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(54) **A compactor with collection bag**

(57) This invention relates to a compactor (1) comprising a compacting chamber (3) having a charging inlet (7) and a discharge outlet (9). The compactor (1) is provided with a flexible bag (13, 71, 81, 91, 120) for reception of compacted material. There is further provided a fastener to firmly attach the flexible bag to the compactor thereby forming a stable connection between the charg-

ing mouth of the bag and the discharge outlet of the compactor (1) allowing materials to be compacted in the flexible bag. The flexible bag is provided with a neck portion that facilitates attachment of the flexible bag (13, 71, 81, 91, 120) to the compactor (1). The bag may have a self-sealing neck to permit various orientations of the bag without escape of materials when the bag is being changed.

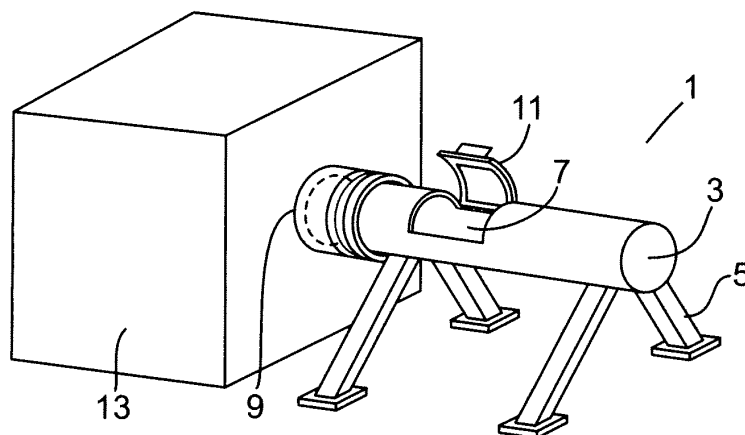


Fig. 1

Description

Introduction

[0001] This invention relates to a compactor with a collection bag.

[0002] Compactors are commonly used to compact materials including domestic waste and commercial waste. Compacted materials can be handled more economically and efficiently than non-compacted materials. By using a compactor, the number of material or waste collections that must be carried out can be significantly reduced. Many different constructions of compactor are known.

[0003] US4,134,335 (O'Rourke et al) discloses a waste compacting apparatus comprising a waste receiving chamber of rectangular cross section and a compaction ram slidably mounted in the waste receiving chamber.

[0004] US3,854,397 (Dempster) discloses a waste compacting device comprising a compaction chamber and a compacting ram slidably mounted in the compaction chamber. Refuse exiting the compaction chamber may be captured in rigid containers or flexible bags.

[0005] US3,821,929 (Stapf) discloses a refuse compactor having a compacting cylinder and a compacting ram slidably mounted in the compacting cylinder. The compacting cylinder is arranged to permit a refuse bag to be slipped over the front end of the cylinder to have pre-compacted refuse ejected therein.

[0006] US3,687,063 (Clar) discloses a compacting apparatus having a material receiver chamber and a compaction blade moveable forwards and backwards in the material receiver chamber. The apparatus has an outlet snout dimensioned to receive a receptacle such as a bag. The bag is free to slide along the snout.

[0007] One of the greatest challenges associated with compactors relates to the handling of the compacted waste. The compactors that are suitable for use with a collection bag are preferred as they facilitate handling of the compacted waste. There are however problems with the known types of compactor. In many cases, there is a tendency for the waste to expand as it is delivered into the bag thereby detracting somewhat from the benefit obtained by compacting the waste in the first instance.

[0008] It is an object of the present invention to overcome at least some of the problems with the known types of compactor.

Statements of Invention

[0009] According to the invention there is provided a compactor for material comprising a compacting chamber having a compacting ram mounted in the chamber and moveable in a reciprocal fashion back and forth inside the chamber, an actuator to move the ram back and forth inside the chamber, a charging inlet, a discharge outlet and a material receptacle comprising a collection

bag constructed from a flexible material having a charging mouth in communication with the discharge outlet, **characterised in that** there is provided a fastener to releasably attach the collection bag to the compactor thereby holding the collection bag in a fixed relationship relative to the compactor.

[0010] By having such a compactor with a collection bag, it will be possible to increase the amount of material placed into the collection bag. This is due to the fact that the materials will be compacted in the flexible bag and will not be permitted to expand to the same degree as the known compactors with collection bags. This reduces the collection cost and the frequency of collection required.

[0011] In one embodiment of the invention there is provided a compactor in which the collection bag is substantially cuboid in shape. By having a cuboid bag, the bag may be conveniently placed on a pallet which will facilitate handling. Furthermore, this shape of bag allows for good compaction of material in the bag while providing a robust bag.

[0012] In another embodiment of the invention there is provided a compactor in which the collection bag comprises a body having a neck portion terminating in the charging mouth and in which the neck portion protrudes outwardly from the body. By having a neck portion, it is possible to use the neck portion to surround the discharge outlet and form a firm connection between the bag and the compactor. Furthermore, by having a neck, this will enable the bag to be sealed after it has been released from the compactor thereby preventing escape of materials or odours from the bag.

[0013] In another embodiment of the invention there is provided a compactor in which the collection bag comprises a body having a neck portion terminating in the charging mouth and in which the neck portion protrudes inwardly into the body. By having a neck protruding inwardly into the body, the neck will have a tendency to close after the bag is released from the compactor thereby sealing the bag and preventing egress of material from the bag.

[0014] In one embodiment of the invention there is provided a compactor in which the bag is a self sealing bag.

[0015] In another embodiment of the invention there is provided a compactor in which there are provided a plurality of sealing flaps surrounding the charging mouth. This is seen as a simple way of sealing the bag.

[0016] In another embodiment of the invention there is provided a compactor in which neck portion is provided with a substantially rigid collar.

[0017] In one embodiment of the invention there is provided a compactor in which the material collection bag has a plurality of skins.

[0018] In another embodiment of the invention there is provided a compactor in which the collection bag is substantially cuboid in shape having a plurality of faces with the charging mouth located substantially centrally in one of the faces, and in which the seams of the bag sur-

rounding the charging mouth are sewn so that there are four seams, each of which extends inwardly from one of the corners of the face towards the charging mouth. By arranging the stitching in such a manner, the bag will be able to withstand greater forces. There is a tendency for the bags to split adjacent the charging mouth at the neck joint however with diagonal stitching from each of the corners of the face to the open mouth, the bag will not have a tendency to split. When a neck is provided on the bag, the stitching will extend along the length of the neck to the charging mouth.

[0019] In another embodiment of the invention there is provided a compactor in which there is provided a pair of spaced apart collars surrounding the compacting chamber adjacent to the discharge outlet. By having the pair of spaced apart collars, a neck of a bag may be used to surround the compacting chamber adjacent the discharge outlet and a jubilee clip or other fastener may be seated over the neck of the bag between the collars thereby providing a robust connection between the bag and the compactor.

[0020] In one embodiment of the invention there is provided a compactor in which there is provided a door mounted on the compacting chamber for the charging inlet, the door comprising a section cut from the compacting chamber wall for the charging inlet, the section forming a tight fit in the charging inlet when closed thereby effectively reconstituting the outer tube. By having a door cut from the compacting chamber wall, it will form a tight fit in the charging inlet of the compactor and this will prevent any shear forces from forming in the compactor. Shear forces are a significant problem with the known types of compactors and the present invention practically eliminates shear forces in the compactor.

[0021] In another embodiment of the invention there is provided a compactor in which the door further comprises an outer frame on which the section cut from the compacting chamber is mounted. The outer frame may comprise an outer skin or alternatively the outer frame may comprise an abutment member. The outer frame will permit simple mounting of the door on the compacting chamber and further will prevent the section cut from the compacting chamber from extending inwardly into the interior of the compacting chamber.

[0022] In another embodiment of the invention there is provided a compactor in which the door is hingedly mounted on the compacting chamber.

[0023] In one embodiment of the invention there is provided a compactor in which there is provided a moveable gate releasably secured in position in the compacting chamber intermediate the charging inlet and the discharge outlet. By providing a moveable gate, it will not be possible to limit the amount of material that may be placed into the compactor at any one time.

[0024] In another embodiment of the invention there is provided a compactor in which the compactor is arranged with the compacting chamber in a substantially vertical orientation with the discharge outlet facing up-

wards away from the ground and with a material receptacle substantially above the compactor.

Detailed Description of the Invention

[0025] The invention will now be more clearly understood by the following description of some embodiments thereof, given by way of example only in which:

Fig. 1 is a perspective view of a compactor according to the invention;

Fig. 2 is a perspective, partially cut-away view of a compactor;

Fig. 3 is a cross-sectional view along the lines A-A of Fig. 2;

Fig. 4 is a perspective view of a material collection bag used with the compactor according to the present invention;

Fig. 5 is a partial cross-sectional view of the bag of Fig. 4;

Fig. 6 is a cross-sectional view of the bag engaging the discharge outlet of a compactor;

Fig. 7 is a cross-sectional view of the compactor showing the door in an open configuration;

Fig. 8 is a cross-sectional view of the compactor showing the door in a closed configuration;

Fig. 9 is an exploded perspective view of the door of the compactor shown in isolation;

Fig. 10 is an exploded side view of the door of the compactor with a hinge mounted thereon;

Fig. 11 is a front view of the door of the compactor;

Fig. 12 is an end cross-sectional view of the door shown in a closed configuration;

Fig. 13 is a perspective view of an alternative embodiment of compactor according to the present invention;

Fig. 14 is a perspective view of an alternative discharge outlet arrangement;

Fig. 15 is a diagrammatic cross-sectional view of the compactor with the alternative discharge outlet arrangement shown in Fig. 14 in operation;

Fig. 16 is a side cross-sectional view of an alternative configuration of bag for use with the compactor;

Fig. 17 is a side cross-sectional view of an alternative configuration of bag for use with the compactor;

Fig. 18 is a partial side cross-sectional view of an alternative configuration of bag for use with the compactor;

Fig. 19 is an enlarged view of portion of the bag shown in Figure 18;

Fig. 20 is a partial side cross-sectional view of the bag shown in Figure 18 with the neck portion unfolded;

Fig. 21 is a side cross-sectional view of an alternative arrangement of compactor and bag;

Fig. 22 is a side cross-sectional view of a further alternative configuration of compactor with bag;

Fig. 23 is a side cross-sectional view of a self-sealing bag;

Fig. 24 is a plan view of the charging mouth portion of the self sealing bag shown in Fig. 23 with the charging mouth open;

Fig. 25 is a side cross-sectional view of the self-sealing bag shown in Fig. 23 with the charging mouth closed; and

Fig. 26 is a plan view of the charging mouth portion of the self sealing bag shown in Fig. 25 with the charging mouth closed.

[0026] Referring to the drawings and initially to Fig. 1 thereof, there is shown a compactor, indicated generally by the reference numeral 1, having a compacting chamber comprising an outer tube 3 mounted on a ground engaging frame 5. The compactor 1 comprises a charging inlet 7 and a discharge outlet 9. The charging inlet 7 is provided with a door 11 and a material receptacle, in this case a flexible material collection bag 13, is connected to the discharge outlet 9.

[0027] Referring to Figs. 2 and 3, there is shown a detailed view of the compactor 1. The compactor 1 comprises an outer tube 3, a compacting ram comprising an inner tube 15 mounted in the outer tube coaxially therewith and movable in a reciprocal fashion back and forth inside the outer tube 3. An actuator, in this case a hydraulic ram 17, is provided to move the inner tube back and forth inside the outer tube. The hydraulic ram 17 is mounted at one end on a ram anchor plate 19 and its other end is connected to the inner tube. The compactor comprises a pair of collars 21, 23 surrounding the outer tube adjacent the discharge outlet 9 for reception therebetween of a clamp to hold the bag (not shown) in position. Instead of a hydraulic ram, a pneumatic ram or elec-

tric motor could be provided to move the inner tube back and forth. The supply for the actuator is not shown in the drawings however this would normally be provided below the outer tube adjacent the ram anchor plate 19.

[0028] In use, a refuse bag is placed in the charging inlet 7, the door 11 is closed over the charging inlet 7 and the inner tube is advanced along the outer tube until it contacts with the refuse bag (not shown) and forces the refuse bag through the discharge outlet 9 into the material collection bag 13. The material collection bag 13 is secured in place by a clamp (not shown) and therefore over time as more and more refuse is forced into the material collection bag, it will be compacted in the material collection bag 13. The inner tube 15 may comprise a cylinder or more simply a plate dimensioned to form a snug fit in the outer tube. What is important is that the inner tube can act as a plunger to advance the material from the charging inlet of the compacting chamber outer tube towards the discharge outlet of the compacting chamber.

[0029] Referring to Figs. 4 to 6 inclusive, there is shown various views of the bag 13. The bag 13 is a heavy duty bag preferably constructed from jute, heavy plastic material, or other fabric material. The bag 13 is substantially cuboid in shape with a plurality of faces 30. On one of the faces 30, the bag has a neck 31 having an open charging mouth 33 for engagement with the discharge outlet 9 of the compactor. The bag 13 has a plurality of lifting straps 35 to assist in handling of the bag. The lifting straps effectively comprise loops of material and these loops are preferably located adjacent each of the corners of one of the faces of the bag. Castors, or other similar rollers or wheels could be provided on the bag to assist in manoeuvring the bag. Similarly, pockets could be provided on the bag for engagement of tines of a forklift.

[0030] Referring specifically to Fig. 4, it can be seen that there are seams 36 extending inwardly from each of the corners 32 of the face 30 with the neck 31 converging on the seam 34 surrounding the neck 31. The seams 36 extend along the neck 31 to the charging mouth 33. The seams 36 will reduce the stresses exerted on the neck seam 34 and will therefore strengthen the bag. In one embodiment, the neck seam 34 may not be provided as it may not be required. Similarly, it is envisaged that the seams 36 may terminate at the seam 34 of the neck however it is preferable to have the seams 36 extend along the neck.

[0031] Referring specifically to Fig. 6, there is shown a side cross-sectional view of the bag 13 engaging the compactor 1. The neck 31 of the bag 13 is placed around the discharge outlet 9 of the compactor and a clamp, such as a jubilee clip, or the like, is then used to secure the neck 31 of the bag in position around the compactor. The jubilee clip or another clamp is positioned intermediate the pair of collars 21, 23 to hold the bag in position relative to the compactor. This fastener arrangement is seen as particularly effective at providing a tight yet releasable fastener between the bag and the compacting chamber. Alternative fasteners can be envisaged without

departing from the scope of the present invention. For example, it would be possible to provide one or more hooks on one of the bag and the compactor and one or more complementary eyes on the other of the bag and the compactor for engagement of the corresponding hook. Similarly, one or more over centre latches and complementary receivers could be used to releasably secure the bag to the compactor.

[0032] Referring to Figs. 7 to 12 inclusive, there is shown various views of the door 11 of the compactor 1. The door 11 further comprises a section 41 cut out from the outer tube 3. In this way, the section 41 of the door will form a close fit in the charging inlet 7. By having a door that forms a close fit in the charging inlet, this will minimise any shear forces in the compacting chamber as there will be a negligible gap surrounding the door on the inside surface of the compacting chamber. A frame, provided in this case by an outer skin 43, is welded to the cut-out section 41 and is in turn mounted about hinge 45 on the outer tube 3. The outer skin 43 forms a flange 44 surrounding the cut out section and the flange limits inward movement of the cut out section 41 into the compacting chamber. Instead of having an outer skin 43, a simple framework structure will suffice. What is important is that there is an abutment member that operates in a manner similar to the flange 44 that will limit the travel of the door into the compactor chamber so that the inner surface of the compactor chamber is relatively smooth to prevent shear forces, and to a lesser extent to provide a structure on which the hinge 45 may be mounted. Preferably, the hinge 45 is a damped hinge to limit the speed of movement of the door. Alternatively, a torsion spring, a gas strut or other damper could be provided to slow the movement of the door.

[0033] Referring specifically to Fig. 12, there is shown a locking mechanism 47, in this case a solenoid operated mechanical interlock which is controlled by a control unit (not shown). It will be understood to one skilled in the art that the locking mechanism operates to prevent unauthorised access to the compactor and also to prevent operation of the inner tube and the actuator when the door is open and the locking mechanism is not engaged. This will provide an additional safety feature to the device. Furthermore, alternatives to an electromagnetic lock are readily envisaged.

[0034] Referring to Fig. 13 there is shown an alternative embodiment of compactor, indicated generally by the reference numeral 51. The compactor comprises a control unit 53 and a door interlock mechanism 55 for securing the door 11 in position. It is envisaged that the control box will have either a keypad or swipe card, preferably swipe card functionality, to allow a pay-per-use function of the compactor so that prepaid swipe cards, or indeed debit cards or credit cards may be used by individuals to unlock the door and allow them to compact their material in the compactor 51. The control box will have data recording capability and memory capability as well as memory reading and writing capability to allow

data to be read from swipe cards and data to be written to the swipe cards to, for example, keep up-to-date account details on the swipe cards. Furthermore, it is envisaged that the control unit 53 may comprise one or more of a GPRS unit, a modem, a PC technology memory on processor and sensors. It may also incorporate remote monitoring, malfunction indicators and capacity indicator equipment.

[0035] In use, a swipe card may be introduced to the control box 53 and the control box will check the information on the card, for example the name and available credit left to the user. If the user has available credit, the control box releases the interlock door mechanism and allows the door to be opened and records the incidence of use of the compactor. The user's account may at that stage also be debited and the information stored either on the card or on the control box may be updated. The information may also be sent to a remote monitoring station.

[0036] The user then places material into the tube through the charging inlet 7 and the user then closes the door 11. Once closed, the interlock device clamps the door shut and sends a signal to the control box that the door has been successfully closed. The user can then press a control button 57 to begin operation of the compactor, or alternatively operation may start automatically, if desired, once the signal has been sent from the interlocking device that the door has been secured in a closed position. It is envisaged that if a control button 57 is provided it will not engage until the door has been shut and the control box gets the appropriate signal from the interlocking device 55. The inner tube traverses the material along the outer tube pushing the compacted material through the discharge outlet 9 into a bag (not shown). The inner tube then cycles back rearwards along the tube to its initial position free of the charging inlet 7. The door remains locked until a swipe card is introduced to the control unit of the compactor. A particularly beneficial feature of the present invention is that the compactor charge box is cleared of material after each stroke.

[0037] Referring to Figs. 14 and 15, there is shown an alternative discharge outlet arrangement for a compactor where like parts have been given the same reference numerals as before. The compactor, indicated generally by the reference numeral 61, comprises a frustum shaped section terminating in the discharge outlet 9. The outer tube 63 tapers inwardly in a frustum section 65 which has the affect of compacting the rubbish inwardly as it is pushed along the compactor before entering into the material collection bag (not shown). This is seen as a particularly useful embodiment of compactor as the material (not shown) can also form a plug in the frusto-conical (frustum) shaped portion (Fig. 15).

[0038] Referring to Fig. 16, there is shown an alternative construction of bag indicated generally by the reference numeral 71. The bag 71 has an inwardly depending neck 73 which extends internal the body and terminates in an open mouth 75. When material is fed into the bag

71, the material will build up inside the bag and create an internal pressure inside the bag. When the bag is removed from the compactor (not shown), the pressure of the material inside the bag will cause the neck 73 to close inwardly thereby sealing the bag.

[0039] Referring to Fig. 17, there is shown an alternative construction of bag, indicated generally by the reference numeral 81. The bag 81 has a neck with an inwardly depending neck portion 83 which extends internal the body and terminates in an open internal mouth 85 and an outwardly depending portion 87 which extends outwardly from the body and terminates in an open external mouth 89. The inwardly depending neck portion 83 tapers inwardly and narrows towards the open internal mouth 85. The outwardly depending portion 87 is substantially cylindrically shaped. When material is fed into the bag 81, the material will build up inside the bag and create an internal pressure inside the bag which will cause the inwardly depending neck portion 83 to collapse in on itself when the bag is removed from a compactor (not shown). In another embodiment, the inwardly depending neck portion 31 will be substantially cylindrically shaped instead of being tapered.

[0040] Referring to Figures 18 to 20 of the drawings there is shown an alternative construction of bag, indicated generally by the reference numeral 91. The bag 91 has a neck 92 with an inwardly depending neck portion 93 which extends internal the body and terminates in an open internal mouth 95 and an outwardly depending portion 97 which extends outwardly from the body and terminates in an open external mouth 99. The inwardly depending neck portion 93 tapers inwardly and narrows towards the open internal mouth 95. Again, the inwardly depending neck portion 93 need not necessarily taper inwardly and could be cylindrically shaped if so desired. The neck portion 93 of the bag will be dimensioned to complement the shape of the compactor adjacent the discharge outlet of the compactor. When material is fed into the bag 91, the material will build up inside the bag and create an internal pressure inside the bag which will cause the inwardly depending neck portion 93 to collapse in on itself when the bag is removed from a compactor (not shown).

[0041] Referring specifically to Figure 20, the neck 92 comprises three sections, a first section 101 that tapers inwardly from the bag towards the internal mouth 95, a second section 103 connected to the first section 101 at the internal mouth 95 and that tapers outwardly from the internal mouth 95, and a third, substantially cylindrical, section 105 connected to the second section 103. It can be seen from Figures 18 to 20 inclusive that the neck of the bag may be constructed in a relatively simple manner in a unitary piece connected to the side of the bag 91 or indeed the neck may be unitary with the bag. In order to construct the bag, the first section 101 and the second section 103 of the neck 92 will be folded inwardly inside the bag from the position shown in Figure 20 to the position shown in Figure 18 by doubling the material forming

the inner neck portion 93 back on itself.

[0042] Referring to Figures 23 to 26 inclusive, there is shown a further embodiment of bag for use with the compactor according to the present invention, indicated generally by the reference numeral 120. The bag 120 is a self sealing bag and has a plurality of triangular shaped flaps 121 arranged circumferentially surrounding the internal mouth 123. When material 126 is pushed into the bag through the neck 127, the flaps 121 will be splayed apart to allow through passage of the material. As the bag 120 fills up with material 126, the material will eventually surround the flaps 121 and will exert a force in the direction marked by arrows A in Fig. 25. This force will cause the flaps to converge inwardly.

[0043] In the embodiment shown in Figures 23 to 26, there are four flaps and they will effectively form a pyramid shaped seal (as shown in Figures 25 and 26). It will be understood that more or less than four flaps may be provided. Furthermore, the flaps do not necessarily have to be triangular shaped but indeed could for example be curved similar to parts of a cone so that as the flaps converge they together form a cone. The flaps may be arranged to overlap so that they form a tight seal or alternatively they could provide a less tight seal if the desired effect is to simply prevent egress of large items from the bag 120. Furthermore, the flaps could all be connected together by material between the flaps. The flaps could be provided by one or more separate, substantially rigid pieces connected to the bag but preferably the flaps will be constructed using the bag material itself with strengthening rigid supports inserted into pockets sewn into the flaps or by attaching the substantially rigid supports to the flaps to provide them with some rigidity.

[0044] Other constructions of bag could be provided depending on the application. For example, different constructions and materials of bag can be used for wet waste, dry waste, hazardous waste or other material. The bag could be constructed from a reticulated material if desired. Similarly, the bag could be provided with drainage holes or the bag material could be porous to allow drainage of fluids from the bag. Alternatively, a bag having a plurality of layers or skins could be provided to prevent leakage or air penetration or to increase longevity of the bag. The bag in the description and drawings is substantially cuboid in shape however other shapes of bag may be provided, such as cylindrical, pyramidal or ball shaped. Other different shapes of bag may also be useful. It may be advantageous to have a collapsible bag with rigid sides that fold down once there is no material contained in the bag.

[0045] Referring to Fig. 21 of the drawings, there is shown an alternative arrangement of compactor and material receptacle. In the embodiment shown, the compactor 1 is vertically arranged with the material receptacle mounted above the compactor in a casing 111. Ideally the outer surface of the casing 111 could be used for advertising or the like. This arrangement could be particularly suitable for city centre locations whereby the ma-

terial is stored with the lowest footprint possible. A slot (not shown) could be provided for pedestrian waste.

[0046] Referring to Fig. 22 of the drawings, there is shown a further still alternative arrangement of compactor according to the present invention. The compactor 1 is mounted above the bag 13 and the bag is filled by the compactor in the manner described previously. This could be particularly suitable for reducing the footprint of the compactor, such as in apartment complexes in underground garages and the like where space is at a premium. All that is required is sufficient length of travel for the stroke of the cylinder and the inner tube of the compactor. The bag 13 could be provided with castors, or indeed could be provided on a pallet which in turn may be provided with castors to facilitate movement of the bag away from the compactor once it has been filled. The bag may be provided with a framework to help maintain a cuboid or other type shape and facilitate manoeuvring the bag once it has been filled. It is further envisaged that the bag could be stored underground. A slot (not shown) could be provided for pedestrian waste.

[0047] In the embodiments shown, both the inner and the outer tube are substantially cylindrically shaped. In such instances, the outer tube may taper inwardly into a frustum shaped section. Alternatively, the outer and inner tubes may be box shaped in cross section and may taper inwardly into a frusto-pyramid shaped portion. In a preferred embodiment, the outer tube and/or the inner tube will be constructed from a sheet of material bent back on itself into a polygon shape closely approximating a cylinder with a plurality of sides. Preferably the shape will be a regular polygon. This will be more cost effective to manufacture than a cylinder.

[0048] It is envisaged that the compactor will be particularly suitable to receive domestic waste. Therefore, the compactor will usually be dimensioned to receive a refuse bag having a volume of the order of 40 litres, or indeed a range of refuse bag sizes from 30 litres to 1000 litres. In such cases, the stroke of the cylinder may be adjusted to allow for different sized refuse bags. Similarly, the dimensions of the inner and outer tube and the door may be altered appropriately to accommodate the refuse bag.

[0049] Preferably, the bag 13 will be a self sealing bag. To this end, the flaps as shown in Figures 23 to 26 inclusive may be used or alternatively, the neck may be elasticated or provided with a drawstring.

[0050] It will be understood that the present invention has been described in terms of compacting materials and waste in particular. It is envisaged that the invention further extends to other materials and uses for the bag. Indeed, the bag itself has many particularly advantageous features, most notably the fact that in some embodiments it is a self sealing bag that seals itself under the internal pressure exerted by the materials in the bag. The bag could be used to transport other materials in perhaps a compacted or non compacted form including grains, foodstuffs, building materials and the like. The uses of

the bag in fact are extremely varied and wide ranging. Furthermore, the bag could be constructed from a flexible material or the bag could have rigid sides hingedly connected together so that the bag can fold up when not in use.

[0051] In the specification the terms "comprise, comprises, comprised and comprising" or any variation thereof and the terms "include, includes, included and including" or any variation thereof are considered to be totally interchangeable and they should all be afforded the widest possible interpretation and vice versa.

[0052] The invention is in no way limited to the embodiments hereinbefore described which may be varied in both construction and detail with the scope of the claims.

Claims

1. A compactor (1) for material comprising a compacting chamber (3) having a compacting ram (15) mounted in the chamber and moveable in a reciprocal fashion back and forth inside the chamber, an actuator (17) to move the ram back and forth inside the chamber, a charging inlet (7), a discharge outlet (9) and a material receptacle comprising a collection bag (13) constructed from a flexible material having a charging mouth (33) in communication with the discharge outlet (9), **characterised in that** there is provided a fastener to releasably attach the collection bag (13) to the compactor (1) thereby holding the collection bag in a fixed relationship relative to the compactor.
2. A compactor (1) as claimed in claim 1 in which the collection bag (13) is substantially cuboid in shape.
3. A compactor (1) as claimed in claim 1 or 2 in which the collection bag (13) comprises a body having a neck portion (31) terminating in the charging mouth and in which the neck portion protrudes outwardly from the body.
4. A compactor (1) as claimed in any preceding claim in which the collection bag (13) comprises a body having a neck portion (31) terminating in the charging mouth (33) and in which the neck portion protrudes inwardly into the body.
5. A compactor (1) as claimed in any of claims 1 to 4 in which the bag (13) is a self sealing bag.
6. A compactor (1) as claimed in claim 5 in which there are provided a plurality of sealing flaps (121) surrounding the charging mouth (123).
7. A compactor (1) as claimed in claims 3 or 4 in which neck portion (31) is provided with a substantially rigid collar.

8. A compactor (1) as claimed in claims 1 to 7 in which the material collection bag has a plurality of skins.

9. A compactor (1) as claimed in any preceding claim in which the collection bag (13) is substantially cuboid in shape having a plurality of faces (30) with the charging mouth (33) located substantially centrally in one of the faces, and in which the seams (36) of the bag surrounding the charging mouth are sewn so that there are four seams (36), each of which extends inwardly from one of the corners (32) of the face towards the charging mouth.

10. A compactor (1) as claimed in any preceding claim in which there is provided a pair of spaced apart collars (21, 23) surrounding the compacting chamber (3) adjacent to the discharge outlet (9).

11. A compactor (1) as claimed in any preceding claim in which there is provided a door (11) mounted on the compacting chamber for the charging inlet, the door comprising a section (41) cut from the compacting chamber for the charging inlet, the section forming a tight fit in the charging inlet when closed thereby effectively reconstituting the outer tube.

12. A compactor (1) as claimed in claim 11 in which the door (11) further comprises an outer frame (43) on which the section cut from the compacting chamber is mounted.

13. A compactor (1) as claimed in any preceding claim in which the door (11) is hingedly mounted on the compacting chamber (3).

14. A compactor (1) as claimed in any preceding claim in which there is provided a moveable gate releasably secured in position in the compacting chamber intermediate the charging inlet (7) and the discharge outlet (9).

15. A compactor (1) as claimed in any preceding claim in which the compactor is arranged with the compacting chamber (3) in a substantially vertical orientation with the discharge outlet facing upwards away from the ground and with a material receptacle substantially above the compactor.

16. A compactor (1) as claimed in any preceding claim in which the outer tube and the inner tube are constructed from a sheet of material bent back on itself into a polygon shape with a plurality of sides.

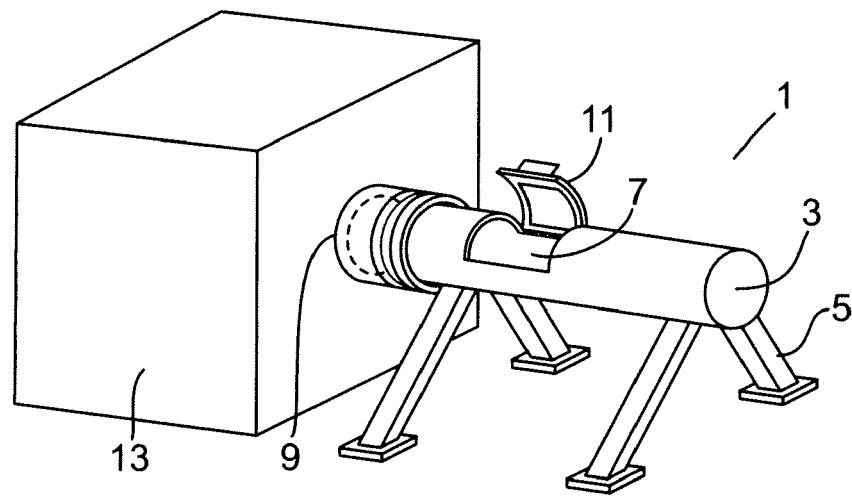


Fig. 1

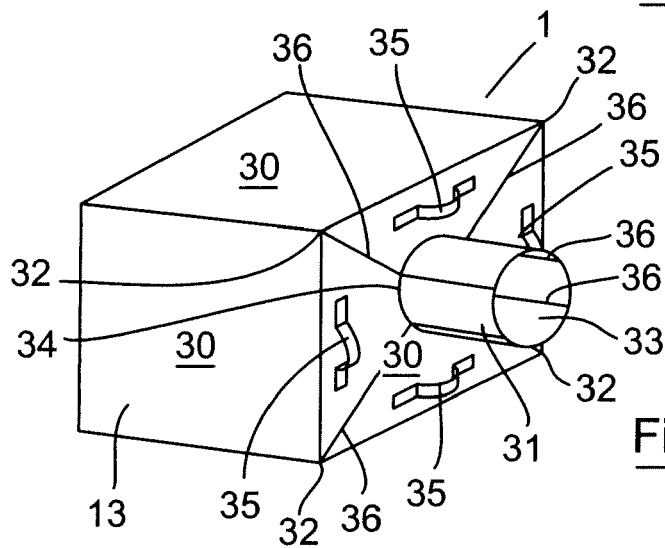


Fig. 4

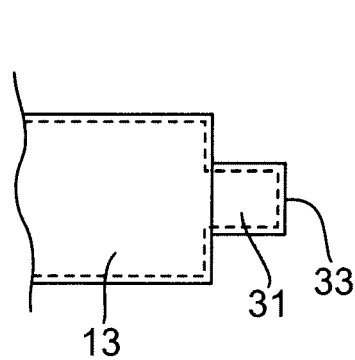


Fig. 5

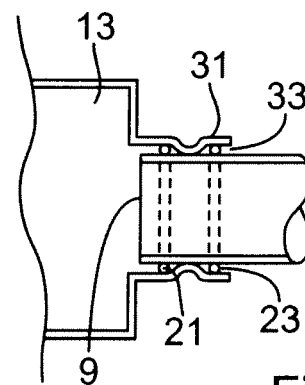
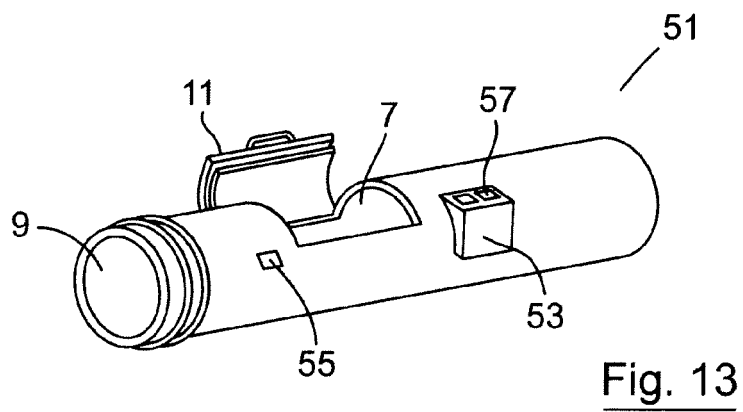
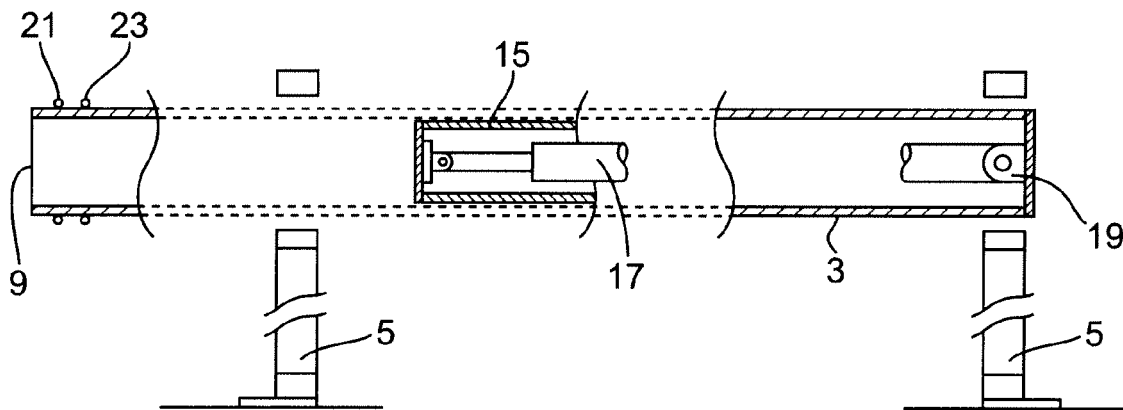
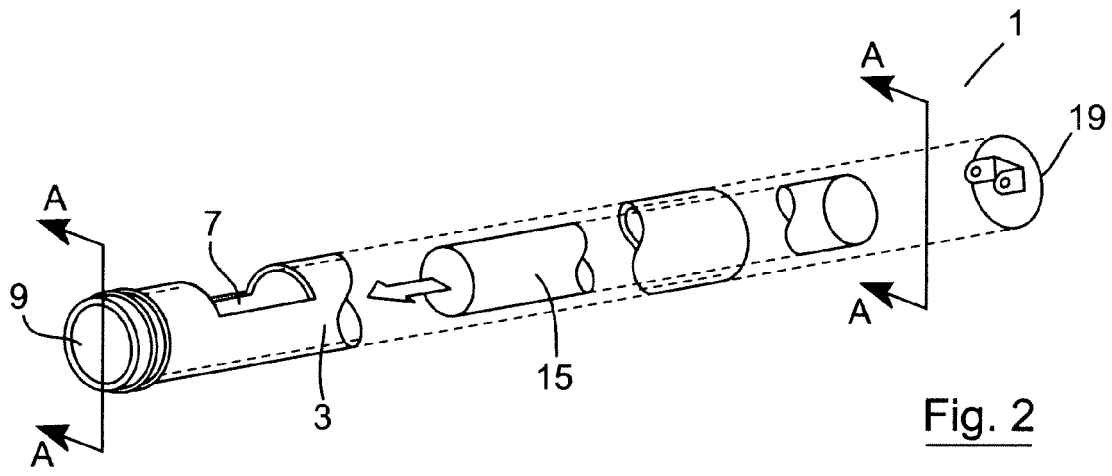


Fig. 6



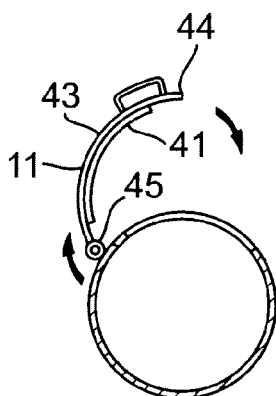


Fig. 7

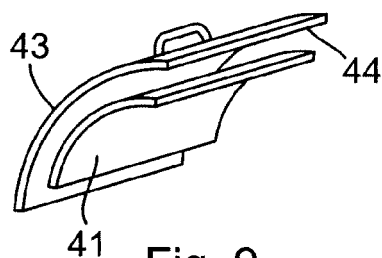


Fig. 9

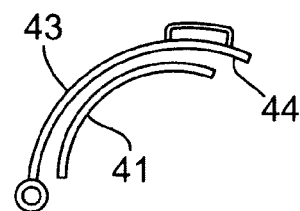


Fig. 10

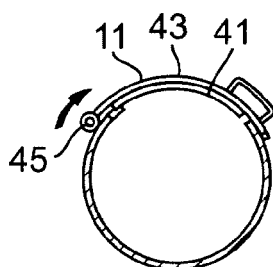


Fig. 8

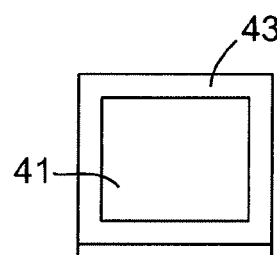


Fig. 11

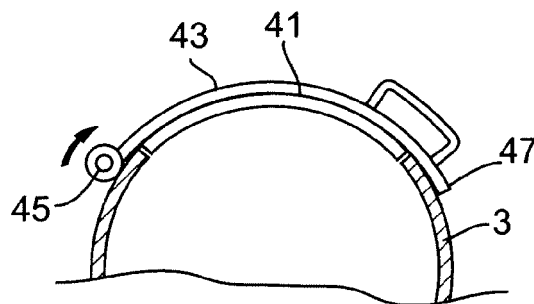


Fig. 12

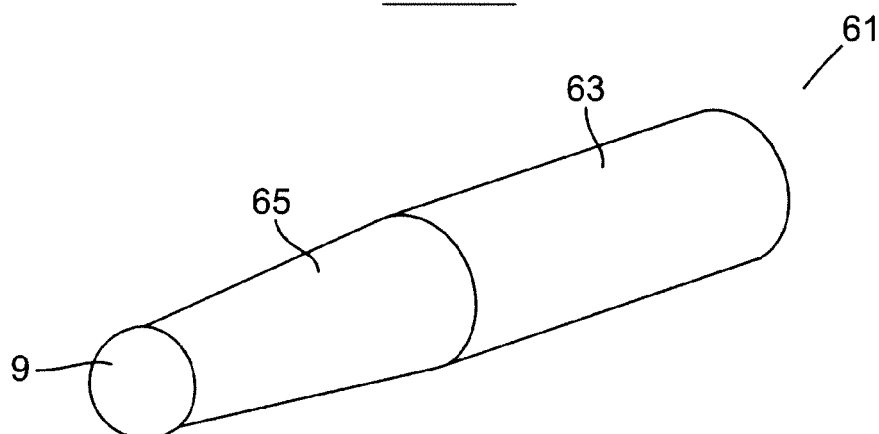


Fig. 14

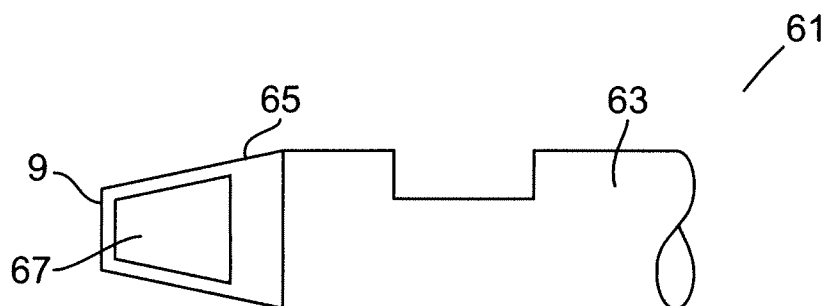


Fig. 15

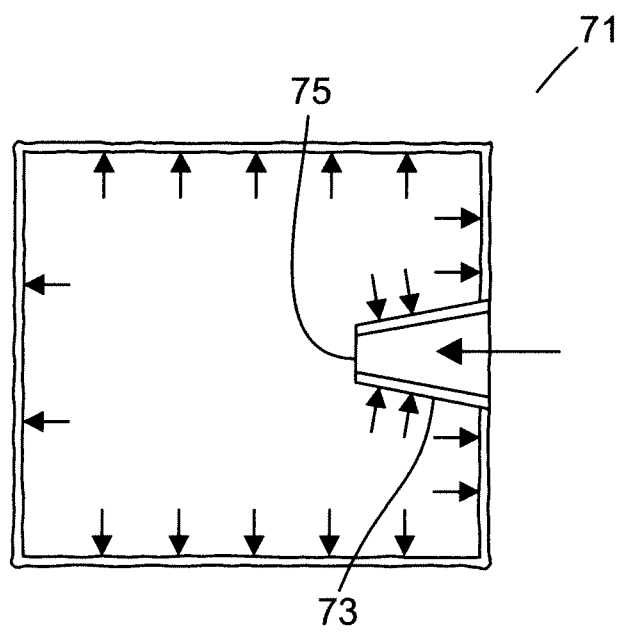


Fig. 16

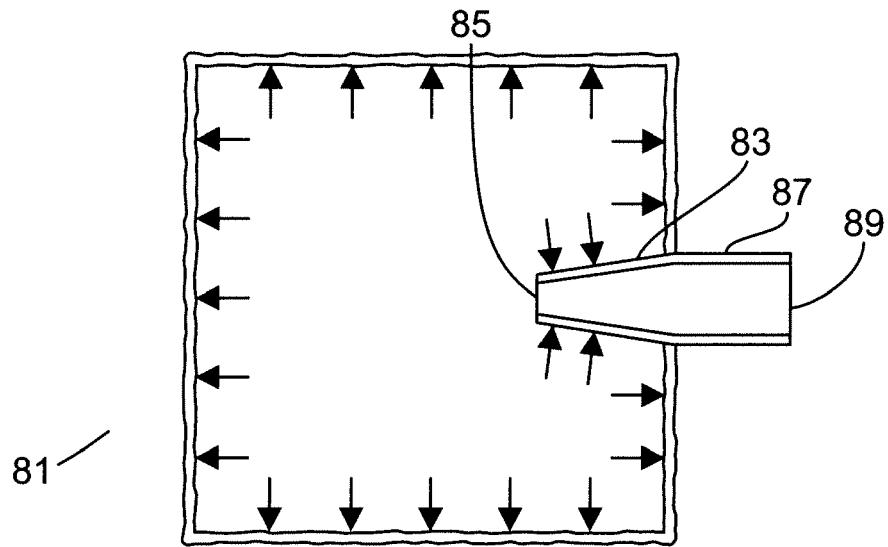


Fig. 17

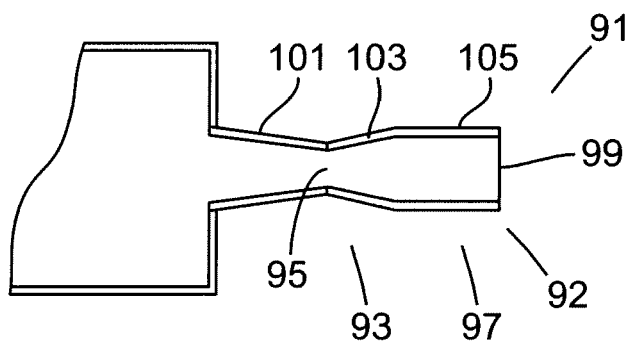


Fig. 20

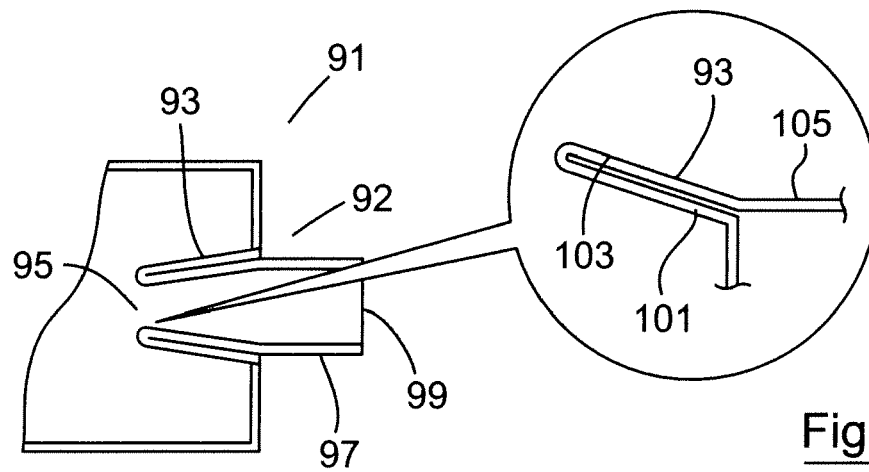


Fig. 19

Fig. 18

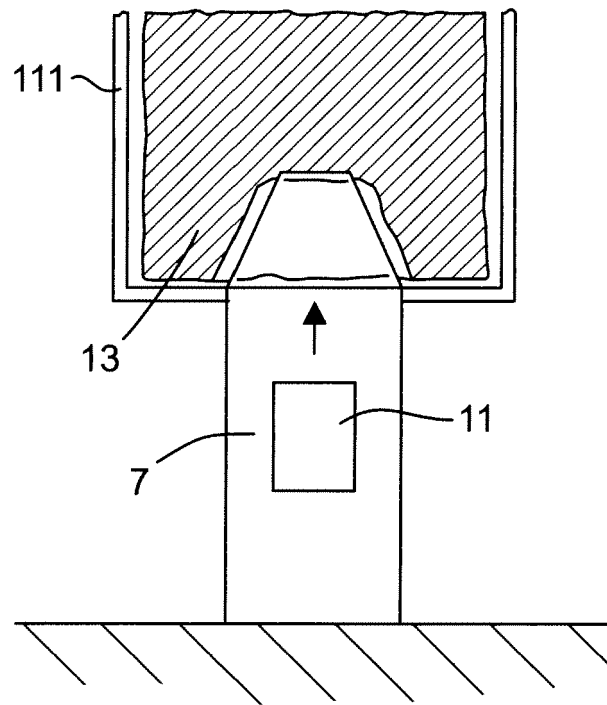


Fig. 21

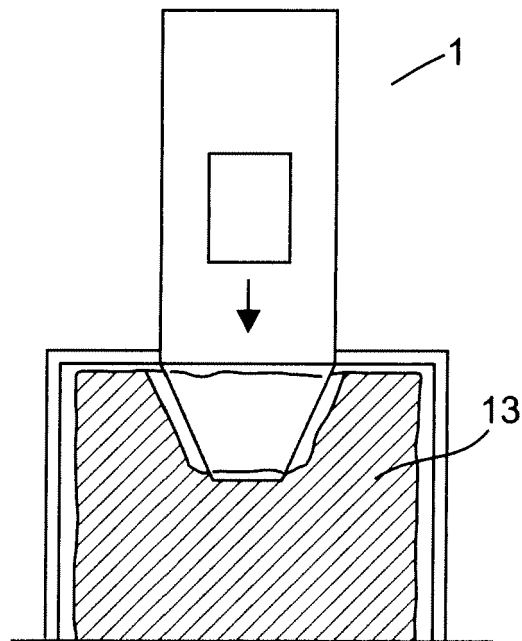


Fig. 22

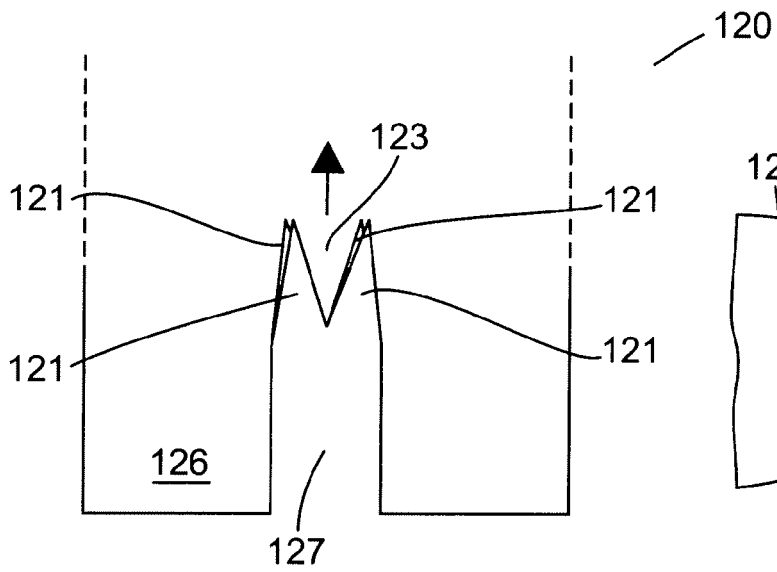


Fig. 23

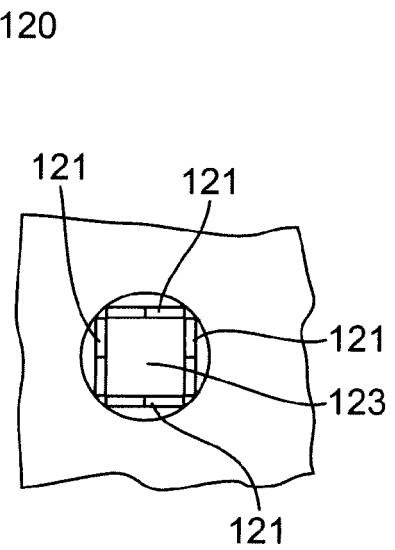


Fig. 24

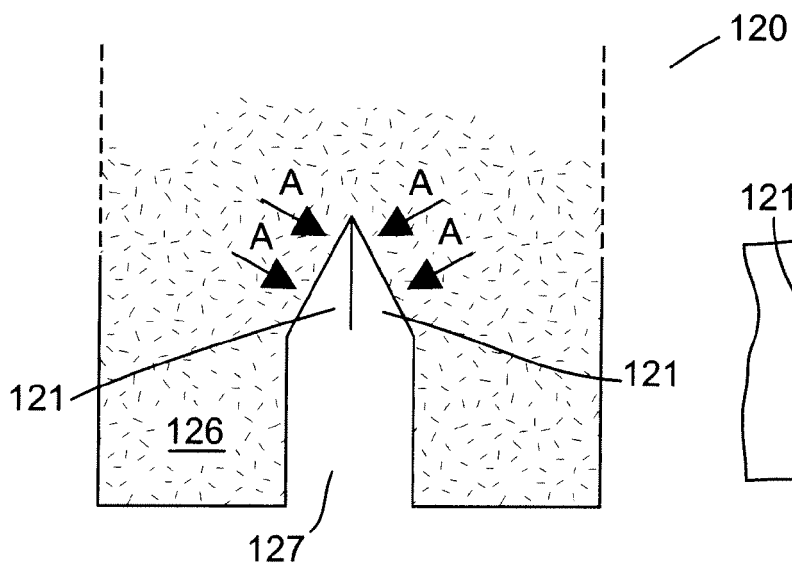


Fig. 25

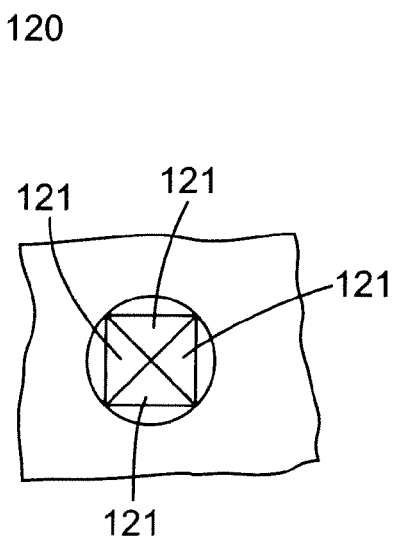


Fig. 26

REFERENCES CITED IN THE DESCRIPTION

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