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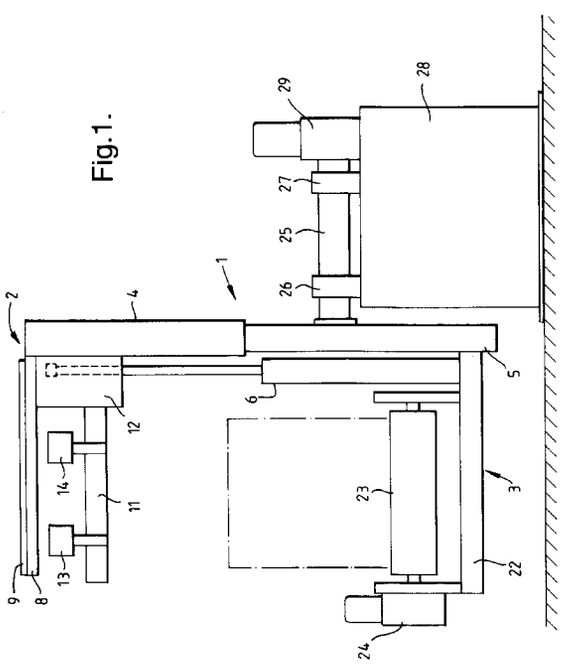
(54) Unpacking tobacco cases.

(57) Conventional decasing units for removal of tobacco bales from their respective packaging cases occupy a considerable amount of floor space. The subject invention provides a simple, effective and compact decasing unit, and method of use.

Fig.1.



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The subject invention relates to the unpacking of tobacco cases.

In order to transport tobacco leaf material to a cigarette manufacturing facility, the material is packed as a compressed bale. The bales are protected by being packed in, for example, a carton board packing box, a so packaged bale commonly being referred to as a "case". The bales and boxes are usually of rectilinear conformation and the boxes often comprise an inner part, consisting of walls and a base, and an outer part consisting of walls and a top, the inner part being slidably received in the outer part. The top of the outer part of such box usually comprises opening flaps. The bale within the box is commonly wrapped in plastics sheet material.

Before the tobacco leaf material can be subjected to requisite processing in the cigarette manufacturing facility it is, of course, necessary to unpack the case, i.e. to separate the packing box from the bale therein, which step is commonly referred to as "decasing". Decasing units are known, one such being described in EP 117 036. It is a feature of the decasing unit of EP 117 036 that it occupies a considerable amount of floor space.

It is an object of the subject invention to provide a simple, effective and compact decasing unit.

The subject invention provides a tobacco bale decasing unit comprising frame means, from which frame means are mounted support means, transfer means and case gripping means, said support means and said transfer means being relatively movable towards and away from each other, said gripping means being movable into and out of a case gripping condition and also being relatively movable towards and away from said transfer means, and said frame means being rotatable between a position in which said support means is beneath said transfer means to a position in which said support means is above said transfer means.

The subject invention further provides a method of unpacking a tobacco case comprising a tobacco bale contained within a packing box, in which method the upper flaps of said box are folded back to the sides of said box, said case is disposed above support means of a decasing unit and below transfer means of said decasing unit, said support means and said transfer means are brought to a condition wherein said case is held between said support means and said transfer means, said support means and said transfer means are rotated together so as to effect inversion of said case, case gripping means is brought into a condition wherein said gripping means grips said box, after which said gripping means is moved upwardly so as to effect removal of said box from said bale, whereupon said bale is transferred on said transfer means and is removed from said unit.

Preferably the frame means of a decasing unit according to the subject invention comprises first and second sections, which sections are movable relatively of each other. From the second of these sections is mounted the support means, and advantageously also the case gripping means, and from the first section is mounted the transfer means.

The transfer means advantageously takes the form of a conveyor.

In order that the subject invention may be clearly understood and readily carried into effect, reference will now be made, by way of example, to the diagrammatic drawings hereof, in which:-

Figure 1 shows, in side elevation, a tobacco bale decasing unit;

Figures 2-4 and 6 show respective stages in the operation of the unit of Figure 1; and

Figure 5 shows, at an enlarged size, a detail of the unit of Figure 1.

The decasing unit shown in Figure 1 comprises frame means, generally designated by reference numeral 1, which frame means is constituted by a section which, as viewing Figure 1, is an upper section, generally designated by reference numeral 2, and a lower section, generally designated by reference numeral 3. The upper section 2 comprises a vertically extending member 4 and the lower section 3 comprises an upwardly extending member 5. The member 4 is slidably mounted of the member 5, whereby the upper section 2 of the frame means can be brought nearer to and further from the lower section 3 thereof under the action of a pneumatic piston and cylinder unit 6.

The upper section 2 of the frame means 1 also comprises a pair of horizontally extending side forks 7,8 and a horizontally extending middle fork 9 (see also Figure 2), which forks 7-9 are mounted from the member 4. The forks 7-9 provide case support means. The section 2 further comprises a pair of horizontally extending arms 10,11 which are mounted from the member 4 by way of bracket means 12 and which are, as viewing Figure 1, disposed at a level below that of the forks 7-9. The arms 10,11 provide case restraint means.

Mounted from each of the arms 10 and 11 are a pair of gripping pads. The gripping pads mounted from the arm 11 and shown in Figure 1 are designated by reference numerals 13 and 14. In Figure 2 there is shown one of the gripping pads, designated 15, which is mounted from the arm 10. In Figure 5 there is shown, in somewhat more detail, one of the pads(13) which is mounted from arm 11. As can be appreciated from Figure 5, secured to the upper surface of arm 11 is a mounting plate 16 which provides securement means for a parallel linkage comprising linkage arms 17,18 and a horizontally extending linkage member 19. The gripping pad 13 is mounted at one end from the linkage member 19 by way of a swivel joint 20. The gripper pad 13 is movable to-and-fro in a generally horizontal direction under the action of a pneumatic

piston and cylinder unit 21. The other three pads are similarly mounted and powered for movement.

Each of the four gripper pads comprises an array of spikes, three of which on pad 13 are designated a, b and c in Figure 5. The four pads, together with the respective mounting means and powering means comprise case gripping means whereas said gripper pads together with said array of spikes comprises case piercing means.

The section 3 of the frame means 1 comprises horizontally extending structural member 22 which is secured to the upwardly extending member 5. Mounted on the member 22 is a belt conveyor 23, providing transfer means. The conveyor 23 is drivable by way of an electric motor and drive gear unit, jointly designated by reference numeral 24.

The broken lines in Figure 1 indicate the position of a tobacco bale on the conveyor 23.

The frame means 1 of the decasing unit is rotatably mounted by virtue of the securement of the member 5 of section 3 to a horizontal shaft 25, which shaft 25 runs in bearings 26,27 mounted on a pedestal 28. The shaft 25 is drivable by means of an electric motor and drive gear unit 29. The frame means 1 can thus be rotated through 180° from the position thereof shown in Figure 1 and can subsequently by brought back to the position shown in Figure 1.

Figure 2 shows a tobacco case 30 which, by means of a bogey 31, has been positioned such that it is disposed above the forks 7-9 and below the conveyor 23 of the decasing unit. The packing box of the case 30 is of the aforesaid type having an inner part which is slidably received in an outer part. As is indicated in Figure 2, the upper flaps of the packing box have been folded back to the sides of the box and upper parts of a plastic sheet inner wrapper have been brought down over the flaps. In Figure 2 a side flap is designated by reference numeral 32 and the end flaps have been designated by reference numerals 33 and 34, the plastics wrapping material being designated by reference numeral 35. The box flaps and upper parts of the inner wrapper may be brought manually to the positions thereof indicated in Figure 2.

By means of the piston and cylinder unit 6, the section 2 of the frame means 1 is raised thus to bring the forks 7 and 8 into contact with the underside of the case 30 and to bring the fork 9 into contact with the underparts of the bogey 31, and to raise the case 30 until the upper extremity thereof is brought into contact with the conveyor 23. This stage of the operation of the decasing unit is shown in Figure 3. The frame means is now rotated in the direction of the arrow A of Figure 3, under action of the motor and drive gear unit 29, so as to invert the case 30. When the inversion step has been completed the two pairs of gripping pads mounted from the arms 10,11 are moved into a position in which the spikes of the pads penetrate the respective end walls of the packing box of the case 30 and the inner sheet wrapper (see Figure 4).

Section 2 of the frame means 1 is then, under action of the piston and cylinder unit 6, moved upwardly relative to the section 3, thus to effect upward removal of the complete packing box and the inner wrapper from the tobacco bale. This stage of operation is shown in Figure 6, in which figure the bale is designated by reference numeral 36. The conveyor 23 is then activated, by means of the motor and drive gear unit 24, to transfer the bale 35 in the direction of the arrow B, thus to remove the bale 36 from the decasing unit. The piston and cylinder unit 6 is then again activated, this time to lower the section 2 of the frame means 1 until the empty packing box rests upon the, now stationery, conveyor 23. The frame means 1 is then rotated to reverse the orientation thereof, whereby the section 2 of the frame means 1 is lowermost (with respect to section 3), and the forks 7-9 are lowered out of contact with the box and with the bogey 31. The empty box may then be transported on the bogey 31 out of the decasing unit.

It may be observed that during the inversion steps of the frame means 1 the arms 10,11 restrain the case or empty box from moving from between the forks 7-9 and the conveyor 23.

Claims

1. A tobacco bale decasing unit comprising frame means, from which frame means are mounted support means, transfer means and case gripping means, said support means and said transfer means being relatively movable towards and away from each other, said gripping means being relatively moveable into and out of a case gripping condition and also relatively movable towards and away from said transfer means, and said frame means being rotatable between a position in which said support means is beneath said transfer means to a position in which said support means is above said transfer means.

2. Apparatus according to Claim 1, wherein said frame means comprises first and second, relatively movable sections.

3. Apparatus according to Claim 2, wherein said transfer means is mounted of the first of said sections.

4. Apparatus according to Claim 2 or 3, wherein said support means is mounted of the second of said sections.

5. Apparatus according to Claim 2, 3 or 4, wherein said frame means comprises actuating means,

said actuating means being operable to effect relative movement of said first and second sections of said frame means.

6. Apparatus according to any one of Claims 2 to 5, wherein said case gripping means is mounted of said second section of said frame means.

7. Apparatus according to any one of the preceding claims, wherein said transfer means takes the form of a conveyor.

8. Apparatus according to any one of the preceding claims, wherein said support means takes the form of a plurality of forks.

9. Apparatus according to any one of the preceding claims, wherein said case gripping means comprises case wall piercing means and powering means, said powering means being operable to move said piercing means between a non-case gripping condition thereof and a case gripping condition thereof.

10. A method of unpacking a tobacco case comprising a tobacco bale contained within a packing box, in which method the upper flaps of said box are folded back to the sides of said box, said case is disposed above support means of a decasing unit and below transfer means of said decasing unit, said support means and said transfer means are brought to a condition wherein said case is held between said support means and said transfer means, said support means and said transfer means are rotated together so as to effect an inversion of said case, case gripping means is brought into a condition wherein said gripping means grips said box, after which said gripping means is moved upwardly so as to effect removal of said box from said bale, whereupon said bale is transferred on said transfer means and is removed from said unit.

Fig.1.

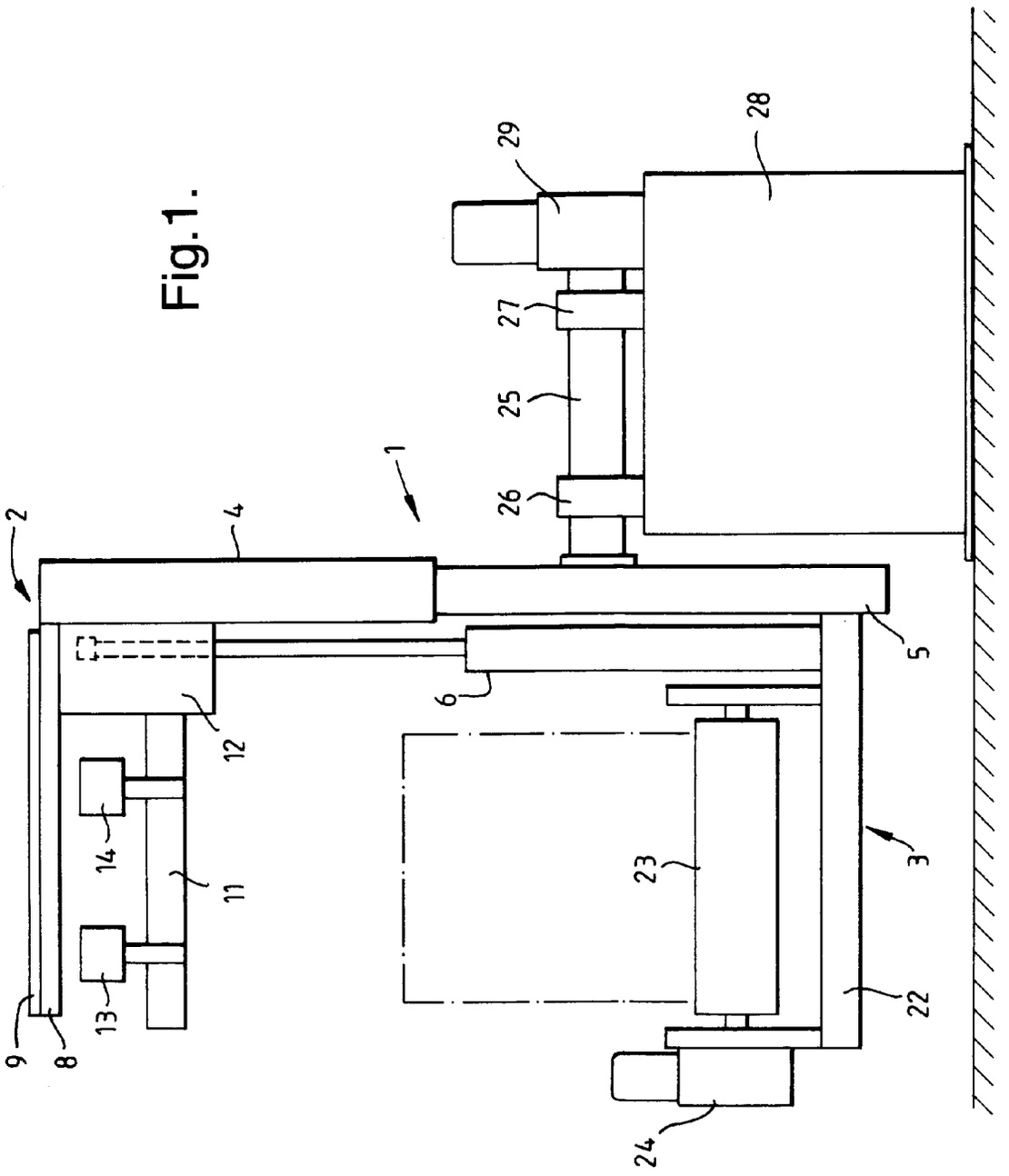


Fig.2.

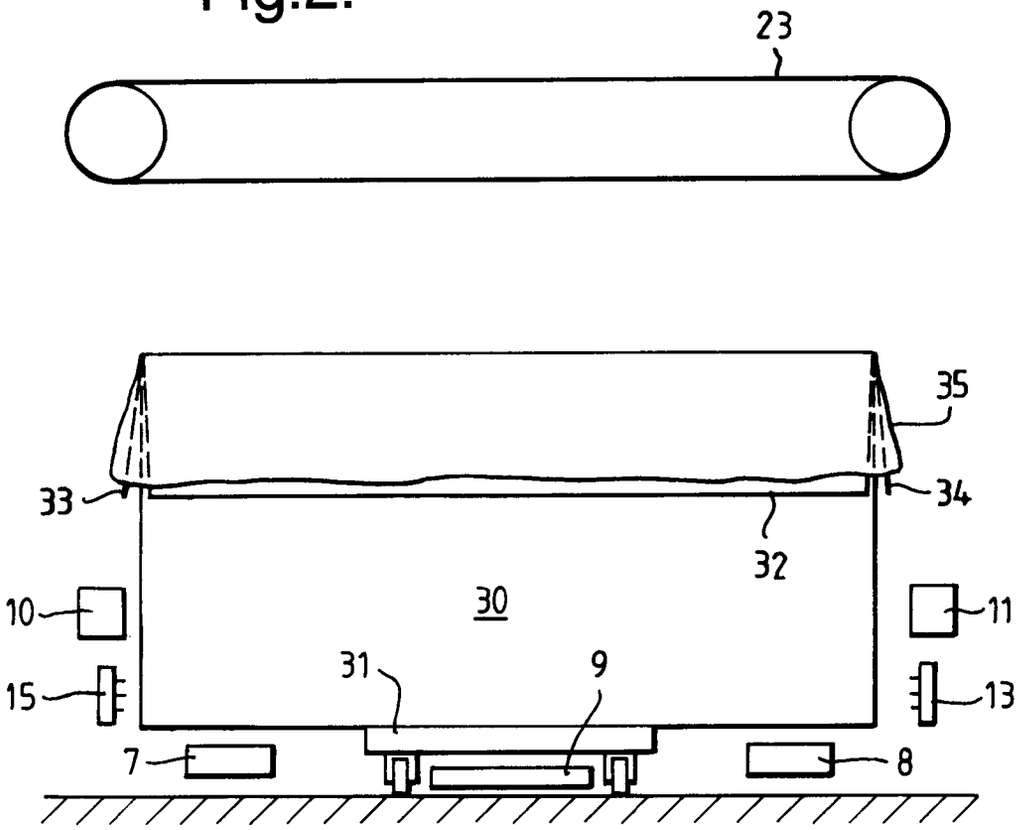


Fig.3.

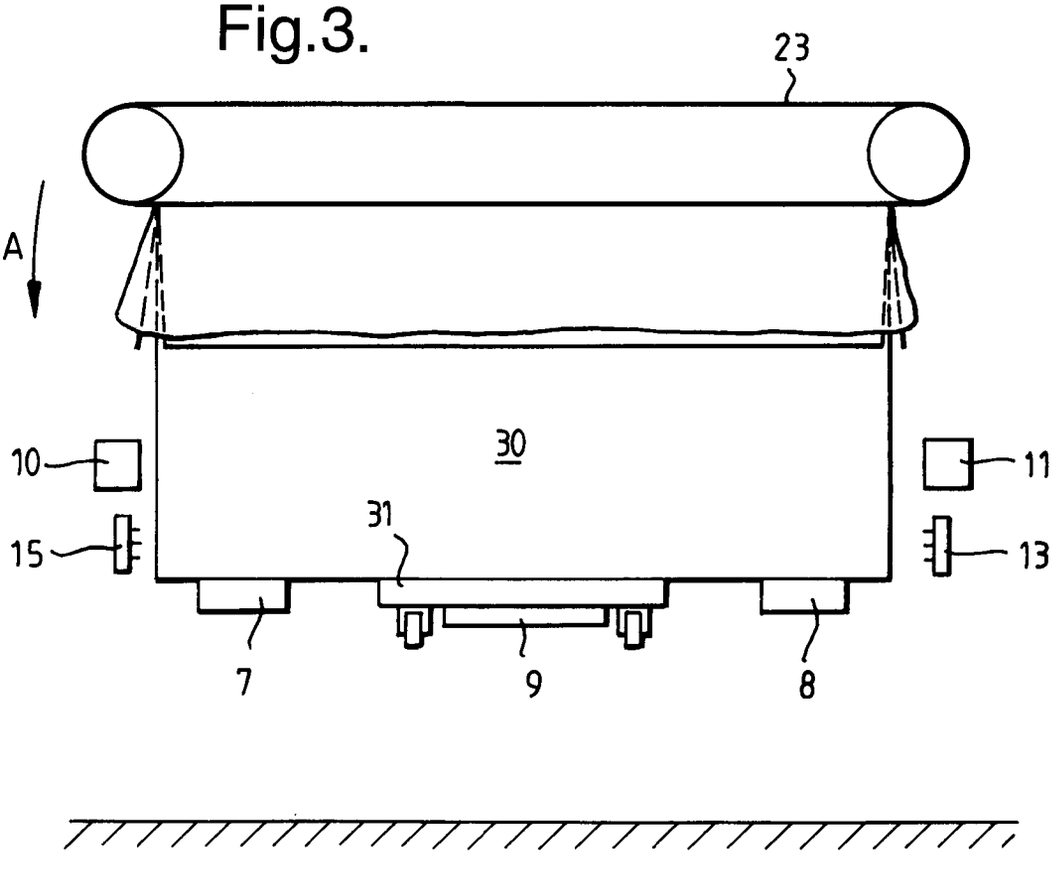


Fig.4.

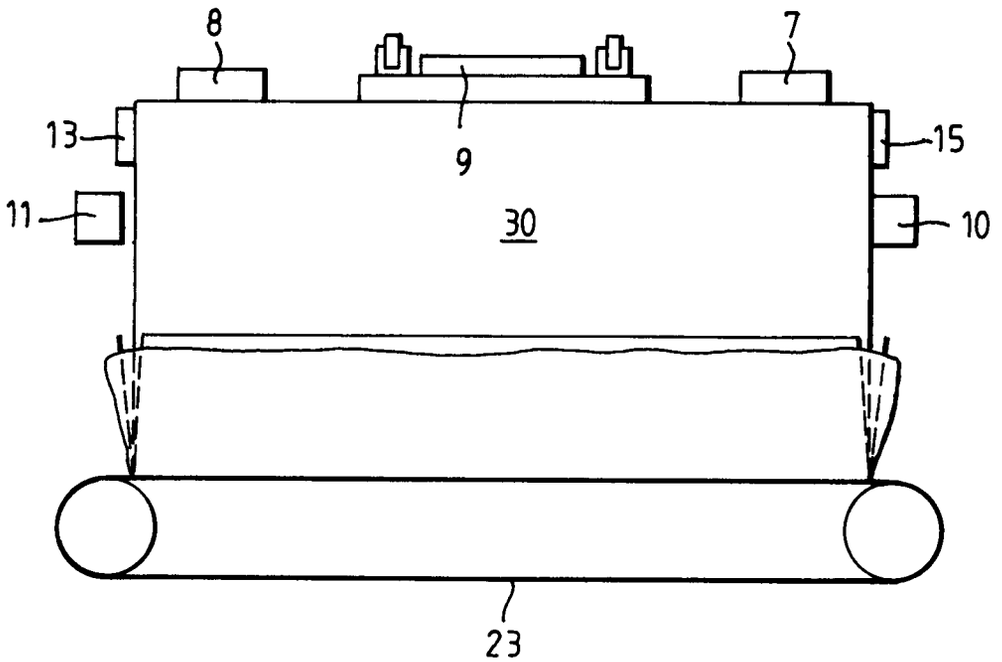


Fig.5.

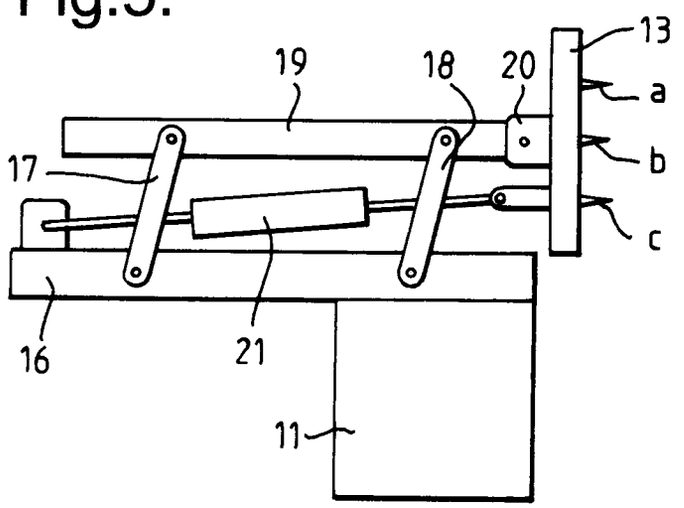
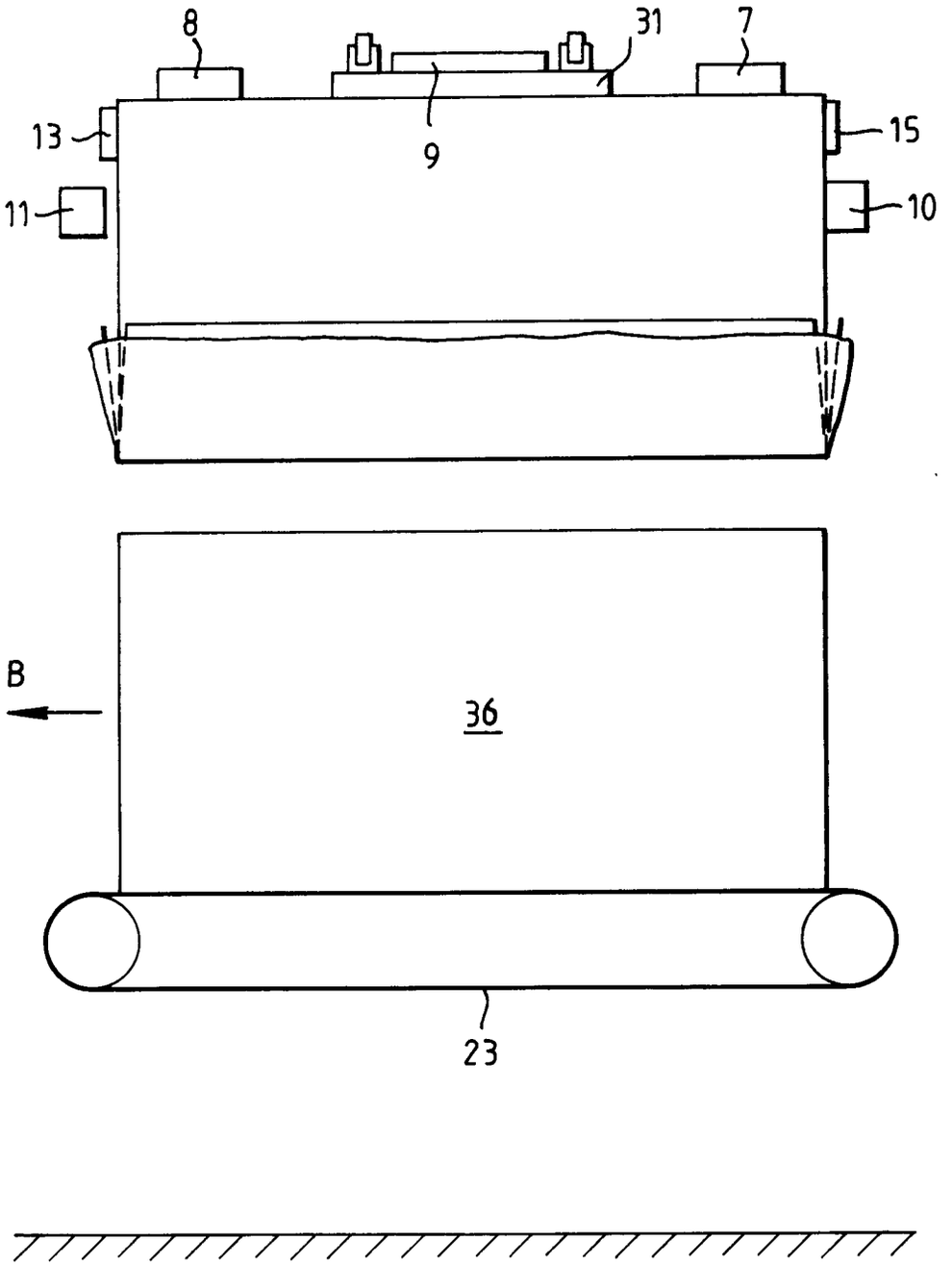


Fig.6.



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EUROPEAN SEARCH REPORT

Application Number
EP 94 30 6616

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	DE-A-33 20 459 (B.A.T. CIGARETTENFABRIKEN GMBH) * the whole document *	1,10	A24B3/00 B65B69/00
A	GB-A-2 132 163 (THE JAPAN TOBACCO & SALT PUBLIC CORPORATION) * the whole document *	1,10	
A	DE-C-41 09 461 (B.A.T. CIGARETTENFABRIKEN GMBH) * the whole document *	1,10	
A,D	EP-A-0 117 036 (W.H. DICKINSON ENGINEERING LIMITED) * the whole document *	1,10	
A	DE-A-24 33 687 (AUTOMATIC MATERIAL HANDLING INC.)		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6) A24B B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 December 1994	Riegel, R

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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