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(54) **An outfeed unit of a packer machine manufacturing containers for tobacco products**

Ausgabeeinheit einer Verpackungsmaschine zur Herstellung von Behältern für Tabakprodukte

Unité de sortie d'empaqueteuse fabriquant des récipients pour produits de tabac

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Description

[0001] The present invention relates to an outfeed unit of a packer machine manufacturing containers for tobacco products, in particular packets of cigarettes.

[0002] Conventionally, the outfeed unit of a cigarette packer comprises a rectilinear channel along which packets of cigarettes ordered in a substantially continuous row are conveyed, cured and measured.

[0003] The channel in question is delimited above and below by two mutually opposed branches of two power-driven conveyor belts, looped around respective pairs of rollers at the opposite ends of the channel.

[0004] The cigarette packets are generally of rectangular parallelepiped appearance, each presenting two end walls disposed transversely to a longitudinal axis of the packet, and four side walls by which the end walls are interconnected.

[0005] The two end walls coincide with the top end face and bottom end face of the packet, whilst the two larger side walls coincide with the front and rear faces, and the two smaller side walls with the flank faces.

[0006] Internally of the aforementioned channel, the packets are disposed transversely to the direction of movement of the conveyor belts and with one of the two flank faces resting on the bottom of the channel.

[0007] Likewise conventionally, as the packets advance along the channel, one of the exposed faces presented by each individual packet, typically the bottom end face, is marked during the course of a printing step with a number (the production lot, for example), or a date, or a code of whatever given description.

[0008] To this end, the machine is equipped with a laser or ink-jet printer.

[0009] To ensure the print is correctly and consistently aligned on each packet, the machine further comprises means by which to time the passage of the packets with the operation of the printing device.

[0010] Such means are provided by interlocking the printing device to a further device stationed upstream of the selfsame printing device and monitoring the progress of the packet, so as to establish an exact synchronization between the passage of each packet and the activation of the printing device.

[0011] Were the packets to be distanced one from the next, the monitoring device could make use of a barrier photocell able to detect the position of each successive packet by way of the gaps in the advancing row.

[0012] In outfeed units of conventional embodiment, however, the packets generally advance in close contact one with the next, in such a way that the respective bottom end faces combine to form a substantially flat and unbroken surface; accordingly, monitoring devices of the type in question utilize sensors designed to detect a particular reference mark or notch identifying the packet or brand currently in production.

[0013] US 2003/146 068 A1 discloses a conventional device for feeding cigarette packets out of a packing machine.

[0014] Self-evidently, this means that when switching to another brand of cigarette and/or to a different size or type of packet, the sensors or their settings must be replaced or modified so that they can be adapted to products with different specifications.

[0015] The object of the present invention is to provide a monitoring device for an outfeed unit of a packer machine manufacturing containers for tobacco products, such as will be unaffected by drawbacks associated with the prior art as mentioned above, that is to say, a monitoring device that will require no modification whatever in the event of production being switched from one brand to another.

[0016] The stated object is realized in an outfeed unit of a machine manufacturing containers for tobacco products, of which the characteristics are as recited in one or more of the appended claims.

[0017] The invention will now be described in detail, by way of example, with the aid of the accompanying drawings, in which:

- figure 1 shows an outfeed unit of a cigarette packer embodied in accordance with the present invention, viewed schematically in a front elevation;
- figure 2 shows an enlarged detail of figure 1, viewed in plan;
- figure 3 is a graph illustrating the methodology applied in operation of the outfeed unit to which the present invention relates;
- figure 4 shows a cigarette packet of the type illustrated in figure 1, viewed in perspective.

[0018] With reference to figures 1 and 2, numeral 1 denotes an outfeed unit, in its entirety, forming part of a machine 2 producing packets 3 of cigarettes, known conventionally as a cigarette packer.

[0019] The outfeed unit 1 presents a rectilinear channel 4 along which packets 3 ordered in a continuous row 5 are conveyed and cured.

[0020] The channel 4 is carried by a vertical bulkhead 6 of the packer machine 2, and connects this same machine with an overwrapping machine, schematized as a block denoted 7, by which the packets 3 are enveloped in an outer covering of transparent material.

[0021] The channel 4 is delimited above and below by two mutually opposed and parallel branches 8 and 9 of two respective conveyor belts 10 and 11 looped around respective pairs of rollers 12 and 13 at opposite ends of the channel.

[0022] The two belts 10 and 11 are driven by a motor 14, with the active branches 8 and 9 running in a feed direction denoted F (see arrow).

[0023] In familiar fashion, and as shown in figure 4, the cigarette packets 3, which for example could be of hinge-lid type, are of substantially rectangular parallelepiped appearance, each presenting two end walls 15 and 16 disposed transversely to the longitudinal axis of the pack-

et, denoted L, and four side walls 17, 18, 19 and 20 by which the end walls 15 and 16 are interconnected.

[0024] The two end walls 15 and 16 coincide respectively with the top end face and the bottom end face of the packet 3, the two smaller side walls 17 and 18 with the flank faces, and the two larger side walls 19 and 20 respectively with the front face of the packet 3, from which the lid is opened, and the rear face or back of the packet, which is crossed by the hinge line of the lid.

[0025] Internally of the channel 4, the packets 3 are disposed transversely to the feed direction F of the conveyor belts 10 and 11 and positioned with one flank face 17 or 18 resting on the bottom of the channel 4, so that the bottom end of each packet 3, as viewed in the elevation of figure 1, remains accessible on the side of the channel 4 opposite from the bulkhead 6.

[0026] In figure 1, numeral 21 denotes a monitoring device designed to track the packets 3 during their passage through a monitoring position 22 located along the channel 4.

[0027] With reference to the plan view of figure 2, the monitoring device 21 comprises sensing means 23 consisting in a high sensitivity distance sensor 24 of laser or microwave type, positioned facing the substantially flat surface presented by the adjoining end faces 16 of the single packets 3 advancing in succession along the channel 4.

[0028] By way of example, the distance sensor 24 could be an OADM series laser sensor, made by the Swiss company Baumer Electric AG.

[0029] Located at a position 25 along the channel 4, downstream of the monitoring position 22, the unit 1 comprises a printing device, schematized in the drawing as a block denoted 26 and consisting, for example, of an ink-jet printing device or a laser printing device.

[0030] The printing device 26 is interlocked to the monitoring device 21 by way of a master control unit 27 in receipt of the output signal from an encoder 28 designed to generate a succession of pulses indicating the feed rate of the conveyor belts 10 and 11, and consequently also indicating the number of machine cycles.

[0031] The graph of figure 3 represents the variation in amplitude A of the output signal generated by the distance sensor 24 in response to the variation in distance D between the sensor 24 and the bottom end faces 16 of the packets 3, occurring with the displacement S of the row 5 relative to the monitoring position 22.

[0032] As indicated by the graph, the amplitude A of the output signal from high accuracy sensors of the type in question registers a peak value M during the passage of the areas of contact, denoted 29, between successive packets, or in other words with each increase in the distance between the sensor 24 and the discontinuities in the surface created by the bottom end faces 16 of the packets 3.

[0033] It will be clear that the monitoring device according to the present invention requires neither replacing nor recalibrating, as the operating principle remains entirely independent of the brand of cigarette, or the size and type of the packet 3 in production.

[0034] It will also be self-evident that the application of the monitoring device disclosed remains the same, even where the containers of tobacco products happen to be cartons containing multiple packets of cigarettes, and the outfeed unit is that of a cartoner.

Claims

1. An outfeed unit of a packer machine manufacturing containers for tobacco products, comprising a channel (4) along which containers (3) are conveyed in a row (5), arranged one beside another and advancing in a given direction (F), a printing device (26) by which predetermined markings are applied to each container (3) at a position (25) along the channel (4), and a monitoring device (21) comprising means (23) by which to sense the position of each container (3) at a position (22) upstream of the position (25) along the channel (4), the printing device (26) being interlocked operatively to the monitoring device (21), **characterized**
in that the sensing means (23) consist in distance sensing means (24) of high sensitivity, able to detect areas of contact (29) between one container and the next.

2. A unit as in claim 1, wherein the containers (3) are of substantially parallelepiped appearance, so as to determine in said row (5), by at least one face (15; 16) a substantially flat surface extending along the row (5), **characterized in that** the high sensitivity sensing means are of a type designed to output analogue signals indicating discontinuities, coinciding with the areas of contact (29), of the substantially flat surface.

3. A unit as in claim 1 or 2, wherein the sensing means (24) are laser type distance sensors.

4. A unit as in claim 1 or 2, wherein the sensing means (24) are microwave type distance sensors.

5. A unit as in claim 2 or 3 or 4, wherein the containers (3) consist in cigarette packets.

6. A unit as in claim 2 or 3 or 4, wherein the containers (3) consist in cigarette cartons.

Patentansprüche

1. Ausgabeeinheit einer Verpackungsmaschine zur Herstellung von Behältern für Tabakprodukte, umfassend einen Kanal (4), entlang dem Behälter (3) in einer Reihe (5) befördert werden, die nebenein-

ander angeordnet sind und in einer bestimmten Richtung (F) vorrücken, eine Druckvorrichtung (26), durch welche festgelegte Markierungen an jedem Behälter (3) in einer Position (25) entlang dem Kanal (4) angebracht werden sowie eine Kontrollvorrichtung (21), umfassend Mittel (23), durch welche die Position eines jeden Behälters (3) in einer Position (22) erfasst wird, die der Position (25) entlang dem Kanal (4) vorgeschaltet ist, wobei die Druckvorrichtung (26) betriebsbereit an der Kontrollvorrichtung (21) verriegelt ist,
dadurch gekennzeichnet, dass
die Erfassungsmittel (23) aus hochempfindlichen Abstanderfassungsmitteln (24) bestehen, die dazu fähig sind, Kontaktbereiche (29) zwischen einem Behälter und dem nächsten zu ermitteln.

2. Einheit nach Anspruch 1, wobei die Behälter (3) einer im Wesentlichen quaderförmigen Gestalt sind, sodass in der Reihe (5) durch mindestens eine Fläche (15; 16) eine im Wesentlichen ebene Oberfläche gebildet wird, die sich entlang der Reihe (5) ausdehnt, **dadurch gekennzeichnet, dass** die hochempfindlichen Erfassungsmittel eines Typs sind, der dazu konzipiert ist, analoge Signale auszugeben, die Diskontinuitäten angeben, die den Kontaktbereichen (29) der im Wesentlichen ebenen Oberfläche entsprechen.

3. Einheit nach Anspruch 1 oder 2, wobei die Erfassungsmittel (24) Abstandssensoren vom Lasertyp sind.

4. Einheit nach Anspruch 1 oder 2, wobei die Erfassungsmittel (24) Abstandssensoren vom Mikrowellentyp sind.

5. Einheit nach Anspruch 2 oder 3 oder 4, wobei die Behälter (3) Zigarettenschachteln sind.

6. Einheit nach Anspruch 2 oder 3 oder 4, wobei die Behälter (3) Zigarettenstangen sind.

Revendications

1. Unité de sortie d'empaqueteuse fabriquant des récipients pour produits de tabac, comprenant un canal (4) le long duquel les récipients (3) sont acheminés en une rangée (5), disposés l'un à côté de l'autre et avançant dans une direction donnée (F), un dispositif d'impression (26) qui applique des marquages prédéterminés sur chaque récipient (3) à une position (25) le long du canal (4), et un dispositif de contrôle (21) comprenant des moyens (23) qui détectent la position de chaque récipient (3) à une position (22) en amont de la position (25) le long du canal (4), le dispositif d'impression (26) étant accouplé opérationnellement au dispositif de contrôle (21),
caractérisée
en ce que les moyens de détection (23) consistent en des moyens de détection de distance (24) à haute sensibilité, capables de détecter des zones de contact (29) entre un récipient et l'autre.

2. Unité selon la revendication 1, dans laquelle les récipients (3) présentent une forme essentiellement parallélépipède, de sorte à déterminer dans ladite rangée (5), avec au moins une face (15 ; 16), une surface essentiellement plate évoluant le long de la rangée (5), **caractérisée en ce que** les moyens de détection à haute sensibilité sont d'un type conçu pour émettre des signaux analogiques signalant des discontinuités, coïncidant avec les zones de contact (29), de la surface essentiellement plate.

3. Unité selon les revendications 1 ou 2, dans laquelle les moyens de détection (24) sont des capteurs de distance de type laser.

4. Unité selon les revendications 1 ou 2, dans laquelle les moyens de détection (24) sont des capteurs de distance de type par micro-ondes.

5. Unité selon les revendications 2 ou 3 ou 4, dans laquelle les récipients (3) consistent en des paquets de cigarettes.

6. Unité selon les revendications 2 ou 3 ou 4, dans laquelle les récipients (3) consistent en des cartouches de cigarettes.

FIG.1

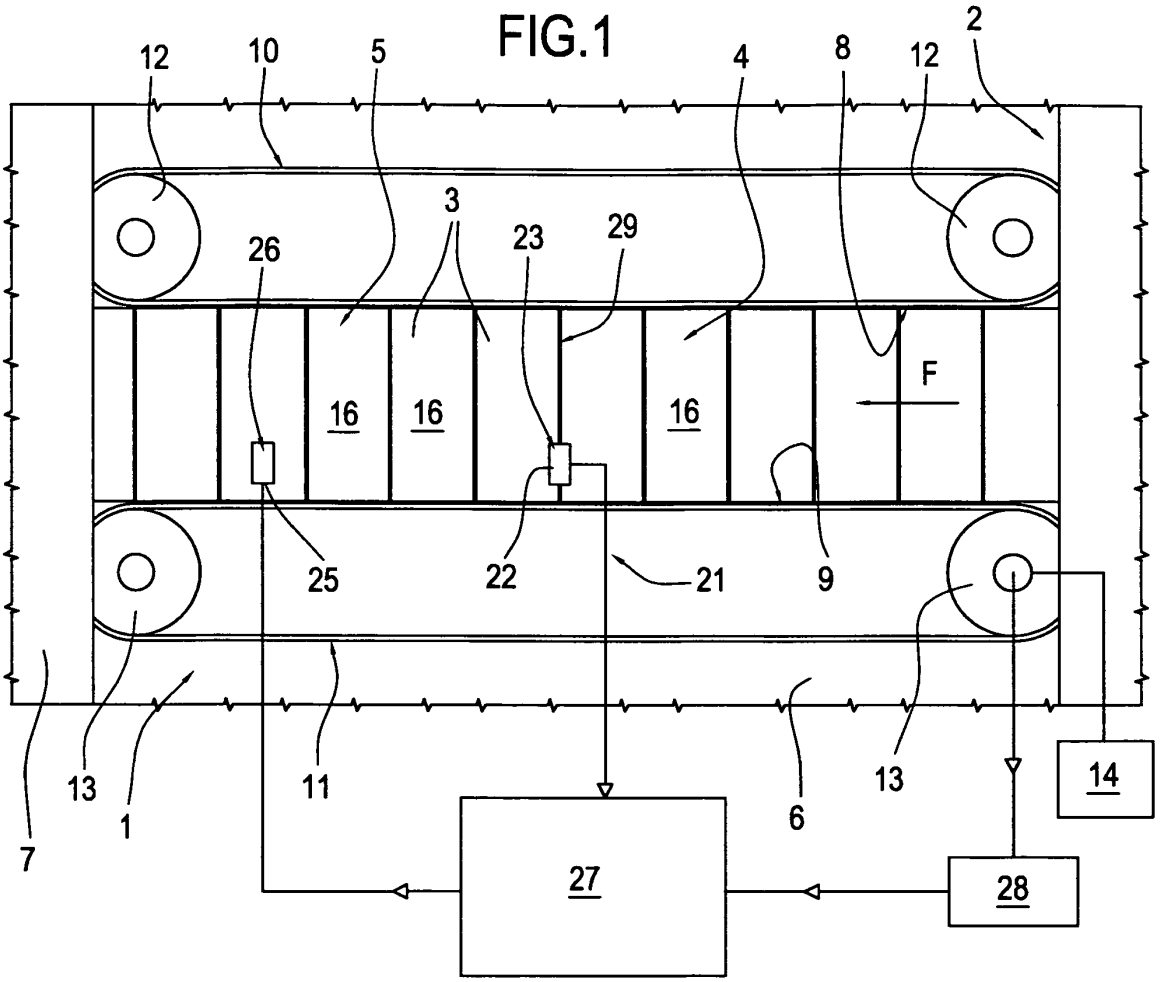

12
10
5
4
8
12
2
3
23
29
26
16
16
16
F
25
22
21
9
13
11
6
13
14
7
1
27
28

FIG.2

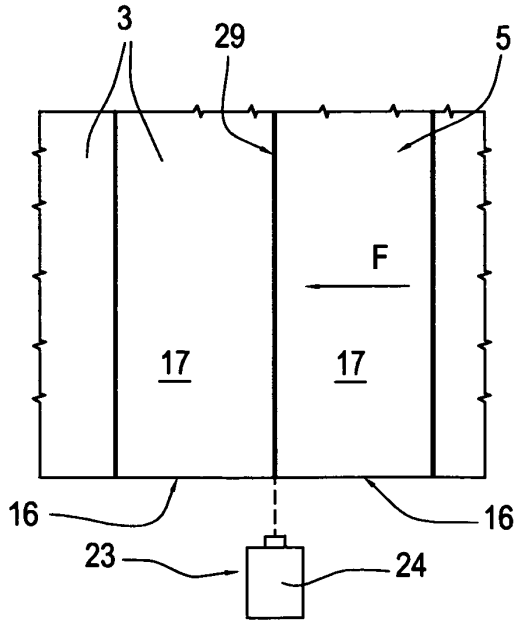

3
29
5
F
17
17
16
16
23
24

FIG.3

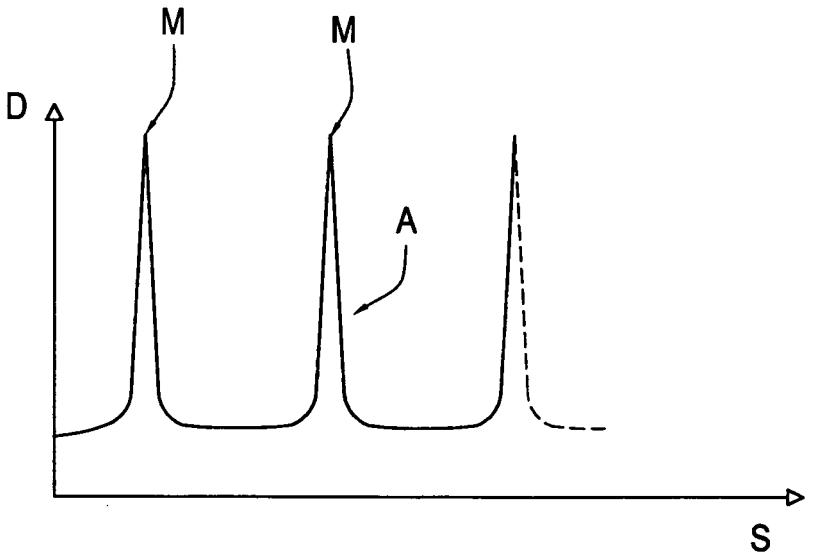
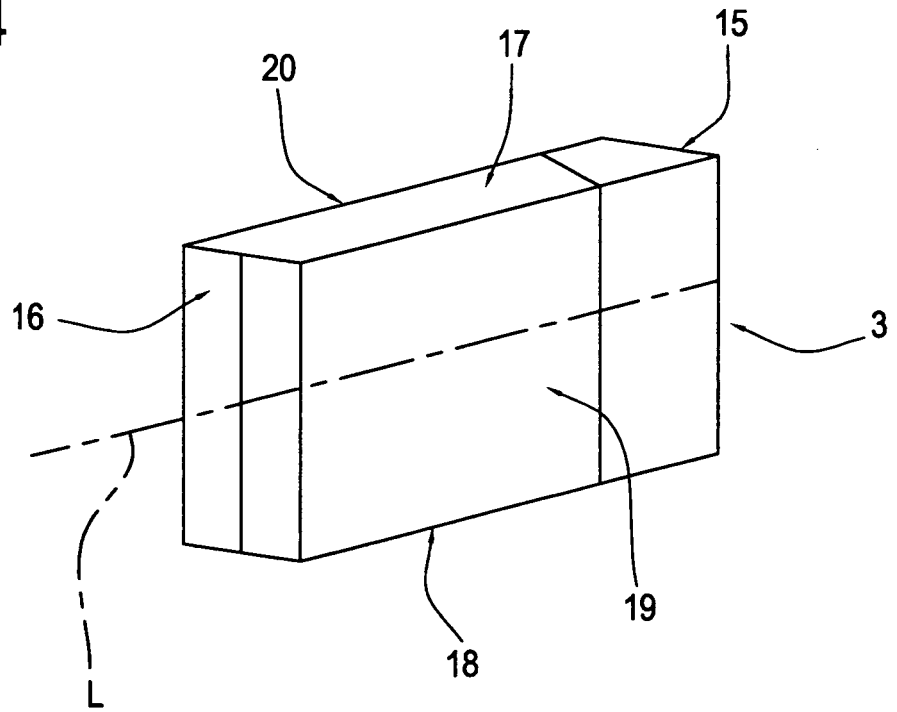


FIG.4



REFERENCES CITED IN THE DESCRIPTION

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