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GB 2156510 A **US 5953788 A** **US 5205013 A**

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(54) Abstract Title
A waste collecting suction apparatus

(57) An inlet opening (22), located within the base of a housing (12) adjacent to an aperture (18) in a front face (20) of the housing (12) is connected to suction means (26). An outlet conduit (28) leads from the suction means (26) and extends into a lid (16) of the housing (12) to terminate in an outlet (30) above a waste receptacle (32). The lid (16) is hingedly attached to the top of the housing (12). Waste can be swept along the floor to a position adjacent the aperture (18). The suction means (26) can then be activated to suck the waste through the inlet opening (22) and deliver it via the outlet conduit (28) and the outlet opening (30) to the receptacle (32). Waste can alternatively be dropped into the receptacle (32) when the lid (16) is in an open position.

FIGURE 3

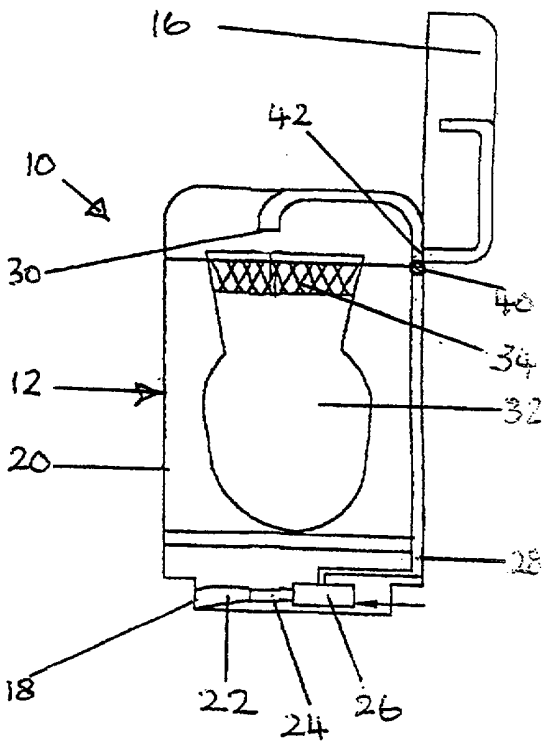

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FIGURE 1

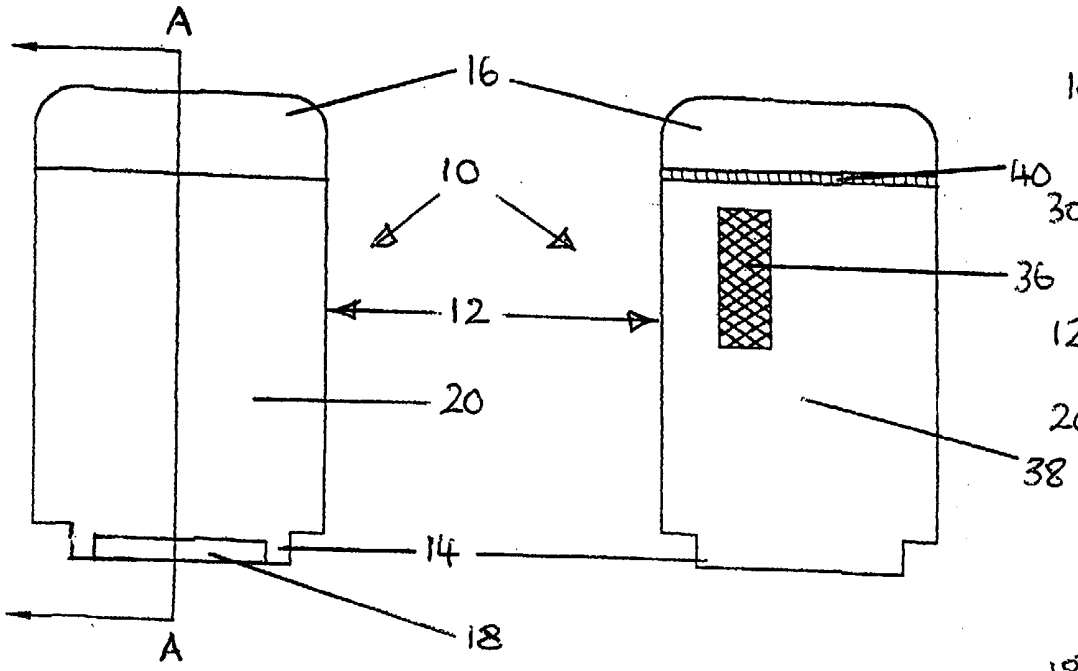
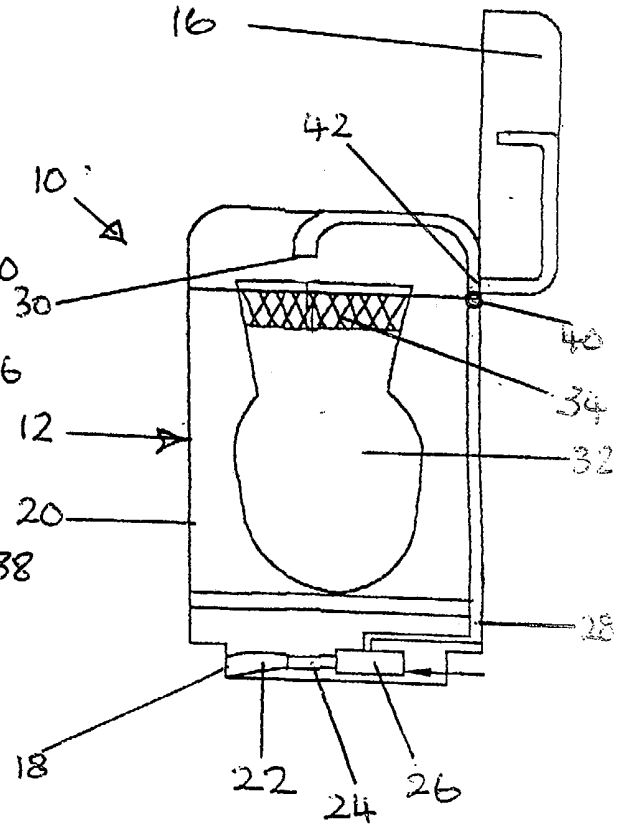


FIGURE 2

FIGURE 3



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A waste collection apparatus

The present invention relates to a waste collection apparatus.

In domestic and commercial environments there is a need for effective disposal of general waste, such as debris which has fallen to the floor and larger items such as, for example, food packaging.

Domestic and commercial floors are conventionally swept using a soft bristle brush, which is often more suitable than a vacuum cleaner. However, the swept waste requires collection in a dust pan, or similar device, before disposing of it in a bin. This can often lead to some waste remaining on the floor which requires further sweeping which, to many people, is a tiresome task.

UK patent specification number GB 2101472 describes a unit which is preferably fixed in position within a kitchen and encloses suction means leading to a dirt collection bag. Dirt is swept towards an opening at the bottom of the front face of the unit and, upon activation of the suction means, it is sucked into the unit and collected in the bag.

Such a unit is limited to the disposal of dust and small items of waste which have dropped to the floor. It cannot be used for disposing of larger items such as, for example, food packaging.

An object of the invention is to extend the use of the aforesaid type of waste collection apparatus.

With this object in view, the present invention provides a waste collection apparatus comprising at least one upright face having an aperture at or adjacent the bottom thereof, and suction means having an inlet proximate the aperture, from which waste is transported, by suction, to an outlet conduit which delivers the waste to a receptacle, characterised in that the receptacle has an open mouth and an openable lid is provided enabling manual insertion of waste into the receptacle.

The waste collection apparatus of the invention can be located in a suitable position within an area which requires sweeping and clearance of waste. Small items of waste and dust may be swept towards the waste collection apparatus, to a position adjacent the aperture. When sufficiently close to the aperture, the suction means may be activated causing the waste to be sucked into the inlet and out through the outlet conduit into the waste receptacle.

In addition, waste, including larger items, can be manually inserted into the waste receptacle through the openable lid. This allows the apparatus to be used as a conventional waste bin in combination with the floor waste collection means.

Preferably the apparatus includes a housing, most preferably comprising of four upright faces, a base and a lid. The housing accommodates the remainder of the apparatus and provides for the apparatus to exist as an independent free standing unit.

The receptacle may be a conventional plastic bin bag, which is commonly used in existing waste collection bins. These bags may be disposed of using existing methods and are readily available and affordable.

Alternatively, a reusable substantially rigid container may be used as the receptacle. The solid container may be emptied into larger bins or skips, when required, and washed before further use. This alternative has environmental advantages of limiting the plastics which are been disposed of.

The receptacle may also comprise of the bag within the rigid container.

The receptacle may be semi-permeable or include a permeable region allowing air to pass through at least a partial area of its wall, the waste being retained to remain within the receptacle. Alternatively, a gap may exist between the top of the receptacle and the lid, to exhaust the air after it has been separated from the waste particles.

Preferably, the outlet conduit is, at least partially, of arcuate configuration, to cause the air to lose energy and to aid separation of the air and waste particles.

The outlet conduit is advantageously integrated within the lid of the housing or within the rigid container which is, or forms part of, the receptacle.

Some embodiments of the waste collection apparatus of the invention may comprise a demountable cyclone means to cause the air to lose energy and aid separation of the air and waste particles. The cyclone means may be mounted on the receptacle, on the housing or on the lid, or on a combination of the aforementioned.

The inlet opening may be a nozzle, for example, of fishtail configuration.

The openable lid is preferably hingedly connected to the housing.

When the lid is opened, whether hingedly connected or not it is conveniently arranged so as to prevent the operation of the suction means by use of, for example, a cut-off switch to isolate the power supply to the suction means. Alternatively, when the lid is closed and the suction means is operated, the lid may be prevented from being opened.

The suction means is preferably a material handling fan, most preferably a centrifugal fan.

Filter means, such as a HEPA (high efficiency particulate air) filter, may be provided and located within at least one of the faces of the housing, allowing for the exhausted air to be filtered on removal from the housing to the external environment.

In embodiments of the waste collection apparatus having a housing, the latter may be mounted on castors to allow it to be easily manoeuvred to areas which require sweeping and clearing of waste.

Further embodiments of the waste collection apparatus of the invention may be installed within domestic or commercial cupboard units, for example in kitchens or in hair salons, or other commercial environments.

The present invention will be described further, by way of example, with reference to the accompanying drawings in which:

Figure 1 is a front elevation of a waste collection apparatus according to the present invention;

Figure 2 is a rear elevation of the waste collection apparatus shown in Figure 1; and

Figure 3 is a schematic cross section through a line A-A of the waste collection apparatus shown in Figure 1.

Referring to the drawings a preferred practical embodiment (10) of the apparatus of the invention comprises a housing (12) formed by four upright faces, namely a front face (20) and a rear face (38), a base (14) and a lid (16).

An aperture (18) is formed at the bottom of the front face (20) adjacent to which an inlet opening (22) is located within the base of the housing (12). The inlet opening (22) is of fishtail configuration and connected to an inlet conduit (24) to provide an air tight fitting. The inlet conduit (24) is connected to a suction means, in the form of a material handling centrifugal fan (26).

An outlet conduit (28) leads from the suction means (26) and extends upwards to a section which is integrated into the housing lid (16). This section terminates, in an outlet (30), above a waste receptacle in the form of a bag (32).

The bag (32) is demountable. It may consist of a plastic bag similar to the type of bin bag conventionally used as a bin liner. However, a filter section (34) is provided adjacent its mouth through which air is exhausted out from the bag (32) into the interior of the housing (12).

A filter (36), for example of the HEPA type, is provided within the rear face (38) through which air is exhausted from inside the housing (12).

The lid (16) is hingedly attached to the top of the rear face (38). The outlet conduit (28) includes a flexible section (42) adjacent the hinge (40) to allow the upper part of the outlet

conduit (28) to move relative to the fixed housing (12) as the lid is being opened and closed.

In use, the suction means (26) can only be activated when the lid (16) is fully closed onto the housing (12). Waste can be swept along the floor to a position adjacent the aperture (18). The suction means (26) can then be activated, either by manual switch or automatic sensor means, to suck the waste through the inlet opening (22) and deliver it via the outlet conduit (28) and the outlet opening (30) to the receptacle (32).

The outlet conduit (28) extends and integrates into the lid (16) as a spiral configuration. This provides a cyclonic mechanism for the separation of the suspended waste particles from the air entraining said waste, by means of centrifugal forces set up when the air is made to flow through a tight conical vortex.

Additionally, the cross sectional area of the outlet conduit (28) enlarges with length in the spiral configuration. This reduces the energy and velocity of the air and allows the waste particles to drop downwards, out of the vortex, into the receptacle (32). The excess air is vented, through filters (34)(36), and exhausted from the housing.

Opening of the lid (16) prevents activation of the suction means (26), by use of, for example, a cut off switch which isolates the power supply to the suction means. When the lid (16) is in an open position, larger items of waste can be dropped into the bag (32). On closing the lid (16), the suction means(26) is enabled, allowing it to be activated again by switch or automatic means.

The foregoing is illustrative and not limitative of the scope of the invention. Many variations in design detail are possible compared to this illustrated embodiment.

CLAIMS

(1) A waste collection apparatus comprising at least one upright face having an aperture at or adjacent the bottom thereof, and suction means having an inlet proximate the aperture, from which waste is transported, by suction, to an outlet conduit which delivers the waste to a receptacle, characterised in that the receptacle has an open mouth and an openable lid is provided enabling manual insertion of waste into the receptacle.

(2) A waste collection apparatus as claimed in claim 1, wherein the receptacle is located within a housing.

(3) A waste collection apparatus as claimed in claim1 or 2, wherein the receptacle comprises a bag.

(4) A waste collection apparatus as claimed in claim 1, 2 or 3, wherein the receptacle includes a substantially rigid container.

(5) A waste collection apparatus as claimed in claims 2 to 4, wherein the openable lid is hingedly mounted to the housing.

(6) A waste collection apparatus as claimed in claims 2 to 5, wherein the housing comprises at least one filter means.

(7) A waste collection apparatus as claimed in any of the preceding claims, wherein the receptacle comprises at least one filter means.

(8) A waste collection apparatus as claimed in any of the preceding claims, wherein the outlet conduit is, at least partially, integrated within the lid.

(9) A waste collection apparatus as claimed in any of the preceding claims, wherein the outlet conduit is, at least partially, of arcuate configuration.

(10) A waste collection apparatus as claimed in any of the preceding claims, wherein opening of the lid prevents operation of the suction means.

(11) A waste collection apparatus as claimed in claim 1 to 9, wherein operation of the suction means prevents operation of the lid.

(12) A waste collection apparatus as claimed in any of the preceding claims, wherein the apparatus is mounted on casters.

(13) A waste collection apparatus substantially as hereinbefore described withe reference to and illustrated in the accompanying drawings.

Application No:	GB 0010526.2	**Examiner:**	John Wilson
Claims searched:	1-13	**Date of search:**	27 March 2001

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): A4F; F4X

Int Cl (Ed.7): A47L 5/28 5/38 9/02; B08B 15/00

Other: Online:- WPI, EPODOC, PAJ

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2156510 A	Zefair - whole document	1-3,6,9,12 at least
X	US 5953788	Douglas - see inlet 2 and lid 26	1-3,5 at least
A	US 5205013	Lopes - whole document	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.