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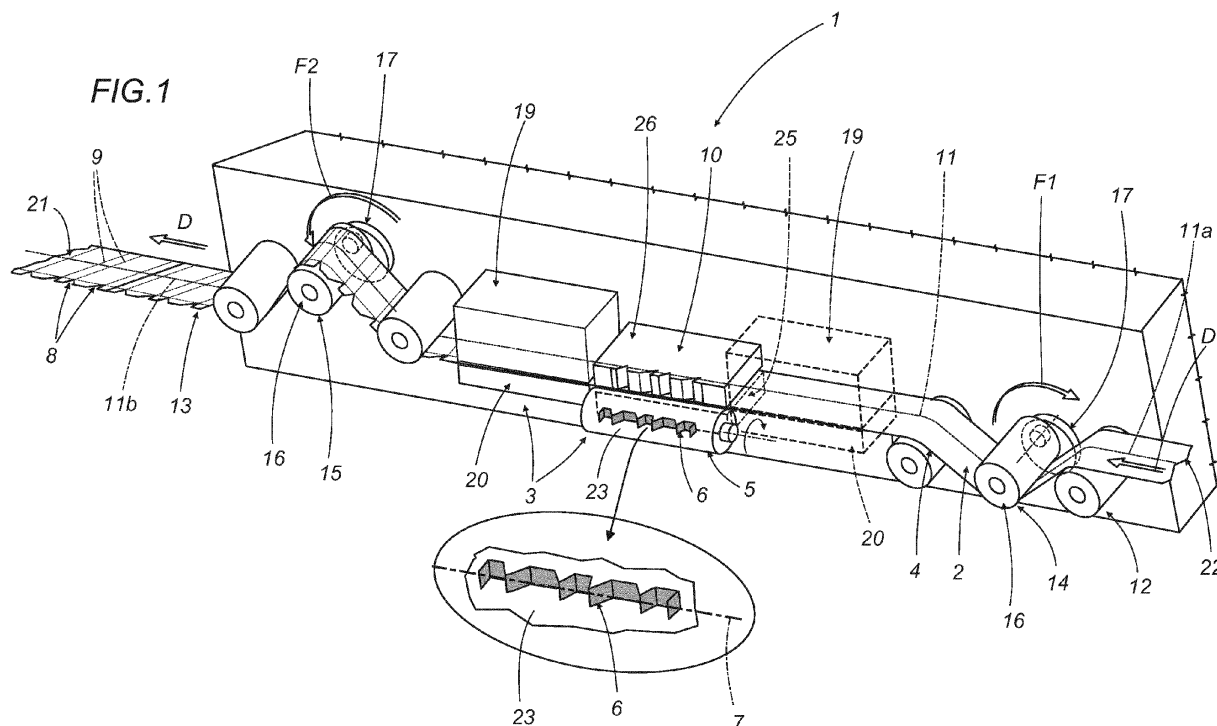
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(54) **Device for processing packaging material for cigarette packets**

(57) The device for processing packaging material for cigarette packets comprises a feed line (3) for the packaging material (2), the latter having a longitudinal edge (4) which is substantially parallel with the feed line (3), and also comprises a first cutting device (5) comprising at least one cutter profile (6) extending along a main longitudinal line (7) which is substantially parallel with the feed line (3); at a first operating station (10) and with the

packaging material (2) stationary, the first cutting device (5) brings its cutting profile (6) into contact with the edge (4) of the packaging material (2) in a position such that the main longitudinal line (7) of the selfsame profile (6) lies, at the moment of cutting, in a plane which is substantially coplanar with the plane in which the packaging material (2) lies so that the entire notch (8) is made immediately and all at once.



Description

[0001] This invention relates to a device for processing packaging material for cigarette packets.

[0002] The packaging material may be more or less stiff paper material or plastic material and the like, also more or less stiff.

[0003] More specifically, reference will be made to devices designed to make in the packaging material, notches and cuts or lines of weakness intended to define a blank for a semirigid or soft label or a sheet for making packets of diverse kinds. Existing kinds of packets form part of the common general knowledge of the average person skilled in the art in the tobacco industry.

[0004] Prior art devices which make notches and cuts in a packaging material operate on material which is in motion. In other words, these devices operate on the material as it moves along the production line. Further, these devices use cutters mounted, for example, on rollers or punches, which need a mating die in order to make the notch or cut.

[0005] These cutters impact strongly on the mating die, resulting in rapid blade wear.

[0006] These devices also present maintenance problems due to the need to sharpen and/or substitute the cutters, which are usually difficult for an operator to access.

[0007] Moreover, the prior art devices are also characterized by the high costs involved in substituting worn cutters and mating dies.

[0008] This invention has for an aim to provide a device for processing packaging material for cigarette packets which overcomes the above mentioned drawbacks of the prior art.

[0009] More specifically, it is an aim of this invention to provide a device for processing packaging material for cigarette packets which can guarantee a long working life of the cutters used to make the cuts in the packaging material.

[0010] Another aim of the invention is to provide a device that is quick and easy to maintain and whose maintenance costs are limited.

[0011] These aims are achieved by a device for processing packaging material for cigarette packets having the features described in the annexed claims.

[0012] The invention will now be described with reference to the accompanying drawings which illustrate by way of example two preferred embodiments of it and in which:

- Figure 1 is a schematic perspective view of a feed line for the packaging material comprising a device according to the invention for processing the packaging material;
- Figures 2 and 3 are schematic plan views, with some parts cut away, illustrating two successive steps in the processing of the packaging material; and
- Figure 4 is an exploded, schematic perspective view

of an alternative embodiment of the device for processing the packaging material.

[0013] With reference to Figure 1, the numeral 1 denotes in its entirety a device for processing packaging material 2 for cigarette packets.

[0014] The device 1 comprises a feed line 3 for the packaging material 2 and the packaging material 2 has a longitudinal lateral edge 4 which is substantially parallel with the feed line 3.

[0015] The device 1 also comprises a first device 5 for cutting the material 2 comprising at least one cutter profile 6 extending along a main longitudinal line 7 which is substantially parallel with the feed line 3 for the packaging material 2. In this specification, the term "cutting" is used, as will become clearer as this description continues, to mean the making in the packaging material 2 of an open and/or closed notch 8 or the making of one or more lines of weakness 9.

[0016] The first cutting device 5 works at a first operating station 10 and with the packaging material 2 stationary. Also, according to the invention, the first cutting device 5 works on the above mentioned edge 4 of the packaging material 2 but it might also work simultaneously on opposite edges of the packaging material 2.

[0017] With reference to Figure 1, the packaging material 2 is unwound in a feed direction D along a feed path 11 defined between an infeed zone 12 and an outfeed zone 13 of the device 5. At the infeed zone 12 and outfeed zone 13, which are suitably spaced, the packaging material 2 engages respective tensioning means 14 and 15.

[0018] The feed path 11 has a first stretch 11a, which is located upstream, and a second stretch 11b, which is located downstream, of the first operating station 10, and more specifically, of the first cutting device 5, and where the first and second tensioning means 14 and 15 operate.

[0019] The first and second tensioning means 14 and 15 preferably consist of rollers 16, mounted in such a way as to be freely rotatable, at an eccentric position, on respective crank discs 17, which are rotatable about a horizontal axis of rotation transversal to the feed direction and at a constant angular speed in the direction indicated by the arrow F1, clockwise looking at Figure 1 in the case of the first tensioner 14, and by the arrow F2, anticlockwise looking at Figure 1 in the case of the second tensioner 15.

[0020] Preferably, the crank discs 17 of the tensioning rollers 16 are driven in rotation through suitable transmission means, not illustrated, by a drive unit, also not illustrated.

[0021] The tensioning rollers 16 continuously vary the length of the feed path of the packaging material 2 in the first stretch 11a, upstream of the first operating station 10, and in the second stretch 11b, downstream of the first operating station 10, respectively. More specifically, an increase in the length of the packaging material feed path in the first stretch 11a of the path is accompanied by a corresponding decrease in the length of the pack-

aging material feed path in the second stretch 11b, so that the total length of the feed path between the infeed zone and the outfeed zone remains constant

[0022] More specifically, the alternate variations in the length of the packaging material feed path in the stretches upstream and downstream of the first operating station 10 are such as to determine zero relative speed of the material at the first operating station 10, on account of the material accumulated upstream of the first operating station 10 itself.

[0023] The circular movement of the tensioning rollers on which the packaging material is wound, driven in rotation by the crank discs, produces a loop of variable size at the stretches upstream and downstream of the first operating station 10. The formation of the loop causes a continuous variation in the length of the packaging material feed path stretches upstream and downstream of the operating station 10.

[0024] More specifically, since the angular positions of the tensioning rollers on the crank discs are offset from each other by approximately half a turn, an increase in the length of the first stretch of the packaging material feed path, upstream of the first operating station, produces a corresponding decrease in the length of the second stretch of the packaging material feed path, downstream of the first operating station. Next, a decrease in the length of the first stretch produces a corresponding increase in the length of the second stretch of the packaging material feed path, so as to keep the total length of the feed path between the infeed zone 12 and the outfeed zone 13 constant and so as to obtain zero speed of the material at the first operating station

[0025] During this stage, the unwinding of the material determined by the simultaneous reduction in the length of the stretch of material downstream of the first operating station, controlled by suitable electronic control means, guarantees continuity of packaging material feed at the outfeed zone.

[0026] Next, the reduction in the size of the loop in the first stretch of the packaging material feed path causes the material itself to be fed through the first operating station.

[0027] The above refers to a single operating station.

[0028] It is understood, however, that the description also applies to other operating stations present in the device. That is to say, in the case of two or more stations, and thus two or more cutting devices associated with respective operating stations, the cutting devices operate simultaneously on two or more portions of the zero speed stretch between the infeed zone and the outfeed zone of the device. In short, each cutting device operates on a portion of the zero speed stretch which defines a single piece of material which will constitute the cigarette packet. More specifically, each cutting device operates on a stretch of the edge of the packaging material coinciding with a longitudinal edge of a piece of packaging material which will constitute the cigarette packet.

[0029] As described in more detail below, to facilitate

what has just been said, the packaging material is moved from the infeed zone to the outfeed zone with intermittent motion according to a step, or a multiple of it, equal to the longitudinal length of an individual piece.

[0030] In the embodiment illustrated, the first cutting device 5 makes in the edge 4 of the material 2 a notch 8 where material is removed.

[0031] The first cutting device 5 makes in the edge 4 of the material 2 a notch 8 with a view to making a series of tongues 18 of a semirigid label or piece 21. When the packet is formed around a respective group of cigarettes, the tongues 18 define the bottom wall of the packet and the related inner closing tongues.

[0032] The device 1 further comprises a second cutting device 19 for the packaging material 2, also operating with the packaging material 2 stationary. The second cutting device 19 operates at a second operating station 20 and makes at least one line of weakness 9 in the material.

[0033] The second operating station 20 may be located upstream (as illustrated with a dashed line in Figure 1) or downstream (as illustrated with a solid line in Figure 1) of the first operating station 10.

[0034] As shown in Figures 2 and 3, the second cutting device 19, which is of known type and therefore not described in detail, makes the lines of weakness 9 in a stretch t of packaging material 2 defining the individual piece 21.

[0035] If the second operating station 20 is located downstream of the first 10, the second cutting device 19 makes the lines of weakness 9 in synchrony with the feeding of the material 2. In other words, for the lines 9 to be made correctly based on the profile of the notch 8, the second cutting device 19 is located, relative to the first cutting device 5, at a distance equal to a step p , or a multiple of it, coinciding, according to what was said above, with the longitudinal dimension t of the piece 21.

[0036] That way, the lines of weakness 9 are correctly matched with the cut profile.

[0037] If the second operating station 20 is located upstream of the first, it is the first cutting device 5 which has to operate in synchrony with the second cutting device 19, in the same way as described above.

[0038] The packaging material 2 may be fed to the device 1 in the form of a continuous web 22, or in the form of a plurality of individual pieces (not illustrated).

[0039] In the embodiment illustrated in Figure 1, the packaging material is in the form of a continuous web 22 unwound from a roll, not illustrated, located upstream of the device 1. Next, the notch 8 and the lines of weakness 9 are made in the web 22 in the same way as that described above. Lastly, the web 22 must be cut along a direction transversal to the feed direction D so as to form the individual pieces 21 that will constitute the cigarette packet.

[0040] The individual pieces 21 may be cut off at any point in the device, or even outside it. Whatever the case, transversely cutting off the individual pieces 21 is preferably effected downstream of the second operating sta-

tion 20, after the lines of weakness have been made in the packaging material. If the packaging material is in the form of a plurality of individual pieces, these are adjacent to one another as they are moved forward. That is because it is preferable for the web to be transversely cut upstream of the first operating station, or upstream of the device itself. Obviously, the pieces might be stacked in piles in a magazine and fed to the operating station one after the other.

[0041] It is convenient to keep the pieces adjacent to each other so it is easier to synchronize the cutting devices with the pieces being fed. Keeping the pieces adjacent to each other and making them advance by a step equal to their longitudinal length, or a multiple of it, also simplifies the architecture of the device in its entirety and the control of its individual devices.

[0042] As illustrated in Figures 1, 2 and 3, the first cutting device 5 comprises a drum 23, having a cutter profile 6 rotating about an axis 24 which is parallel with the feed line 3 for the packaging material 2.

[0043] The drum 23 is located at the side of the feed line 3 and, more specifically, it is suitably located, relative to the stationary packaging material 2, in such a way that the main longitudinal line 7 of the cutter profile 6 lies, at the moment of cutting, in a plane which is substantially coplanar with the plane in which the packaging material 2 lies.

[0044] That means that the moment the cutter profile 6 is brought into contact with the edge 4 of the packaging material 2, the entire notch 8 is made immediately and all at once by the first cutting device 5.

[0045] Also, the drum 23 rotates with continuous motion and is of a size suitable to synchronize the cutting of the notch 8 with the feeding of the material 2.

[0046] For example, it should be noted that this might be done by setting a constant rotation speed fixed on the basis of the length of time the packaging material remains stationary at the first operating station 10

[0047] Or, more conveniently, the size of the drum is fixed also according to the size of the material to be processed and the speed of rotation is modified on the basis of the operating speed of the machine and hence according to variations in the length of time the packaging material remains stationary at the first operating station 10

[0048] In Figure 2, the roller 23 is cutting the notch 8 along the edge 4 of the packaging material 2 and the second operating station is making the lines of weakness 9. In Figure 3, the roller 23 is rotating to return in synchrony towards its notch cutting position.

[0049] In order to guarantee that the notch 8 is cut correctly, the first cutting device 5 has a fixed die plate 25 supporting the material 2, and a hold-down element 26, also fixed, placed on top of the packaging material 2 on the side of the packaging material 2 opposite the fixed die plate 25.

[0050] The fixed die plate 25 and the hold-down element 26 have an edge 27 (Figure 4), which is aligned with the edge 4 of the packaging material 2. Both of the

edges 27 have a profile 28 which reproduces in negative the cutter profile 6 of the drum 23.

[0051] In a further embodiment, illustrated in Figure 4, the drum 23 is substituted for a cutter punch 28, having the same cutter profile 6 and able to move from a non-operating position to an operating position for cutting the material 2, along a straight trajectory, indicated by the arrows F. More specifically, the cutter punch 28 moves along a trajectory which is perpendicular to the plane in which the packaging material 2 lies, that is, it moves in a plane which is substantially perpendicular to the plane in which the packaging material 2 lies, and which is parallel with the predetermined direction of feed D of the packaging material.

[0052] In this case, too, the cutter profile 6 extends along a main longitudinal line 7 parallel to the feed line 3.

[0053] During operation, the cutter punch 28, to start with, is located, at the non-operating position. When the packaging material 2 is advanced and made to stop at the first station 10, the punch is moved to the operating position where it cuts the notch 8 in the edge 4 of the packaging material 2. Immediately after cutting the notch 8, the cutter punch 28 is moved back to the non-operating position so as not to hinder the feeding of the packaging material 2.

[0054] The cutter punch 28 has a cutter profile 6 which projects from a flat underside face and extends towards the packaging material 2. Further, the cutter profile 6 is shaped in such a way that it lies in the same plane as the packaging material 2 when the notch 8 is being cut.

[0055] As in the first embodiment, in this case, too, there is a fixed die plate 25 supporting the web and a hold-down element 26 for the packaging material 2, which are identical both in structural and functional terms as those of the first embodiment of the device.

[0056] In a third embodiment, not illustrated, the first cutting device has a cutter element which is, in this case, moved along a curved trajectory from a non-operating position to an operating position for cutting the packaging material.

[0057] The device described offers numerous advantages. First of all, the device has a simple constructional architecture which not only provides rapid access to all its parts but also allows its overall costs to be reduced.

[0058] Also, it allows a clean and precise cut to be made in the edge of the packaging material since the cut is made while the packaging material is stationary and not while it is in motion.

[0059] Moreover, the device lends itself to easy and economical retrofitting on existing machines.

[0060] The device is also characterized by high flexibility in terms of the size of the packaging material web and of the packet to be made. Indeed, substitution of parts in the event of changeover to a different size web of packaging material or packet is quick and easy. This reduces downtime and costs for changeover and maintenance.

[0061] The device described also allows the working

life of its components to be significantly extended, since they do not require frequent substitution, especially the cutters which operate on the packaging.

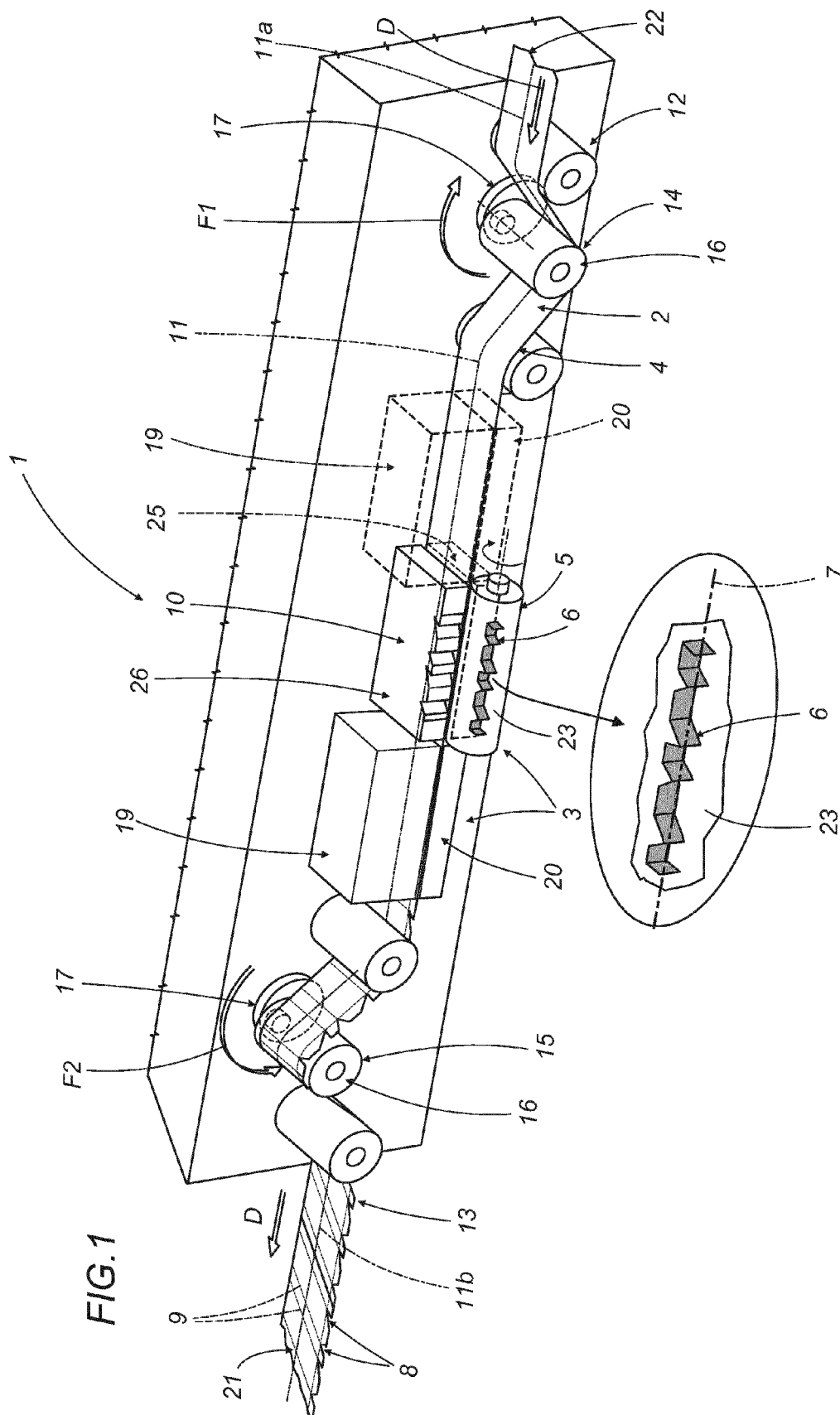
[0062] Indeed, thanks to the notched edge, in particular of the die plate, the device can cut the notch correctly without necessitating a cutter blade which impacts strongly on the die plate itself. Thus, the device allows cutter elements and blades to have a longer working life and reduces safety-related risks arising out of possible blade failure during operation.

Claims

1. A device for processing packaging material for cigarette packets, comprising a feed line (3) for the packaging material (2), said packaging material (2) having a longitudinal edge (4) which is substantially parallel with the feed line (3); and a first device (5) for cutting the material (2) comprising at least one cutter profile (6) extending along a main longitudinal line (7) which is substantially parallel with the feed line (3) for the packaging material (2); the first cutting device (5) operating, at a first operating station (10) and with the packaging material (2) stationary, on the longitudinal edge (4) of the packaging material (2)
2. The device according to claim 1, **characterized in that** the main longitudinal line (7) of the cutter profile (6) lies, at the moment of cutting, in a plane which is substantially coplanar with the plane in which the packaging material (2) lies.
3. The device according to claim 1 or 2, **characterized in that** the first cutting device (5) comprises a cutter punch (28), having a cutter profile (6) able to move along a straight trajectory and in a plane substantially perpendicular to the plane in which the packaging material (2) lies and parallel with the predetermined direction of feed of the packaging material (2), from a non-operating position to an operating position for cutting the material (2).
4. The device according to any of the claims from 1 to 3, **characterized in that** the first cutting device (5) comprises a cutter profile (6) able to move, along a curved trajectory, from a non-operating position to an operating position for cutting the material (2).
5. The device according to claim 4, **characterized in that** the first cutting device (5) comprises a drum (23), comprising a cutter profile (6) rotating about an axis (24) which is parallel with the feed line (3) for the packaging material (2).
6. The device according to any of the claims from 1 to 5, **characterized in that** the packaging material (2)

is a continuous web (22) fed from a reel located upstream of the device

7. The device according to any of the claims from 1 to 5, **characterized in that** the packaging material is in the form of a plurality of individual pieces (21).
8. The device according to any of the claims from 1 to 7, **characterized in that** the first cutting device (5) makes a notch (8) in the lateral edge (4) of the packaging material (2).
9. The device according to any of the claims from 1 to 8, **characterized in that** it comprises a second cutting device (19) for the packaging material (2), operating with the packaging material (2) stationary at a second operating station (20); the second cutting device (19) creating at least one line of weakness (9) in the material (2).
10. The device according to claim 9, **characterized in that** the second operating station (20) is located upstream or downstream of the first operating station (10).
11. The device according to any of the claims from 1 to 10, **characterized in that** the packaging material (2) is fed to the device (1) infeed and is picked up at the device (1) outfeed in a continuous fashion; the packaging material being fed at least at one operating station (10, 20) between the device (1) infeed and its outfeed, with intermittent motion according to a step (p), or a multiple of it, defined by the length of an individual piece (21).



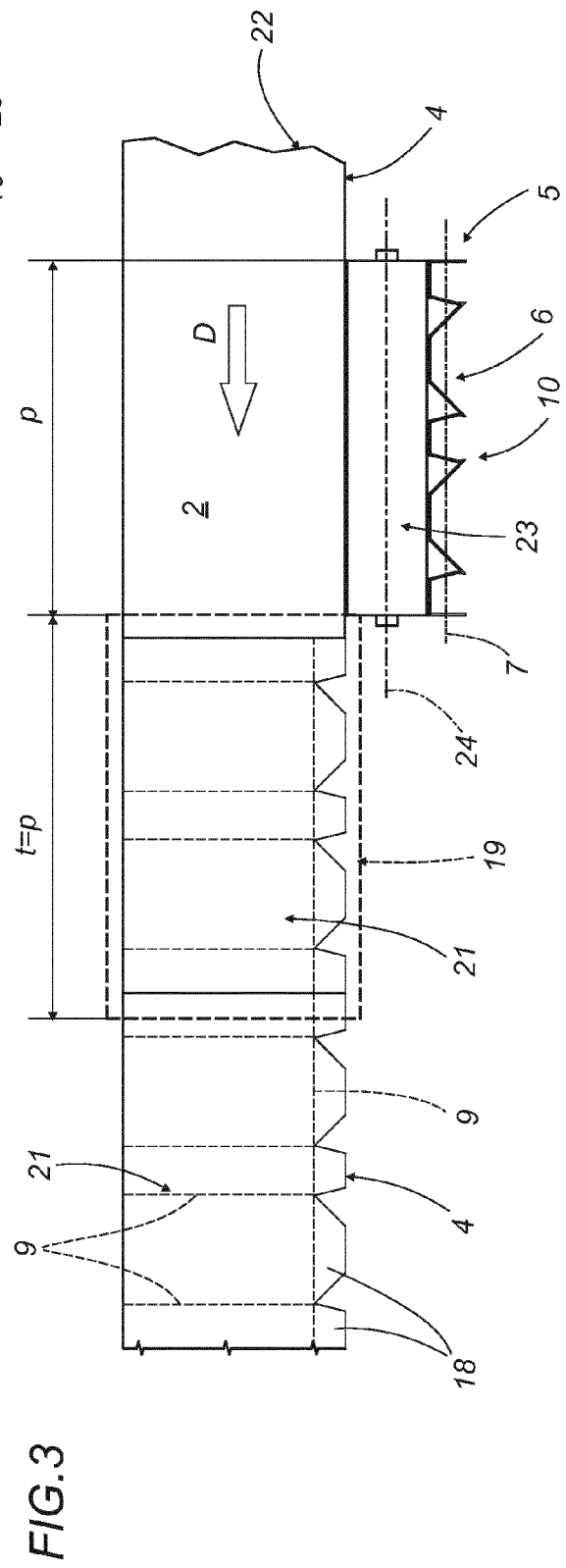
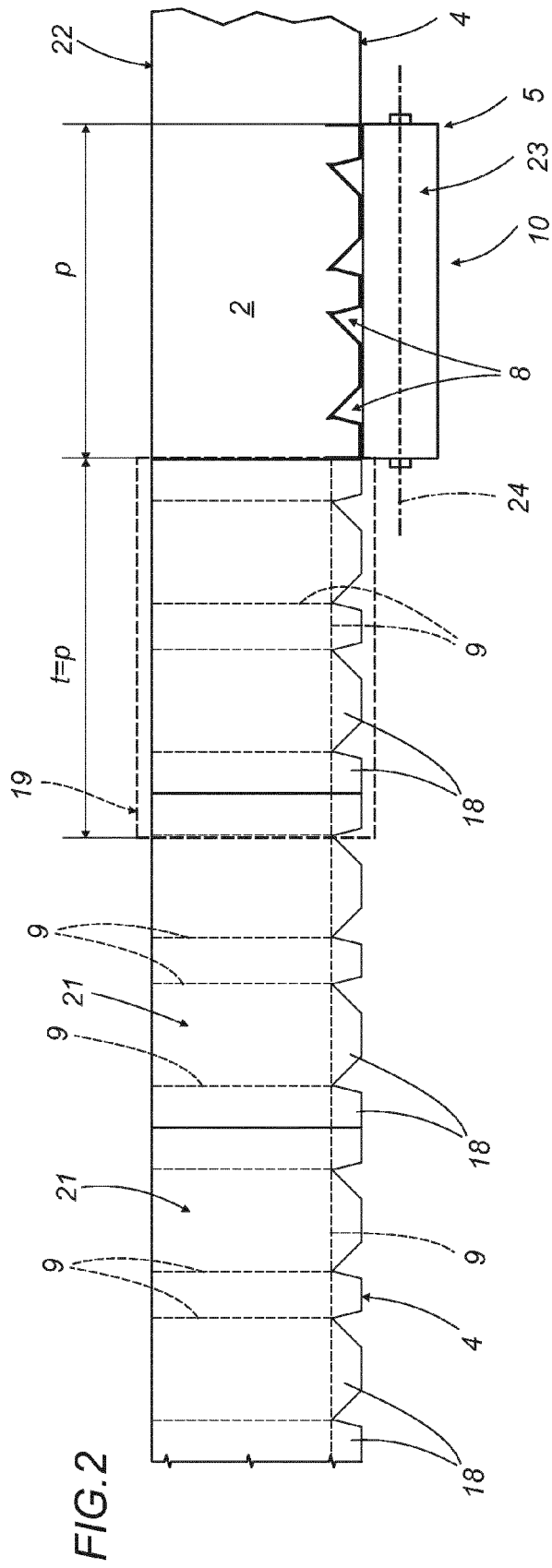
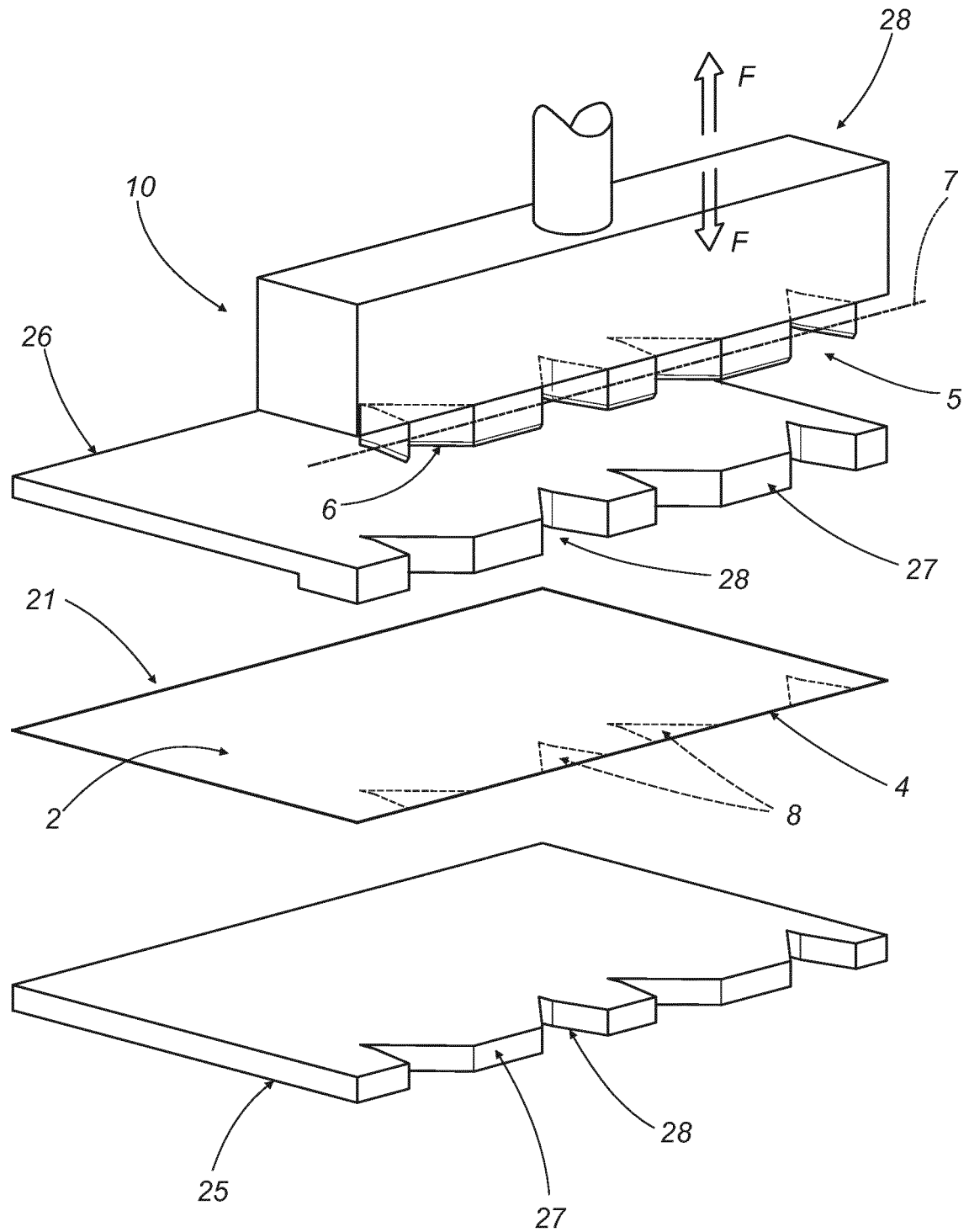


FIG.4





EUROPEAN SEARCH REPORT

Application Number
EP 12 17 3670

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 22 October 2012	Examiner Bevilacqua, Vincenzo
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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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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