

(19)



(11)

EP 2 431 280 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
30.12.2015 Bulletin 2015/53

(51) Int Cl.:
B65B 9/13 (2006.01) B65B 9/14 (2006.01)

(21) Application number: **11181536.1**

(22) Date of filing: **16.09.2011**

(54) Machine for applying a packaging hood on an object

Vorrichtung zum Anbringen einer Verpackungshaube auf einem Gegenstand

Machine pour appliquer une housse d'emballage sur un objet

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **21.09.2010 IT MI20101715**

(43) Date of publication of application:
21.03.2012 Bulletin 2012/12

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Description

[0001] The present invention relates to a machine for wrapping objects, such as packages, with a hood of film. In particular, the packages may consist of objects which are stacked on a pallet.

[0002] In the prior art machines, called hooding machines, are known, these machines being designed to fit a hood formed by a tube of heat-shrinkable film onto the package to be covered. The film is then heated in order to cause heat-shrinking thereof around the package. These machines usually form or unroll the tube of film directly above the package receiving zone from a reel which is arranged close to this zone or alongside the machine. Suitable means are provided for conveying the film so as to form with it a hood and transfer it onto the package.

[0003] One problem associated with these machines is that of inserting rapidly the hood onto the package. Usually a gripping frame grips the free edge of the hood and draws it along the package. In order to prevent the hood from rubbing excessively along the sides of the package it has also been proposed introducing air into the hood during the insertion movement. For this purpose suitable nozzles are provided at the base of the machine or on the gripping frame. These nozzles are usually small in size and the quantity of air introduced is usually limited to a small local area. This does not always produce a satisfactory result. Larger nozzles have been proposed, but these hinder the insertion and heat-shrinkage operations.

[0004] US 2002/170270 describes small nozzles which are mounted on the film gripping grippers. The air flow is, however, limited and the dimensions of the nozzles in any case hinder fitting of the film.

[0005] Moreover, the known machines are somewhat slow and the aesthetic quality of the heat-shrunk hood is often unsatisfactory, especially in the case of product packages which cause rapid cooling of the film when the latter accidentally touches them. In this case, in fact, the heat-shrunk hood has puckers, bumps and irregularities. This is particularly the case, for example, with packs of glass bottles. Among other things, precisely the packaging of bottles is one of the sectors where rapid execution of the hooding operation is required owing to the high processing speed of the plants which produce the bottles.

[0006] The heating induced in the film gripping members owing to the film heat-shrinkage cycle may cause melting of the film on these gripping members. This further limits the operating speeds of the machine and results in packaging defects in particular in the case of mobile heating frames.

[0007] The general object of the present invention is to provide a hooding machine which is able to achieve improved insertion of the hood and a more satisfactory end result.

[0008] In view of this object the idea which has occurred according to the present invention is to provide a

machine as claimed in Claim 1.

[0009] In order to illustrate more clearly the innovative principles of the present invention and its advantages compared to the prior art, an example of embodiment applying these principles will be described below, with the aid of the accompanying drawings. In the drawings:

- Figure 1 shows a partial, perspective, schematic view of a hooding machine designed in accordance with the invention;
- Figure 2 shows a schematic cross-sectional view of a driving frame present in the machine according to Figure 1;
- Figure 3 shows a partial, perspective, schematic view of a gripper of the machine;
- Figure 4 shows a cross-sectional schematic view of a gripper according to Figure 3 in another operating position thereof;
- Figures 5 and 8 are schematic side elevation views of successive sequences of operating steps of the machine according to Figure 1.

[0010] With reference to the figures, Figure 1 shows, denoted overall by 10, a hooding machine provided in accordance with the principles of the present invention.

[0011] The machine 10 comprises a fitting unit 13 which is able to fit, from the top downwards, a hood of heat-shrinkable film 12 over an object 14 (for example formed by a pack of objects, such as bottles, boxes, bricks, etc., which are arranged on a pallet) positioned (advantageously on top of a suitable known raised base 50, which may be equipped with means for moving the pack inside and outside of the machine) in a hooding zone 15 of the machine.

[0012] The hood 12 is advantageously transferred to the fitting unit by known supply means (denoted generally by 11 in Figure 4) which may for example form the hood from a strip or a tube of film (if necessary with suitable welding means), as is known to the person skilled in the art. These means for supplying and for forming, where necessary, the hood may be of any known type and will therefore not be further described or shown here.

[0013] The vertical fitting unit 13 comprises a conveying frame 33 and, advantageously, a heat-shrinking frame 34 arranged on top (advantageously both in the form of a closed rectangle lying in a horizontal plane), which frames are motor-driven so as to slide vertically in sequence about the object which is positioned in the hooding zone (as schematically shown in Figures 4-7).

[0014] Advantageously, sliding is performed by means of suitable motor-driven support carriages 51, 52 sliding along a pair of vertical uprights 21.

[0015] Advantageously above the hooding zone there is also a protective frame 35 which defines the inlet from above in this zone for the hood. This protective frame, which is for example made of metal mesh or the like, defines externally a zone 36 which receives the heat-shrinking frame when not operative (in its raised position)

so as to prevent contact between the hood and heating means 39 (for example gas air heaters) present on the heat-shrinking frame and protect the hood during insertion onto the object by the conveying frame 33.

[0016] As can be clearly seen in Figure 1, the conveying frame 33 supports vertical grippers 37 which are operated so as to grip the edge of the hood of heat-shrinkable film. Advantageously, the grippers 37 have means for position adjustment depending on the transverse dimensions of the hood, so as to be able to position them close to the hood edges. These means may be formed by suitable guides and supporting cross members for the grippers, as can be clearly seen in Figure 1. In the solution shown, the conveying frame 33 has advantageously an outer peripheral structure 61 on which facing cross members 55 sliding parallel to each other by guide means 53 which are positioned on the frame at the ends of the cross members are arranged. The grippers 37 are slidably mounted on the cross members. Suitable locking means (for example of the screw type) allow the grippers and the cross members to be locked in the desired position depending on the dimensions of the hood. Known motor-driven means (not shown) may be provided for automatic or semiautomatic adjustment.

[0017] The grippers are advantageously four in number and arranged facing each other in pairs on opposite sides of the hood.

[0018] As can be clearly seen in the cross-sections in Figures 2 and 4, the grippers 37 have jaws 56 and 57 which can be opened and closed by means of a suitable actuator 58 and which are intended to be arranged with one of them on the outside of the edge of the hood 12 and the other one on the inside, so as to grip and retain the hood, when operated.

[0019] Advantageously, in order to grip the film, the outer jaw 56 is designed movable so as to rotate about an axis 60 (as shown in broken lines in Figure 2), while the inner jaw 57 is designed fixed.

[0020] Nozzles for emitting air inside the hood are directly arranged on the grippers 37. In particular, the inner jaw 57 has its free end 59 which forms a mouth with a wide slit extending parallel to the closing surface of the jaws and, in this case, to the axis of rotation 60. This also defines the plane of the overlying film wall.

[0021] In particular, as can be seen more clearly in Figures 3 and 4, advantageously the outer jaw 56 is formed as a hollow box-shaped element (with a triangular shape) having a jaw wall 63 which is situated above an opening 64 directed towards the jaw 57. The jaw 57 is formed open towards the jaw 63 (so as to have a generally C-shaped cross-section). Flexible pipes 62 convey pressurized air into the box-shaped jaw 57. As can be seen more clearly in Figure 4, when the gripper is closed, the air is able to pass from one jaw to the other one and exit from the slit 59 into the hood 12. As regards the rest, the inside of the jaws is sealingly closed, the two jaws forming a single box-shaped container. The conveying frame advantageously comprises means for blowing air to be sup-

plied to the grippers. These blowing means may comprise a fan 38 (which may be throttled for regulation of the air flow) blowing air through pipes which emerge on the front end of the grippers 37.

[0022] Advantageously, as can be clearly seen in Figure 2, it is the same outer peripheral frame 61 which is formed box-shaped so as to convey the air flow from the fan 38 to zones close to the grippers where flexible pipes 62 for connecting the inside of the peripheral frame 61 and the grippers are present.

[0023] As can be seen in Figure 4, each gripper may also advantageously rotate about the axis 60 upon operation of an actuator 65 so as to move from the first vertical operating position shown in Figure 1 into the second operating position (shown in Figure 4) inclined towards the inside of the hood, for the reasons which will become clear below. It has been found that by blowing directly air from the grippers (namely from the main gripping point of the hood) correct inflation of the hood is improved considerably and oscillations which may damage the quality of the final product are reduced.

[0024] During the operating steps of the machine, firstly the hood is supplied so that it is gripped by the grippers 37 with the frame 33 arranged at the top (and the heat-shrinking frame, where present, seated inside the protective element 35). Following which, the air is supplied to the grippers and the hood is thus inflated. The frame 37 then starts its travel movement for inserting the hood over the object 14 to be lined (Figure 5).

[0025] At the end of the travel movement (namely when the hood is correctly inserted over the object 14, for example as far as the base defined by a pallet - see Figure 6), the conveying frame 33 stops and the heat-shrinking frame 34 starts its travel movement downwards, with the heating means which are activated and are directed towards the outer surface of the fitted hood, while advantageously blowing of air into the hood continues (Figure 7).

[0026] The descent continues down as far as the base of the package. In this position it has been found to be useful for the grippers to rotate as shown in Figure 4 so as to tension the film and position its end portion underneath the package. Heat-shrinking may thus form a solid bead of film which is also useful for fixing the pallet to the package. During the subsequent return upward movement of the heat-shrinking frame, heating may be maintained for more complete and uniform heat-shrinkage of the film.

[0027] Once the frames have returned into the high position, the package may be removed and a new object to be wrapped may be arranged in the hooding zone (Figure 8).

[0028] At this point it is clear how the predefined objects have been achieved. With the machine described, the wrapping operations are performed more quickly and the result is always of a satisfactory quality. Moreover, the movement of the heat-shrinkage means may be performed more quickly owing to the fact that the hood touch-

es stably the package only after it has been heat-shrunk. Moreover, a low power consumption may be maintained. The machine is compact and has small dimensions. Finally, the quality of the end product is improved owing to the innovative features which characterize insertion, retention and heat-shrinking of the hood on the object. The air which flows directly into the grippers (if necessary, also inside the outer jaw before exiting from the mouth on the inner jaw) cools the grippers and avoids the potential risk of the film becoming glued to the grippers, especially after repeated heat-shrinking cycles and when, at the base of the package, the heat-shrinking frame remains longer in order to form a bead of heat-shrunk film. As can be clearly seen in Figure 4, cooling may advantageously affect also the gripper actuating piston which is arranged inside said gripper, so as to protect it from overheating. Also the conveying frame may be cooled by the air flow directed towards the grippers.

[0029] Since the blowing nozzles are directly situated on the grippers, they are correctly positioned inside the hood without the need for further separate adjustment of the position.

[0030] Obviously, the above description of an embodiment applying the innovative principles of the present invention is provided by way of example of these innovative principles and must therefore not be regarded as limiting the scope of the rights claimed herein. For example, the proportions of the various parts of the machine may vary depending on the specific requirements and the dimensions of the products to be wrapped. Moreover, heat-shrinkage of the film may also be performed in a separate station, with a heating frame or with a special heated chamber or oven. In this case it is possible to dispense with the heat-shrinking frame 34, and also, if required, the protective frame 35, if it is considered unnecessary for guiding the hood.

Claims

1. Hooding machine (10) for an object (14), comprising a fitting unit (13) which is able to fit a hood of heat-shrinkable film with its open end over an object positioned in a hooding zone (15) of the machine, air blowing nozzles being present for blowing air into the hood at least during the action of the fitting wherein the fitting unit comprises grippers (37) for gripping the edge of the said open end of the hood, the blowing nozzles (59) being directly arranged on these grippers unit, **characterized in that** the air flow directed towards the blowing nozzles (59) also flows into the grippers for cooling the grippers.
2. Machine according to Claim 1, **characterized in that** the fitting unit comprises a conveying frame (33) which is motor-driven so as to slide vertically around the object positioned in the hooding zone and which supports said gripping grippers (37) for conveying the hood onto the object.
3. Machine according to Claim 1, **characterized in that** the grippers have a jaw (57) which is arranged inside the hood and which has a free end provided with said blowing nozzles (59).
4. Machine according to Claim 3, **characterized in that** the said jaw (57) is designed hollow and open on its free end so as to form the blowing mouth (59).
5. Machine according to Claim 2, **characterized in that** the conveying frame (33) is designed as a box-shaped element for conveying air from a blowing fan towards the said grippers.
6. Machine according to Claim 5, **characterized in that** a flexible pipe (62) is connected between the inside of the frame (33) and the blowing nozzle.
7. Machine according to Claim 1, **characterized in that** the grippers are supported on the frame (33) in such a way that their position can be adjusted so as to adapt to the transverse dimensions of the hood.
8. Machine according to Claim 1, **characterized in that** the fitting unit comprises a heat-shrinking frame (34) which is motor-driven so as to slide vertically around the object positioned in the hooding zone, the heat-shrinking frame supporting heating means directed towards the outer surface of the hood fitted by means of the fitting unit (13) onto an object positioned in the hooding zone.
9. Machine according to Claim 8, **characterized in that** above the hooding zone there is a protective frame (35) which defines the inlet in this zone for the hood, the protective frame defining externally a zone for receiving the heat-shrinking frame when not operative, so as to prevent contact between the hood and the heating means of the heat-shrinking frame.
10. Machine according to Claim 3, **characterized in that** the grippers have a further jaw (56) which is arranged outside the hood and inside which the air flow passes, directed towards the free end of the jaw (57) provided with said blowing nozzles.
11. Machine according to Claim 1, **characterized in that** the grippers have an actuating actuator (58) which is contained inside them so as to be cooled by the air flow which flows inside the grippers.

Patentansprüche

1. Haubenmaschine (10) für ein Objekt (14), mit einer Anbringungseinheit (13), die dazu in der Lage ist,

- eine Haube aus einem durch Wärme schrumpfenden Film mit deren offenem Ende über ein Objekt anzubringen, das in einer Haubenzone (15) der Maschine positioniert ist, wobei Luftgebläsedüsen zum Blasen von Luft in die Haube zumindest während des Betriebs der Anbringungseinheit vorhanden sind, wobei die Anbringungseinheit Greifer (37) zum Greifen der Kante des offenen Endes der Haube aufweist, wobei die Gebläsedüsen (59) an diesen Greifern direkt angeordnet sind, **dadurch gekennzeichnet, dass** die zu den Gebläsedüsen (59) gerichtete Luftströmung auch in die Greifer strömt, um die Greifer zu kühlen.
2. Maschine gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Anbringungseinheit einen Förderrahmen (33) aufweist, der motorbetrieben ist, um vertikal um das Objekt zu gleiten, das in der Haubenzone positioniert ist, und der die greifenden Greifer (37) stützt, um die Haube auf das Objekt zu fördern.
 3. Maschine gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Greifer eine Klaue (57) haben, die im Inneren der Haube angeordnet ist und ein freies Ende hat, das mit den Gebläsedüsen (59) versehen ist.
 4. Maschine gemäß Anspruch 3, **dadurch gekennzeichnet, dass** die Klaue (57) hohl ausgelegt und an ihrem freien Ende geöffnet ist, um so die Gebläsemündung (59) zu bilden.
 5. Maschine gemäß Anspruch 2, **dadurch gekennzeichnet, dass** der Förderrahmen (33) als ein kastenförmiges Element zum Fördern von Luft aus einem Gebläselüfter zu den Greifern ausgelegt ist.
 6. Maschine gemäß Anspruch 5, **dadurch gekennzeichnet, dass** ein flexibles Rohr (62) zwischen dem Inneren des Rahmens (33) und der Gebläsedüse angeschlossen ist.
 7. Maschine gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Greifer an dem Rahmen (33) so gestützt sind, dass ihre Position so eingestellt werden kann, dass sie an die Quermaße der Haube angepasst sind.
 8. Maschine gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Anbringungseinheit einen Wärmeschrumpfrahmen (34) aufweist, der motorgetrieben ist, um so vertikal um das Objekt zu gleiten, das in der Haubenzone positioniert ist, wobei der Wärmeschrumpfrahmen eine Heizeinrichtung stützt, die zu der Außenfläche der Haube gerichtet ist, die mittels der Anbringungseinheit (13) an dem Objekt angebracht wird, das in der Haubenzone positioniert

ist.

9. Maschine gemäß Anspruch 8, **dadurch gekennzeichnet, dass** über der Haubenzone ein Schutzrahmen (35) vorhanden ist, der den Einlass in dieser Zone für die Haube definiert, wobei der Schutzrahmen außen eine Zone zum Aufnehmen des Wärmeschrumpfrahmens definiert, wenn er nicht in Betrieb ist, um so einen Kontakt zwischen der Haube und der Heizeinrichtung des Wärmeschrumpfrahmens zu verhindern.
10. Maschine gemäß Anspruch 3, **dadurch gekennzeichnet, dass** die Greifer eine weitere Klaue (56) haben, die außerhalb der Haube angeordnet ist und in deren Inneren die Luftströmung hindurchtritt, die zu dem freien Ende der Klaue (57) gerichtet ist, die mit den Gebläsedüsen versehen ist.
11. Maschine gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Greifer einen Betätigungsaktor (58) haben, der in ihrem Inneren so enthalten ist, dass er durch die Luftströmung gekühlt wird, die im Inneren der Greifer strömt.

Revendications

1. Machine de housage (10) pour un objet (14), comprenant une unité d'ajustement (13) qui est capable d'ajuster une housse de film thermorétractable avec son extrémité ouverte sur un objet positionné dans la zone de housage (15) de la machine, des buses de soufflage d'air étant présentes pour souffler de l'air dans la housse au moins pendant l'action de l'unité d'ajustement, dans laquelle l'unité d'ajustement comprend des dispositifs de préhension (37) pour saisir le bord de ladite extrémité ouverte de la housse, les buses de soufflage (59) étant agencées directement sur ces dispositifs de préhension, **caractérisée en ce que** le flux d'air dirigé vers les buses de soufflage (59) s'écoule également dans les dispositifs de préhension pour refroidir les dispositifs de préhension.
2. Machine selon la revendication 1, **caractérisée en ce que** l'unité d'ajustement comprend un châssis de transport (33) qui est motorisé afin de coulisser verticalement autour de l'objet positionné dans la zone de housage et qui supporte lesdits dispositifs de préhension (37) pour transporter la housse sur l'objet.
3. Machine selon la revendication 1, **caractérisée en ce que** les dispositifs de préhension ont une mâchoire (57) qui est agencée à l'intérieur de la housse et qui a une extrémité libre dotée desdites buses de soufflage (59).

4. Machine selon la revendication 3, **caractérisée en ce que** ladite mâchoire (57) est conçue en étant creuse et ouverte sur son extrémité libre afin de former la bouche de soufflage (59). 5
5. Machine selon la revendication 2, **caractérisée en ce que** le châssis de transport (33) est conçu comme un élément en forme de boîte pour transporter l'air d'une soufflante vers lesdits dispositifs de préhension. 10
6. Machine selon la revendication 5, **caractérisée en ce qu'un** tuyau flexible (62) est raccordé entre l'intérieur du châssis (33) et la buse de soufflage. 15
7. Machine selon la revendication 1, **caractérisée en ce que** les dispositifs de préhension sont supportés sur le châssis (33) de sorte que leur position peut être ajustée afin de s'adapter aux dimensions transversales de la housse. 20
8. Machine selon la revendication 1, **caractérisée en ce que** l'unité d'ajustement comprend un châssis de thermorétraction (34) qui est motorisé afin de coulisser verticalement autour de l'objet positionné dans la zone de houssage, le châssis de thermorétraction supportant des moyens de chauffage dirigés vers la surface externe de la housse ajustée au moyen de l'unité d'ajustement (13) sur un objet positionné dans la zone de houssage. 25
30
9. Machine selon la revendication 8, **caractérisée en ce que**, au-dessus de la zone de houssage, on trouve un châssis de protection (35) qui définit l'entrée dans cette zone pour la housse, le châssis de protection définissant extérieurement une zone pour recevoir le châssis de thermorétraction lorsqu'il ne fonctionne pas, afin d'empêcher le contact entre la housse et les moyens de chauffage du châssis de thermorétraction. 35
40
10. Machine selon la revendication 3, **caractérisée en ce que** les dispositifs de préhension ont une autre mâchoire (56) qui est agencée à l'extérieur de la housse et à l'intérieur de laquelle le flux d'air passe, dirigé vers l'extrémité libre de la mâchoire (57) dotée desdites buses de soufflage. 45
11. Machine selon la revendication 1, **caractérisée en ce que** les dispositifs de préhension ont un actionneur (58) qui est contenu à l'intérieur de ces derniers afin d'être refroidis par le flux d'air qui s'écoule à l'intérieur du dispositif de préhension. 50
55

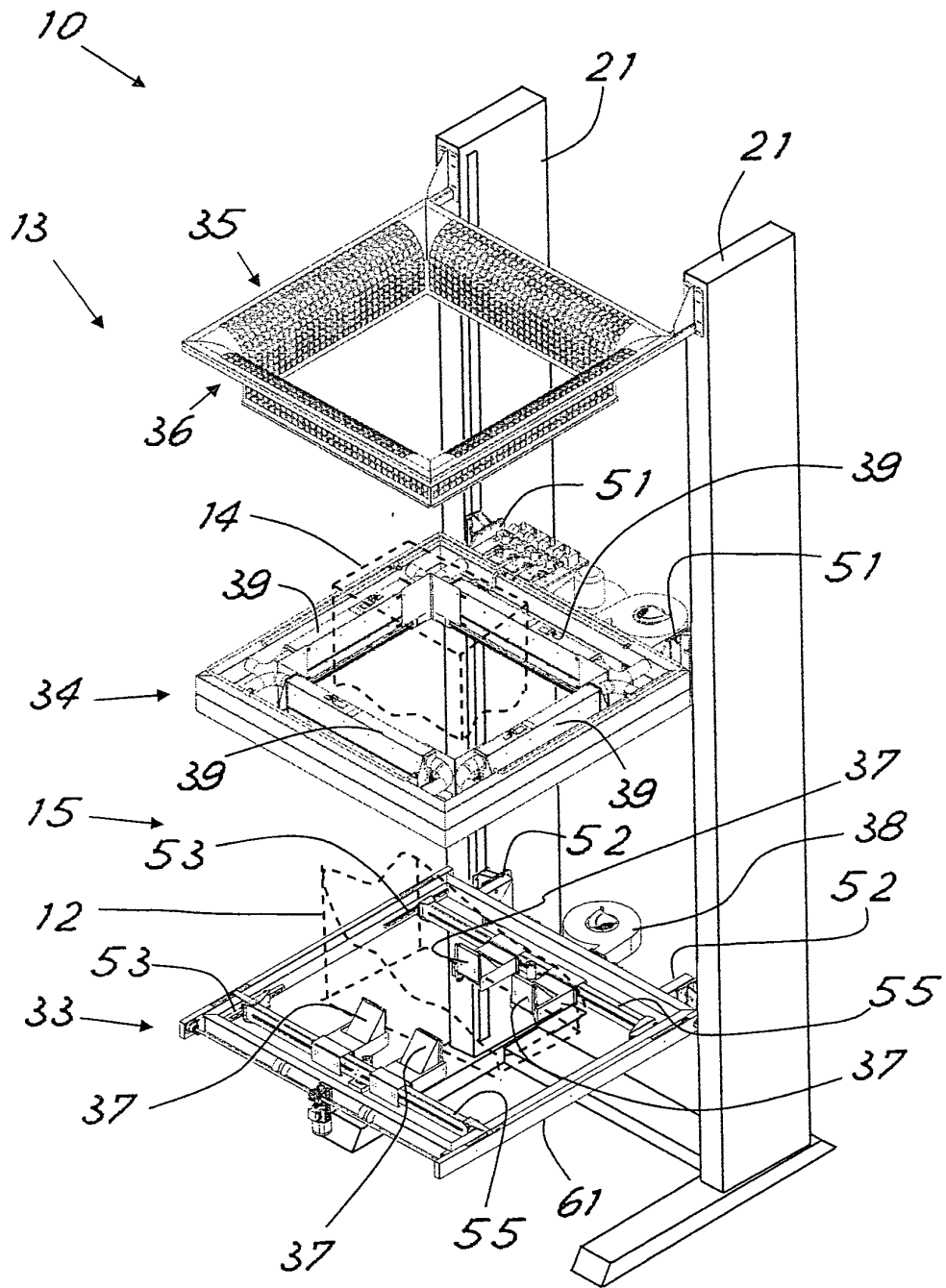


Fig.1

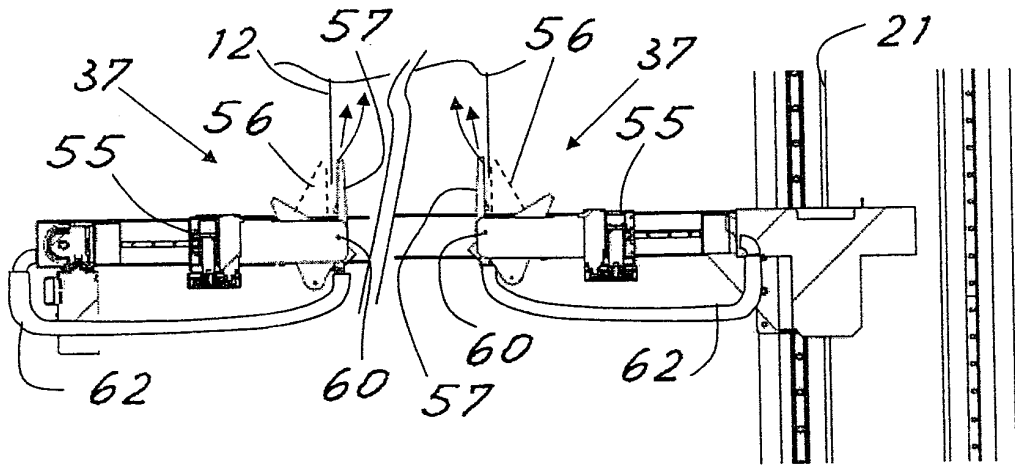


Fig. 2

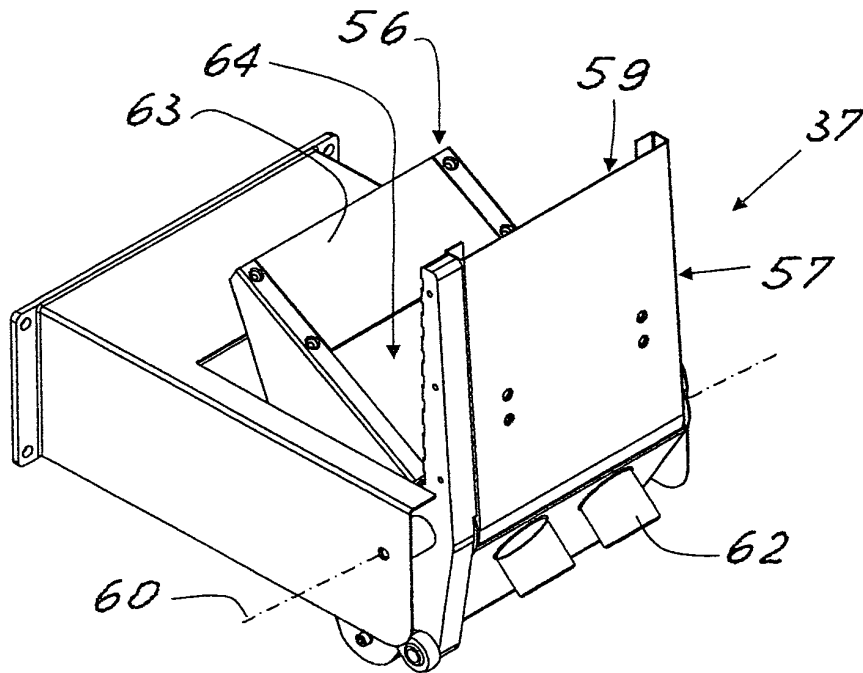


Fig. 3

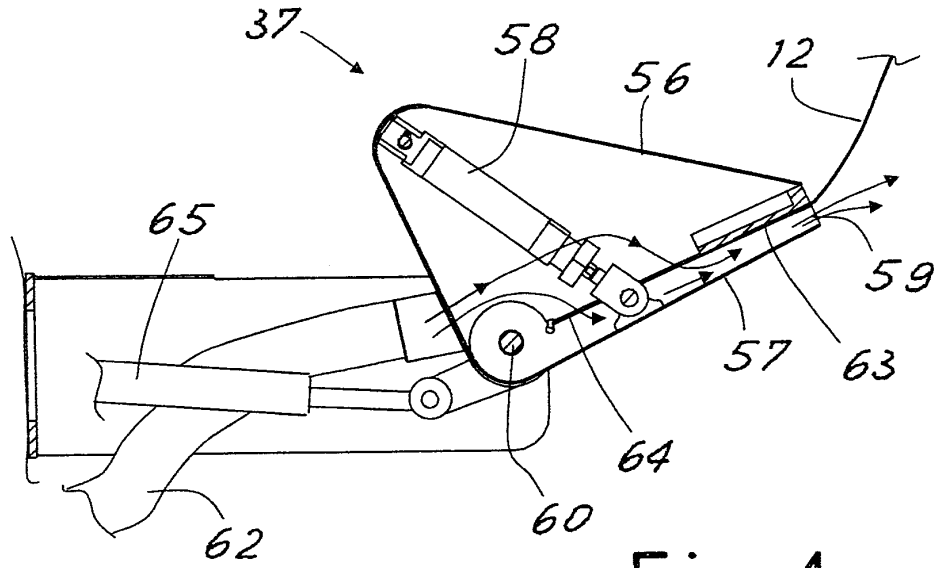


Fig. 4

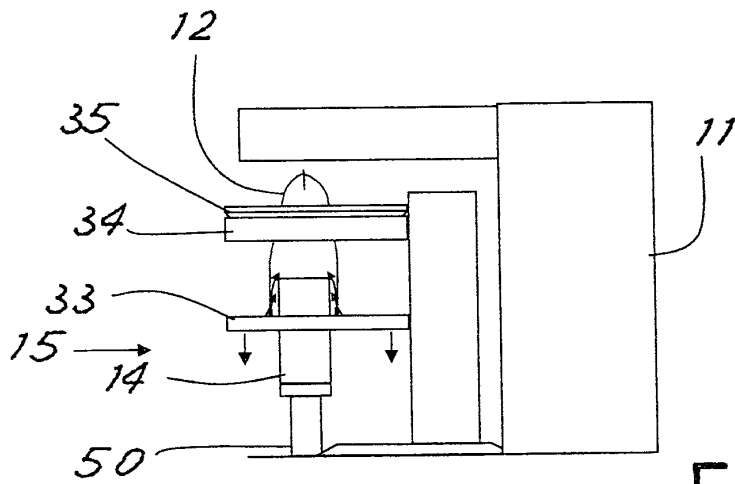


Fig. 5

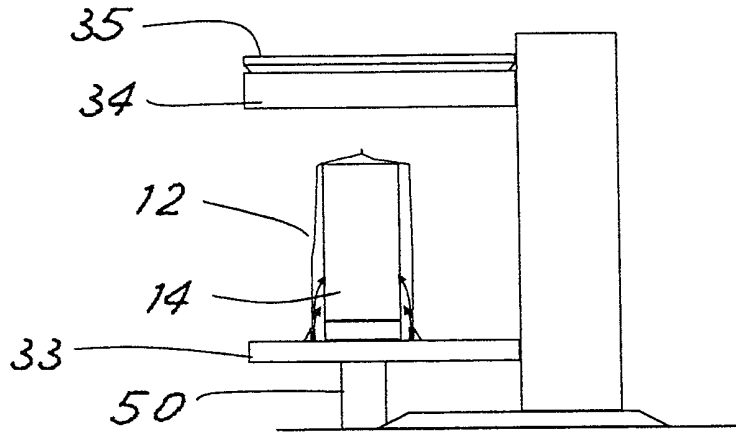


Fig. 6

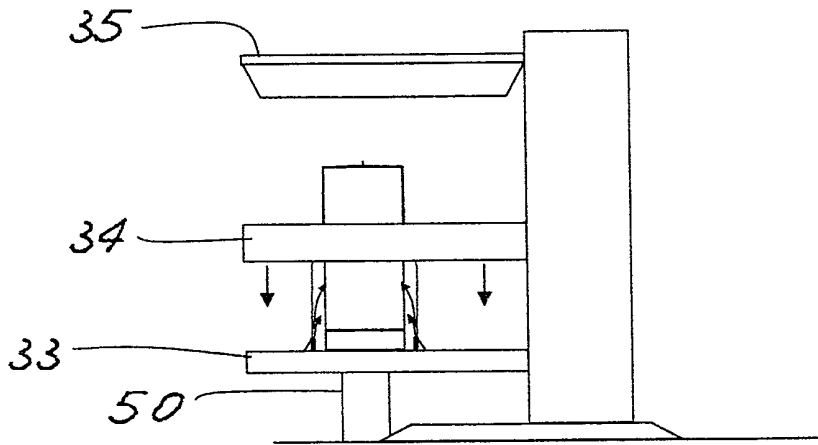


Fig. 7

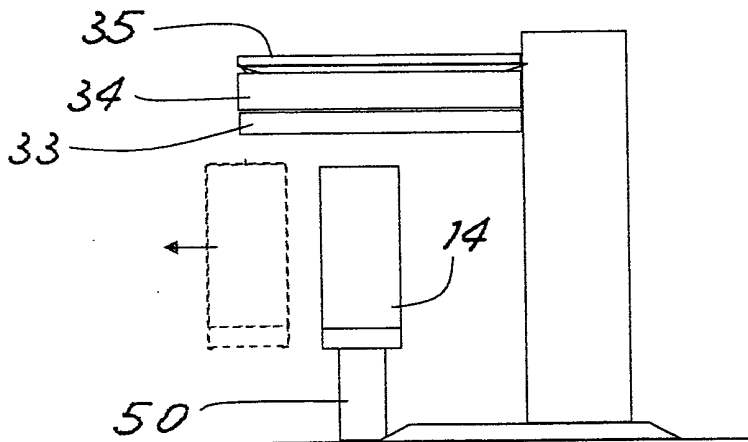


Fig. 8

REFERENCES CITED IN THE DESCRIPTION

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