



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.10.2012 Bulletin 2012/43

(51) Int Cl.:
B30B 9/30 (2006.01) B30B 1/00 (2006.01)

(21) Application number: **12163601.3**

(22) Date of filing: **10.04.2012**

(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
Designated Extension States:
BA ME

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(30) Priority: **18.04.2011 NL 2006618**

(54) **Press device**

(57) A description is given of a method of limiting the volume of material by exerting a pressure force on a sub-surface of the material, after which an increase of the limited volume when the pressure force decreases is counteracted by preventing expansion of the material over an area corresponding to said sub-surface. The associated press device comprises a container (3), which is open on at least one side, into which material to be compressed is deposited, press means arranged on said side, comprising a pressure plate (5) for exerting a pressure force on said material, and partitions (8) which are secured in the container (3) and which are hinged in the direction in which the pressure force is exerted, and which extend at least partly over the surface of the pressure plate, said partitions preventing expansion of material in the opposite direction.

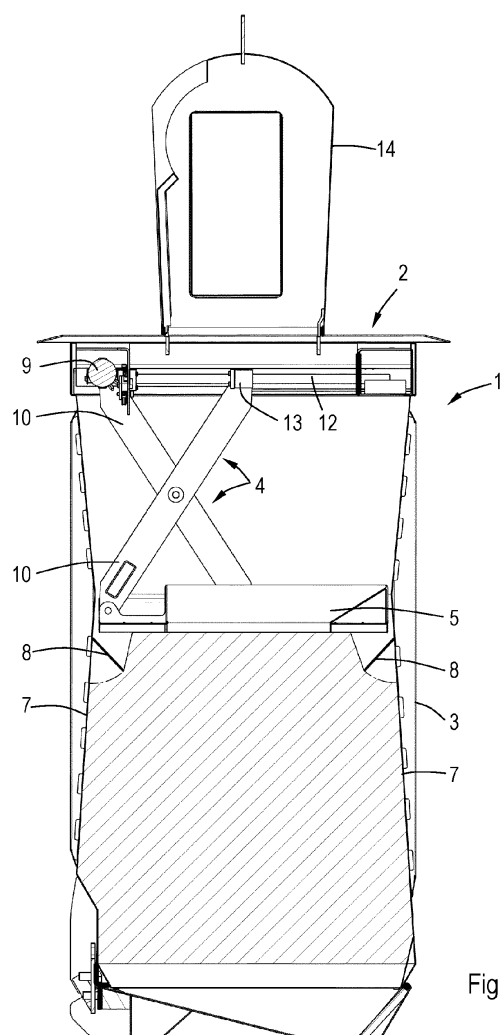


Fig.2

Description

[0001] The present invention relates to a method of pressing material and to a press device

[0002] Such a method and such a press device are generally known to be used for pressing, for example, straw which, after pressing, is enveloped with, for example, a band, a ribbon, a piece of cord or a plastic bag surrounding the pressed material to make sure that the volume reduction obtained by pressing is maintained.

[0003] A drawback of this known press device resides in that it requires in-situ operations to provide the material with said envelope. After some time, the envelope has to be removed again, after which the compressed material is exposed.

[0004] In the case of resilient materials, that is to say, materials which after having been compressed show a strong tendency to resume their original volume, these materials should remain under pressure while the envelope is simultaneously provided. This results in a voluminous press device, and causes the required, associated operations to be complex, which is not always practical and advantageous.

[0005] It is an object of the present invention to provide a method and a press devices which can suitably be used to compact rebounding materials deposited in said press device at intervals and keep them compact, without any enveloping operations being required.

[0006] To achieve this, the method according to the invention has the characteristics that the volume of material is limited by exerting a pressure force on a sub-surface of the material, after which an increase of the limited volume when the pressure force decreases is counteracted by preventing expansion of the material over an area corresponding to said sub-surface.

[0007] The corresponding press device according to the invention comprises a container, which is open on at least one side, into which material to be compressed is deposited, and, on said side, press means with a pressure plate exerting a pressure force on said material, and partitions which are secured in the container and which are hinged in the direction in which the pressure force is exerted and which extend at least partly over the surface of the pressure plate, said partitions preventing expansion of the material in the opposite direction.

[0008] An advantage of the method and the press device according to the invention is that a pressure force has to be applied only on the sub-surface, while, on the other hand, measures have to be taken on an area outside said sub-surface and independent of the pressure surface to prevent the material from rebounding. This method can suitably be used for a large category of rebounding materials, as a result of which in particular storage and transport are much more efficient.

[0009] When the method is performed underground in an underground press device according to the invention, wherein measures for enveloping the material can be dispensed with, advantageously only a limited under-

ground space is required.

[0010] An embodiment of the method is characterized according to the invention in that expansion of the material is prevented and simultaneously new material is added the volume of which is limited by subjecting is to a pressure force.

[0011] When, in practice, materials, such as waste materials, are separately collected, the method to be carried out at regular intervals in successive cycles proved to be suitable for successively filling, in particular, plastic material into the device (?) in a layer-like manner and compressing it.

[0012] A further embodiment of the press device according to the invention is **characterised in that** the pressure plate is provided with an opening through which the material can access the container; that is to say, when the press device is vertically arranged, the material drops into the holder or container situated below the press device.

[0013] Preferably, in a preferred embodiment of the press device according to the invention, after the compression operation, springs ensure that the hinged partitions are kept in the position(s) in which they prevent expansion of the material, which positions, at maximum hinge angles, are between 40 and 75 degrees, in particular approximately 60 degrees, with respect to the vertical.

[0014] Further, detailed, possible embodiments as set forth in the remaining claims are mentioned together with the associated advantages in the following description.

[0015] Next, the method and the press device according to the present invention will be explained in greater detail with reference to the accompanying figures, in which corresponding parts are indicated by means of the same reference numerals. In the drawings:

Figure 1 is a perspective view of the press device according to the invention with retracted press means; and

Figure 2 shows an assembly of the press device of fig. 1 and a device arranged above it in a waste-collection point, in which device the waste material is first reduced in size before it is fed to the press device with, in this case, extended press means.

[0016] Figure 2 shows a representation, which is also a schematic diagram, of a press device 1 which is suitable for compressing material, in particular waste material in the form of household refuse, whether bagged or not, and or plastic waste. The press device 1 can particularly be used in the process of compressing crushed and/or shredded and/or cut-up plastic materials. The above-mentioned materials are examples of materials which show a tendency to partly resume their original volume after being compressed. As a result, storing these materials, particularly at waste collection points, and transporting these materials do not take place in a very efficient

manner.

[0017] The press device 1, as also shown in figure 1, comprises a container or holder 3 which is open on at least one side 2. The material to be compressed can be deposited therein. On the open side 2 thereof, press means 4 are arranged which are capable of exerting, by means of a pressure plate 5, a pressure force on the material in the container 3. The embodiment of figure 1 shows that the pressure plate 5 advantageously comprises a central opening 6 through which the material introduced into the container from above drops to the bottom thereof, on the proviso that the press device 1 is vertically arranged, as shown in the figure. If necessary, the opening 6 could be provided in one or more of the walls 7 of the container 3.

[0018] The press device 1 further comprises hinged partitions 8 which in this case are arranged on all four sides of the container shown in square cross-section. The partitions are hinged in the direction in which the press force is exerted, i.e. downwards in figures 1 and 2, and are secured to the inside walls 7 of the container 3. The hinged partitions 8 are freely rotatable in a downward direction, but only through a limited angle in an upward direction, so that, when the pressure plate 5 is pressed downwards by the press means 4, as shown in figure 2, the material is pressed towards the bottom of the container 3, and when the pressure plate reverses direction, the partitions 8 hinge upwards up to their maximum angle position due to the rebounding material. In said position, a further upward expansion and rebound of the material is prevented. The cohesion of the material is such that the presence of the opening 6 or the central opening 6 does not result in the material being able to pass through said opening.

[0019] In practice, the maximum hinge angle of the partitions 8 is in the range of 40 to 75 degrees, possibly in the range of 45 to 70 degrees, but in particular a maximum hinge angle of 60 degrees is preferred. In practice, the partitions will further be spring-loaded, so that they will naturally assume said maximum position when they are in a condition of rest.

[0020] As for the drive unit, the press means 4 can be embodied in a suitable manner, i.e. it may possibly comprise a hydraulic or pneumatic actuator or, as shown in the figure, an electric motor 9. The embodiment shown in the figures comprises a double pair of mutually hinged links 10 which pivotally act on either side of the pressure plate 5. The linkage mechanism shown comprises a speed reducing mechanism 11 coupled to the relevant motor 9, which speed reducing mechanism is coupled to a rotatable shaft 12 with external screwthread, which shaft runs in a bushing 13 with internal screwthread, said bushing 13 being situated at the end of the links 10 and thus being capable of depressing the pressure plate against the waste material and subsequently moving it upwards again.

[0021] Figure 2 further shows the assembly of a press device 1 and a device 14 arranged above it in a waste

collection point. In this device, waste material introduced into it is first reduced in size and possibly crushed. Next, it enters the press device 1 via the opening 6.

[0022] In the press device 1, the volume of the material introduced is limited in that by means of the open pressure plate 5 a pressure force is exerted on a sub-surface of the material extending around the opening 6. When the material is in the compressed state, further expansion of the material is prevented over an area which substantially corresponds with said sub-surface by means of the partitions 8 hinging upward up to the maximum angle position.

[0023] Although the press device 1 could be a two-side press device comprising an upper and a lower pressure plate 5, hereinabove a description has been given of a single-sided press device, which operates according to the same principle. In the single-sided version explained hereinabove, the sub-surface and the area or areas are also situated on the same side 2.

[0024] The compressed material exemplified herein is cuboid in shape having a substantially square cross-section, but it may alternatively be in the shape of a rectangular cuboid or, for example, cylindrical.

[0025] At the above-mentioned collection points, new material is repeatedly introduced the volume of which is limited by regularly subjecting it to said pressure force. In this case the method is cyclically repeated. Suitable control means and sensors will be employed to initiate the method and complete it as soon as it is detected that the container 3 is getting full.

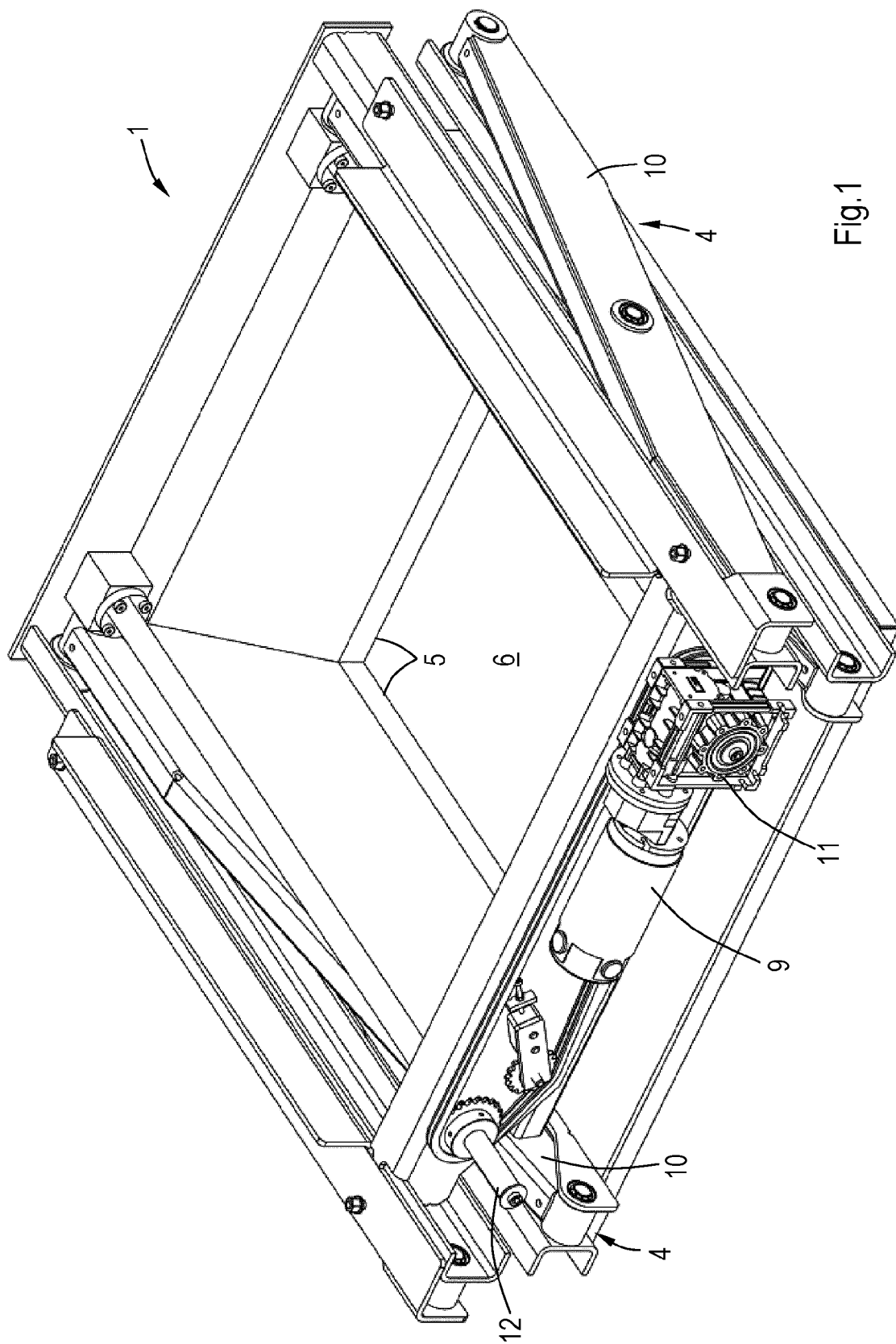
Claims

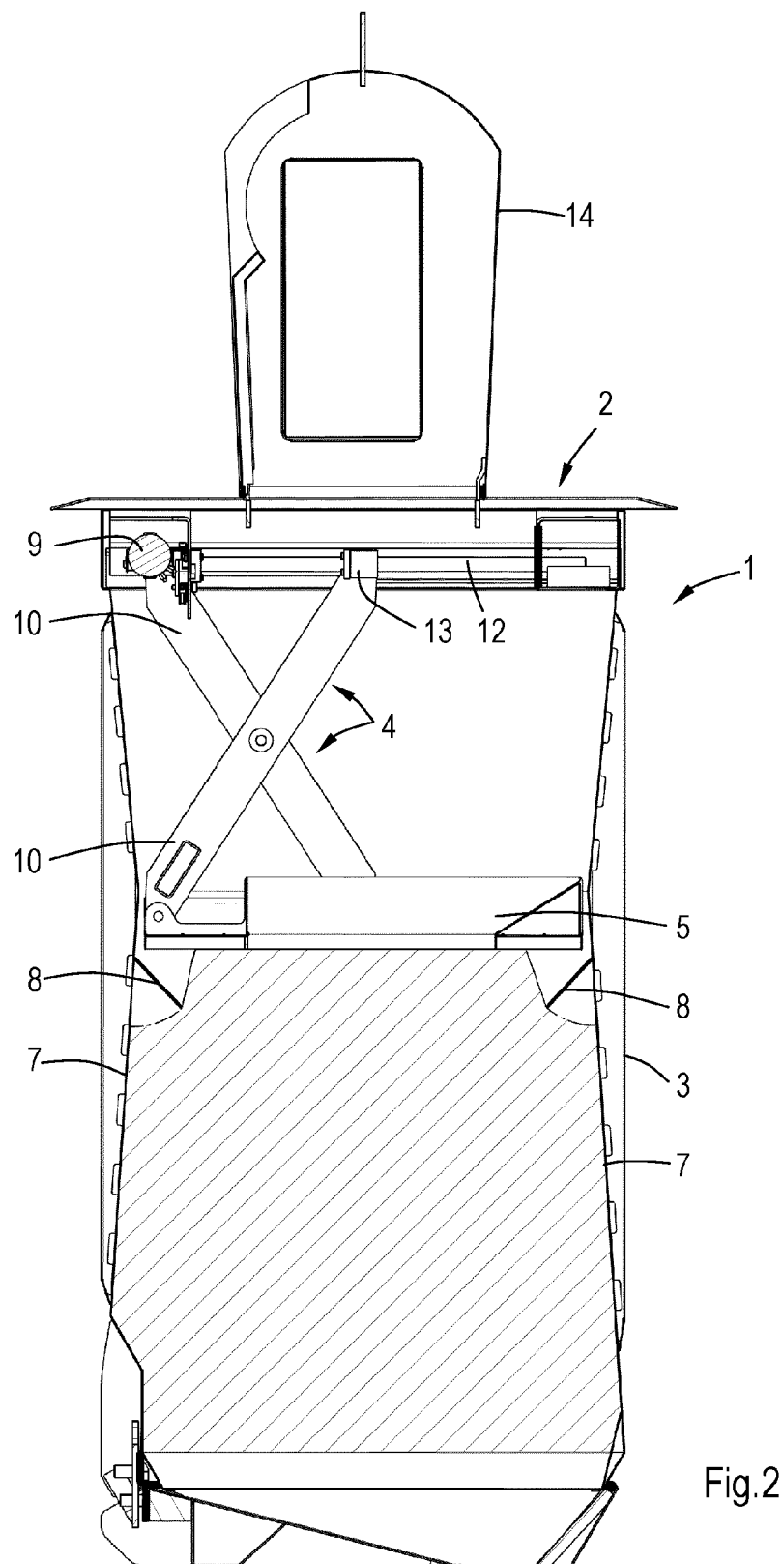
1. A method of limiting the volume of material by exerting a pressure force on a sub-surface of the material, after which an increase of the limited volume when the pressure force decreases is counteracted by preventing expansion of the material over an area corresponding to said sub-surface.
2. The method according to claim 1, **characterized in that** the pressure force is exerted on the material on at least one side thereof.
3. The method according to claim 1 or 2, **characterized in that** the sub-surface and the area or areas are situated on the same side of the material.
4. The method according to any one of claims 1 to 3, **characterized in that** the compressed material is substantially cuboid or cylindrical in shape.
5. The method according to any one of claims 1 to 4, **characterized in that** the material comprises waste material, in particular in the form of household refuse, whether bagged or not, and/or plastic waste, and, very particularly, material which may or may not be

crushed, shredded and/or cut-up, such as paper, cardboard or plastic material.

embodied so as to comprise mutually hinged links to which the pressure plate is secured.

6. The method according to any one of claims 1 to 5, **characterized in that** expansion of the material is prevented and simultaneously new material is added the volume of which is limited by subjecting it to a pressure force, which method may be applied repeatedly, if necessary. 5
7. The method according to claim 6, **characterized in that** the increase of the limited volume when the pressure force decreases is counteracted by preventing expansion of the materials in the area situated outside the sub-surface. 10 15
8. A press device comprising:
 - a container, which is open on at least one side, into which material to be compressed is deposited, 20
 - press means arranged on said side, comprising a pressure plate for exerting a pressure force on said material,
 - partitions which are secured in the container and which are hinged in the direction in which the pressure force is exerted, and which extend at least partly over the surface of the pressure plate, said partitions preventing expansion of the material in the opposite direction. 25 30
9. The press device according to claim 8, **characterized in that** the press device is vertically arranged with, on the upper side thereof, an open side of the container, on which side the press means are secured. 35
10. The press device according to claim 8 or 9, **characterized in that** the pressure plate is provided with an opening through which the material can access the container and drop to the bottom thereof. 40
11. The press device according to any one of claims 8 to 10, **characterized in that** the container has walls to which the hinged partitions are secured. 45
12. The press device according to any one of claims 8 to 11, **characterized in that** the hinged partitions are kept in the position(s) in which they prevent expansion of material by means of springs. 50
13. The press device according to any one of claims 8 to 12, **characterized in that** the maximum hinge angle of the partitions is in the range of 40 to 75 degrees, in particular around 60 degrees. 55
14. The press device according to any one of claims 8 to 13, **characterized in that** the press means are
15. An assembly of a press device according to any one of the claims 8 to 14, and a device to be arranged above it in a waste collection point, in which device, waste material is at least first reduced in size and possibly crushed before it is fed to the press device.







EUROPEAN SEARCH REPORT

Application Number
EP 12 16 3601

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 4 May 2012	Examiner Bélibel, Chérif
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03/02 (P04C01)



EUROPEAN SEARCH REPORT

Application Number
EP 12 16 3601

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 4 May 2012	Examiner Bélibel, Chérif
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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