



- (51) International Patent Classification:
B65B 19/24 (2006.01)
- (21) International Application Number:
PCT/EP2016/058088
- (22) International Filing Date:
13 April 2016 (13.04.2016)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
BO2015A000181 15 April 2015 (15.04.2015) IT
102016000002633 13 January 2016 (13.01.2016) IT
- (71) Applicant: GIMA TT S.P.A. [IT/IT]; Via Tolara di Sotto n. 121/A, 40064 Ozzano Dell'emilia (Bo) (IT).
- (72) Inventor: DRAGHETTI, Fiorenzo; c/o GIMA TT S.p.A., Via Tolara di Sotto n. 121/A, 40064 Ozzano Dell'emilia (Bo) (IT).
- (74) Agent: PAGLIA, Pietro; Botti & Ferrari S.r.l., Piazza dei Martiri 1943-1945, 5, 40121 Bologna (IT).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,

DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

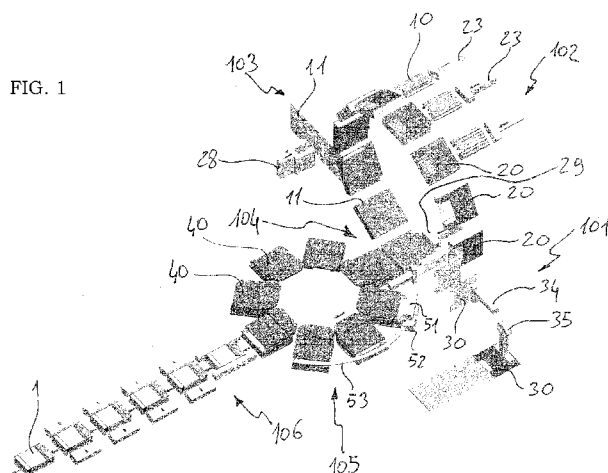
Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

Published:

— with international search report (Art. 21(3))
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(54) Title: METHOD AND RELATED APPARATUS FOR MANUFACTURING A SEALED WRAPPING OF A BUNDLE OF CIGARETTES



(57) Abstract: A method for manufacturing a sealed wrapping (1) of a bundle of cigarettes (10), including the steps of: providing a pocket (20) being shaped to receive a bundle of cigarettes (10); inserting a stiffening element (30) inside the pocket (20); inserting a bundle of cigarettes inside the pocket (20) in order to be surrounded by the stiffening element (30); providing a wrapping sheet (11) having a weakening line (2) suitable to obtain an access window for the bundle of cigarettes (10); folding in a U shape the wrapping sheet (11) on the pocket (20) in order to have two parallel flaps on the pocket (20); extracting the bundle of cigarettes (10) together with the stiffening element (3) from the pocket (20) in order to drag the wrapping sheet (11) until it contacts the bundle of cigarettes (10) and the stiffening element (3) without the interposition of the pocket (20) anymore; performing a first sealing by creating a transversal fin (9) forming joining two flaps of the wrapping sheet along one transversal edge (14) of the bundle of cigarettes (10), said transversal fin (9) being soldered while it is arranged along the edge perpendicularly to the bottom wall of the bundle of cigarettes (10); performing a final sealing of the open sides of the wrapping sheet (11) in order to form the sealed wrapping (1).



- 1 -

Method and related apparatus for manufacturing a sealed wrapping of a bundle of cigarettes

DESCRIPTION

Application field

5 The present invention refers to a method for manufacturing a sealed wrapping of a bundle of cigarettes.

The invention also refers to the related apparatus intended to implement that method.

The invention finds useful application particularly in the tobacco industry.

10 Known art

Traditionally, cigarettes are packaged in rigid or semi-rigid packets, inside which they are wrapped in an internal wrapping generally made of aluminum foil.

15 Even if it is diffusely adopted, such a form of internal wrapping is a compromise solution between the manufacturing costs and the necessity of keeping unaltered the aromatic qualities of the cigarette tobacco.

20 Actually, with the purpose of better preserve the organoleptic qualities of the product, it should be certainly preferable to realize a sealed internal wrapping, being produced starting from a sheet of thermoplastic film soldered along the perimeter of the bundle of cigarettes contained therein.

In order to preserve the organoleptic characteristic of the cigarettes for a longer time, packets of cigarettes have been produced where the internal wrapping is impermeable, is sealed by heat sealing and comprises an internal wrapping sheet made of impermeable material having an opening
25 to extract the cigarettes, which is closed by a reusable closing label.

Realizing the heat sealing is extremely difficult because the cigarettes placed inside the wrapping made of impermeable material undergo to mechanical stresses, which can cause a local deformation, and to thermal stresses, which can locally spoil the tobacco.

- 2 -

In order to partially obviate the latter problem, a rigid collar is used, being formed by a stiffening element made of cardboard, inside the internal wrapping and around the bundle of cigarettes to maintain the right configuration of the internal wrapping and to protect the cigarettes during
5 the folding and the heat sealing of the internal wrapping sheet made of impermeable material.

However, placing and folding the collar around the bundle of cigarettes before wrapping the internal wrapping sheet around the bundle of cigarettes itself is very complicated in a standard packaging machine;
10 consequently, in order to realize this type of internal wrapping it is necessary to make modifications which can degrade the whole productivity.

Summary of the invention

Therefore, the technical problem underlying the present invention is to
15 provide a method for manufacturing a sealed wrapping of a bundle of cigarettes, which overcomes the above-described drawbacks.

The above-mentioned technical problem is solved by the method according to claim 1.

The technical problem is also solved by an apparatus according to claim
20 15, which is advantageously able to realize that method.

Further characteristics and advantages will be mainly apparent from the detailed description of a preferred but not exclusive embodiment of the present disclosure made in the following, referring to the attached figures given by way of non-limiting example.

25 Brief description of the drawings

Figures 1 and 2 schematically show a respective perspective view of an apparatus for manufacturing a hermetical wrapping according to the present invention;

Figures 3-7, 9, 11-12 show details of the apparatus of figures 1 and 2;

30 Figure 8 shows a cross-section view taken along line VIII-VIII of figure 7;

- 3 -

Figure 10 shows a cross-section view taken along line X-X of figure 9;

Figure 10A shows a schematic view of a folding step shown in figure 10, according to an alternative embodiment;

Figure 13 shows a sealed wrapping according to the present invention;

5 Figure 14 shows a top view of a wrapping sheet for forming a wrapping according to the present invention;

Figure 15 schematically shows the steps representative of the method according to the present invention successively.

Detailed description

10 Referring to figure 13, with the number 1 there is shown as a whole an internal wrapping for a rigid packet of cigarettes preferably being made of cardboard or rigid cardboard and being shaped as a cup with a reclosable lid.

15 The internal wrapping 1 encloses a bundle of cigarettes 10 having a parallelepiped shape and it has an opening for extracting the cigarettes frontally and on the top, being defined by a weakening line 2.

20 The internal wrapping 1, when it encloses the bundle of cigarettes 10, has a rectangular parallelepiped shape having a top wall 3 and a bottom wall 4 being parallel and opposite to each other, two major lateral walls 5 and 6 being parallel and opposite to each other, and two minor lateral walls 7
25 being parallel and opposite to each other. Particularly, a major lateral wall 5 defines a front wall of the wrapping 1, while the other major lateral wall 6 defines a back wall of the wrapping 1. Between the minor lateral walls 7 and the front 5 and back 6 walls four longitudinal edges are defined, while
between the top and bottom walls and the front, back and minor lateral walls eight transversal edges are defined.

30 The opening of the internal wrapping 1 is centrally arranged and it is closed by a reusable closing label 8, which affects a portion of the front wall 5 of the wrapping 1 and a portion of the top wall 3 of the wrapping 1, as well as possibly a portion of the back wall 6 of the wrapping 1.

- 4 -

The closing label 8 is fixed to the wrapping 1 by means of a repositionable adhesive that does not dry, which is applied to the lower surface (the one contacting the wrapping 1) of the closing label 8 and it is arranged all around the extraction opening to allow the closing label 8 to be partially
5 separated from the wrapping 1 and then fixed again to the wrapping 1 more than once. Preferably, the closing label 8 is provided with a lower grasping tongue 8a, which is free of repositionable adhesive, rests on the front wall 5 of the wrapping 1 and is suitable to facilitate grasping the closing label 8 when lifting the closing label 8 itself; in other words, in
10 order to lift the closing label 8, an user can easily grasp the grasping tongue 8a, which is not by any means fixed to the front wall 5 of the wrapping 1.

The wrapping 1 is obtained by folding a wrapping sheet 11, which has a rectangular shape, it is made of airtight and heat-sealable plastic material,
15 and it is folded around the bundle of cigarettes 10 according to the procedures being described in the following. Before folding the wrapping sheet 11 around the bundle of cigarettes 10, the wrapping sheet 11 itself is pre-cut in order to form the weakening line 2, having a U shape in the shown example, defining the extraction opening; then, the closing label 8
20 being adhesive coated on the lower side (on the side coupling to the wrapping sheet 11) is applied to the wrapping sheet 11, in other words, it is provided with repositionable adhesive in its lower surface, which inside the weakening line 2 causes the permanent gluing of the internal portion of the wrapping sheet 11 to the closing label 8, and outside the weakening
25 line 2 causes a separable gluing of the wrapping sheet 11 to the closing label 8, except the portion of closing label 8 which is glued to the upper portion of the back wall 6 of the wrapping 1, where a permanent gluing is present.

According to the present invention, the wrapping 1 includes a stiffening
30 element 30, which is made of cardboard or rigid cardboard, it is "U"-shaped and it is arranged inside the wrapping 1 contacting the bundle of cigarettes 10. The stiffening element 30 includes a base wall 31 having a rectangular shape, which is arranged contacting a front wall formed by the cylindrical lateral walls of the cigarettes of the bundle of cigarettes 10,
35 and a pair of lateral wings 32, which are connected to the major sides (the longitudinal ones) of the base wall 31 and are arranged contacting the

- 5 -

minor lateral walls of the bundle of cigarettes 10 formed by the cylindrical lateral walls of the cigarettes. Consequently, the base wall 31 of the stiffening element 30 is arranged near the front wall 5 of the wrapping 1 and the lateral wings 32 of the stiffening element 30 are arranged near the
5 minor lateral walls 7 of the wrapping 1.

Preferably, the base wall 31 of the stiffening element 30 has a U-shaped upper edge 33 suitable to define a window, which is arranged at the extraction opening for the cigarettes so that the base wall 31 does not by any means obstruct the extraction of the cigarettes.

10 The stiffening element 30 function is to give more stiffness and more shape stability to the wrapping 1 in order to avoid the wrapping 1 itself collapsing after extracting part of the cigarettes being contained in the wrapping 1, making the extraction of the remaining cigarettes difficult and particularly making the opening and following closure of the closing label
15 8 very difficult.

The wrapping 1 with internal stiffening element 30 is made by providing a rigid pocket 20 inside which the U-folded stiffening element is inserted, then the bundle of cigarettes 10 is inserted inside the rigid pocket 20 containing the stiffening element 30, so that the stiffening element 30 is
20 arranged around and contacting the bundle of cigarettes 10, then the U-shaped wrapping sheet 11 is wrapped outside the rigid pocket 20 containing the bundle of cigarettes 10 surrounded by the stiffening element 30.

The folding step of the wrapping sheet 11 on the pocket 20 can also occur
25 before inserting the stiffening element 30 and/or the bundle of cigarettes 10 in the pocket 20.

The rigid pocket 20 is arranged to tight fit the bundle of cigarettes. Particularly, said rigid pocket 20 is shaped like a hollow rectangular parallelepiped, being extended along a longitudinal direction X and
30 provided with a first opening 21 and a second opening 22 facing each other at its opposite ends with respect to the longitudinal axis X. Besides the two opposite openings 21, 22, the parallelepiped defining the rigid pocket 20 also includes two minor lateral walls 24 and two major lateral walls 25.

- 6 -

The major lateral walls 25 thickness is relatively small.

The folding of the wrapping sheet 11 around the rigid pocket 20 envisages initially folding the wrapping sheet 11 in a “U” shape around the rigid pocket 20 covering the first opening 21, where the filters of the cigarettes
5 of the bundle of cigarettes 10 are placed, and contacting the major walls 25 of the rigid pocket 20.

Particularly and as shown in figure 14, the rectangular wrapping sheet 11 has a central longitudinal axis y, two opposite major edges 12 (being parallel to the longitudinal axis y) and two opposite minor edges 13a and
10 13b (being perpendicular to the longitudinal axis y) and it is folded around the rigid pocket 20 in order to define two parallel flaps having a different length (as measured along the y axis): a minor flap 11a and a major flap 11b which will lay on a respective major wall 25 of the rigid pocket 20. The
15 weakening line 2, forming the access window for the cigarettes, is placed on the wrapping sheet 11 in order to be arranged in the U-folded area 27, which occludes the first opening 21.

Preferably, the closing label 8 is placed on the wrapping sheet 11 before the latter is U-folded on the rigid pocket 20.

After folding the wrapping sheet 11 in a U shape, the assembly formed by
20 bundle of cigarettes 10, stiffening element 30 (placed inside the pocket 20) and wrapping sheet 11 (placed outside the pocket 20) is extracted from the pocket by means of an extractor 29 acting on the bundle of cigarettes 10 accessing from the second opening (where the cigarette tips are looking
25 out) and pushing towards the first opening (where the cigarette filters are looking out) along the longitudinal axis X, in order to obtain the bundle of cigarettes 10 and the stiffening element 30 directly contacting the wrapping sheet 11, without the rigid pocket 20 interposed therebetween.

During the extraction step of the bundle of cigarettes 10 with the stiffening element 30, which are dragging the wrapping sheet 11, the
30 pocket 20 is stationary.

Once extracted the bundle of cigarettes 10 with the stiffening element 30 being wrapped by the wrapping sheet 11 without the interposed pocket 20, the minor flap 11a and the major flap 11b will protrude with their

- 7 -

respective minor edge 13a and 13b from the bundle of cigarettes 10 for a minor distance “d” and a major distance “D”, respectively.

The major flap 11b is folded against the bottom wall of the bundle of cigarettes 10, formed by the cigarette tips of the bundle of cigarettes 10, in order to bring the free end of the major distance D in contact with the
5 minor distance d of the minor flap 11a protruding from the bottom wall of the bundle of cigarettes 10.

After folding the major flap 11b, the soldering of the overlapped portions of the two flaps 11a, 11b occurs in order to form a tubular wrapping having
10 two open ends at the minor lateral walls of the bundle of cigarettes 10.

Particularly, the soldering near the minor edges 13a and 13b of the wrapping sheet 11 occurs by keeping the minor flap 11a with the minor distance d overlapping the bundle of cigarettes 10, that is arranged perpendicular to the bottom wall of the bundle of cigarettes 10, along the
15 transversal edge 14 between the bottom wall 4 and one of the major walls (in the shown example, the front wall 5) of the wrapping 1 that is going to be formed.

In this way, a transversal fin 9 is created along the transversal edge 14 between the bottom wall 4 and the front wall 5 of the wrapping 1 that is
20 going to be formed. This transversal fin 9 is arranged in parallel with the front wall and thus perpendicular to the bottom wall of the wrapping 1 that is going to be formed.

Due to the soldering according to the just described configuration, the two flaps 11a, 11b are soldered to each other without the need to push against
25 the front wall of the bundle of cigarettes 10 by any means.

The transversal fin 9, being formed by the two overlapped and soldered flaps, is folded along the transversal edge 14 against the major wall by making a 180° rotation, in the example against the front wall 5 of the wrapping 1 that is going to be formed; basically, on the wall where the
30 stiffening element 30 is.

Preferably, the length of the major distance D (along the y axis) is equal to the sum of the length of the minor distance d (along the y axis) and the

- 8 -

width of the bottom wall of the bundle of cigarettes 10, the transversal fin 9 having a width equal to the minor distance d.

As an alternative to what described, the wrapping sheet 11 can be folded on the pocket 20 in a symmetrical way. In the latter case, the flaps protruding from the bundle of cigarettes 10 will be equal and thus one of the two flaps will overlap the created transversal fin, as shown in figure 10A.

Once formed the tubular wrapping by soldering the overlapped portions of the two flaps 11a, 11b, the closure of the wrapping sheet 11 around the bundle of cigarettes 10 is completed in order to define the internal wrapping 1 by folding the two open ends at the minor lateral walls of the bundle of cigarettes 10.

Finally, the internal wrapping 1 is stabilized by performing two longitudinal soldering of the overlapped portions of the wrapping sheet 11 along the minor lateral walls of the bundle of cigarettes 10, where the two lateral wings 32 of the stiffening element 30 are present.

In the shown example, the closure of the open ends of the minor lateral walls of the wrapping 1 to be formed occurs first folding towards each other the smaller protruding flaps 15 and against the minor lateral walls in order to create two folds, then each greater protruding flap 16 is folded against the minor lateral wall in order to overlap to each other against the minor lateral wall itself. These flaps being folded against the minor lateral wall then are joined to each other by soldering.

Basically, a closure on the sides of the "envelope" type is performed.

According to one alternative embodiment, the closure of the open ends of the minor lateral walls of the wrapping 1 to be formed can be performed by a closure with longitudinal fins with side of the "gusset" type. Finally, these longitudinal fins are folded against the respective minor lateral wall in order to form the whole wrapping 1.

According to the present invention, the apparatus for forming an internal wrapping 1 with stiffening element 30 placed inside it and wrapping a bundle of cigarettes 10 is described herein.

- 9 -

The apparatus 100, schematically shown as a whole in figures 1 and 2, includes a first station 101 to form the stiffening element 30 and then to insert the same inside the pocket 20, a second station 102 to insert the bundle of cigarettes 10 inside the pocket 20, a third station to apply the U-folded wrapping sheet 11 on the pocket 20, a fourth station 104 to extract the bundle of cigarettes 10 with stiffening element 30 and U-wrapped wrapping sheet 11 from the pocket 20, a fifth station 105 to form the transversal fin 9 along the transversal edge 14 and to form the tubular wrapping, a sixth station 106 to close the minor lateral walls of the wrapping 1 to complete the sealing of the wrapping itself.

The first station 101, shown in figure 3, includes a shaping device 34 suitable to give the U shape to the stiffening element 30 with the base wall 31 having an upper U-shaped edge 33 suitable to define a window, and the two lateral wings 32.

A suitable collection head 35 collects the stiffening element 30 in the plane form and by rotating, places it in front of the shaping device 34, which, once formed the collar-shaped stiffening element, passes it to a pusher 36, which pushes the stiffening element 30 inside the pocket 20.

The pusher 36 is arranged in order to insert the support 30 along the longitudinal axis X of the pocket 20, in the example, the insertion of the collar 30 occurs through the first opening 21 of the pocket 20.

The support 30 is placed inside the pocket 20 with the base wall 31 contacting the internal side of one of the major walls 25 of the pocket 20 and the wings 32 contacting the internal side of the minor lateral walls 24 of the pocket 20.

In the shown example, one of the major walls of the pocket 20 has a window 26.

After inserting the stiffening element 30 in the second station 102, shown in figures 4 and 5, a pusher 23 pushes the bundle of cigarettes 10 accompanying it inside the pocket 20 where the support 30 is already present.

The insertion of the bundle of cigarettes 10 inside the pocket 20 occurs

- 10 -

along the longitudinal axis X of the pocket 20, in the example, the insertion of the bundle of cigarettes 10 occurs through the second opening 22 of the pocket 20.

5 It should be noted that the bundle of cigarettes 10 is inserted with the filters facing towards the first opening 21.

The bundle of cigarettes 10 is wrapped by the U-shaped stiffening element 30 inside the pocket 20.

10 Then, the pocket 20 moves to the third station 103, shown in figure 6, where a folding unit 28 including two parallel and opposite prongs 28a is provided in order to slide and overlap the rigid pocket 20 when the latter is corresponding to the third station 103.

The two prongs 28a are spaced apart in order to be able to make the wrapping sheet 11 adhere to the major walls 25 of the pocket 20.

15 In this step, the wrapping sheet 11 is provided lying between the folding unit 28 and the rigid pocket 20 in the first opening 21 area. By sliding the folding unit 28, the wrapping sheet 11 is dragged making it adhere to the first opening 21 contacting the bundle of cigarettes, preferably contacting the cigarette filters, and folding its two flaps 11a and 11b in an asymmetrical way, against the two major opposite walls 25 of the rigid
20 pocket 20.

As already told, alternatively, it is possible to perform the folding of the wrapping sheet 11 in a symmetrical way (Fig. 10A).

25 The movement of the folding unit 28 is parallel to the longitudinal axis X of the pocket 20 and hits the wrapping sheet 11 being placed perpendicular to the longitudinal axis X before it is wrapped on the pocket 20.

30 It should be noted that the weakening line 2, afterward allowing the opening of the access window for the bundle of cigarettes 10, is placed on the first opening 21 of the pocket 20, in the U-folded area 27, where the cigarette filters are.

Basically, the bundle of cigarettes 10 being wrapped by the stiffening

- 11 -

element 30 is inside the rigid pocket 20 while the wrapping sheet 11 is outside the rigid pocket 20, therefore the latter is interposed between the bundle of cigarettes 10 and the wrapping sheet 11.

5 The fourth station 104, shown in figure 7, envisages the use of the extractor 29 in order to extract the bundle of cigarettes 10 with the stiffening element 30 from the rigid pocket 20. That extractor 29 has an abutting surface 29a intended to contact the bundle of cigarettes 10 and the stiffening element 30 in order to exert a push thereon. While
10 advancing along the longitudinal axis x, the extractor 29 inserts in the rigid pocket 20 from the second opening 22, therefore it contacts the bundle of cigarettes 10 and the stiffening element 30, which are pushed outside the rigid pocket 20 through the first opening 21 and it continues its travel until bringing the bundle of cigarettes 10 with the stiffening element 30 to contact the wrapping sheet 11.

15 In order to optimize the manufacturing process, a plurality of said rigid pockets 20 are circumferentially mounted on a first rotatable drum (not shown in the figures) having a rotational axis parallel to the longitudinal axis x of the pockets 20. The rigid pockets 20 are mounted having their major lateral walls 25 tangential with respect to the circumference being
20 defined by the first rotatable drum.

Due to the rotation of the first rotatable drum, on which the rigid pockets 20 are mounted, each individual rigid pocket 20 can be moved through the first, second, third and fourth stations, which perform the first steps of the method for manufacturing the wrapping 1, according to the present
25 invention.

When the extractor 29 ends the extraction of the bundle of cigarettes 10 with stiffening element 30 from the pocket 20, the push continues until reaching the fifth station 105, shown in figure 9, where a second rotatable drum, not shown in the attached figures, is present, having a rotational
30 axis perpendicular with respect to the rotational axis of the first drum. In the shown example, the rotational axis of the first drum is arranged horizontally, while the rotational axis of the second drum is arranged vertically.

The transfer from first to second drum occurs in the lowest area of the

- 12 -

first drum.

In the extraction step, shown in figure 7, the movement of the said extractor 29 allows extracting the bundle of cigarettes 10 with the stiffening element 30 from the rigid pocket 20 together with the wrapping sheet 11. Actually, since the cigarettes 10 contact the wrapping sheet 11 through the first opening 21, in their movement the bundle of cigarettes 10 and the stiffening element 30 drag the whole wrapping sheet 11 with them, the rigid pocket 20 being fixed during the extraction.

Basically, in the extraction step of the bundle of cigarettes 10 together with the stiffening element 30 from the rigid pocket 20, the bundle of cigarettes 10 and the stiffening element 30 drag with them the wrapping sheet 11, which slides on the outside of the rigid pocket 20 until directly contacting the bundle of cigarettes 10 and the stiffening element 30.

In this way, the rigid pocket 20 being previously interposed between wrapping sheet 11 and bundle of cigarettes 10 with stiffening element 30 is pulled out.

The wrapping sheet 11, which wraps the bundle of cigarettes 10 with stiffening element 30 in a U shape, moves on the second rotatable drum by means of the extractor 29.

Particularly, the extractor 29 pushes the bundle of cigarettes 10 with U shaped stiffening element 30 wrapped by the wrapping sheet 11 towards a U-shaped grip unit 40 having a pair of opposite grip planes 41 and 42 being arranged in parallel to the major lateral walls 25 of the pocket 20, when the latter is stationary in order to allow extracting the bundle of cigarettes 10 with stiffening element 30.

Basically, the bundle of cigarettes 10 with stiffening element 30 move from the pocket 20 to the grip unit 40, when the grip unit 40 is facing the pocket 20 on which the extractor 29 acts.

The distance between the grip planes 41, 42 of the grip unit 40 is fixed and substantially equal to the distance between the major lateral walls 5 and 6 of the wrapping 1 to be formed.

In the shown example, the grip planes 41, 42 have a different longitudinal

- 13 -

extension, wherein the grip plane placed at the bottom, which is called lower grip plane 42, is longer than the grip plane placed at the top, which is called upper grip plane 41.

5 Moreover, the grip planes 41, 42 must extend for a length not exceeding the longitudinal extension of the bundle of cigarettes 10 and at least one of the two grip planes has a length less than the longitudinal extension of the bundle of cigarettes 10.

10 In the shown example, the upper grip plane 41 has a length less than the longitudinal extension of the bundle of cigarettes 10, while the lower grip plane 42 has a length substantially equal to the longitudinal extension of the bundle of cigarettes 10.

15 In order to compact the assembly formed by the bundle of cigarettes 10 being wrapped by the U-shaped stiffening element 30 surrounding the bundle of cigarettes 10, the grip unit 40 has two arms 42a arranged on the sides.

These arms 42a also fold two transversal flaps in order to form a lateral fold on each minor lateral wall of the bundle of cigarettes 10, during the transfer from the pocket 20 to the grip unit 40.

20 Moreover, the lower grip plane 42 is crossed by a longitudinal slot 43 to allow the passage of a pushing unit not shown in the figures.

25 After receiving the bundle of cigarettes 10 with stiffening element 30 wrapped by the wrapping sheet 11, the second drum (Fig. 9) rotates in the direction of the arrow of figure 9, in order to perform the heat sealing along the transversal edge 14 placed between the front wall 5 and the bottom wall 4 of the wrapping 1.

The heat sealing along the transversal edge 14 occurs by means of soldering blocks 51, 52 that solder near the shortest ends 13a, 13b of the wrapping sheet 11.

30 Particularly, as shown in figure 10, a first soldering block 51 is placed on top along the transversal edge 14 holding the minor flap 11a stationary, with the end being arranged perpendicular to and exiting from the bottom wall of the bundle of cigarettes 10, coincident with the bottom wall 4 of the

- 14 -

wrapping 1 to be formed. a second soldering block 52 folds the major flap 11b against the bottom wall of the bundle of cigarettes 10 until contacting it against the minor flap 11a, in order to couple them to form a transversal fin 9 placed along the transversal edge 14, perpendicular with respect to the bottom wall 4 of the bundle of cigarettes.

The second soldering block 52 abuts against the first soldering block 51 with the major and minor flaps 11b, 11a of the wrapping sheet 11 being interposed and coincident with each other to form the transversal fin 9, in order to solder it, forming a tubular wrapping.

Basically, the transversal fin 9 is formed by coupling the minor flap 11a and the major flap 11b.

Then, the transversal fin 9 is folded by 180° against the front wall 5 of the wrapping 1 to be formed by means of a curved cylindrical rod 53 being arranged circumferentially to the second drum and being arranged in order to intercept the transversal fin 9 while the second drum rotates with the bundles of cigarettes 10 placed circumferentially on the second drum.

The transversal fin 90 is folded on the base wall 31 of the stiffening element 30 in order not to damage the underlying bundle of cigarettes, which is wrapped by the U-shaped stiffening element.

After folding the transversal fin 9 by 180°, the process switches to the sixth station 106 where the folding and following soldering of the open ends of the tubular wrapping occur.

The folding step of each of the open ends of the tubular wrapping occurs by means of folding elements 61 (Fig. 11) which fold the transversal flaps 15 in order to form a lateral fold on each minor lateral wall of the bundle of cigarettes 10.

After folding the transversal flaps 15 against the minor lateral wall of the bundle of cigarettes 10, the process switches to fold the facing lateral flaps 16 of the wrapping sheet 11 against the minor lateral wall of the bundle of cigarettes 10 in order to overlap them against the minor lateral wall of the bundle of cigarettes 10.

In the shown example, the folding elements are three on each side, the

- 15 -

first of them folds the transversal flap 15, the second folding element, centrally arranged, folds the lower lateral flap 16 and finally, the third folding element folds the upper lateral flap 16.

5 Then the flaps overlapped with the minor lateral wall are subjected to heat sealing by means of further soldering blocks 72 (Fig. 12).

In this way the sealed internal wrapping 1 is formed.

10 As it is possible to appreciate from what described, the method and the apparatus according to the present invention allow satisfying the needs and overcoming the drawbacks described in the introduction to the present description referring to the known art.

15 Clearly, one skilled in the art, in order to satisfy contingent and specific needs, will be able to make several changes and variations to the above-described discovered, however all included in the protection scope of the invention as defined by the following claims.

- 16 -

CLAIMS

1. A Method for manufacturing a sealed wrapping (1) of a bundle of cigarettes (10), including the steps of:

5 providing a bundle of cigarettes (10) forming a bottom wall formed by the tips of the cigarettes, two major lateral walls and two minor lateral walls formed by the cylindrical lateral walls of the cigarettes;

providing a rectangular wrapping sheet (11) having a weakening line (2) in order to create an access to the bundle of cigarettes (10);

10 providing a rigid pocket (20) suitable to fit the bundle of cigarettes (10) therein, said rigid pocket (20) having a longitudinal extension along a longitudinal axis (X), and including two opposite minor walls (24) and two opposite major walls (25), a first opening (21) and a second opening (22) which open to opposite ends;

15 introducing a stiffening element (30) inside said rigid pocket (20) through one of said openings (21, 22);

introducing the bundle of cigarettes (10) inside said rigid pocket (20) through one of said openings (22, 21) with the stiffening element (30) surrounding the bundle of cigarettes (10);

20 folding in a U shape the wrapping sheet (11) outside the rigid pocket (20) in order to define two parallel flaps (11a, 11b), the weakening line (2) coming to be in the U-folded area (27), which occludes the first opening (21);

25 extracting the bundle of cigarettes (10) with the stiffening element (30) from the rigid pocket (20) by means of an extractor (29) acting on the bundle of cigarettes (10) and on the stiffening element (30) moving from one of said openings (22, 21) towards the other opening (21, 22), in order to obtain the bundle of cigarettes (10) surrounded by the stiffening element (30) and the wrapping sheet (11) without the rigid pocket (20) being interposed therebetween;

30 holding a first of the two flaps (11a) laid on the major wall of the bundle of

- 17 -

cigarettes (10), in order to perpendicularly protrude from the bottom wall of the bundle of cigarettes (10) without said first flap (11a) being folded back on the bottom wall of the bundle of cigarettes (10);

5 folding back a second of the two flaps (11b) against the whole bottom wall of the bundle of cigarettes (10) until reaching the transversal edge (14) between the bottom wall and the major wall of the bundle of cigarettes (10) on which the first flap (11a) is laid, in order to bring the second flap (11b) coincident with the first flap (11a) along said transversal edge (14) and to form a transversal fin (9);

10 performing a first sealing step by soldering said transversal fin (9), while said transversal fin (9) is arranged along the transversal edge (14) and perpendicular to the bottom wall of the bundle of cigarettes (10), in order to create a tubular wrapping being open on two opposite sides;

15 performing a final sealing step, wherein the tubular wrapping is sealed on the open sides, in order to obtain a complete sealing of the wrapping (1) containing the bundle of cigarettes (10) with the stiffening element (30) inside it.

2. The method according to claim 1, wherein the wrapping sheet (11) is folded in a U shape outside the rigid pocket (20) in an asymmetrical way, so that the two flaps laying on the respective major wall (25) of the rigid pocket (20) have a different length: a minor flap (11a) and a major flap (11b), the major flap (11b) being the one that is folded against the bottom wall of the bundle of cigarettes (10) until coinciding with the first flap (11a) being the one protruding from the bottom wall of the bundle of cigarettes (10) without touching the bottom wall of the bundle of cigarettes (10).

3. The method according to claim 1 or 2, wherein at the end of the first sealing step, the transversal fin (9) formed along the transversal edge (14) is folded by 180° about said transversal edge (14) against the major wall of the bundle of cigarettes (10).

4. The method according to claim 3, wherein the 180° folding occurs against a base wall (31) of the stiffening element (30), which is arranged inside and contacting the major wall of the bundle of cigarettes (10) on

- 18 -

which the transversal fin (9) is folded.

5 5. The method according to any preceding claim, wherein the bundle of cigarettes (10) is introduced in the rigid pocket (20) with the respective filters facing in contact with the U-folded area (27) of the wrapping sheet (11) at the weakening line (2).

6. The method according to any preceding claim, wherein the stiffening element (30) is introduced inside said rigid pocket (20) along the direction of the longitudinal axis (X).

10 7. The method according to any preceding claim, wherein the bundle of cigarettes (10) is introduced inside said rigid pocket (20) along the direction of the longitudinal axis (X).

15 8. The method according to any preceding claim, wherein, when U-folded on the pocket (20), the wrapping sheet (11) has the second flap (11b) exceeding the bottom wall of the bundle of cigarettes (10) for a distance equal to the sum of the distance the first flap (11a) exceeds the bottom wall of the bundle of cigarettes and the width of the bottom wall of the bundle of cigarettes (10).

20 9. The method according to any preceding claim, wherein the first of the two flaps (11a) is held laid on the major wall of the bundle of cigarettes (10) by means of first soldering means (51, 52) preventing the first flap (11a) from being able to fold during the first soldering step with the second flap (11b), said first soldering step being performed by said first soldering means (51, 52) at the same time.

25 10. The method according to any preceding claim, wherein on the wrapping sheet (11) there is applied a reusable closing label (8), which affects a portion of the front wall (5) of the wrapping (1) and a portion of the top wall (3) of the wrapping (1), as well as possibly a portion of the back wall (6) of the wrapping (1).

30 11. The method according to any preceding claim, wherein the final sealing step on the open sides first occurs by folding the smaller protruding flaps (15) against the minor lateral walls, then by folding each larger protruding flap (16) against the minor lateral wall in order to

overlap each other against the minor lateral wall itself.

12. The method according to any preceding claim 1-10, wherein the final sealing step on the open sides occurs by creating two longitudinal fins, being subsequently folded on the respective minor lateral wall.

5 13. The method according to any preceding claim, wherein the stiffening element (30) has a base wall (31) with a rectangular shape, which is arranged contacting a front wall formed by the cylindrical lateral walls of the cigarettes of the bundle of cigarettes (10), and a pair of lateral wings (32), which are connected to the major sides of the base wall (31)
10 and are arranged contacting the minor lateral walls of the bundle of cigarettes (10) formed by the cylindrical lateral walls of the cigarettes.

14. The method according to any preceding claim, wherein during the first sealing step when the soldering of said transversal fin (9) occurs, the bundle of cigarettes (10) is housed inside a grip unit (40)
15 including a first grip plane (41) and a second grip plane (42), the first grip plane (41) having a longitudinal extension less than the longitudinal extension of the bundle of cigarettes, in order to keep the area where the soldering of the transversal fin (9) occurs free.

15. An apparatus for manufacturing a sealed wrapping (1) of a
20 bundle of cigarettes (10), comprising:

a first drum rotatable about a rotational axis and including a plurality of rigid pockets (20) to provisionally fit the bundle of cigarettes (10), said rigid pockets being circumferentially arranged on the first drum, each rigid pocket (20) having a longitudinal extension along a longitudinal axis
25 (X) being arranged in parallel to the rotational axis of the first drum, and including two opposite minor walls (24) and two opposite major walls (25), a first opening (21) and a second opening (22) which open to the opposite ends;

a first pusher (36) pushing a stiffening element (30) inside the pocket (20)
30 along said longitudinal axis (X);

a second pusher (23) pushing the bundle of cigarettes (10) inside the pocket (20) along said longitudinal axis (X);

- 20 -

a folding unit (28) including two parallel and opposite prongs (28a) provided in order to slide and overlap the rigid pocket (20) and adapted to fold a wrapping sheet (11) in a U shape outside said rigid pocket (20), said wrapping sheet (11) having a weakening line (2) to create an access for the
5 bundle of cigarettes (10) in the U-folded area (27), said wrapping sheet (11) forming a first flap (11a) and a second flap (11b) which protrude from the bottom wall of the bundle of cigarettes (10);

an extractor (29) being suitable to extract the bundle of cigarettes (10) with the stiffening element (30) from the rigid pocket (20) by acting on the
10 bundle of cigarettes (10) and the stiffening element (30), moving from one of said openings (22, 21) towards the other opening (21, 22), in order to obtain the bundle of cigarettes (10) surrounded by the stiffening element (30) being directly placed inside the wrapping sheet (11) without the rigid pocket (20) being interposed therebetween;

15 first soldering means (51, 52) being arranged to keep the first flap (11a) laid on the major wall of the bundle of cigarettes (10) and to prevent the first flap (11a) from being able to fold against the bottom wall of the bundle of cigarettes (10), in order to perpendicularly protrude from the
20 bottom wall of the bundle of cigarettes (10), said first soldering means (51, 52) being arranged also to fold the second flap (11b) against the whole bottom wall of the bundle of cigarettes (10) until reaching the transversal edge (14) between the bottom wall and the major wall of the bundle of cigarettes (10) on which the first flap (11a) is laid, in order to bring the
25 second flap (11b) coincident with the first flap (11a) along said transversal edge (14), said first soldering means (51, 52) being arranged to solder the first and second flap (11a, 11b) to each other in order to form a transversal fin (9);

second soldering means (72) to realize a final sealing in which the open sides of the wrapping sheet (11) are sealed.

30

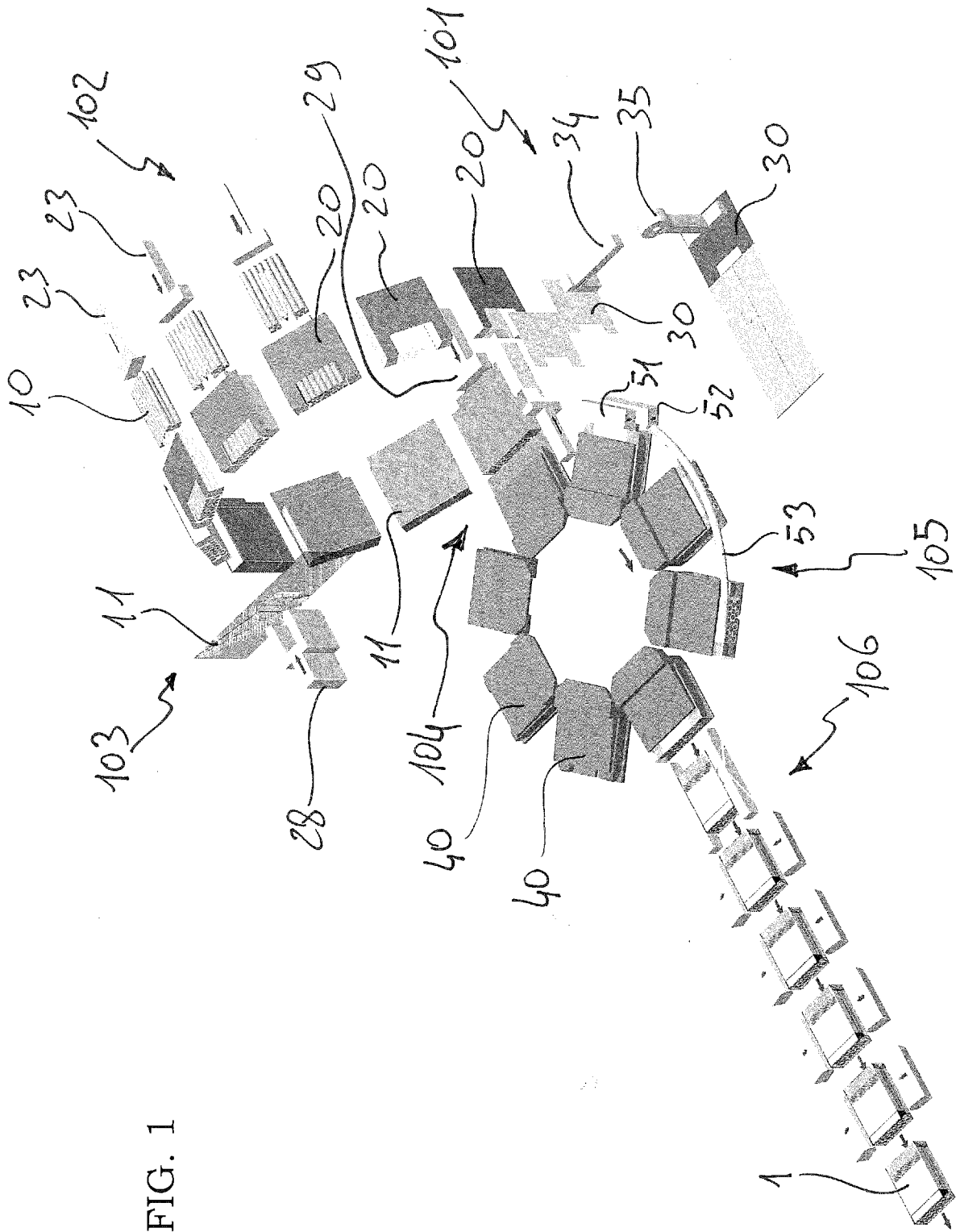


FIG. 1

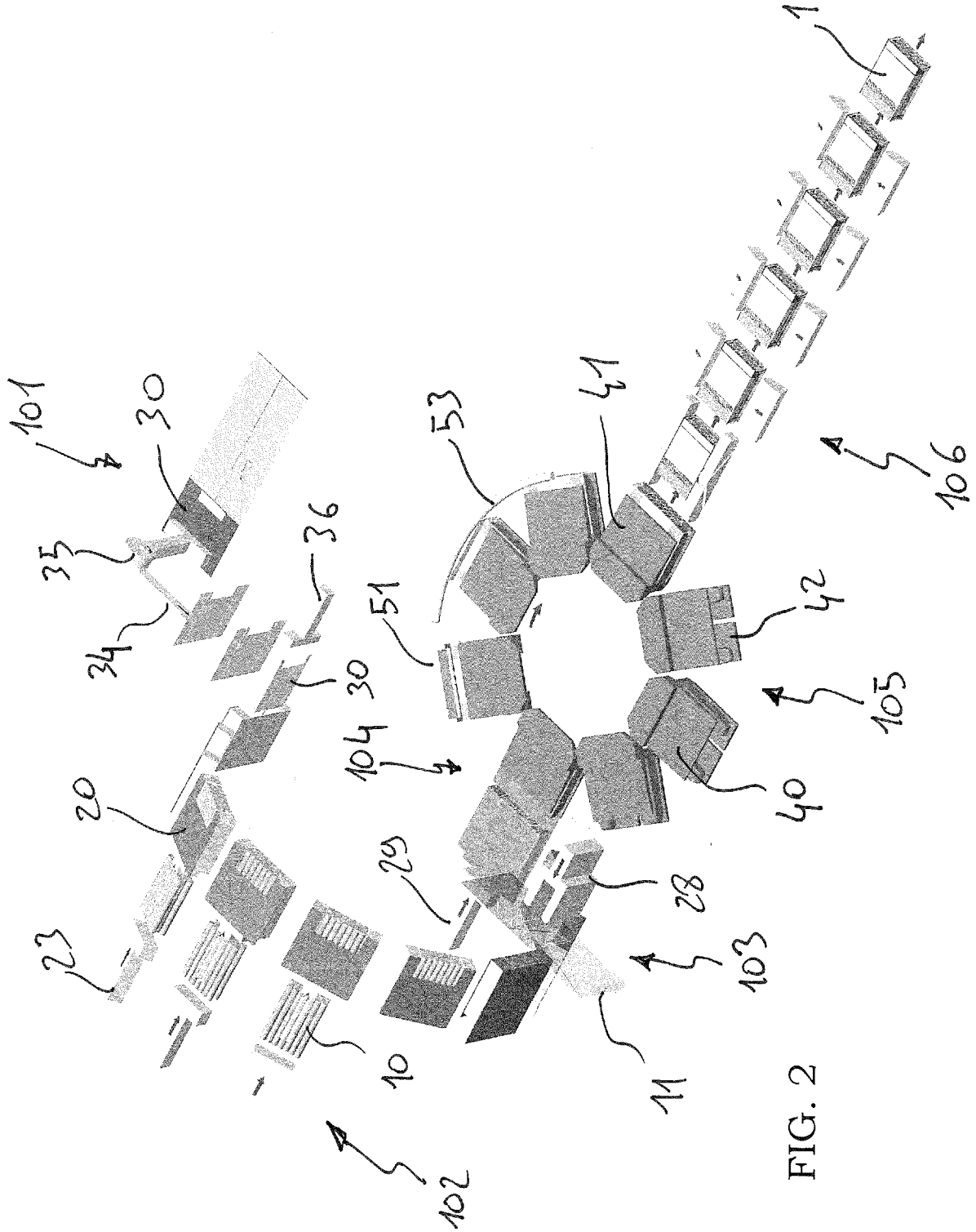


FIG. 2

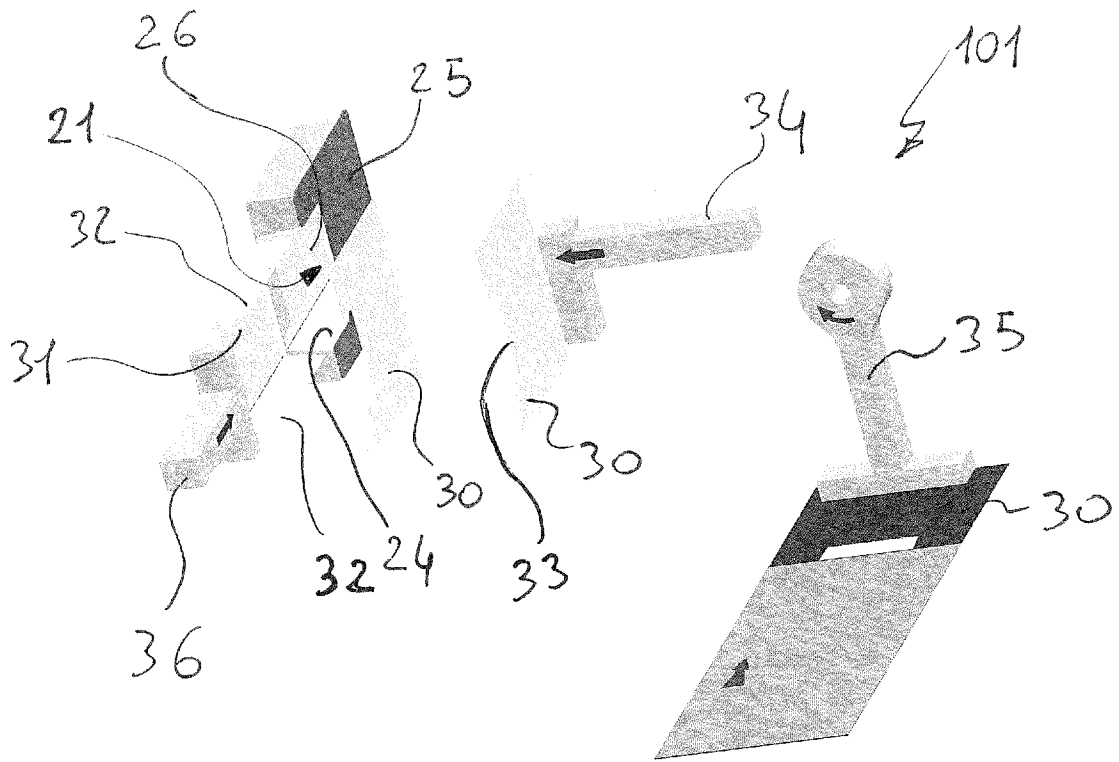


FIG. 3

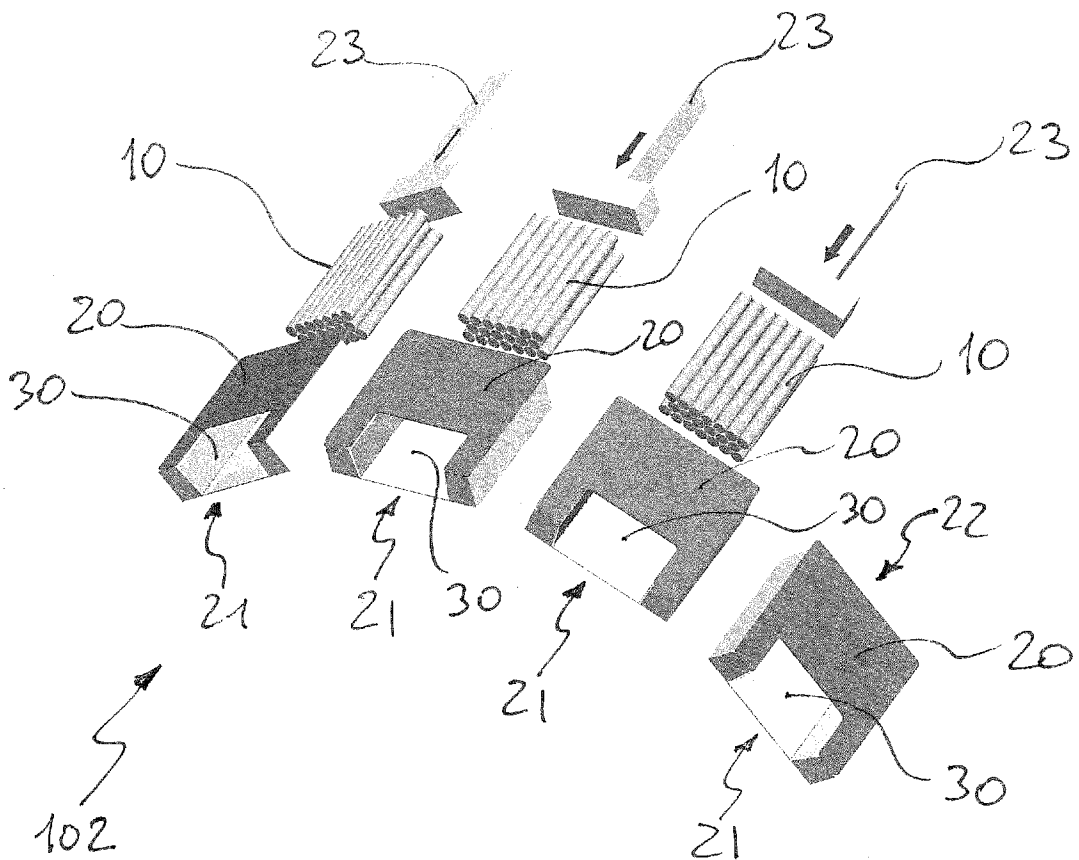


FIG. 4

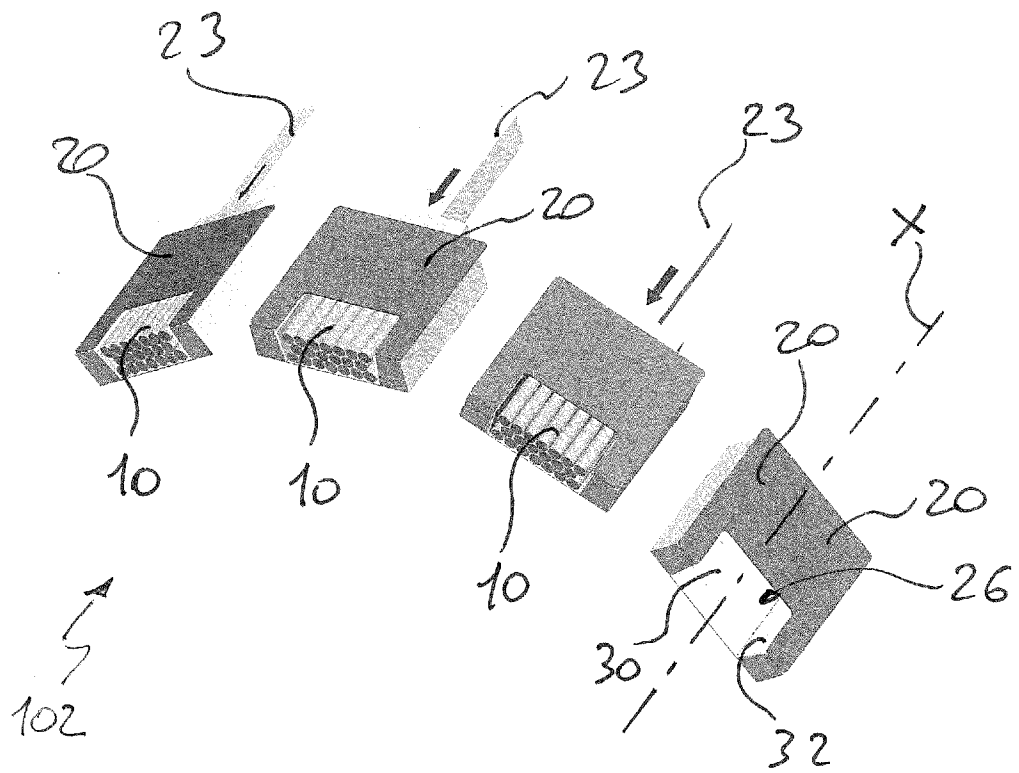


FIG. 5

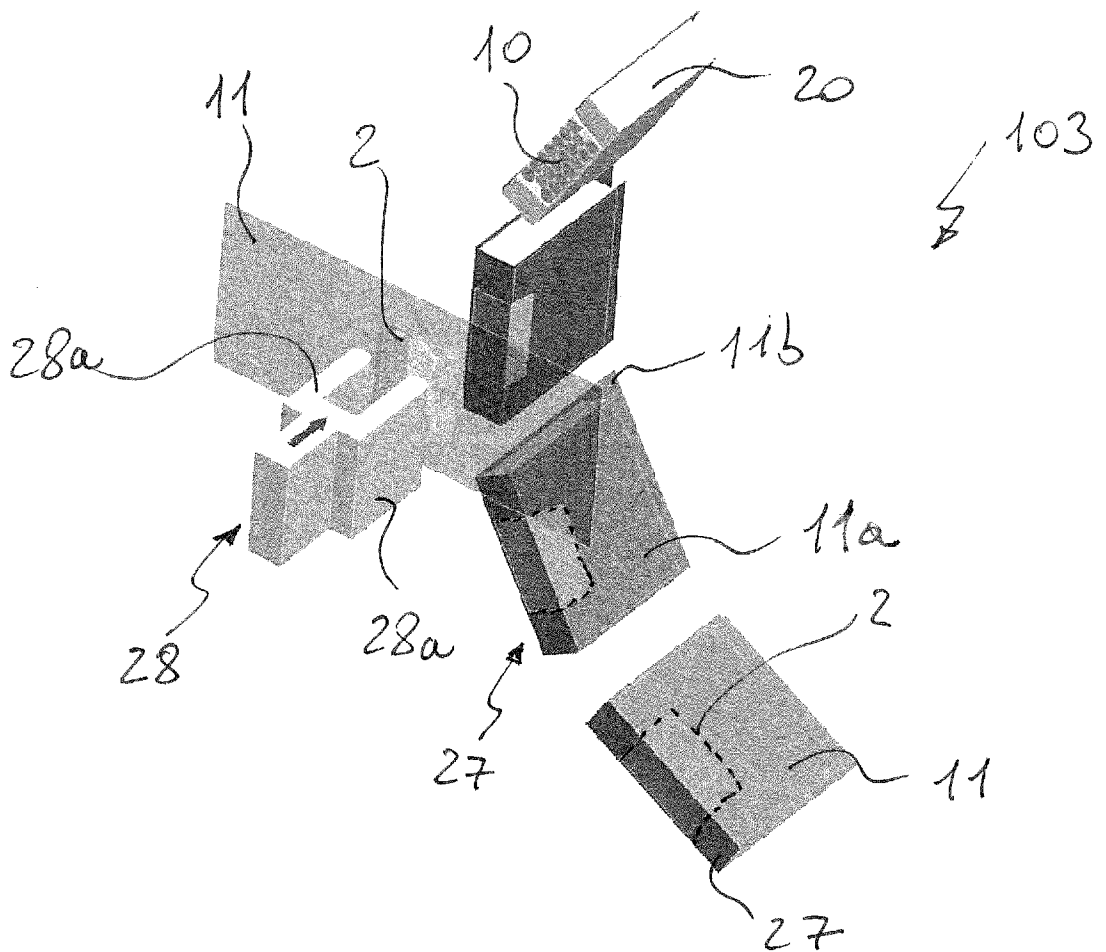
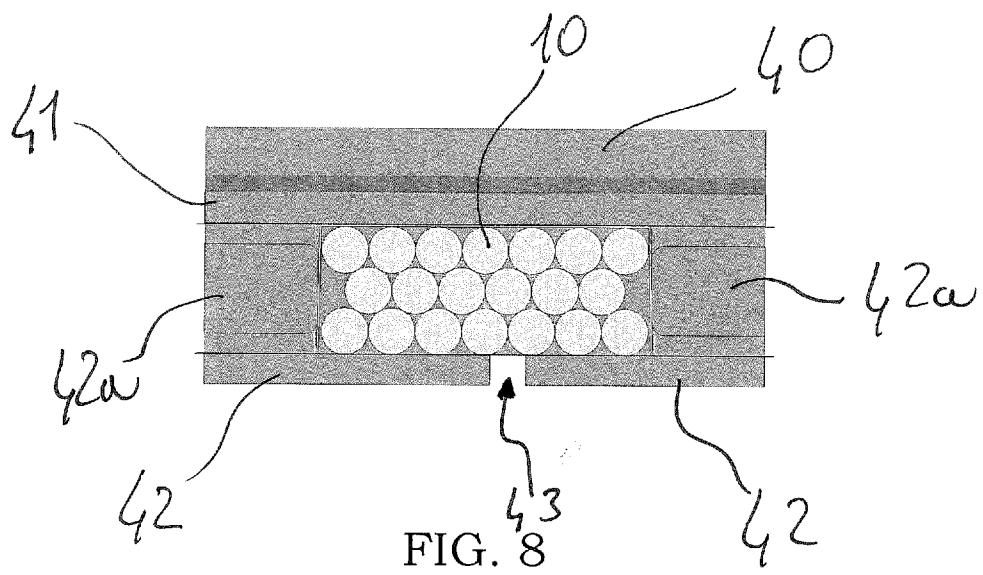
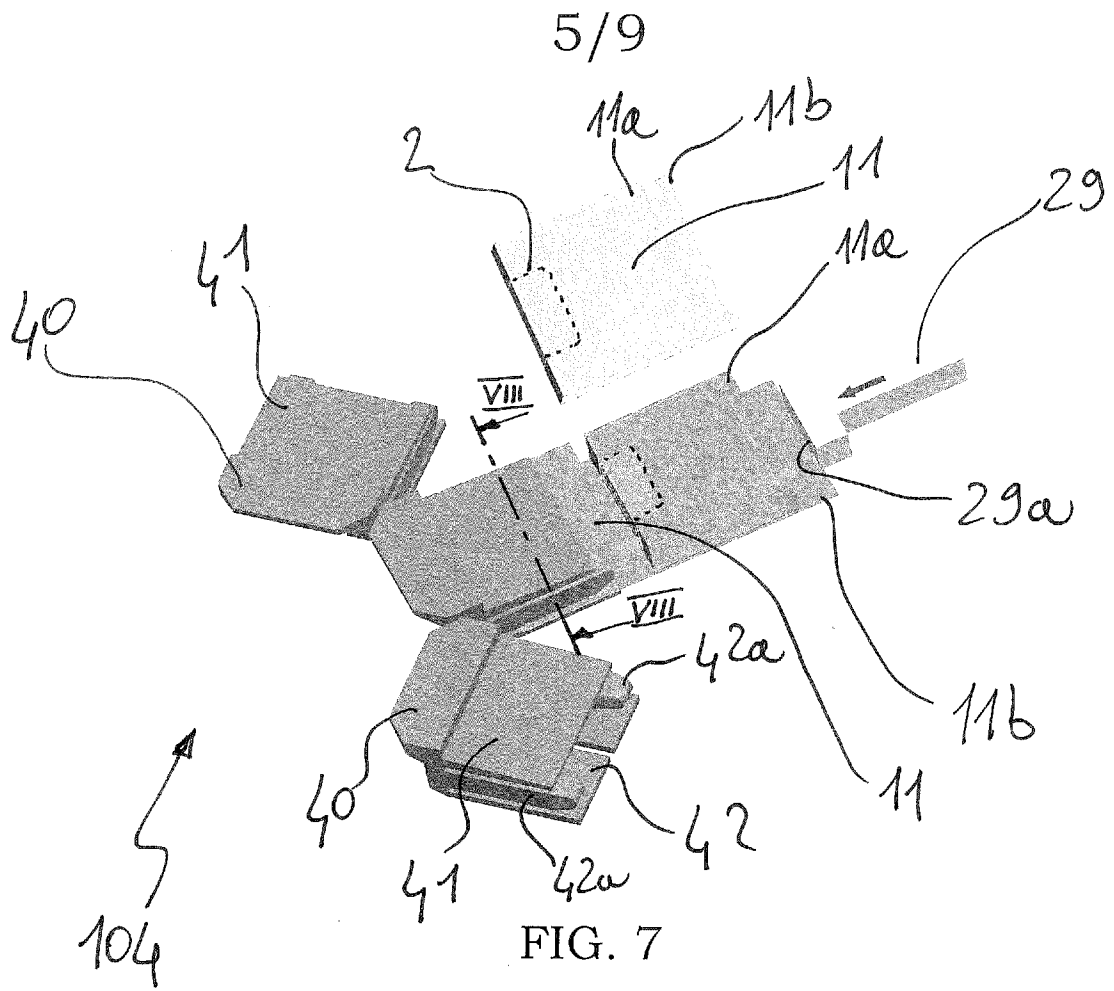


FIG. 6



6/9

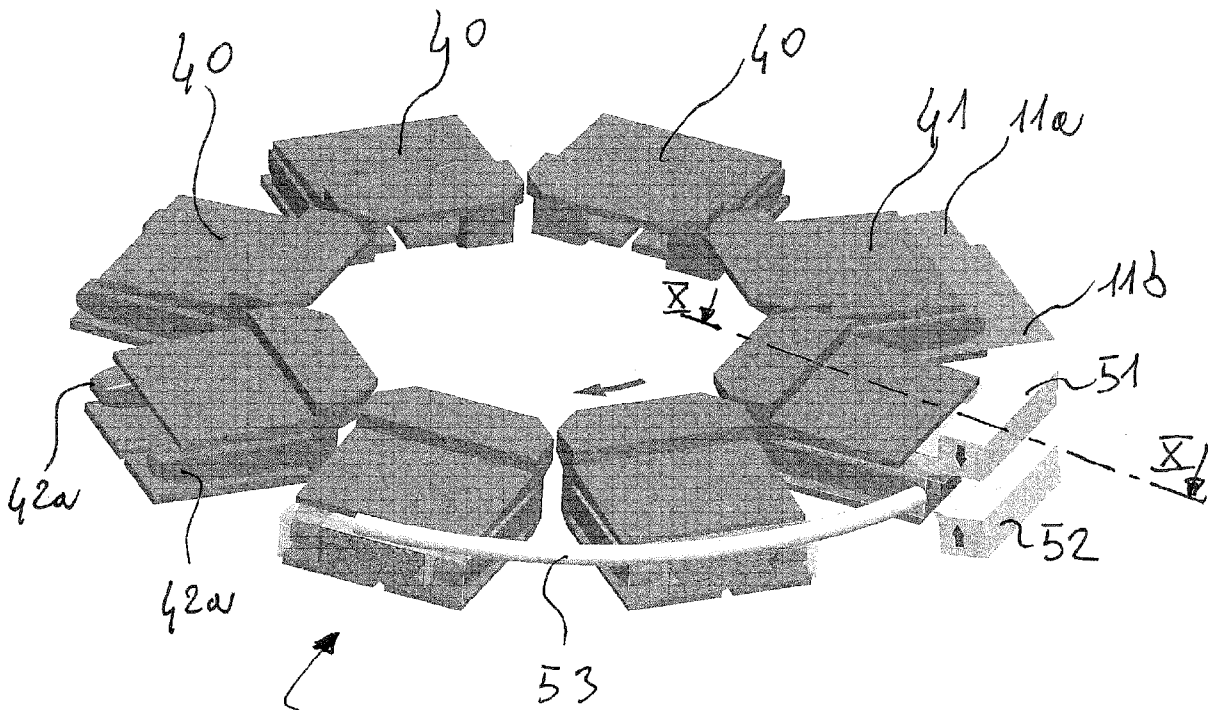


FIG. 9

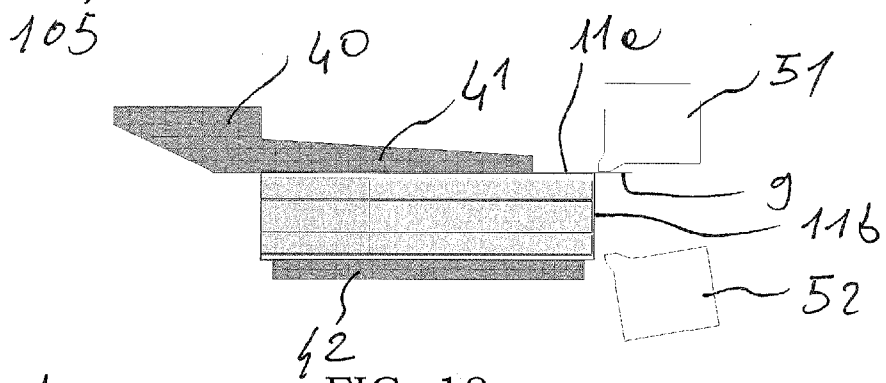


FIG. 10

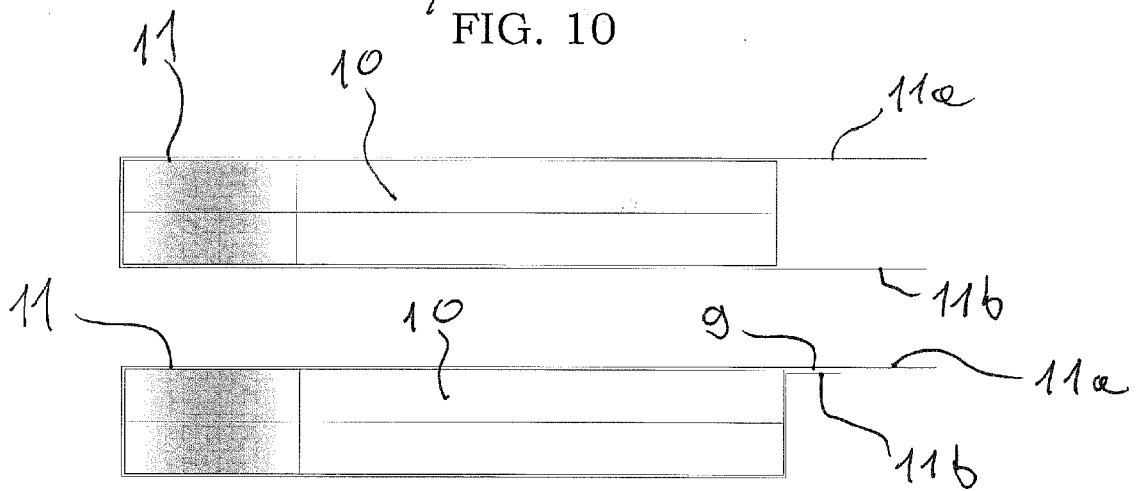


FIG. 10A

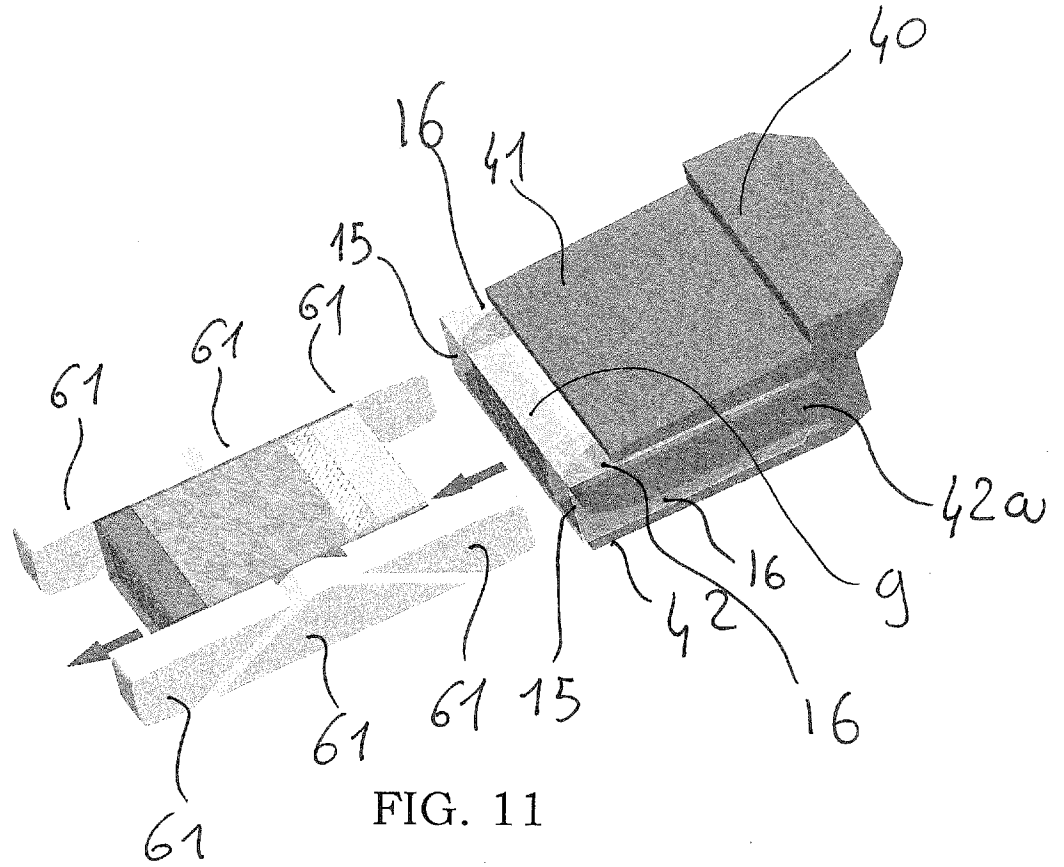


FIG. 11

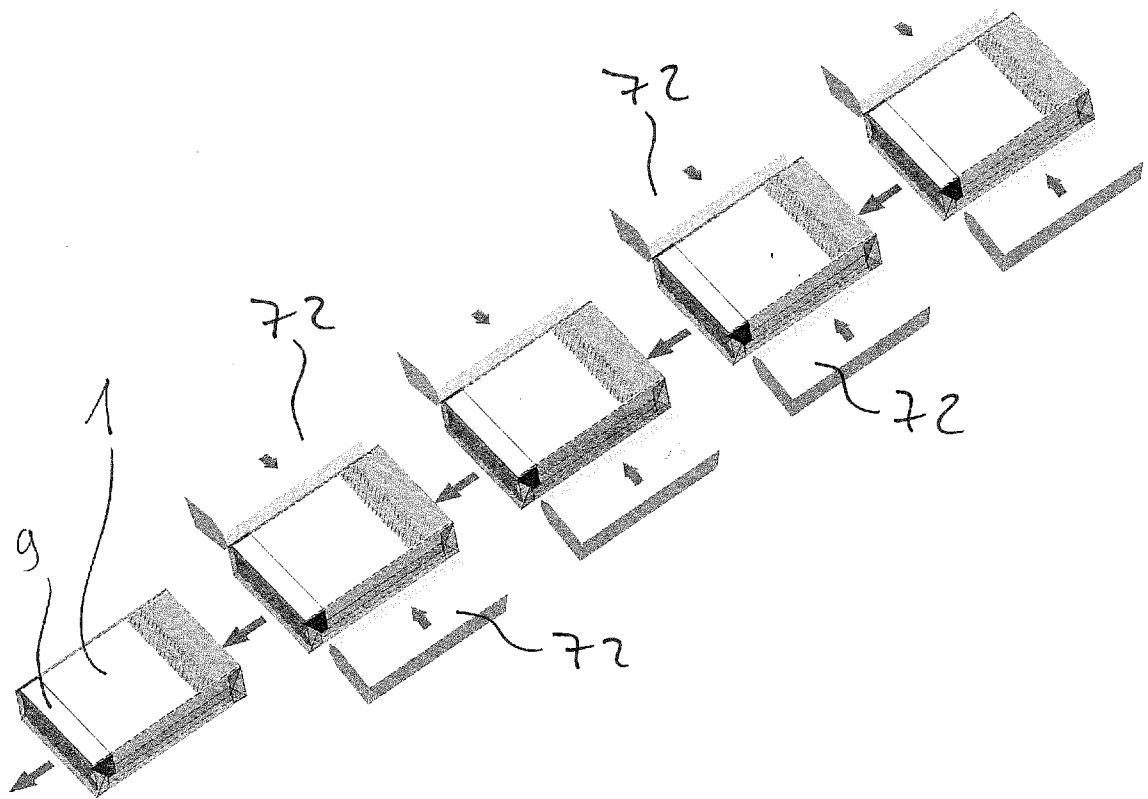


FIG. 12

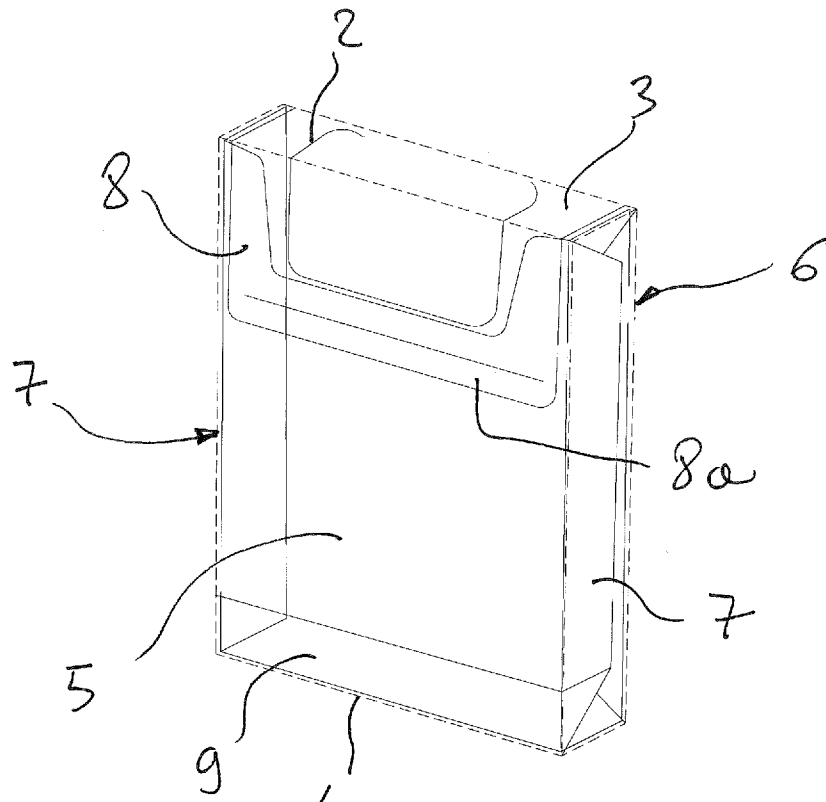


FIG. 13

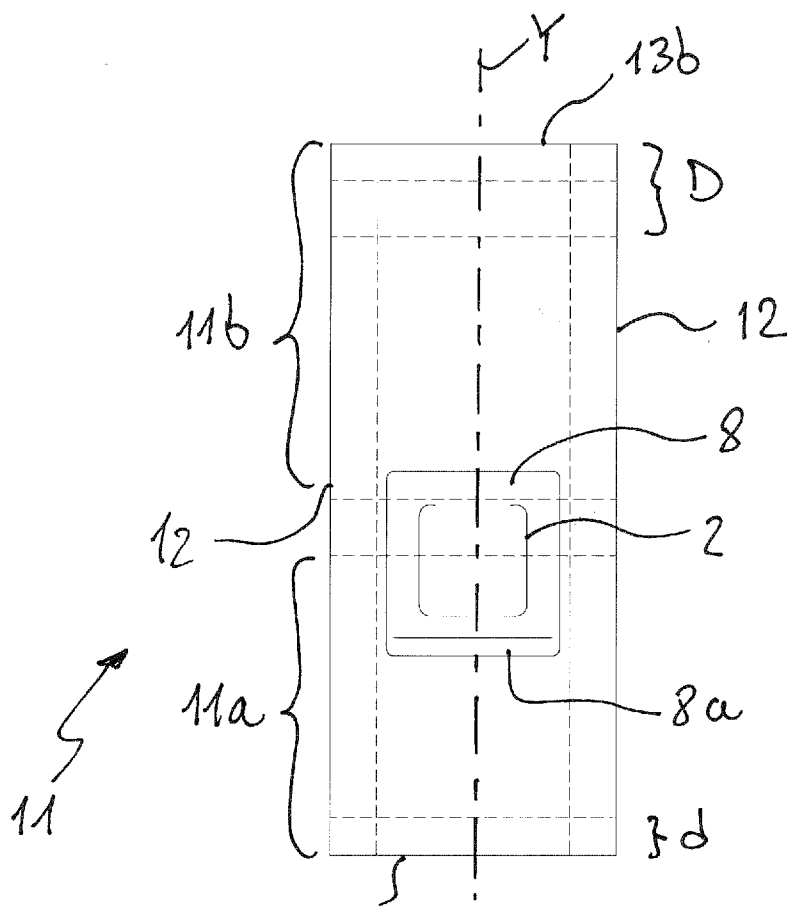


FIG. 14

9/9

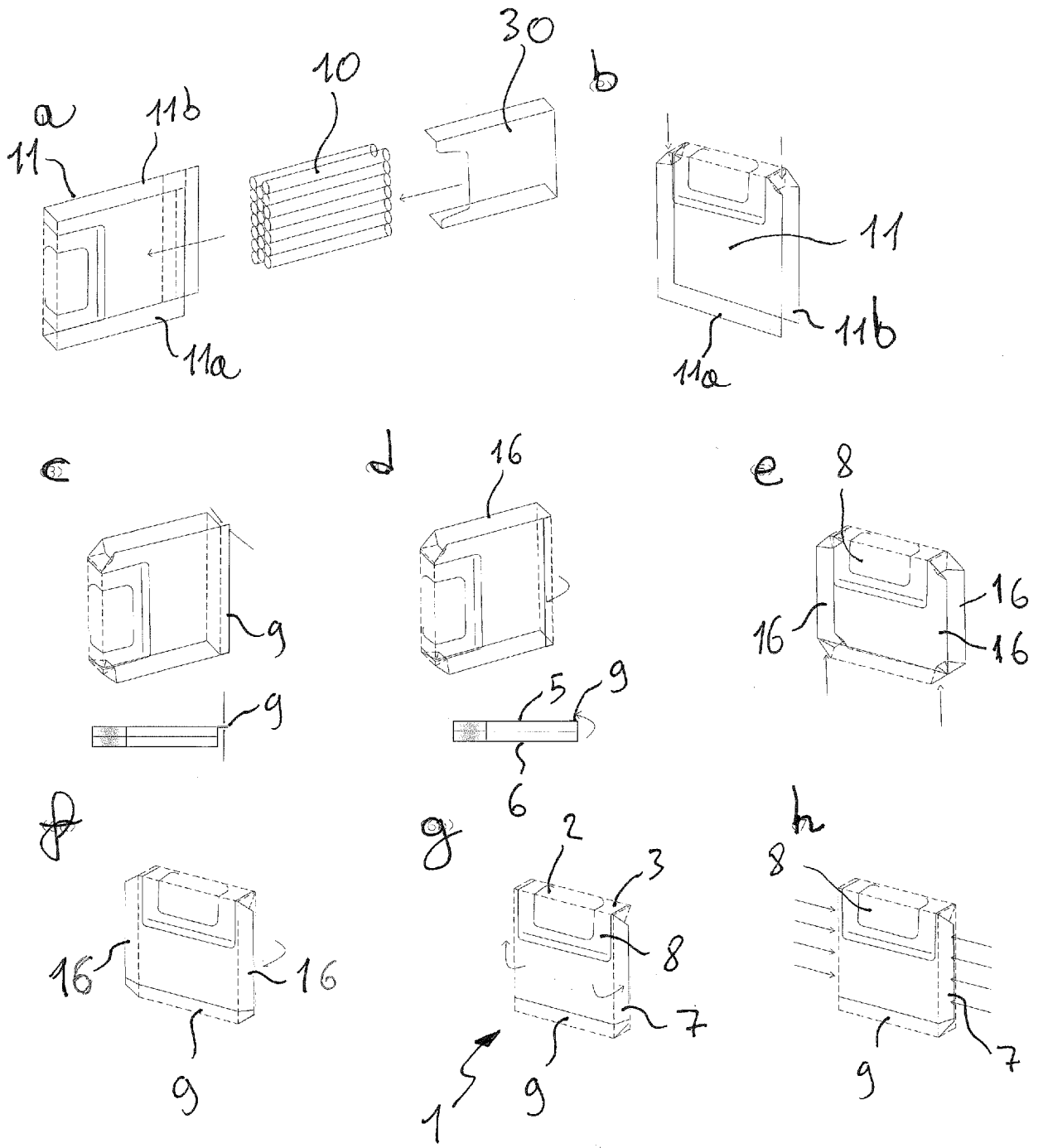


FIG. 15

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/058088

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65B19/24
ADD.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
B65B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2014/181161 A1 (GIMA TT S R L [IT]) 13 November 2014 (2014-11-13)	1,3-15
A	the whole document	2
A	----- GB 1 429 641 A (HAUNI WERKE KOERBER & CO KG) 24 March 1976 (1976-03-24) the whole document -----	2

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search
28 July 2016

Date of mailing of the international search report
05/08/2016

Name and mailing address of the ISA/
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer
Yazici, Baris

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2016/058088

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2014181161 A1	13-11-2014	EP 2922757 A1 WO 2014181161 A1	30-09-2015 13-11-2014

GB 1429641 A	24-03-1976	DE 2308714 A1 GB 1429641 A IT 978911 B	30-08-1973 24-03-1976 20-09-1974
