June 11, 1968 K. J. MACKEY 3,387,433

DUST COLLECTOR

Filed Oct. 10, 1966 2 Sheets-Sheet 1

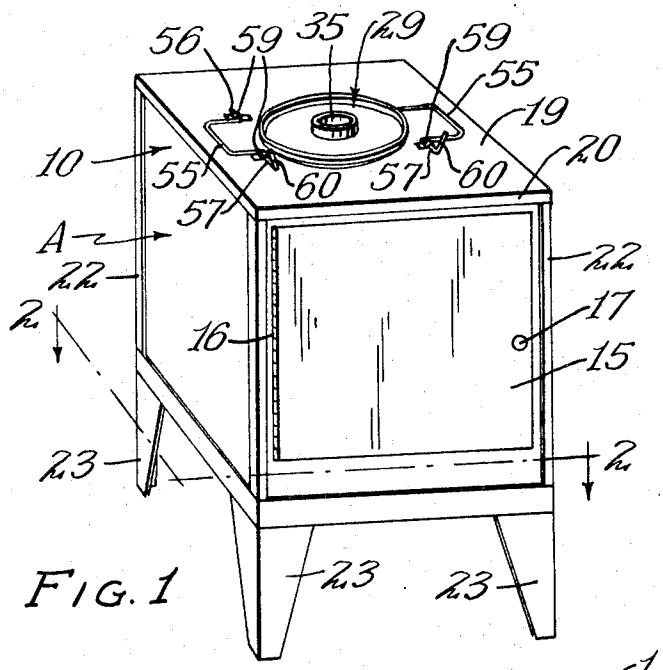



FIG. 1

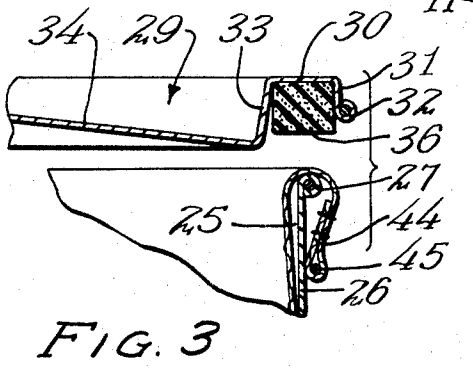



FIG. 3

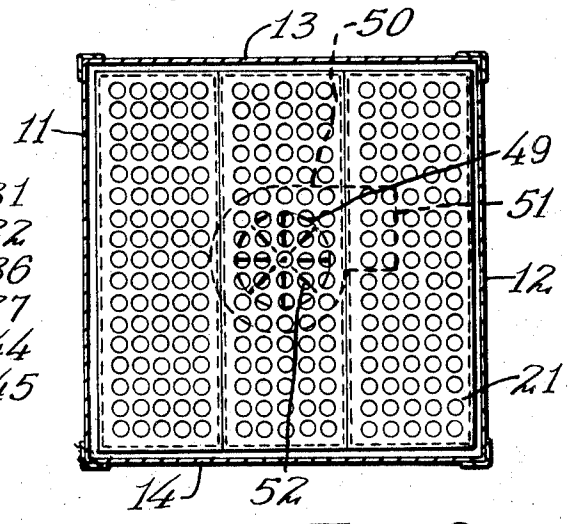



FIG. 2

INVENTOR

KENNETH J. MACKEY

BY Robert M. Dunning

ATTORNEY

June 11, 1968 K. J. MACKEY 3,387,433

DUST COLLECTOR

Filed Oct. 10, 1966 2 Sheets-Sheet 2

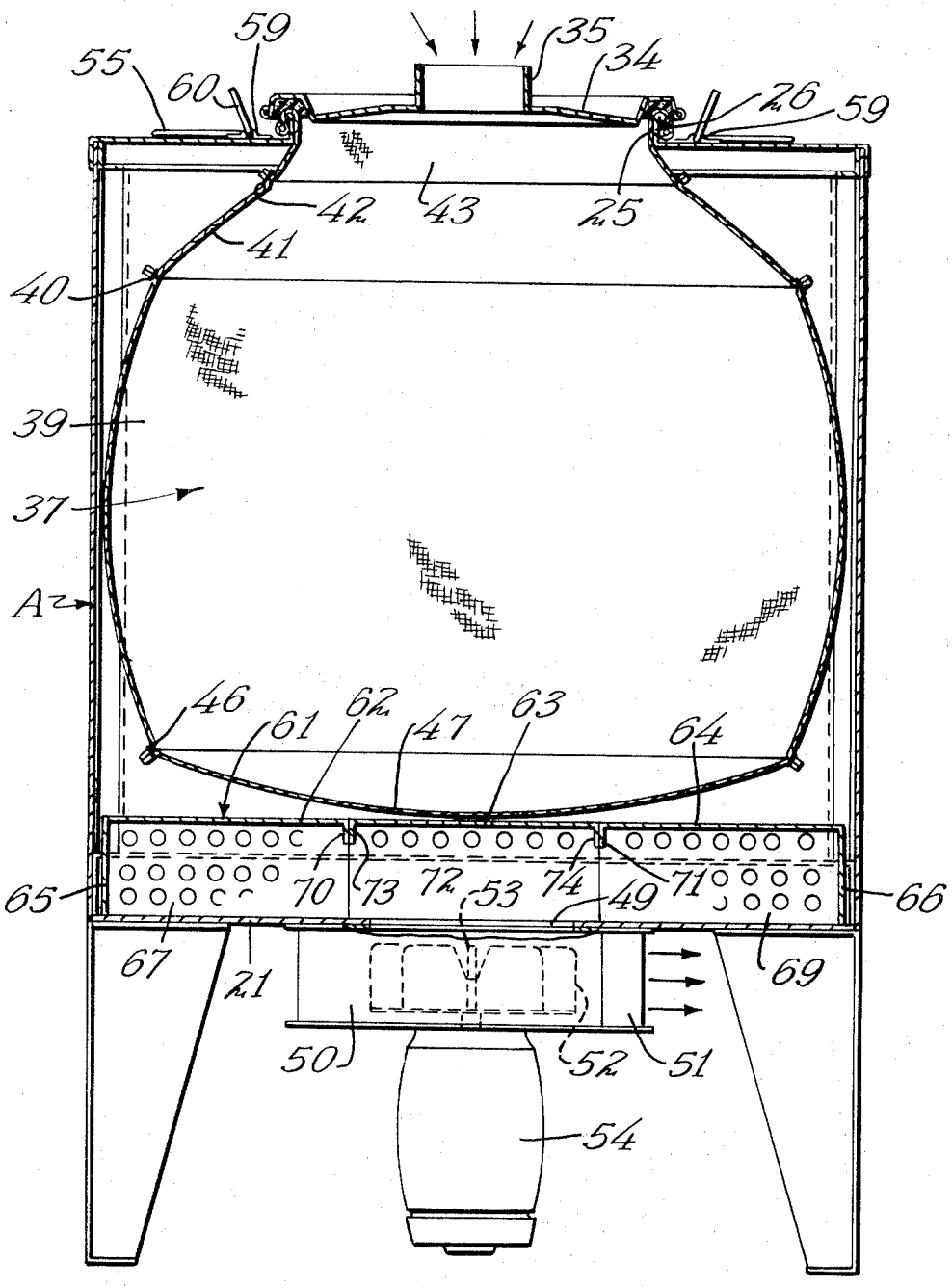



FIG. 4

INVENTOR

KENNETH J. MACKEY

BY Robert M. Dunning

ATTORNEY

United States Patent Office 3,387,433 Patented June 11, 1968



3,387,433

# DUST COLLECTOR

Kenneth J. Mackey, St. Paul, Minn., assignor to The Torit Corporation, Ramsey County, Minn., a corporation of Minnesota

Filed Oct. 10, 1966, Ser. No. 585,678
2 Claims. (Cl. 55—356)

## ABSTRACT OF THE DISCLOSURE

The invention describes a generally rectangular enclosure having a top wall provided with a central aperture encircled by an upwardly extending flange. A porous filter bag is provided with an open end of cylindrical shape of proper size to extend through the flange and fold over the top thereof. A drawstring tightens the bag end about the flange. A lid is provided with a peripheral gasket which seals the bag against the top of the flange. The lid is provided with an air inlet; and a blower on the bottom panel draws air through the bag from the inlet.

This invention relates to an improvement in lint collector and deals particularly with an extremely simple and effective device for collecting and containing fibrous lint and dusts.

In many plants such as those used in the manufacture of textiles and their related products as well as wood fibers and their related products, a linter type dust is produced in such quantity that difficulty is experienced in collecting it. This dust is so great in bulk that it quickly fills up any ordinary collectors. Furthermore, the dust can not be easily shaken out or emptied out of the bags or tubes in which it collects.

An object of the present invention lies in the provision of a cabinet designed to accommodate a fabric bag of considerable size having an open upper end. The top of the cabinet is provided with an aperture encircled by a substantially cylindrical flange or sleeve. The open upper end of the bag is properly proportioned to extend over the upper edge of this flange or sleeve and to be folded down externally thereof. A lid is provided, the peripheral edge of which is designed to overlie the folded upper edge of the bag and the flange or sleeve. A means is provided for removing air from the interior of the cabinet exteriorly of the bag. The lid is provided with an inlet opening which may be connected by suitable duct work to at hood or inlet. While the lid merely rests upon the upper edge of the flange or sleeve, a tight point is provided when the device is in operation, due to the partial vacuum which exists within the cabinet.

A further feature of the present invention resides in the provision of a cabinet for enclosing a foraminous bag which is provided with a grille or screen supported above the bottom panel. The fan or blower used to withdraw air from the cabinet is preferably mounted on the bottom panel, and the grille acts as a guard for preventing contact between the bag and the fan inlet.

A further feature of the present invention lies in the provision of a device of the type described having a lid supported overlying a flanged opening in the top panel, and means for supporting the lid in an elevated position when the device is not in use. In other words, during the time the bag is being removed and emptied, means are provided for supporting the lid above its usual position.

A further feature of the present invention resides in the provision of a dust collecting device designed to capture by holding and ducting fibrous dust and materials as they are generated by many varied operations, or to capture them as they float in free air after escaping from



such operations as can not be hooded, and collect these materials in a filter element that can be used to store or transport the material as desired.

A further purpose of the present invention lies in the provision of a device of the type described including a filter element which may be easily changed even when full of collected material of a fibrous nature, so as to allow changes from one filter element to another in a short period of time. As a result, contamination of one material with another in the filter bag because of color, size, type or material is avoided.

A further feature of the present invention resides in the provision of a device of the type described that is completely self contained except for the source of electrical current, and any necessary ducting or hooding devices. The device is readily portable from one part of a shop to another so that its location may be readily changed.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of the specification

FIGURE 1 is a perspective view of the device, showing the general arrangement of parts,

FIGURE 2 is a horizontal sectional view through the cabinet, showing the grille or screen protecting the fan, the position of the section being indicated by the line 2—2 of FIGURE 1.

FIGURE 3 of the drawings is an enlarged sectional view through a portion of the removable lid, the flange upon which it rests, and the manner in which the top of the bag is folded over the flange.

FIGURE 4 is a vertical sectional view through the cabinet, showing the general arrangement of parts therein.

The lint collector is indicated in general by the letter A. The collector includes a generally rectangular cabinet illustrated in general by the numeral **10**. The cabinet **10** includes parallel sides **11** and **12**, the rear edges of which are connected by a rear panel **13**, and the front edges of the side panels **11** and **12** are connected by a front panel **14**. The front panel **14** is provided with an aperture therein which is normally closed by a door **15** hingedly connected to the front panel by a hinge **16**. A latching means for the door is diagrammatically illustrated at **17**.

The rectangular tubular structure thus formed is closed at its upper end by means of a top closure panel **19** having a channel shaped downwardly projecting peripheral edge **20** overlying the various wall panels. A bottom panel **21** closes the lower end of the cabinet. While the details of construction of the cabinet are not illustrated, the vertical corners are preferably reinforced by angle iron members **22**.

Angularly extending legs **23** are secured beneath the corners of the bottom panel to support the hollow rectangular cabinet **10** in spaced relation to the floor or other support. The legs **23** provide space beneath the cabinet for accommodating the suction fan and motor, as will be later described.

The top panel **19** is provided with a central aperture **25** which is encircled by an upwardly extending peripheral flange **26**. The flange **26** preferably terminates in a rolled or rounded upper edge **27**. The aperture **25** is normally closed by a removable lid which is indicated in general by the numeral **29**. As is indicated in FIGURE 3 of the drawings, the lid **29** includes a ring shaped inverted channel shaped rim **30**, the outer edge **31** of which is provided with a rolled edge **32**. The inner wall **33** of the channel **30** is connected to a shallow concavo-convex ring **34** which leads at its inner and upper edge to an inlet sleeve **35**. The sleeve **35** is adapted to communicate by a suitable ductwork, not illustrated in the drawings, to a hood or

area in which air and lint are present. In other words, the ductwork, which is usually at least partially flexible, leads from a hood or other enclosure where lint or similar airborne particles are present.

A gasket ring **36** of foam rubber or other suitable material is positioned in the channel **30**, and is designed to seat upon the upper end **27** of the flange **26**. The gasket **36** is designed to seal against the filter bag, as will be described.

The bag is indicated best in FIGURE 4 in the drawings by the numeral **37**. The bag **37** includes an intermediate portion **39** which may be cylindrical or slightly barrel shaped as illustrated with outwardly bowed walls. The upper edge of the intermediate portion **39** is connected along a circular seam **40** to a substantially frusto-conical portion **41**. The upper edge of the tapering portion **41** is connected by a seam **42** to a generally cylindrical portion **43**, the upper end of which is doubled as indicated in FIGURE 3 at **44** to form a seam enclosing a drawstring **45** by means of which the hem may be tightened about the outer periphery of the flange **26** when the bag is in place. Actually, the intermediate bag portion **39** is normally formed as a cylindrical sleeve, and the upper portion **41** is frusto-conical. However, when air is being drawn through the bag **37**, it assumes the rounded shape illustrated in FIGURE 4. The lower edge of the intermediate portion **39** is connected along a seam **46** to a bottom panel **47**. The bottom panel **47** is normally flat when the bag is formed, but bows downwardly as indicated in FIGURE 4 when air is evacuated from the cabinet. The bottom panel **21** of the cabinet includes a central aperture **49** which communicates with the interior of a blower housing **50**. The blower housing **50** is normally provided with a tangentially extending outlet duct **51** which forms the outlet for the housing. A blower **52** is mounted upon the vertical shaft **53** of a motor **54** which is suspended below the blower housing **50**. Rotation of the rotor **52** acts to draw air downwardly through the opening **49** and out the outlet **51**. If desired, a conduit may be connected to the blower outlet to direct the air in any desired direction or to any desired outlet point.

A pair of generally U-shaped brackets **55** have outturned ends **56** and **57** which are channeled in bearing loops **59** on the top panel **19** on opposite sides of the central aperture **25**. The outturned ends **57** terminate in an angularly extending end **60** which is arranged at an acute angle to the plane of the U-shaped bracket **55**. The brackets **55** are arranged with their axes on the parallel lines equally spaced from the center of the aperture **25**. The purpose of the brackets **55** is to support the lid **29** in a raised position while the bag **37** is being removed or replaced. When the lid **29** is raised upwardly, the brackets **55** may swing upwardly and inwardly until the angular arms **60** engage the upper surface of the top panel **19**. When thus located, the upper ends of the brackets **55** are somewhat closer together than the diameter of the lid **29** so that the lid may be lowered into contact therewith to be supported in spaced parallel relation above the top panel **19**.

The operation of the apparatus is believed fairly evident from the foregoing description. When the device is to be used, the lid **29** is raised and is held in raised position by the brackets **55**. A bag **37** is positioned in the cabinet, and the upper cylindrical portion **25** of the bag is extended through the flange **26**, and the bag is folded over the top of the flange **26** to encircle the flange. The drawstring **45** is then tightened to secure the bag in place, and the lid is lowered, the gasket **36** engaging against the folded neck of the bag and clamping the bag against the top of the flange **26**. Thus the neck of the bag assists in forming the gasket between the lid and the cabinet.

The sleeve **35** being connected by suitable ductwork to the area where the air is contaminated with dust, the motor **54** is started to drive the fan **52**, withdrawing air and lint from the contaminated area into the interior of the bag **37**. The bag **37** being formed of porous fabric or the like which will trap the lint and permit the air to pass therethrough, the air is withdrawn from the bag, and the lint is trapped within the bag.

After a sufficient quantity of lint or similar material is collected in the bag **37**, the motor and fan are turned off, the lid **29** raised and supported in raised position, and the drawstring **45** of the bag is loosened. The bag **37** may then be removed from the cabinet through the opening provided for the door **15** and either emptied and returned into position, or else replaced. Due to the simplicity with which the filter bag may be changed, the lint collector may be in use almost continuously.

In order to limit the flexing of the bag **37** toward the fan **52**, a foraminous grille or screen **61** is supported in spaced parallel relation to the bottom panel **21**. In the arrangement illustrated, the grille **61** comprises three perforated horizontal panels **62**, **63** and **64**. The outer panels **62** and **64** are bent to provide vertical side flanges **65** and **66**, and vertical end flanges **67** and **69** respectively. Reinforcing flanges extend downwardly from the inner opposed edges of the panels **62** and **64** as indicated at **70** and **71** respectively. The center panel **63** is provided with vertical front and rear flanges **72**, and vertical reinforcing edges **73** and **74** which extend downwardly in face contact with the previously described flanges **70** and **71** respectively. Thus a continuous grille or screen is provided.

The main advantages of the structure described lies in the fact that almost the entire area of the bag is subjected to partial vacuum within the cabinet so that virtually the entire surface of the bag may be used for filtering purposes. As a result, with a material such as lint which will build up a porous pad capable of permitting free or nearly free airflow through the pad and filter bag, a very sizeable quantity of lint may be collected. While FIGURE 4 of the drawings shows the wall of the bag in close proximity to the walls of the cabinet, it should be remembered that the cabinet is rectangular so that the points of near contact are only near the centers of the wall panels.

The simplicity of changing bags is also of importance. As a result, it is possible to change the bags at frequent intervals if desired to collect lint of different colors where different colored fabrics are being processed on the machines. This is also true when it is desired to segregate lint particles of certain size or from different types of material. The filter bags may be of woven or non-woven cloth of animal or chemical origin, and the bag need not be secured with an airtight seal to the flange encircling the neck in view of the fact that the lid clamps the bag in place due to the differential in pressure inside and outside the cabinet.

It will also be seen that the filter element A may be easily moved about from place to place with ease due to its compact structure, and due to the fact that the ductwork connected to the inlet may be flexible, and the only other connection need be an electrical current to the fan motor.

In accordance with the patent office statutes, I have described the principles of construction and operation of my improvement in lint collection, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

**1.** A lint filter including:

a body including a top wall and a bottom wall peripherally connected by vertical wall means,

said top wall including a substantially central aperture encircled by an upwardly projecting flange,

a foraminous grille extending parallel to, and spaced above, said bottom panel,

a porous filter bag having a body portion of somewhat smaller periphery than said vertical wall and having a substantially cylindrical open end having a peripheral hem enclosing a draw string securing the open position about the flange,

said open end portion of said bag extending through said aperture, being folded outwardly over the top of said flange, and said draw string encircling said flange to hold said bag in place,

the diameter of the open end portion of the bag being substantially equal to the outer diameter of said flange,

a lid having a peripheral downwardly opening channel overlying said flange,

a ring-shaped gasket in said channel and contacting the portion of said bag overlying said flange, said gasket and bag portion combining to form a substantially airtight seal between said flange and said lid when the interior of said body is subjected to partial vacuum,

an inlet opening in said lid,

a suction fan secured to said bottom panel and operable to withdraw air from the portion of said body beneath said grille, the interior of said body, and the interior of said bag.



2. The structure of claim 1 and including a pair of lid supporting brackets hingedly supported by said top wall along parallel axes and being pivotal from a position against said top wall to an upwardly and inwardly inclined position beneath said lid when said lid is raised into an elevated position above said flange.


References Cited

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 975,396 | 11/1910 | Cochran | 55—373 |
| 1,064,412 | 6/1913 | White | 55—472 X |
| 1,145,047 | 6/1915 | Wiedemann et al. | 55—373 X |
| 1,847,352 | 3/1932 | McClatchie | 55—380 X |
| 2,222,077 | 11/1940 | Kahn | 55—366 |
| 2,652,902 | 9/1953 | Sheahan | 55—373 |
| 2,778,447 | 1/1957 | Meyerhoefer | 55—472 X |
| 3,180,071 | 4/1965 | Nolte. | |

FOREIGN PATENTS

| | | |
|---|---|---|
| 1,210,328 | 9/1959 | France. |


HARRY B. THORNTON, *Primary Examiner.*

S. W. SOKOLOFF, *Assistant Examiner.*