be suggested by those skilled in the art.

It is to be understood that while the embodiments shown represent preferred embodiments of my invention, they are not to be construed as limitations thereof but that various changes may be made without deparing from the spirit and scope of the invention which is defined by the appended claims.

I claim:

**1.** In a cleaning device in combination:

a suction unit comprising an impeller, and an electric motor drivingly connected to the impeller;

a dust collector bag made of air pervious material having an open end and having said open end held in position to receive dust laden air;

means including the aforesaid impeller for causing dust laden air to enter said open end of the dust collector bag; and

means for mounting said device including the suction unit and the dust collector bag on the floor of a house in a properly shaped opening in the floor comprising a perforate cover for the device supporting the suction unit and the dust collector bag below said cover and resting on the floor so that the impeller, the electric motor, and the dust collector bag are all located below the floor surface, and so that the upper surface of the cover for said device is substantially at the same level as the adjoining floor surface; wherein the perforate cover is slotted, the open end of the dust collector bag is secured directly to the slotted cover, the suction unit is mounted directly beneath said dust collector bag and draws air through said slotted cover, through said dust collector bag into said suction



device, and out of the bottom of the cleaning device, the motor is mounted directly below the impeller and is supported by the impeller to drive the impeller, there is provided an upper casing secured to said cover and surrounding and supporting the dust collector bag, a lower casing housing said impeller and said motor, and first brackets are secured to said upper case and support said impeller, and second brackets are secured to the first brackets and support said lower casing.

**2.** In a cleaning device in combination:

a suction unit comprising an impeller, an electric motor mounted directly below the impeller and supported by the impeller to drive said impeller, and a lower casing surrounding the sides of said impeller and said motor;

a dust collector bag made of air pervious material, having an open end, and having said open end held in upper position to receive dust laden air, and positioned directly above said suction unit so that said suction unit draws dust laden air into the open end of the bag, through the bag where the dust is filtered, into the top of the suction unit, and out of the bottom thereof;

means for mounting said device including the suction unit and the dust collector bag on the floor of a house in a properly shaped opening in the floor comprising

a cover for the device having perforations formed therein, the cover having a length and breadth each larger than the opening in the floor and each increasedly larger than the corresponding horizontal dimension of the suction unit and the dust collector bag, secured directly to the open end of said bag, resting on the floor, and positioned directly above said bag and directly above said suction unit and at substantially the same level as the floor surface,

an upper casing positioned directly below and secured to the cover and surrounding the sides of and supporting the dust collector bag,

a plurality of first brackets secured to the upper casing and supporting said suction unit, and

a plurality of second brackets secured to the first brackets and supporting said lower casing; and

means including the aforesaid impeller for causing dust laden air to pass through the perforations in the cover, the open end of said bag, and said bag, and then into the top and out of the bottom of said impeller whereby said suction unit and said bag may be lifted through said opening and removed together with said cover in order to service one of said components.

**3.** In a cleaning device in combination:

a suction unit comprising an impeller, an electric motor mounted directly below the impeller and supported by the impeller to drive said impeller, and a lower casing surrounding the sides of said impeller and said motor;

a dust collector bag made of air pervious material, having an open end, and having said open end held in upper position to receive dust laden air, and positioned directly above said suction unit so that said suction unit draws dust laden air into the open end of the bag, through the bag where the dust is filtered, into the top of the suction unit, and out of the bottom thereof;

means for mounting said device including the suction unit and the dust collector bag on the floor of a house in a properly shaped opening in the floor comprising

a slotted cover for the device consisting of a steel floor mounting plate and a slotted steel top secured directly to the open end of said bag, said cover having a length and a breadth resting on the floor, and positioned directly above said bag and at substantially the same level as the floor surface,

an upper casing positioned directly below and secured to and supported by the steel floor mounting plate and

surrounding the sides of and supporting the dust collector bag,

a plurality of first brackets secured to the upper casing and supporting said suction unit, and

a plurality of second brackets secured to the first brackets and supporting said lower casing; and

means including the aforesaid impeller for causing dust laden air to pass through the slotted cover, the open end of said bag, and said bag, and then into the top and out of the bottom of said impeller.

4. The structure of claim 2 in which the cover comprises a steel floor mounting plate and a perforated steel top, and the steel floor mounting plate supports the upper casing and the steel top supports the dust collector bag.

5. The structure of claim 2 in which the cover comprises a steel floor mounting plate and a perforated steel top and the steel top is surrounded by and is removably supported by the steel floor mounting plate and the steel floor mounting plate supports the upper casing and the steel top supports the dust collector bag.

6. The structure of claim 2 in which the cover comprises a steel floor mounting plate and a steel top and the steel floor mounting plate is fastened to the floor and supports



the upper casing, and the upper casing has a flange which supports the top and the top supports the dust collector bag.

7. The structure of claim 2 in which the cover has sloping leading edges which tend to prevent water from getting into the cleaner inadvertently.


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