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(72) Inventors:
• **Tacchi, Alver**
40133 Bologna (IT)
• **Minarelli, Alessandro**
40053 Bazzano (Prov. of Bologna) (IT)
• **Corazza, Giuliano**
40033 Casalecchio di Reno (Bologna) (IT)

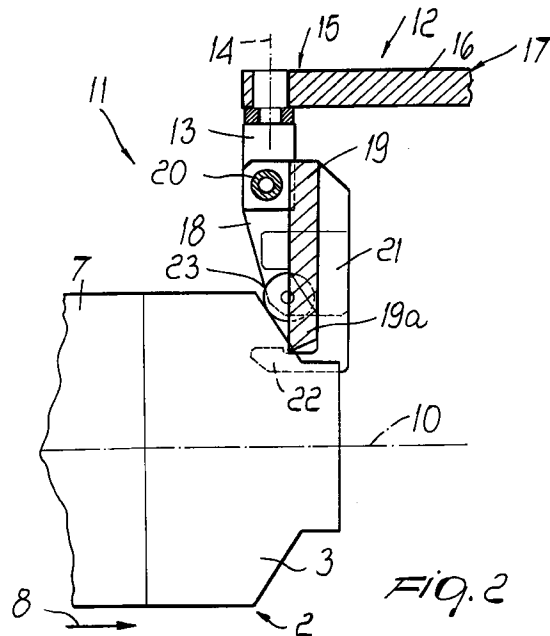
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(74) Representative:
Modiano, Guido, Dr.-Ing. et al
Modiano & Associati S.r.l.
Via Meravigli, 16
20123 Milano (IT)

(71) Applicant: **G.D. S.p.A.**
40133 Bologna (IT)

(54) **Device for cutting preform stack wrapping straps**

(57) A device (12) for cutting straps (7) for wrapping stacks (2) of preforms (3), wherein a cutting blade (19), adapted to affect and cut the strap (7) of each stack (2) in a cutting station (11) arranged along a path (9) for feeding the stacks (2) to a user machine (5), is supported by a plate (18) where to a separator lamina (21) is fixed, one end (22) of the lamina being adapted to penetrate between the preforms (3) of the stack (2) to facilitate the insertion and sliding of at least one portion (19a) of the blade (19) between the preforms (3).



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Description

The present invention relates to a device for cutting preform stack wrapping straps.

The present invention is used advantageously for cutting straps wrapped around stacks of cardboard preforms during the feeding of said stacks to user machines, particularly packaging machines for producing cigarette packs of the rigid type, to which the following description will explicitly refer without thereby losing in generality.

Stacks of cardboard preforms, wrapped in corresponding straps, are currently fed to a machine for packaging cigarettes by means of a conveyor which moves said stacks in succession along a feed path which passes through a cutting station, whereat there is provided a device for cutting the straps, which are subsequently removed.

A conventional cutting device which is currently being used comprises a cutting blade which is fixed to a supporting lever in a protruding manner, said lever being mounted so that it can swing at one end of a fixed bracket and is provided, at one of its ends, with a feeler roller.

While the stacks of preforms are being fed to the packaging machine, the feeler roller, at the cutting station, makes contact with a side of each stack, causing a rotation of said lever which makes the cutting blade affect the strap and cut it.

During the operation of the above-described cutting device, frequent damage to the cardboard preforms of the stack has been observed due to contacts between the blade and the edges of the preforms arranged on the cutting line.

It has also been observed that the above-described cutting device is capable of operating effectively only if the strap is wrapped around the stack so that it is perfectly stretched and clings to the sides of said stack, whilst if the strap is wrapped around the stack with inadequate tension, the cutting blade is unable to tear the strap cleanly and completely and the strap cannot therefore be subsequently removed.

The aim of the present invention is to provide a device for cutting preform stack wrapping straps which is free from the above-described drawbacks.

According to the present invention, a device for cutting preform stack wrapping straps is provided, which comprises: a cutting blade which reaches and cuts the corresponding strap of each stack in a strap-cutting station arranged along a path for feeding said stacks to a user machine; and means for supporting said cutting blade; said device further comprising separator means which are adapted to penetrate between the preforms of said stack to facilitate the insertion and sliding of at least one portion of said blade between said preforms.

Further characteristics and advantages of the present invention will become apparent from the following detailed description of some embodiments thereof, illustrated only by way of non-limitative examples in the

accompanying drawings, wherein:

figure 1 is a partially sectional schematic plan view, with parts removed for the sake of clarity, of a preferred embodiment of the strap cutting device according to the present invention;

figure 2 is an enlarged-scale view of a detail of figure 1;

figure 3 is a vertical sectional view of the device of figure 1;

figure 4 is an enlarged-scale view of the device of figure 1 in another operating position;

figure 5 is a partially sectional schematic plan view, with some parts removed for the sake of clarity, of an alternative embodiment of the device according to the present invention;

figure 6 is a vertical sectional view of the device of figure 5; and

figure 7 is a schematic view of a different embodiment of the device of figure 5.

With reference to figure 1, the reference numeral 1 designates a line for feeding substantially parallelepiped-shaped stacks 2 of flat cardboard preforms 3 to an inlet 4 of a packaging machine 5 for producing cigarette packs (not shown) of the rigid type.

The line 1 comprises a conveyor 6, which is adapted to cause the sequential advancement of the stacks 2, wrapped in corresponding straps 7, in a direction 8 along a path 9, in which the respective longitudinal axes 10 of the preforms 3 are parallel to said direction 8.

The path 9 runs through a cutting station 11, whereat a cutting device 12 is adapted to cut the straps 7 and to work in a known manner together with a conventional device, not shown, for removing the cut straps 7.

As shown in figure 2, the device 12 comprises a fork 13 which is oscillatably mounted with respect to an axis 14 lying transversely to the direction 8 and to the axes 10 at an end 15 of a bracket 16 to oscillate within a given oscillation range determined by stop elements, which are not illustrated.

The bracket 16 is fixed or can be part of a cutting head 17 movable towards and away from the station 11 and with respect to the preforms 3 of the stack 2 in said station 11 under the thrust of a conventional actuation unit, which is not illustrated.

As shown in figures 2 and 3, a supporting plate 18 for a cutting blade 19 is pivoted to the fork 13 by means of a pivot 20 arranged transversely to the direction 8 and to the axis 14.

A flexible lamina 21 is fixed to the plate 18, is arranged so as to be substantially co-planar with respect to the blade 19, and is thicker than the blade 19; one of its free ends 22 is shaped like a tapering hook so as to protrude with respect to the plate 18 and to the blade 19 and is adapted to penetrate between the preforms 3 of each stack 2 in the station 11 in order to sep-

arate the preforms 3 and facilitate the insertion of a portion 19a of the blade 19 between said preforms 3, parallel to the plane of arrangement of the preforms 3.

As shown in figures 2, 3 and 4, a feeler roller 23 is also mounted on the plate 18 so that it can rotate about an axis which is normal to the plane of arrangement of the blade 19, said roller being adapted to reach the peripheral region of each stack 2 which advances in the direction 8 in order to slide in contact with the profile of said stack 2 under the thrust of elastic compression means, which are interposed between the plate 18 and the bracket 16 and are represented schematically by means of a spring 24 in figure 4.

In use, during advancement along the path 9, each stack 2 passes through the station 11, whereat the end 22 of the lamina 21 penetrates between two preforms 3 of the stack 2 and separates them, facilitating the insertion of the portion 19a of the blade 19 between said two preforms 3; simultaneously, the roller 23, by sliding along the profile of the stack 2, causes the rotation of the plate 18 and of the lamina 21 counterclockwise in figure 4, overcoming the resistance of the spring 24.

The end 22 of the lamina 21 is then inserted between the preforms 3 at a lateral region of the stack 2 and at a preset distance from an outer edge of said stack 2.

In this arrangement, the portion 19a of the blade 19 can thus slide easily between the preforms 3, parallel to the plane of arrangement of said preforms 3, until it engages the strap 7 and tears it completely, thus avoiding damage at the edges of said preforms 3.

In particular, it can be seen that the roller 23, once it has reached the strap 7, slides along said strap 7 and, being pushed by the spring 24, is capable of flattening out a portion of the strap 7, making it cling to the side of the stack 2 just before said part is engaged by the portion 19a of the blade 19.

Therefore, even if the strap 7 is wrapped around the stack 2 with inadequate tension, i.e., if it does not cling to the sides of said stack 2, the device 12 is capable of cleanly and fully tearing the strap 7, which can thus be easily removed.

Moreover, the ability of the fork 13, and therefore of the plate 18 pivoted thereto, to oscillate about the axis 14 allows the end 22 and the portion 19a of the blade 19 to remain perfectly co-planar with respect to the preforms 3, adapting to their orientation, and therefore to slide without jamming even if the preforms 3 of the stack 2 are slightly curved.

According to the second embodiment shown in figures 5 and 6, the plate 18 is fixed to the fork 13 and the lamina 21, which is aligned with the blade 19 and is thicker than said blade 19, is fixed to the plate 18 so that the free end 22 protrudes from said plate 18 with a sharp edge 22a, which lies at an angle with respect to the axes 10 of the preforms 3 and to the path 9 and has the dual function of engaging the stack 2 at an edge 25 of the side of said stack 2 to penetrate between two preforms 3 so as to separate said preforms 3 from one

another, and of tearing the strap 7 once the station 11 is reached.

In this manner, the blade 19, by means of its portion 19a, acts on the strap 7 only if the cutting edge 22a of the end 22 of the lamina 21 has been unable to cleanly and fully tear said strap 7, for example because of insufficient tension in wrapping the strap 7 around the stack 2.

According to the embodiment shown in figure 7, the cutting blade 19 is constituted by a substantially hook-shaped tip 26 of the end 22 of the lamina 21.

The present invention is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept; likewise, the details may be replaced with other technically equivalent elements.

The materials and the dimensions may be any according to requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A device (12) for cutting straps (7) for wrapping stacks (2) of preforms (3), comprising: a cutting blade (19) which reaches and cuts the corresponding strap (7) of each stack (2) in a station (11) for cutting the straps (7) which is arranged along a path (9) for feeding said stacks (2) to a user machine (5); and means (18, 13, 16) for supporting said cutting blade (19); said device being characterized in that it further comprises separator means (21, 22) which are adapted to penetrate between the preforms (3) of said stack (2) to facilitate the insertion and sliding of at least one portion (19a) of said blade (19) between said preforms (3).
2. A device according to claim 1, characterized in that said supporting means (18, 13, 16) comprise a plate (18) for supporting said cutting blade (19); said separator means (21, 22) comprising a lamina (21) which is fixed to said plate (18) and is substantially co-planar to said blade (19); one end (22) of said lamina (21) which protrudes from said plate (18) and from the cutting blade (19) being adapted to penetrate between the preforms (3) of said stack (2).
3. A device according to claim 2, characterized in that said supporting means (18, 13, 16) further comprise a fork (13) rotatably mounted on a bracket (16) so as to oscillate with respect to an axis (14) which lies transversely to the longitudinal axes (10) of the preforms (3).

4. A device according to claim 3, characterized in that said bracket (16) is part of a cutting head (17) movable from and towards said cutting station (11) and with respect to the preforms (3) of each stack (2) in said cutting station (11). 5
5. A device according to claim 4, characterized in that said plate (18) is pivoted to said fork (13) about a pivot (20) which lies transversely to said longitudinal axes (10) and to said axis (14). 10
6. A device according to claim 5, characterized in that it comprises a feeler roller (23) mounted on said plate (18) to affect the peripheral region of each one of said stacks (2) and slide in contact with the profile of said stack (2) under the thrust of elastic compression means (24) which act on said plate (18). 15
7. A device according to any one of claims 1 to 4, characterized in that said end (22) of the lamina (21) protrudes from said plate (18) so that its cutting edge (22a) is inclined with respect to the longitudinal axes (10) of the preforms (3) of said stack (2) and is adapted to act on said strap (7) so as to tear said strap (7). 20
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8. A device according to claim 7, characterized in that said cutting edge (22a) is arranged, with respect to said path (9), so as to affect the stack (2) at an edge (25) of said stack (2) in order to penetrate between the preforms (3) of the stack (2) and separate said preforms (3). 30
9. A device according to claim 8, characterized in that said cutting blade (19) is constituted by a substantially hook-shaped tip (26) of the end (22) of said lamina (21). 35

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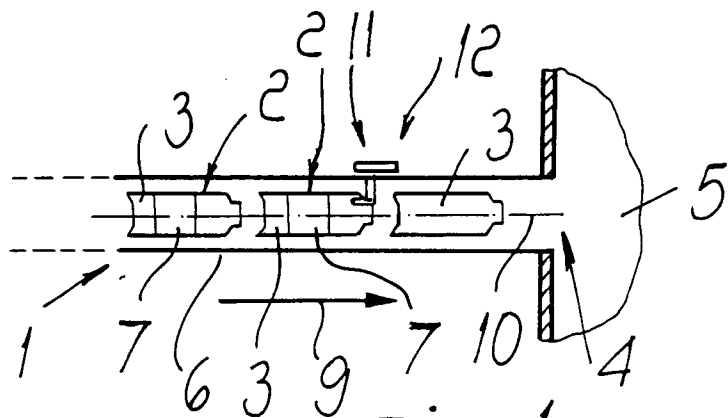


FIG. 1

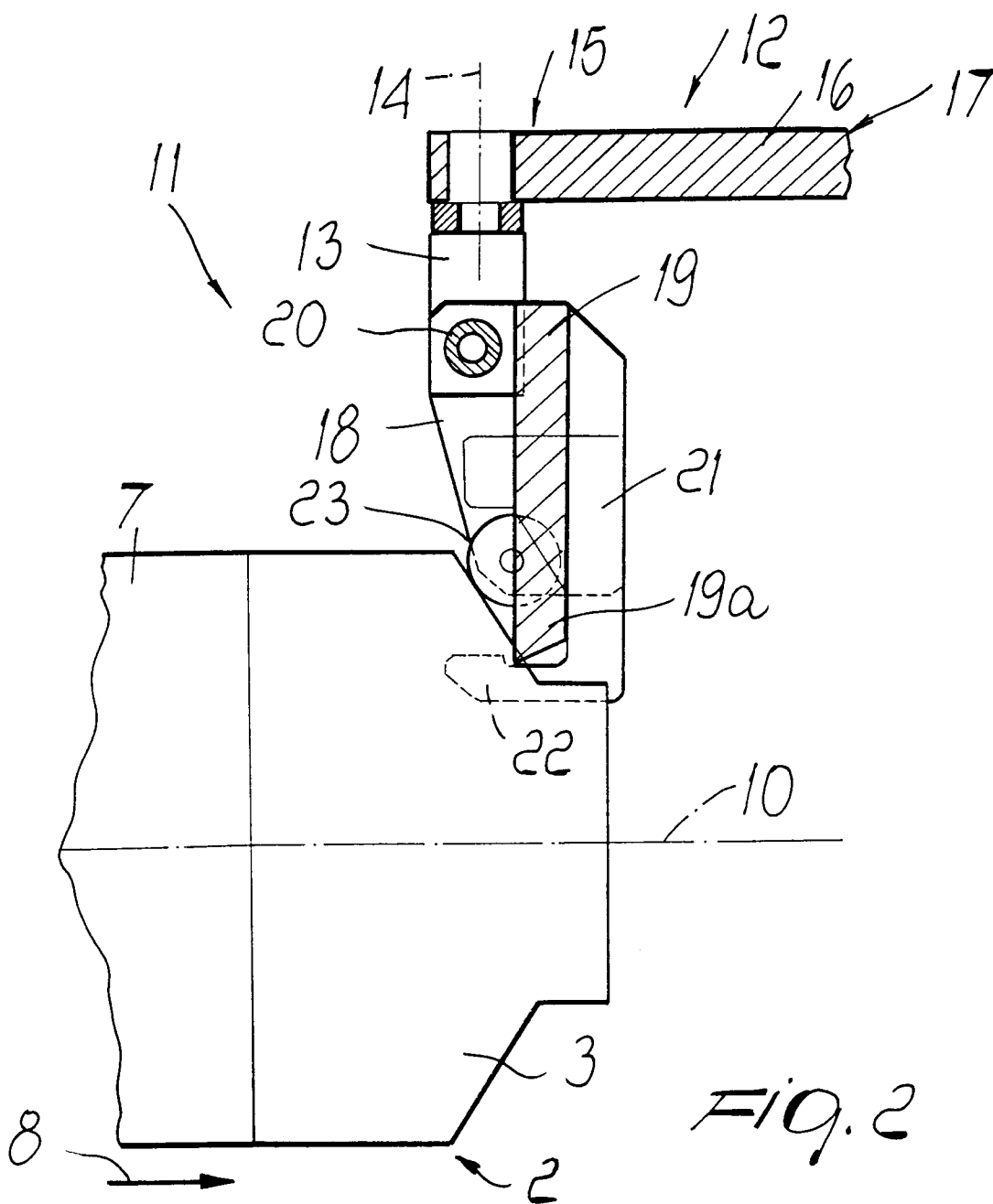


FIG. 2

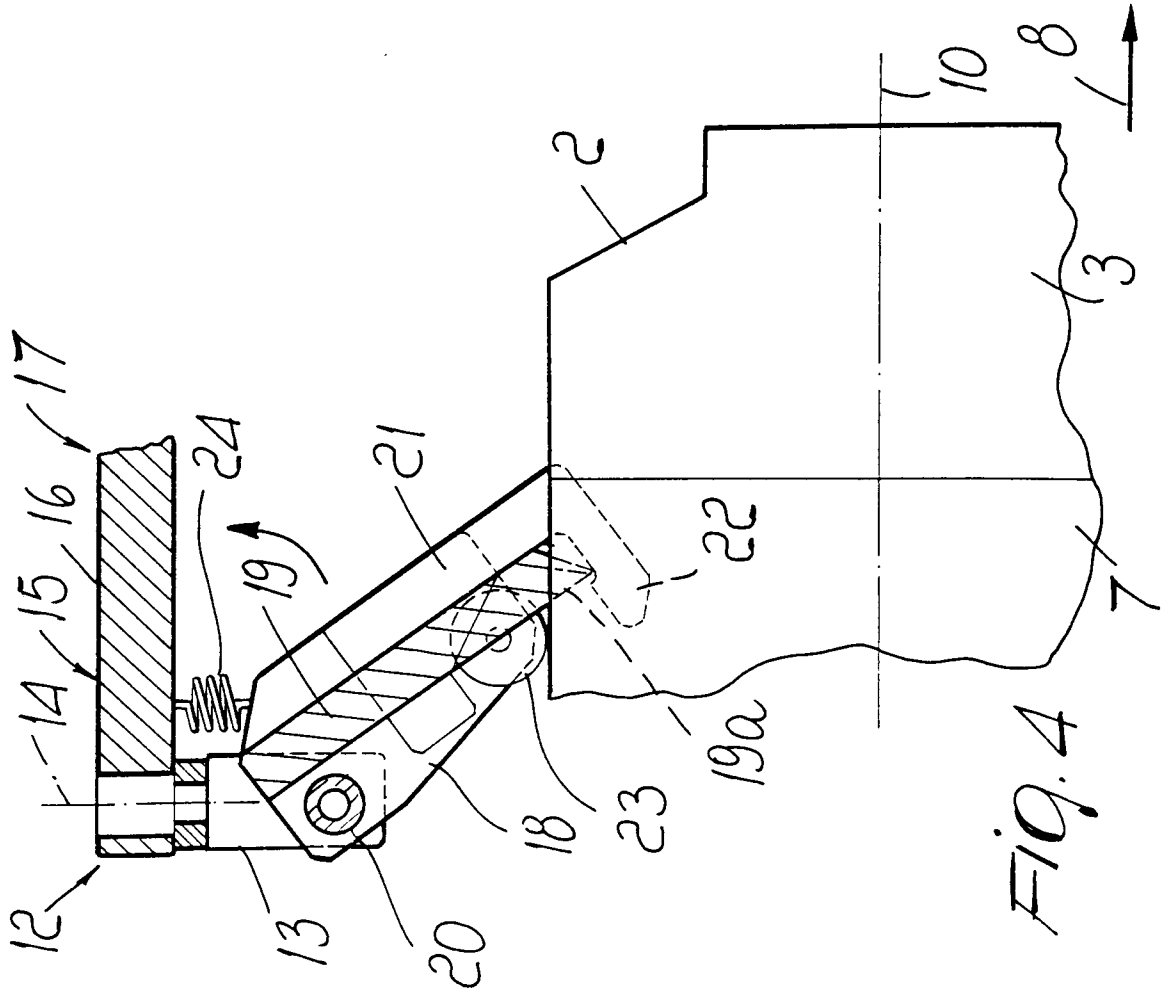


FIG. 4

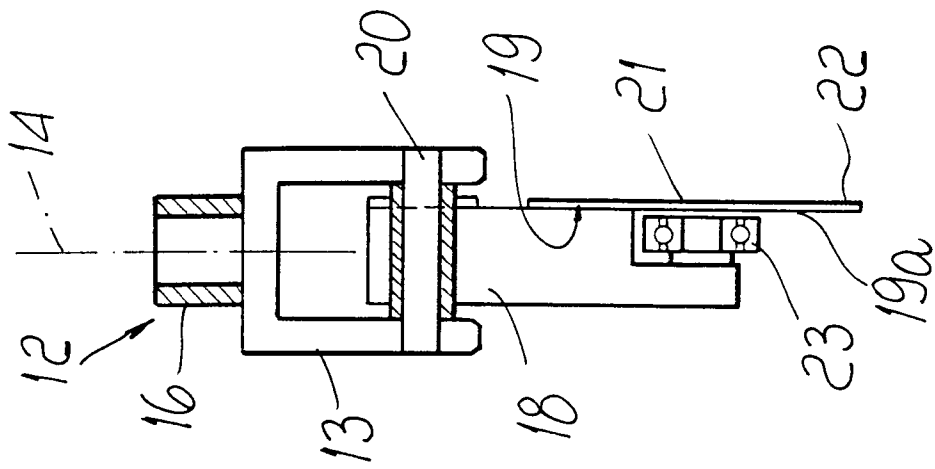
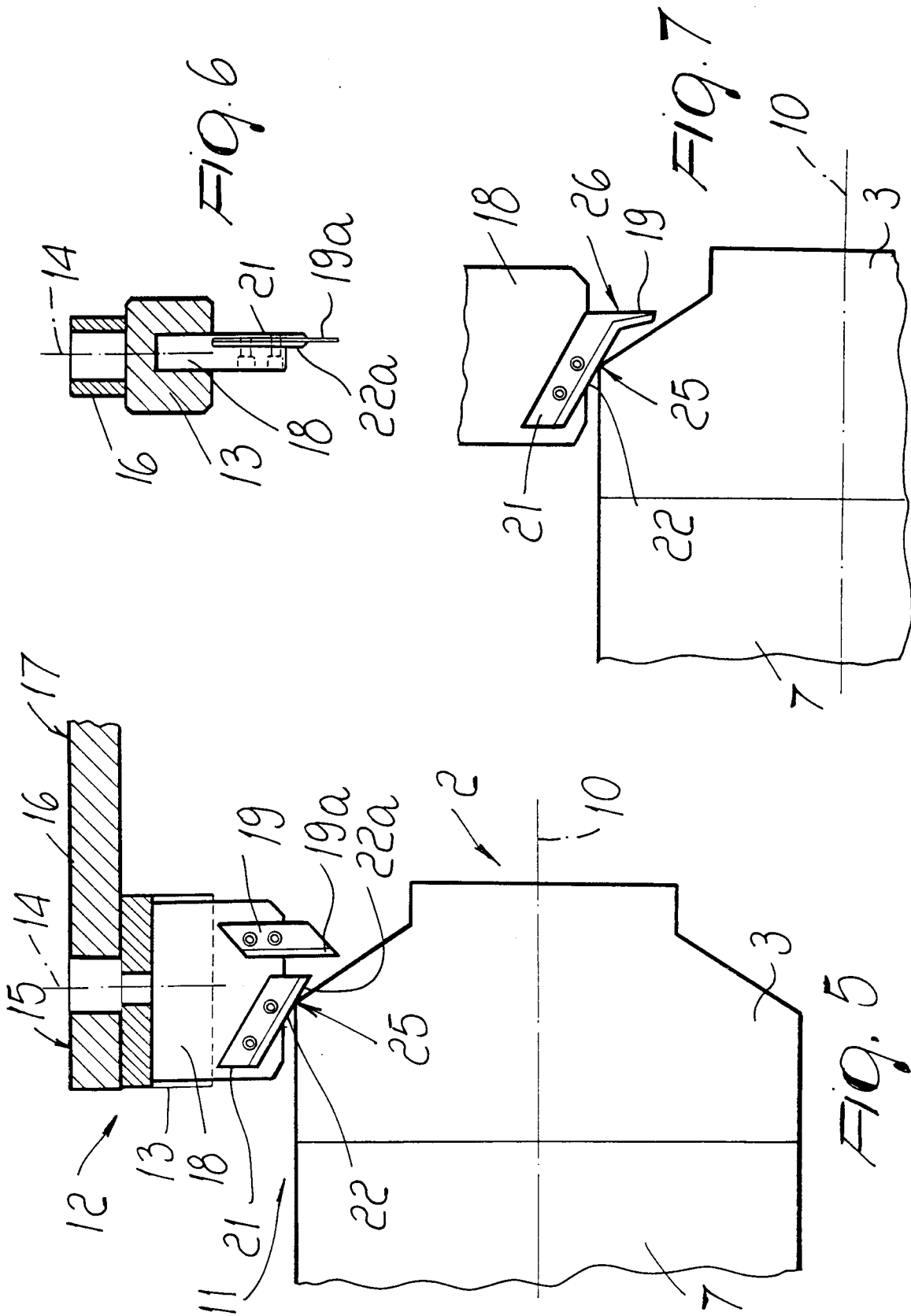


FIG. 3





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EUROPEAN SEARCH REPORT

Application Number
EP 97 10 9098

DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
P,X	DE 195 29 669 A (GIESECKE) * the whole document *	1,2
A	EP 0 100 990 A (GAO) * abstract; figure 1 *	1
<p style="text-align: center;">--- -----</p>		
		B65B69/00
		TECHNICAL FIELDS SEARCHED (Int.Cl.6)
		B65B
The present search report has been drawn up for all claims		
Place of search	Date of completion of the search	Examiner
THE HAGUE	15 September 1997	Claeys, H
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