Nov. 19, 1968 H. E. JORDAN 3,411,174

DIRT REMOVAL AND DISPOSAL UNIT

Filed Oct. 21, 1965 3 Sheets-Sheet 1

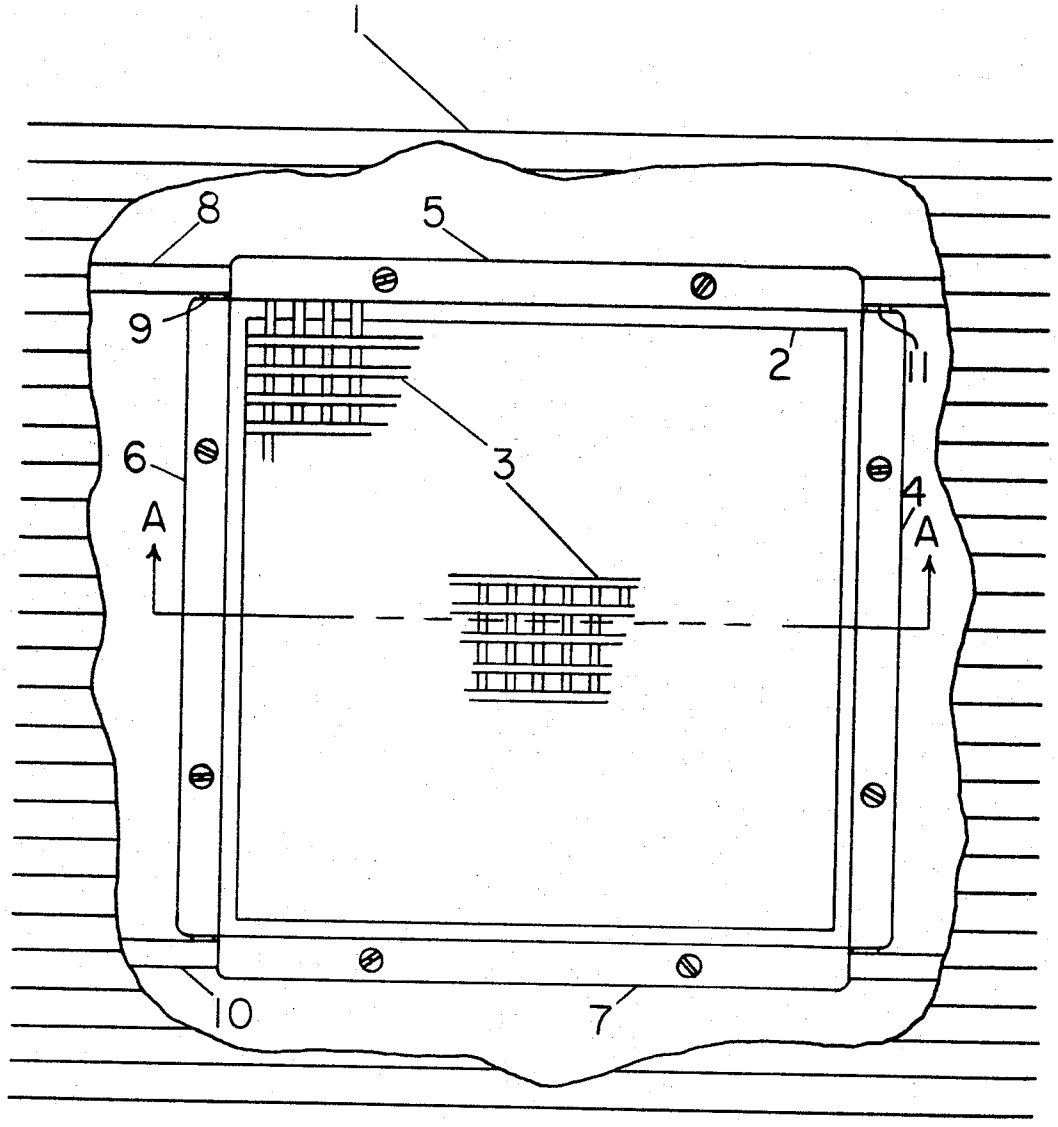


FIG. 1

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DIRT REMOVAL AND DISPOSAL UNIT

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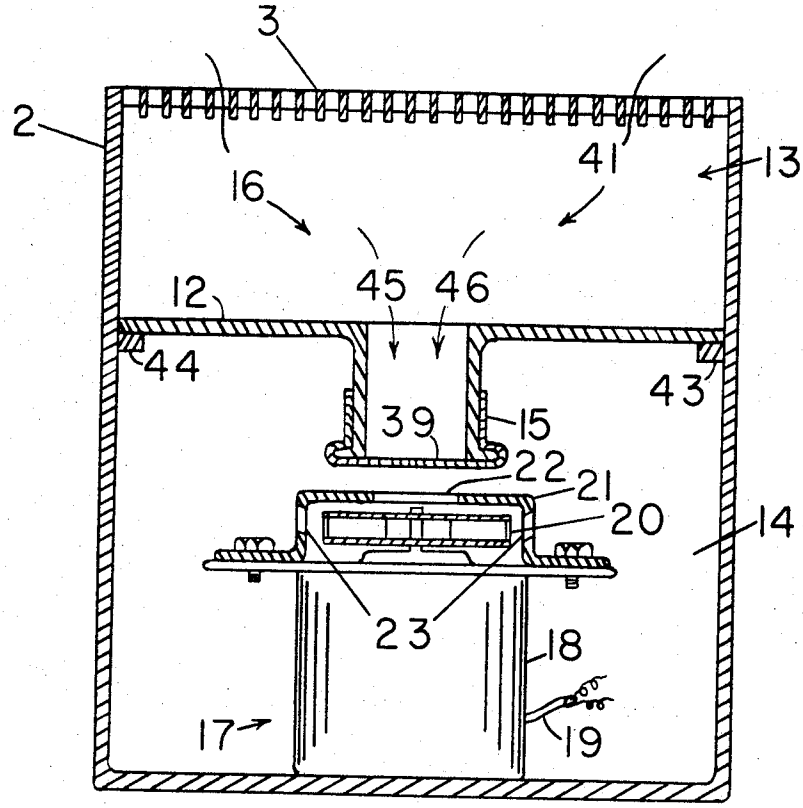


FIG. 2

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DIRT REMOVAL AND DISPOSAL UNIT

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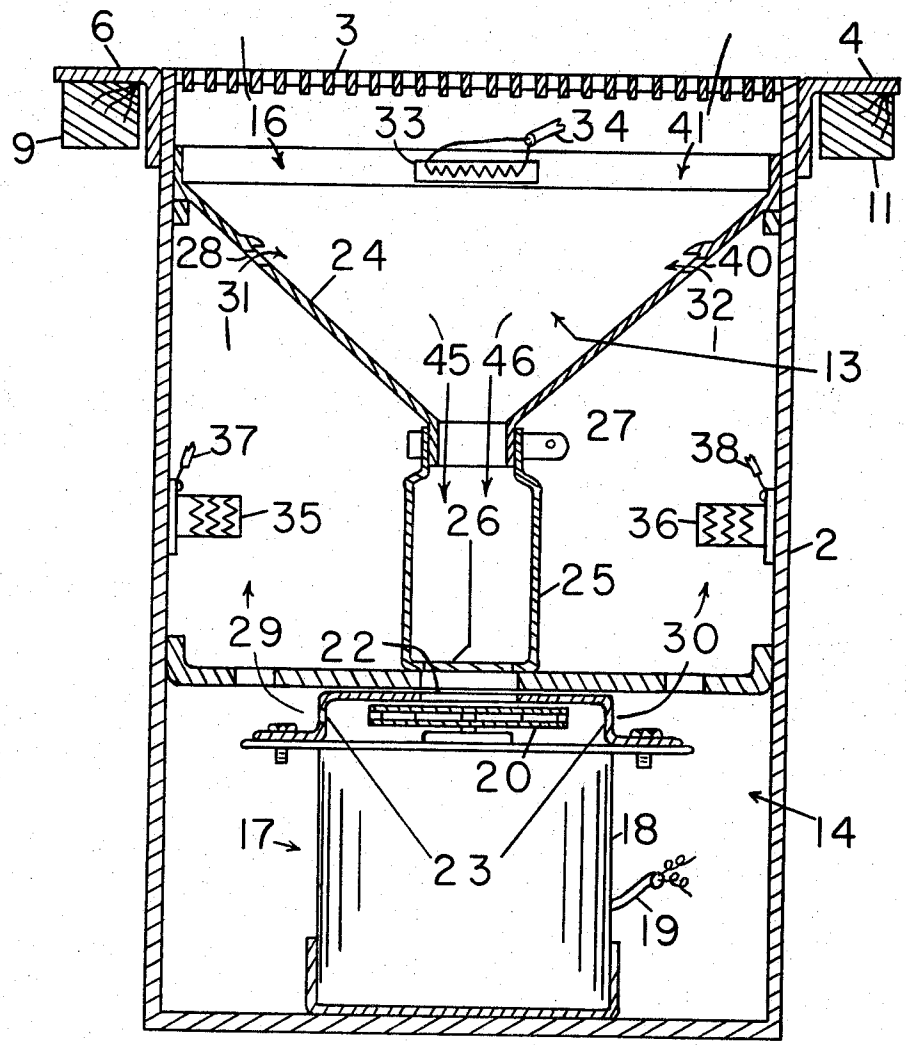


FIG. 3

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DIRT REMOVAL AND DISPOSAL UNIT

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3 Claims. (Cl. 15—310)

ABSTRACT OF THE DISCLOSURE

This invention relates to a dirt removal and disposal unit for use as a portable unit or for installation in the entrance halls of buildings to remove dirt from the shoes of persons entering the building by a combinaton of rubbing action of the shoes on a grating and suction action provided by the unit.

This invention relates to a dirt removal and disposal unit suitable for use as a portable unit or for installation in the entrance halls of buldings or homes and more particularly to a unit which has a suction means for removing dirt and causing it to enter a receptacle without passing through the fan creating the suction.

There are numerous products available for the removal of dirt from the floors and carpets of homes and commercial buildings after the dirt has been deposited on the floor or carpet. A large percentage of the dirt is carried in by people entering the building on the soles of their shoes. Still the only practical method of combating this tracking of dirt into the building is by placing a mat at the entrance on which people can wipe their feet. This is unsatisfactory as the removal of dirt is incomplete and unless the mat is frequently cleaned or replaced it soon transfers more dirt onto the shoes than it removes.

A dirt removal and disposal unit which can be located in the entrance halls of buildings and which would permanently remove the dirt from the shoes of persons entering such buildings would solve this problem and thereby make frequent cleaning of the floors and carpets within the buildings unnecessary. Such a unit to be practical must be convenient to use, durable so as not to require frequent repair or replacement and must be quiet operating. The invention disclosed herein describes such a unit.

An object of this invention is, then, to provide a dirt removal and disposal unit which will remove and collect the dirt from the shoes of persons entering a building in which it is installed.

A further object of this invention is to provide a dirt removal and disposal unit having a grating and a suction means for moving the dirt which falls through the grating into a receptacle without allowing it to pass through the fan which establishes the suction.

A further object of this invention is to provide in a dirt removal and disposal unit heating elements to aid in the removal of snow and ice from the shoes of a person standing on the grating.

A further object is a dirt removal and disposal unit having an air recirculation means for providing for the recirculation of air through the suction means and back through the receptacle so as to achieve a more thorough dirt removing action.

A still further object is to provide in a dirt removal and disposal unit the interposition of heating elements in the path of the recirculating air, thereby raising the temperature of the region around the grating to aid in the removal of snow and ice from shoes.

These and other objects and advanages are achieved in accordance with my invention by providing a dirt removal and disposal unit comprising a box having a top opening; a grating mounted substantially horizontally in the top opening; a partition beneath the grating which

includes a dirt-collecting receptacle dividing said box into an upper, dirt-collecting compartment and a lower, fan compartment; said dirt-collecting receptacle not permeable to dirt, at least a portion of said receiptacle being permeable to air; a fan in the fan compartment capable of causing air to be drawn through the permeable portion of said receptacle so as to cause the dirt entering said box through the grating to be collected in the receptacle. My invention will become apparent as the construction and operation of the dirt removal and disposal unit are more fully described herein, reference being made to the accompanying drawings in which:

FIGURE 1 is a top view of the unit showing a representative section of the grating recessed in a section of flooring;

FIGURE 2 is a vertical section view of one embodiment taken substantially about a plane indicated by line A—A;

FIGURE 3 is a vertical section view of a second embodiment taken substantially about a plane indicated by line A—A showing a unit having an inclined partition dividing the dirt-collecting compartment and the fan compartment, an air recirculation means and electrical heating elements.

Referring now to FIGURE 1 of the drawings, the numeral **1** generally designates a section of flooring in which there is an opening. The dirt removal and disposal unit includes a box **2**, a grating **3**, and supports **4**, **5**, **6**, and **7** which are fitted to the box. These supports rest on beams **8**, **9**, **10**, and **11** which are part of the building's structure serving as flooring supporting members.

Referring now to FIGURE 2, the partition **12** divides the box **2** into two compartments, a dirt-collecting compartment **13** and a fan compartment **14**. The dirt-collecting receptacle **15** which is in communication with the partition **12**, is made of a material which is not permeable to dirt but at least a portion of it **39** is permeable to air.

Referring to FIGURES 2 and 3, the fan compartment **14** houses the motor driven fan unit **17** which is comprised of an electric motor **18** and its conductor **19** used to connect it to a conveniently located switch and electrical outlet; a fan **20** and a fan cover **21**. The fan cover **21** has an air inlet opening **22** and an exhaust opening **23**.

Referring to FIGURE 2, the air permeable portion of the dirt-collecting receptacle **39** is preferably located directly in front of the fan's air inlet opening **22** thereby permitting the fan to draw air through the permeable portion of the receptacle **39**. The receptacle **15** is not permeable to dirt and therefore all of the dirt will remain in the receptacle **15** and not enter the fan **20**. This important feature of the invention results in noisless operation and elimination of damage to the fan by keeping solids that have dropped through the grating from striking the fan blades.

The operation of the dirt removal and disposal unit begins, for instance, when a person entering the building steps on the grating **3** and cleans his shoes by rubbing them on the grating **3**. The dirt loosened from the shoes is drawn into the dirt-collection receptacle **15** by air flow, generally shown by arrows **16**, **41**, **45**, and **46**. The air flow is established by the fan unit **17**. It is understood that the switching of the fan unit on and off can be effected either manually or can be responsive to an automatic control means, for example, a person stepping on the grating.

The grating **3**, the partition **12**, and the dirt-collecting receptacle **15** are removable for periodic cleaning by first removing the grating **3** and then lifting the assembly consisting of items **12** and **15** from its supports **43** and **44**.

Referring to FIGURE 3, a second embodiment of the dirt removal and disposal unit is shown. Here the grating **3** serves the same function as previously explained. The

dirt falling through the grating strikes the inclined partition **24** which separates the dirt-collecting compartment **13** and the fan compartment **14** and, due to the inclined position of the partition **24**, acting in cooperation with the fan unit **17**, the dirt is moved into the dirt-collecting receptacle **25**. The receptacle **25** is clamped to the partition **24** by a clamp **27**. This receptacle **25**, which is not permeable to dirt, has a portion **26** located directly in front of the fan inlet opening **22** which is permeable to air. This permits the movement of air into the fan without dirt entering the fan as previously explained.

The partition **24**, the dirt-collection receptacle **25** and its clamp **27** are removable for cleaning by first removing the grating **3** and then lifting items **24**, **25**, and **27** out as a unit. The receptacle **25** can then be removed from the partition **24** by loosening the clamp **27**.

Still referring to FIGURE 3, an air recirculation means is provided by openings **28** and **40** in the partition **24** through which the exhaust air from the fan unit **17** can be recirculated back into the dirt-collecting compartment. This recirculated air, shown generally by arrows **29**, **30**, **31**, and **32**, aids in moving dirt toward the receptacle **25**.

The operation of the dirt removal and disposal unit can be improved still further by electrical heating elements located in the dirt-collecting compartment. One typical electrical heating element is element **33** in FIGURE 3. This electrical heating element is connected through a switch to a convenient electrical outlet through its conductor **34**. In operation, the electrical heating element is actuated either manually or automatically by a person stepping on the grating **3** and the heat from the electrical heating elements will melt the snow and ice adhering to the person's shoes. The melted snow and ice will fall into the receptacle **25** thereby avoiding the soiling of the carpets inside of the building in which the dirt removal and disposal unit is installed.

Additional electrical heating elements **35** and **36** are installed in the fan compartment **14**. These, too, are connected through a switch to a convenient electrical outlet by their conductors **37** and **38** respectively. The heat from these electrical heating elements is carried into the dirt-collecting compartment by the recirculating air shown generally by arrows **29**, **30**, **31**, and **32**. The operation of these electrical heating elements is much the same as described for the elements located in the dirt-collecting compartment; that is, they are actuated either manually or automatically and their heat aids in the removal of snow or ice from the shoes of a person standing on the grating **3**. It is understood that the actuation of the fan unit **17**, the electrical heating element **33** and the electrical heating elements **35** and **36** can be simultaneously accomplished by wiring them from the same switch or they may be wired to separate switches so that they can be actuated independently.

The box **2**, the grating **3**, and the supports **4**, **5**, **6**, and **7** are preferably made of iron or steel but other materials such as wood can also be used. The receptacle **15** in FIGURE 2 and **25** in FIGURE 3 can be made of an air permeable material such as paper or cloth. Other commonly used filter materials are also acceptable. If a solid material such as glass is used for the body of the receptacle **15** or **25** then an air permeable insert, paper for instance, must be used for the section **39** or **26** that is located directly in front of the fan unit **17** as already explained. The partition **12** in FIGURE 2 and **24** in FIGURE 3 can be made of wood, steel or other suitable materials.

The foregoing description is illustrative of the principles of this invention. Numerous modifications and changes will occur to those skilled in the art and accordingly such modifications and changes fall within the spirit of this invention as defined in the following claims.

What is claimed is:

1. A dirt removal and disposal unit comprising a box having a top opening, said box adapted to be recessed in an opening in a section of flooring; a grating mounted substantially horizontally in the top opening of said box; an inclined partition beneath the grating, said inclined partition including a dirt-collecting receptacle, said dirt-collecting receptacle having a portion permeable to air but impermeable to dirt; a second partition in said box below said dirt-collecting receptacle, a fan unit below said second partition having an air inlet and an air outlet, means in said second partition communicating said fan inlet with said permeable portion of said dirt-collecting receptacle, means on said inclined partition and means on said second partition for permitting recirculation of at least a portion of the air passing through said dirt-collecting receptacle.

2. The dirt removal and disposal unit as set forth in claim **1** wherein the unit is fitted with electrical elements in the recirculation flow path.

3. The dirt removal and disposal unit as set forth in claim **1** wherein said inclined partition and said second partition have apertures for permitting recirculation air flow, said apertures located remotely from the fan inlet.

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