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(72) Inventors:
• **Lespinasse, Bruno**
20540 Turku (FI)
• **Suokas, Jouni**
31300 Tammela (FI)

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(74) Representative: **Nieminen, Taisto Tapani**
Patenttitoimisto T. Nieminen Oy,
Kehräsaari B
33200 Tampere (FI)

(71) Applicant: **Jomet OY**
30100 Forssa (FI)

(54) **A lift grasper for a bundle of envelopes**

(57) A clamping and lifting mechanism for lifting a bundle (9) of envelopes or a similar asymmetrically compressible bundle of stationery, whereby the clamping and lifting mechanism comprises two movable plates (1), between which bundle (9) to be lifted is placed, in order to move (parts 6, 7) of the mechanism towards and away from each other, and devices (3, 4) in order

to release bundle (9) from clamping and lifting mechanism. The mechanism has clamping means (2) facing each other which can be brought closer to and farther from each other and fitted to clamp bundle (9), from its both end portions and pushing means (3), by means of which bundle (9) can be pressed downward while releasing bundle (9) from the space between plates (1).

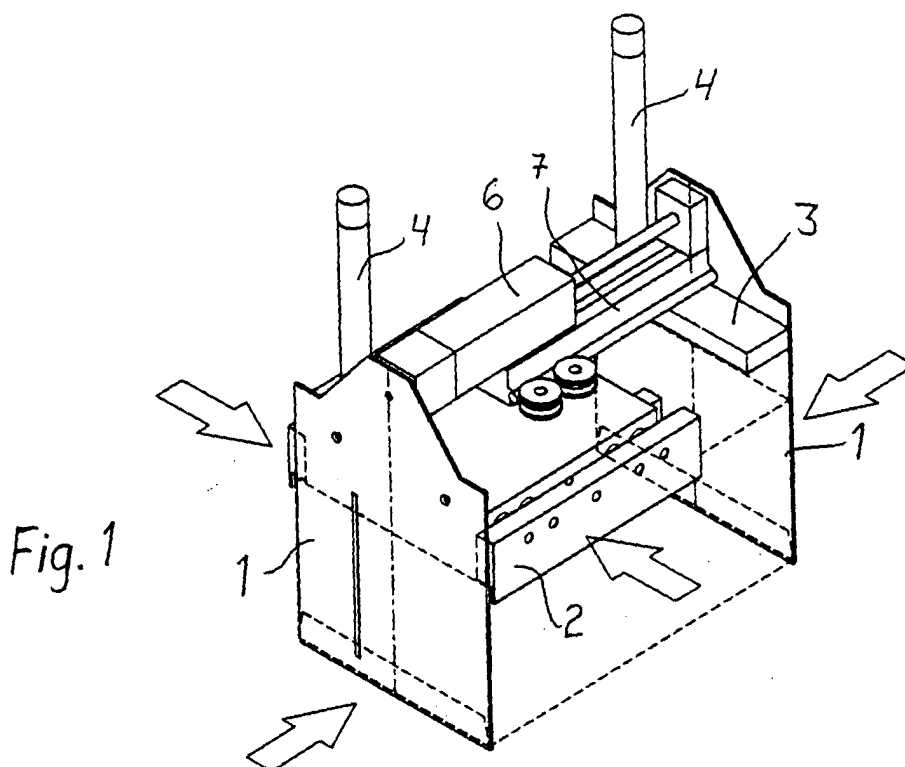


Fig. 1

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Description

[0001] The invention relates to a clamping and lifting mechanism for lifting a bundle of envelopes or a similar asymmetrically compressible bundle of stationery, whereby the clamping and lifting mechanism comprises two movable plates, between which the bundle to be lifted is placed, in order to move the parts of the clamping and lifting mechanism towards and away from each other, and devices for releasing the bundle from the clamping and lifting mechanism.

[0002] Previously known, for instance from patent publication EP 0981480, is a method and device for packing flat items, as envelopes. In this solution, however, the final bundle to be placed into a packing box or similar is not lifted into a prepared packing box but is moved between two plates without lifting the bundle into an open packing box or corresponding bottom part. It is troublesome to lift the envelope bundle grasping it merely clamping from the bundle ends, since with envelopes in same position in the bundle, then in the side of the closing flap, when the flap together with protective coat is folded to make the envelope thicker, a remarkably strong compression of the clamping and lifting mechanism is formed but for the other part hardly any clamping. When such a bundle is lifted by means of the clamping plates the bundle tends to bend and get out from between the plates. The problem is not worked out whether the bundle bends upwards or downwards.

[0003] In order to eliminate the problem a new or similar mechanism for clamping and lifting envelopes is developed, by means of which disadvantages are resolved especially on lifting bundles of stationery that are clamped asymmetrically. The clamping and lifting mechanism according to the invention is characterized in that the mechanism has clamping means, facing each other and which can be brought closer to and farther from each other and fitted to clamp the bundle from both side portions, further comprising pushing means by means of which the bundle can be pressed down, while releasing the it from the space between the plates.

[0004] The advantage of the clamping and lifting mechanism according to the invention is that the bundle to be packed can be lifted into a set up packing box and the bundle released from the clamping and lifting mechanism inside the box regardless of the bundle being at the moment of release in clamped state. A bundle to be packed can be formed of envelopes, all of which are in same direction and the closing flap of which forms a noticeable addition of thickness on one edge of the bundle. By means of the clamping and lifting mechanism according to the invention the bundle remains without bending during lifting regardless of asymmetric clamping.

[0005] In the following the invention is disclosed with reference to the enclosed drawing, where

Fig. 1 presents a diagonal view of a clamping and lift-

ing mechanism according to the invention and the clamping directions of the bundle shown by means of arrows.

Fig. 2 presents a bundle of envelopes between clamping plates.

Fig. 3 presents a packing box into which the clamped bundle can be placed.

Fig 4 shows a negative pressure connection in the box portion above the bundle.

[0006] Figure 1 shows a the clamping and lifting mechanism, comprising two plates 1, which can be moved closer to or farther from each other. As conveying mechanism there is a guide bar 7, which is moved sideways on rolls. The rolls are fixed in balk 6 and in balk 6 there is also a motion-making turning device conveyor of screw screw/nut. The bundle 9 of stationery is formed between plates 1 for convey and lifting.

[0007] The clamping and lifting mechanism has also clamping means 2 clamping bundle 9 from the long side. The mechanism moving them is not shown, but their moving closer to or farther from each other and stopping them at a regulated clamping force can be, for instance, done by means of a pneumatic cylinder. The task of these clamps 2 is to avoid bending of bundle during lifting. Clamps 2 are most suitably placed to clamp the bundle from the upper bundle edge, whereby clamps 2 hardly disturb the bundle let-down into a packing box.

[0008] In figure 2 yet an enlargement of the clamping means shape is shown seen from its end, whereat by means of the presented structure the clamping means the bundle width can be increased only as much as the thickness of bracket 5. Then said means can also without disturbance get down into the packing box. The bracket thickness can be even dimensioned smaller as 2 mm and at least to a thickness under 4 mm.

[0009] When bundle 9 and the clamping and lifting mechanism are in packing box 8 the clamping of clamping means 2 is opened a little. Pushing means 3 in the clamping and lifting mechanism, which are pressing the bundle 9 downward from the ends, are regulated to press the bundle from both ends so close to parts 1 that the bundle remains in the box, when parts 1 and the structure of clamping and lifting mechanism are lifted up. For pushing means there are moving cylinders 4 or similar, by means of which it is possible to give them a motion down so deep that the bundle ends remain in the box. The other part of the bundle remains there already thanks to gravitation. If plates 1 in the envelope are in bottom-edge as shown in figure, generally sufficient as travel of pushing means 3 is that plates 1 have vanished from the clamping between parts 1. Then clamping of envelopes decreases decisively and the envelopes remain in box. 8.

[0010] Figure 3 shows a case part 11 of the clamping and lifting mechanism, that is placed above the bundle. Case portion 11 includes a sufficient number of sliding walls, in order to make the case portion airtight enough

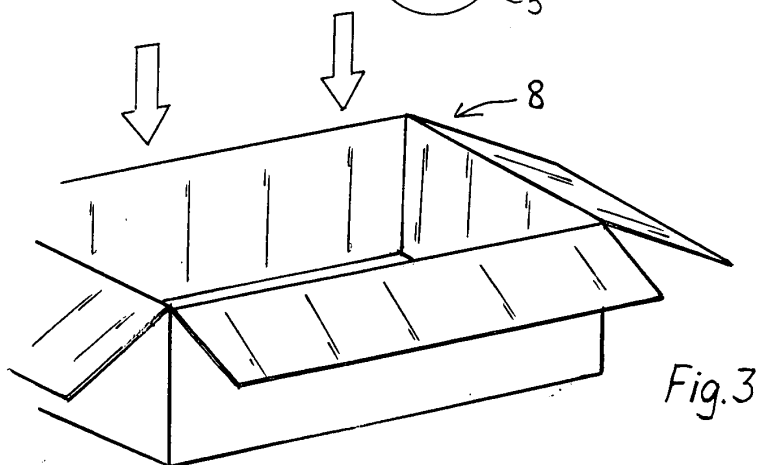
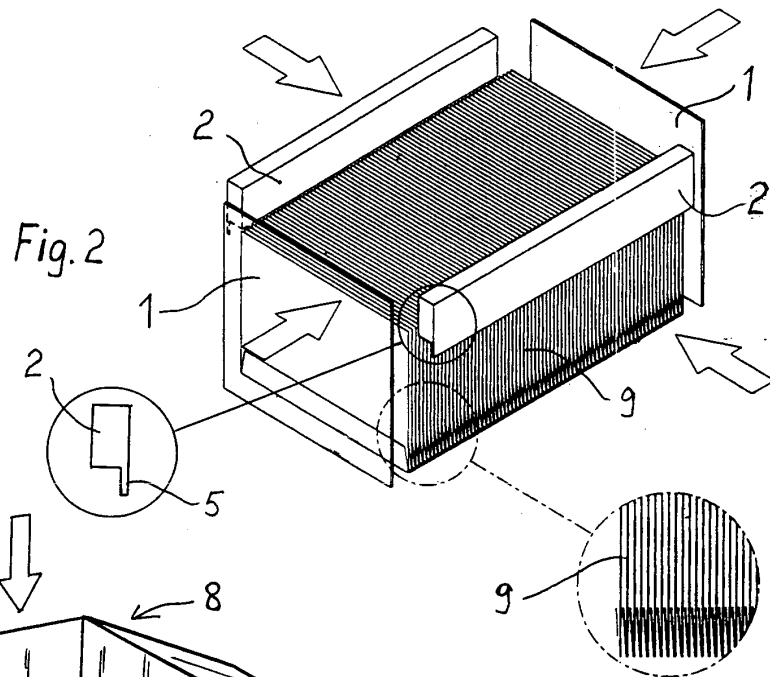
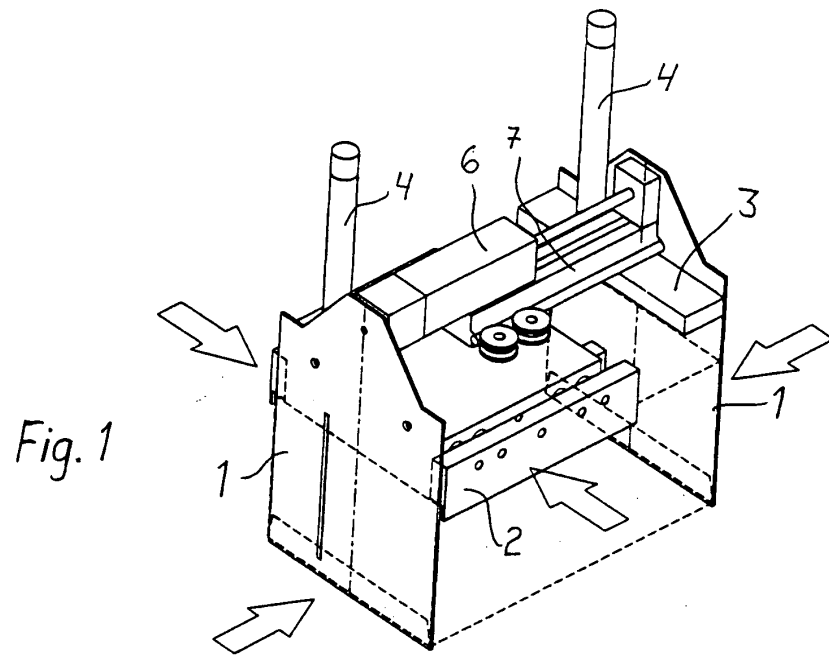
as to its structure. Case portion 11 has a tubing connection 10 to convey negative pressure to bundle upper side, whereby the negative pressure supports bundle 9 during lifting. The supporting impact is brought about by means of negative pressure to bundle 9, even if there were air leakage through bundle and structures.

[0011] The shapes of clamping and pushing means 2 and 3 are in no way restricted to presented shapes but many variations are possible.

state.

Claims

1. A clamping and lifting mechanism for lifting a bundle (9 of envelopes or a similar asymmetrically compressible bundle of stationery, whereby the mechanism comprises two movable plates (1), between which bundle (9) to be lifted is placed, in order to move (parts 6, 7) of the mechanism towards and away from each other, and devices (3, 4) in order to release bundle (9) from the clamping and lining mechanism, **characterized** in that the clamping and lifting mechanism has clamping means (2) facing each other and which can be brought closer to and farther from each other and fitted to clamp (9), while releasing bundle (9) from the space between plates 1 from its both side portions and pushing means (3), by means of which bundle (9) can be pressed downward, while releasing bundle (9) from the space between plates (1).
2. A mechanism according to claim 1 **characterized** in that the clamping means (2) are arranged to clamp bundle (9) from its upper edge.
3. A mechanism according to claim 1. **characterized** in that the mechanism has a case (11) placed above the bundle and said case has a negative pressure connection (10) to produce negative pressure through said connection to the upper side of bundle (9).
4. A mechanism according to claim 1 **characterized** in that the structure of clamping means (2) is fitted to increase the width of the bundle a little, most suitably 2-4 mm.
5. A mechanism according to claim 1 **characterized** in that pushing means (3) is placed in bundle (9) ends close to plates (1) and said means are fitted to press bundle (9) downward during, while lifting up parts (1).
6. A mechanism according to claim 1 **characterized** in that the mechanism including bundle (9) can be taken to packing box (8) and by means of pushing means (3) fitted to break loose from bundle (9) into packing box (8), when the bundle is in clamping



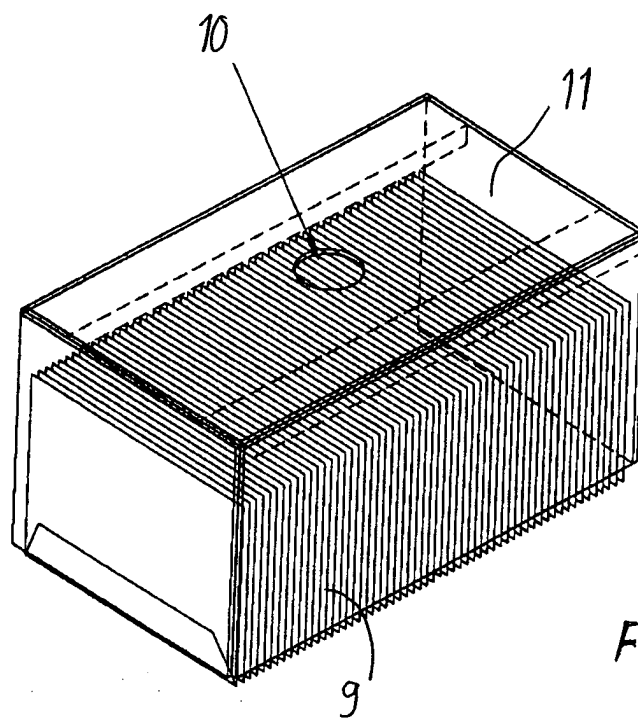


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 05 39 6012

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 6 058 684 A (SUOKAS ET AL) 9 May 2000 (2000-05-09) * column 2, line 31 - column 4, line 10; figures *	1,2,6	B65B25/14 B65B35/36
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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 12 July 2005	Examiner Jagusiak, A
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 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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