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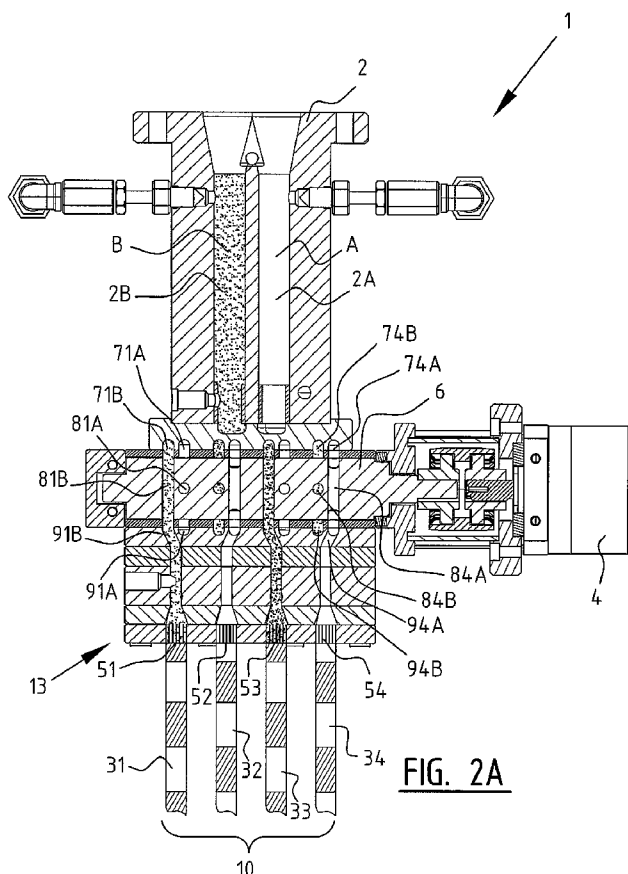
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(54) Title: METHOD AND DEVICE FOR PRODUCING EXTRUDED FOOD PRODUCTS



(57) Abstract: A method for producing extruded food products, in particular confectionery, from at least two partial mass flows from at least one extruder (2), which partial mass flows are fed to at least two inlets (71-74A) (71-74B) of a moulding device (13) having at least one outlet (51-54), together forming a mass flow, wherein at least one of the partial mass flows to the outlet is alternately activated and deactivated, whilst the mass flow continues to flow uninterruptedly, such that the cross-sectional composition of the mass flow will vary in the extrusion direction.

METHOD AND DEVICE FOR PRODUCING EXTRUDED FOOD PRODUCTS

The present invention relates to a method for producing extruded food products, in particular sweets, also referred to as
5 "confectionery", from at least two partial mass flows from at least one extruder, which partial mass flows are fed to at least two inlets of a moulding device having at least one outlet, together forming a mass flow. The invention also relates to a device for producing extruded food products.

10 Such a method is commonly known.

In the food industry, and in particular in the confectionery industry, extrusion processes are frequently used for producing
15 products such as liquorice, sugar paste, fruit gum and chewing gum. The ingredients for the product are fed to an extruder, in which the ingredients are compressed by a screw and/or heated, so that they are mixed and/or cooked, causing them to melt. The material is subsequently pressed through an extrusion die under
20 an elevated pressure, causing the product to take on the sectional shape of the extrusion die.

It is known to arrange several such moulding dies side by side and to extrude a product from each of said dies. Inter alia under
25 the influence of the reduced pressure downstream of the extrusion die, the individual partial mass flows will expand and bond together.

It will be understood that in addition to the taste of the
30 products also the appearance of the product is an important factor in the success of a product. If the various partial mass flows have different shapes and/or colours and said partial mass flows bond together, an attractive product will be obtained. A

product of this kind produced by means of the above process therefore consists of several bonded-together long strips having mutually different compositions, for example, after which cutting and possibly further processing of the products can take place.

The object of the present invention is to improve the above process and to provide a method for producing extruded food products having a highly varied appearance.

In order to accomplish that object, the method of the kind referred to in the introduction is characterised in that at least one of the partial mass flows to the outlet is alternately activated and deactivated, whilst the mass flow continues to flow uninterruptedly, such that the cross-sectional composition of the mass flow will vary in the extrusion direction. While the product manufactured by means of the known method consists of composite strips or partial mass flows, having a constant cross-sectional appearance along its entire length, the present invention makes it possible to manufacture a product having a composition that varies in longitudinal direction. This is achieved by activating and deactivating at least one partial mass flow to the outlet, so that the mass flow of the end product will vary. Since extrusion is a continuous process, those skilled in the art will appreciate that the mass flow that forms the product at the outlet cannot be interrupted.

The method according to the invention thus makes it possible to manufacture a product having a non-constant cross-section by using a continuous extrusion process, which was considered to be impossible to achieve by using the known method. The obtained products can thus be given a surprising and varied appearance.

The activation and deactivation of the partial mass flows preferably takes place within the shortest possible time span so as to obtain a clear separation between two partial mass flows from a single outlet. In another embodiment, switching can also
5 take place gradually, however, so that a transitional area between two successive partial mass flows is formed.

In a preferred embodiment of a method according to the invention, if a partial mass flow to an outlet in a moulding device is
10 activated, other partial mass flows to said outlet will be deactivated. In this embodiment, a mass flow from a single outlet is composed of several partial mass flows, which partial mass flows form the mass flow of the products in series, as it were. Preferably, a switching device is to that end provided, which
15 connects a respective one of the inlet channels for the partial mass flows to the outlet, with the various inlet channels for the partial mass flows being alternately connected by the switching device.

20 In the case of two partial mass flows, for example, which will form a single mass flow at an outlet, the second partial mass flow is deactivated when a first partial mass flow is activated. The mass flow at the outlet now consists of the first partial mass flow. After a predetermined period of time, the second
25 partial mass flow is activated, whilst the first partial mass flow is deactivated; the mass flow at the outlet is now formed by the second partial mass flow. In this way a product that is striped in the longitudinal or extrusion direction is obtained.

30 It should be noted that the invention is not limited to a particular number of partial mass flows for forming a mass flow at the outlet. Although an example comprising two alternating partial mass flows has been described above, it is quite possible

to engage several partial mass flows, depending on the desired appearance of the product.

In another preferred embodiment of the method according to the invention, the mass flow is formed by at least two partial mass flows from at least two outlets of the moulding device, with the partial mass flows to at least one of said outlets being alternately activated and deactivated. Each of the partial mass flows that form the mass flow of products at the outlets can be switched according to the above-described process. It is possible in this regard to alternately activate or deactivate one of the partial mass flows and to maintain another partial mass flow constant or, for example, to activate/deactivate all the partial mass flows in alternation, forming a kind of chessboard pattern.

It is very advantageous in that regard if the individual partial mass flows from the outlets expand and bond together under the influence of a lower temperature and/or a pressure difference, for example, and form the mass flow of the product. According to another possibility, the individual partial mass flows are passed through an additional moulding die so as to form a single mass flow.

In another preferred embodiment of the method according to the invention, a partial mass flow to at least one outlet is alternately activated and deactivated, such that an alternately activated and deactivated mass flow is formed at said outlet. When said non-continuous mass flow bonds to, for example, a continuous mass flow from another outlet, a product is obtained whose cross-sectional area varies in the extrusion direction. A partial mass flow at at least one outlet is temporarily

interrupted, as it were, by temporarily cutting off the supply of a partial mass flow.

It is important in this regard, however, that the product formed as a result of the various partial mass flows bonding together at the outlet does lead to a continuous mass flow. This can be achieved, for example, by having a partial mass flow at another outlet flow uninterruptedly, whilst the discontinuous partial mass flow of the other outlet bonds with the continuous mass flow.

It may also be possible, for example, to have two discontinuous partial mass bond together at the outlets, in which case the two partial mass flows are activated in such a manner as to overlap temporarily.

In another preferred embodiment of the method according to the invention, if a partial mass flow is deactivated to a first outlet, said partial mass flow is activated to another outlet. In this way the partial mass flows can be supplied to the moulding device in a continuous mass flow, as said partial mass flows are continuously connected to at least one outlet, and preferably to constantly the same number of outlets, or at least such that the total output of a composition does not vary.

In another preferred embodiment of the invention it may also be possible, however, to control the output of at least one extruder. The output of the extruder is controlled in dependence on the supply of the partial mass flow from the extruder. The mass flow formed by the partial mass flows at the outlet may not be constant, for example, because the activation and deactivation of the partial mass flows does not take place in phase. It may be advantageous in this regard to adapt the output of the extruder of the alternately deactivated mass flow in an alternating manner, since the mass cannot be retained in the

moulding device indeterminately in the case of a temporary deactivation, especially not in the case of a large mass flow.

In another preferred embodiment of the method according to the invention, the activation and deactivation of a partial mass flow to an outlet comprises the passing and blocking, respectively, of a partial mass flow from the inlet to the outlet of the moulding device. Said blocking and passing may be done by means of valves, for example. Preferably, the activation and deactivation of a partial mass flow to an outlet comprises the rotating of a switching shaft disposed between the inlets and the outlet, in which switching shaft passages are formed, which passages, as a result of said rotation, connect different inlets to the outlet in an alternating manner. When a switching shaft is used, connecting a partial mass flow to an outlet can take place in a simple and efficient manner. When an inlet is connected to an outlet of the moulding device via a passage in the switching shaft, the partial mass flow is able to flow from the inlet to the outlet. Preferably, another inlet of a partial mass flow is blocked in that case, since said inlet does not connect to a passage in the switching shaft. Further rotation of the switching shaft will place said second inlet into communication with a passage in the switching shaft and cause the first partial mass flow to be interrupted.

In another preferred embodiment of the method according to the invention, at least two partial mass flows are of different composition, the compositions preferably being mixed in separate mixing chambers. More preferably, the partial mass flows are different in colour and/or taste. Especially if the partial mass flows are different in colour, endless combinations of the patterns can be realised by means of the method according to the invention. Since the number of different partial mass flows is

by no means limited, either, it would even be possible to form images in a product by co-ordinated activation and deactivation of the appropriate partial mass flows to an outlet.

5 In another preferred embodiment of the method according to the invention, at least two partial mass flows are supplied to at least two separate extruders. Although it is advantageous in that case if the partial mass flows are of different composition, this is not necessary. It is also possible to create a mass flow from
10 a single composition at the outlets, in which case the sectional area is varied by activating and deactivating the partial mass flows.

The invention also relates to a device for use in producing
15 extruded food products, comprising at least two inlets for supplying partial mass flows and at least one outlet, wherein the device comprises a switching device for alternately activating and deactivating at least one of the partial mass flows to the outlet of the outlet channel. The switching device
20 is preferably arranged for switching between at least two inlet channels to a single outlet channel. It is advantageous in this regard if the switching device is connected to a central control unit, which is arranged for driving the switching device at predetermined points in time in dependence on the desired
25 pattern.

In another preferred embodiment of a device according to the invention, the device comprises several outlets, whilst each of the outlet channels of the outlets can be alternately connected
30 to at least one inlet channel of the device. This makes it possible to manufacture products with larger dimensions and of more complex composition, since the partial mass flows exiting

the individual outlets may have mutually different and varying compositions.

In a preferred embodiment of a device according to the invention,
5 the switching device comprises a rotary switching shaft, wherein
the inlet channels and the outlet channel of the device extend
up to the circumferential surface of the switching shaft, and
wherein the switching shaft comprises at least one passage which
extends up to said circumferential surface for alternately
10 connecting at least one inlet channel to an outlet channel. The
inlet channels of a single outlet channel preferably extend
concentrically in that case, being arranged for connecting to
the at least one passage formed in the switching shaft in
dependence on the angle of rotation of the switching shaft.

15 Preferably, the switching device comprises one outlet channel
for every inlet channel, with the inlet channel and the
associated outlet channel extending in the same plane
transversely to the axis of the rotary shaft. More preferably,
20 the several outlet channels converge into a single outlet. It
is advantageous in that regard if the switching shaft comprises
a passage for each inlet channel of the device. For each outlet
there is thus provided an inlet channel, a passage and an outlet
channel for each composition, preferably from separate mixing
25 chambers or extruders for forming the partial mass flow at the
outlet. The outlet channels of a single outlet to that end
converge into said one outlet.

Moreover, it is advantageous in this regard if the passages in
30 the switching shaft and/or the inlet channels of the device
extend in such a manner on the circumferential surface of the
switching shaft that an outlet channel will continuously be
connected to an inlet channel of the device during rotation of

the shaft. In this way it is ensured that an uninterrupted mass flow is obtained at the outlet.

The invention will now be explained in more detail with reference to figures illustrated in a drawing of a preferred embodiment of the invention, in which:

- Figure 1 is a perspective view of the device according to the invention;
- Figures 2A and 2B are cross-sectional views of the device of figure 1 along the line II during two different steps of the production process of the confectionery;
- Figure 3 schematically shows the switching shaft according to the invention;
- Figures 4A and 4B are cross-sectional views of the switching shaft of figure 3 along the lines IVA and IVB, respectively;
- Figures 5A-F show examples of products manufactured by means of the method according to the invention; and
- Figure 6 is a schematic front view of the device according to the invention.

Figure 1 shows a device 1 for producing confectionery by means of an extrusion process. The device 1 to that end comprises a mixing device 2, into which the colourings and flavourings for the end product are introduced. The device 1 further comprises a moulding device 13, which houses a switching device in the form of a switching shaft. The switching shaft is driven by an actuator 4, which is provided with a controllable control unit (not shown). The moulding device 13 is provided with outlets 5 formed in an end plate 111, through which the products will be pressed. The outlets 5 are spaced some distance apart, so that the individual products will not come into contact with each other.

Figure 2A is a more detailed view of the device 1 along the line II in figure 1. In this embodiment, the extrusion device 2 comprises two separate mixing chambers 2A and 2B, to which colourings and/or flavourings are supplied for forming compositions A and B, respectively. The compositions A and B are supplied to individual inlets of the moulding device 13 under the influence of the pump pressure of the upstream extruder. In another embodiment, two separate extruders 2A and 2B may be connected to the inlets of the moulding device 13. Composition A from the mixing chamber 2A is split at the inlet and carried to the inlet channels 71-74A, whilst composition B from the mixing chamber B is carried to the inlet channels 71-74B.

As already mentioned above, a switching shaft 6 is mounted in a bore in the moulding device 13, which switching shaft can be rotated by means of the actuator 4. By rotating the switching shaft 6, the partial mass flows from the mixing chambers 2A and 2B to the outlets 51-54 can be activated and deactivated. The switching shaft 6 is to that end provided with passages 81-84A and 81-84B for the compositions A and B, respectively. The inlet channels 71-74A extend into the bore of the switching shaft 6, so that the inlet channels 71-74A are in communication with the passages 81-84A at a particular angle of rotation of the switching shaft 6. Similarly, the inlet channels 71-74B extend opposite the passages 81-84B for passing the composition B through the switching shaft 6. In a similar manner, outlet channels 91-94 for the compositions A and B are provided on another side of the switching shaft 6, which outlet channels open into the outlets 51-54, respectively.

As shown, the outlet 51 comprises six sub-outlets 51a-f, which are shown in more detail in figure 6. The sub-outlets 51a-f are arranged in closely spaced relationship in the end plate 111,

so that the individual flows from the sub-outlets 51a-f will bond together under the influence inter alia of the pressure drop upon exiting the moulding device 13. The end plate 111 is connected to the moulding device by means of screws 112, so that it is possible to exchange the end plate 111 and vary the shape or the number of sub-outlets 51a-f.

Thus, two inlet channels are provided for an outlet 51, one inlet channel 71A for supplying a partial mass flow having composition A and one inlet channel 71B for supplying a partial mass flow having composition B. Depending on the position of the switching shaft 6, one of the inlet channels 71A or 71B is connected to an outlet channel 91A or 91B by means of the passages 81A or 81B. The outlet channels 91A and 91B converge downstream into the outlet 51. The passages 81A and 81B in the switching shaft 6 extend in such a manner that a partial mass flow will flow through only one of the outlet channels 91A and 91B at a time. In figure 2A the inlet channel 71B for composition B is connected to the outlet channel 91B, so that a partial mass flow 31 having composition B will flow through the outlet 51.

In figure 2A, which shows a first phase of the production process, the switching shaft has been rotated so that the inlet channels 71B, 72A, 73B and 74A are in communication with the passages 81B, 82A, 83B and 84A, respectively. In other words, the partial mass flows in question to the outlets 51-54 are activated. In figure 2B, which shows a second phase of the production process, the switching shaft 6 has been rotated at a point in time indicated by the dotted line III for the partial mass flows 31-34, such that now the other outlet channels, viz. 91A, 92B, 93A and 94B are provided with compositions A and B, respectively.

For the outlet 51, the partial mass flow from the inlet channel 71B to the outlet channel 91B is therefore deactivated at the point in time indicated by the dotted line III, whilst the partial mass flow from the inlet channel 71A to the outlet channel 91A is activated. As a result of the rotation of the switching shaft, the composition of the partial mass flow 31 thus changes from composition B to composition A.

In the above example, the partial mass flows from the inlet channels 72B and 74B to the outlet channels 92B and 94B are activated at the same time as the partial mass flows from the inlet channels 71B and 73B to the outlet channels 91B and 93B are deactivated. As a result, the output of the mixing chamber 2B that supplies composition B need not to be changed. Similarly, also the overall mass flow per unit time for composition A remains unchanged as a result of the activation and deactivation in phase of the partial mass flows to different outlets.

The above-described process results in partial mass flows 31-34 from the outlets 51-54. As shown, the partial mass flows 31-34 are alternately made up of composition A and composition B. The partial mass flows are still shown separately in the figures, but in another embodiment the separate sub-outlets 51a-f may be individually connected to inlet channels 71 for activating and deactivating the partial mass flow to the outlets. The sub-outlets 51a-f could be individually controlled in that case in accordance with the illustrated outlets 51-54. In such a situation, the partial mass flows 31-34 would expand under the influence of the pressure decrease upon exiting the outlets 51-54 - after all, compositions A and B are supplied to the moulding device 13 under pressure - and make contact with each other, resulting in the formation of a single mass flow 10. It will be understood that the outlets 51-54 must be arranged closer

together in that case, analogously to the sub-outlets 51a-f as shown in figure 6.

In figure 3 the switching shaft 6 is schematically shown. The switching shaft 6 is cylindrical in shape and is provided with evenly spaced passages 81A, 81B, 82A and 82B. In use, the switching shaft 6 is rotated continuously or in steps in a direction indicated at I, so that the passages will be alternately connected to the inlet and outlet channels. The situation shown in figure 3 corresponds to the situation shown in figure 2A, in which the inlet channel 71b is connected to the outlet channel 91B via the passage 81B. The partial mass flow from the inlet channel 71A to the outlet 91A is either activated or interrupted.

As was already apparent from figures 2A and 2B, two passages 81B and 81A for the two compositions are provided for each outlet 51-54. The switching shaft 6 is built up of units 8, as it were, with the number of units 8 corresponding to the number of outlets of the moulding devices. The number of passages per unit 8 in turn corresponds to the number of compositions being used, two in this example, viz. composition A and composition B. It will be understood that inlet channels 71 and outlet channels 91 will be provided for each of the compositions being used. As already noted before, it is also quite possible, however, to use more compositions. Furthermore it is possible to use only one composition, in which case the partial mass flows of said one composition to the outlet can be alternately activated and deactivated.

Figures 4A and 4B are cross-sectional views of the switching shaft 6 along the lines IVA and IVB, respectively, in figure 3. The figures furthermore schematically show the inlet channels

71B and 71A and the outlet channels 91B and 91A. The passages 81B and 81A widen in the direction of the circumferential surface of the switching shaft 6. As a result, the inlet channel 71B is connected to the passage 81B within an angle of rotation 12B, augmented by the aperture angle on account of the diameter of the opening 71B. In a corresponding manner, the passage 81B is in turn connected to the outlet channel 91B. The two angles are preferably the same. If the inlet channel 71B is connected to the outlet channel 91B, it is preferable to shut off the inlet channel 71A from the outlet channel 91A. The angle 12A at which the inlet channel 71A is blocked by the circumferential surface of the switching shaft 6 to that end corresponds to the angle 12B in figure 4A. In a preferred variant, both angles are 90° (90 B ??), and the rotational speed of the switching shaft 6 in the direction I can be varied for the purpose of adapting the composition of the partial mass flow at the outlet 51 of the outlet channels 91B and 91A.

Figures 5A-F show various products that can be produced by means of the method according to the invention, wherein the partial mass flows 31-34 will bond together upon exiting the device so as to form the product 10. The mass flow to each of the outlets 51-54 can be activated or deactivated. Figure 5A shows a product that consists of a single (partial) mass flow 31, for example from the outlet 51 in figure 2A. At a point in time indicated at X, the partial mass flow having composition B was deactivated and the partial mass flow having composition A was activated. At point in time XI, the reverse will take place.

Figure 5B shows a product formed from two mass flows 31 and 32, for example from the outlets 51 and 52 in figure 2A. After exiting the moulding device, the two partial mass flows 31 and 32 were bonded together so as to form the product shown in figure 5B.

Each of the partial mass flows 31 and 32 may have been formed in the same manner as the individual mass flow 31 of the product shown in figure 5A. It is advantageous in this regard, however, that when the partial mass flow having composition B for the partial mass flow 31 is deactivated at point in time X, said partial mass flow is activated for the partial mass flow 32. In a similar manner, the partial mass flow having composition A is switched from the partial mass flow 32 to the partial mass flow 31 at point in time X. At point in time XI, the compositions are reversed to partial mass flows 31 and 32 again. The advantage of activating and deactivating the flows in phase in this manner is that the total mass flows of composition A and composition B will remain the same during the course of the process, since the mass flows 31 and 32 are switched in anti-phase. The partial mass flows from the compartments or the extruders 2A and 2B can thus be kept constant.

It is also possible, however, to activate and deactivate the partial mass flows to the outlets independently of each other, as is shown in figure 5C. In this figure, the partial mass flow having composition A to the outlet 51 from which the partial mass flow 31 flows is deactivated at point in time X, and the partial mass flow having composition BA is activated. The partial mass flow 32 is not changed at this point, however, as this will not be done until point in time XII. It will be understood that a double amount of composition B per unit time is required during the period X-XII, and that the mass flow having composition A is completely interrupted. If this switching part on is used in anti-phase on the adjacent product, the overall extruder output will remain the same.

Figure 5D shows a product whose cross-sectional area varies. In this example, the partial mass flow 31A is formed from

composition B and the partial mass flow 32 is initially formed from composition A. At point in time X, the partial mass flow having composition A is deactivated, however, without a partial mass flow having composition B, for example, being activated, as a result of which no partial mass flow will be delivered to the outlet 52, for example, until the partial mass flow in question is reactivated at point in time XII. Also in this case it is possible, as those skilled in the art will appreciate, to realise an endless amount of variations, using different compositions, an example of which is shown in figure 5E, where the partial mass flow having composition B to the outlet 52 is only activated at point in time X for forming the partial mass flow 32. Subsequently, the partial mass flow having composition A to the outlet 51 is deactivated at point in time XII and will be reconnected to the mixing chamber 2B containing composition B at point in time XIII.

Although the above examples each concern two partial mass flows 31 and 32 and two compositions A and B, the invention is by no means limited to such numbers. In figure 5F a product is shown which consists of four interconnected partial mass flows 31, 32, 33 and 34 made up of several compositions A, B, C, D, etc.

CLAIMS

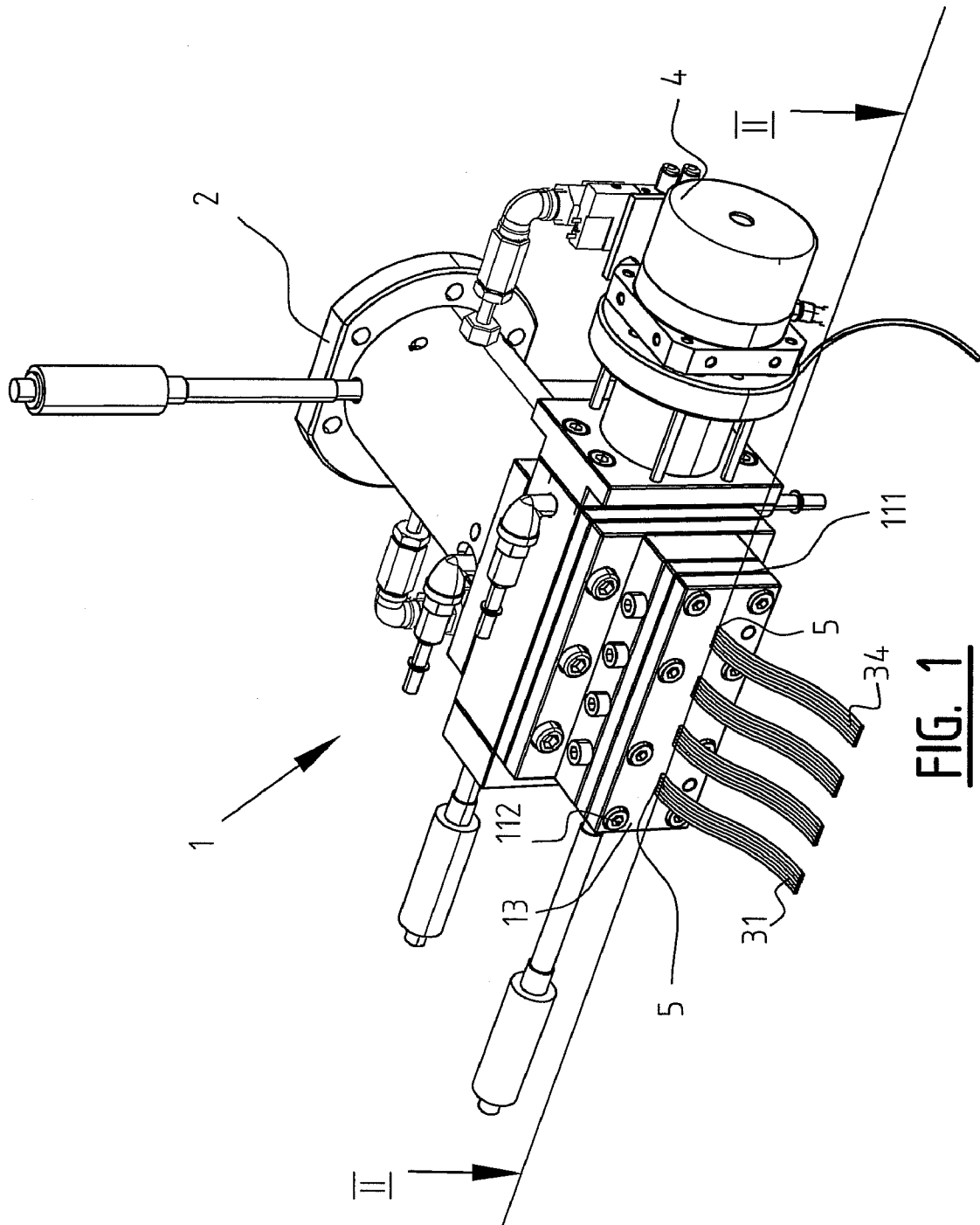
1. A method for producing extruded food products, in particular confectionery, from at least two partial mass flows from at least one extruder, which partial mass flows are fed to at least two inlets of a moulding device having at least one outlet, together forming a mass flow,
characterised in that at least one of the partial mass flows to the outlet is alternately activated and deactivated, whilst the mass flow continues to flow uninterruptedly, such that the cross-sectional composition of the mass flow will vary in the extrusion direction.
2. A method for producing extruded food products according to claim 1, wherein if a partial mass flow to an outlet in a moulding device is activated, other partial mass flows to said outlet will be deactivated.
3. A method for producing extruded food products according to claim 1 or 2, wherein the mass flow is formed by at least two partial mass flows from at least two outlets of the moulding device, wherein the partial mass flows to at least one of said outlets are alternately activated and deactivated.
4. A method for producing extruded food products according to claim 3, wherein a partial mass flow to at least one outlet is alternately activated and deactivated, such that an alternately activated and deactivated mass flow is formed at said outlet.
5. A method for producing extruded food products according to claim 3 or 4, wherein if a partial mass flow is deactivated

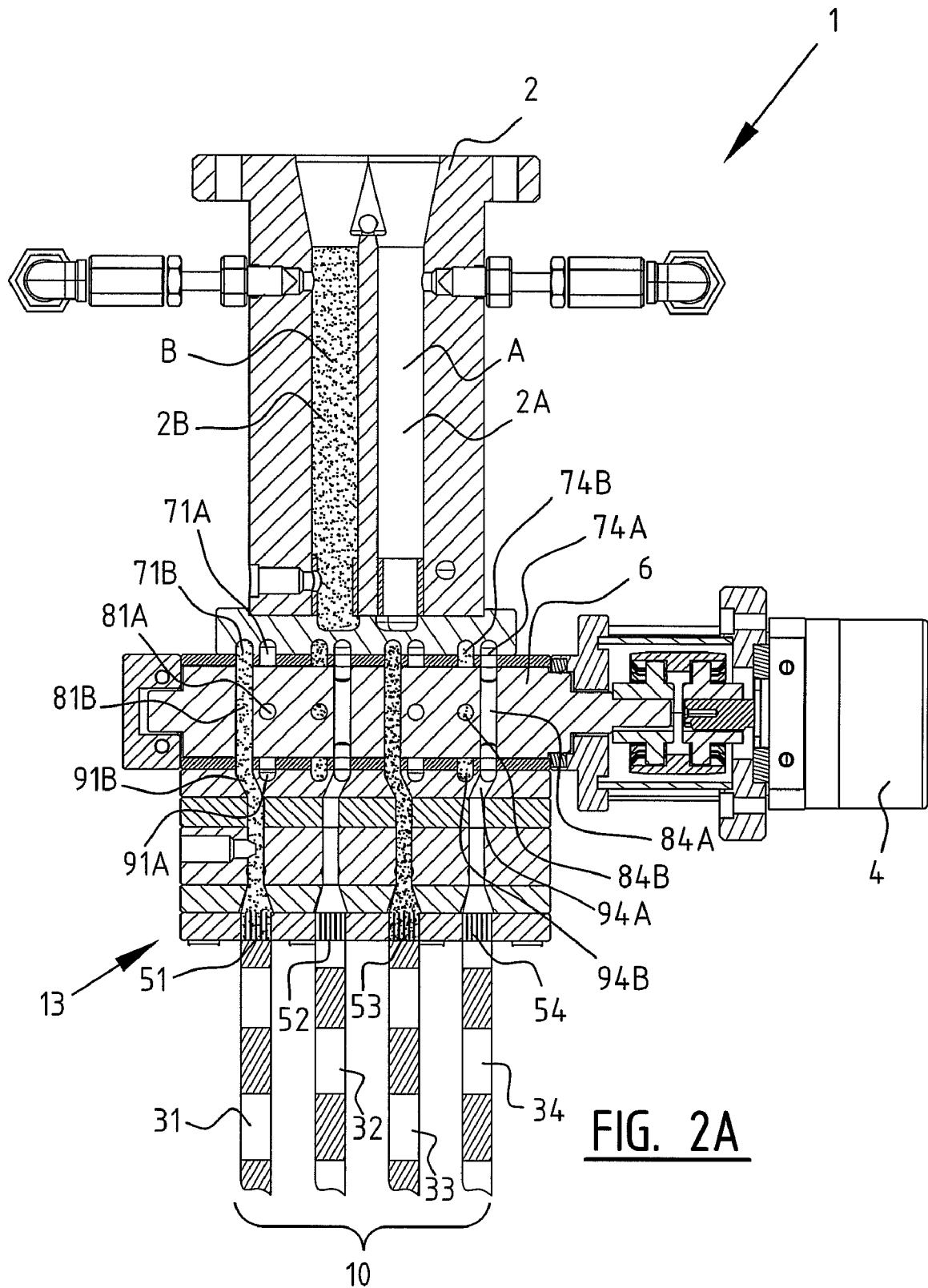
to a first outlet, said partial mass flow is activated to another outlet.

- 5 6. A method for producing extruded food products according to any one of the preceding claims 1 - 5, wherein the activation and deactivation of a partial mass flow to an outlet comprises the passing and blocking, respectively, of a partial mass flow from the inlet to the outlet of the moulding device.
- 10 7. A method for producing extruded food products according to any one of the preceding claims 1 - 6, wherein the activation and deactivation of a partial mass flow to an outlet comprises the rotating of a switching shaft disposed
- 15 between the inlets and the outlet, in which switching shaft passages are formed, which passages, as a result of said rotation, connect different inlets to the outlet in an alternating manner.
- 20 8. A method for producing extruded food products according to any one of the preceding claims 1 - 7, wherein at least two partial mass flows are of different composition.
- 25 9. A method for producing extruded food products according to any one of the preceding claims 1 - 8, wherein at least two partial mass flows are supplied to at least two separate extruders.
- 30 10. A method for producing extruded food products according to any one of the preceding claims 1 - 9, wherein the output of at least one extruder is controlled.

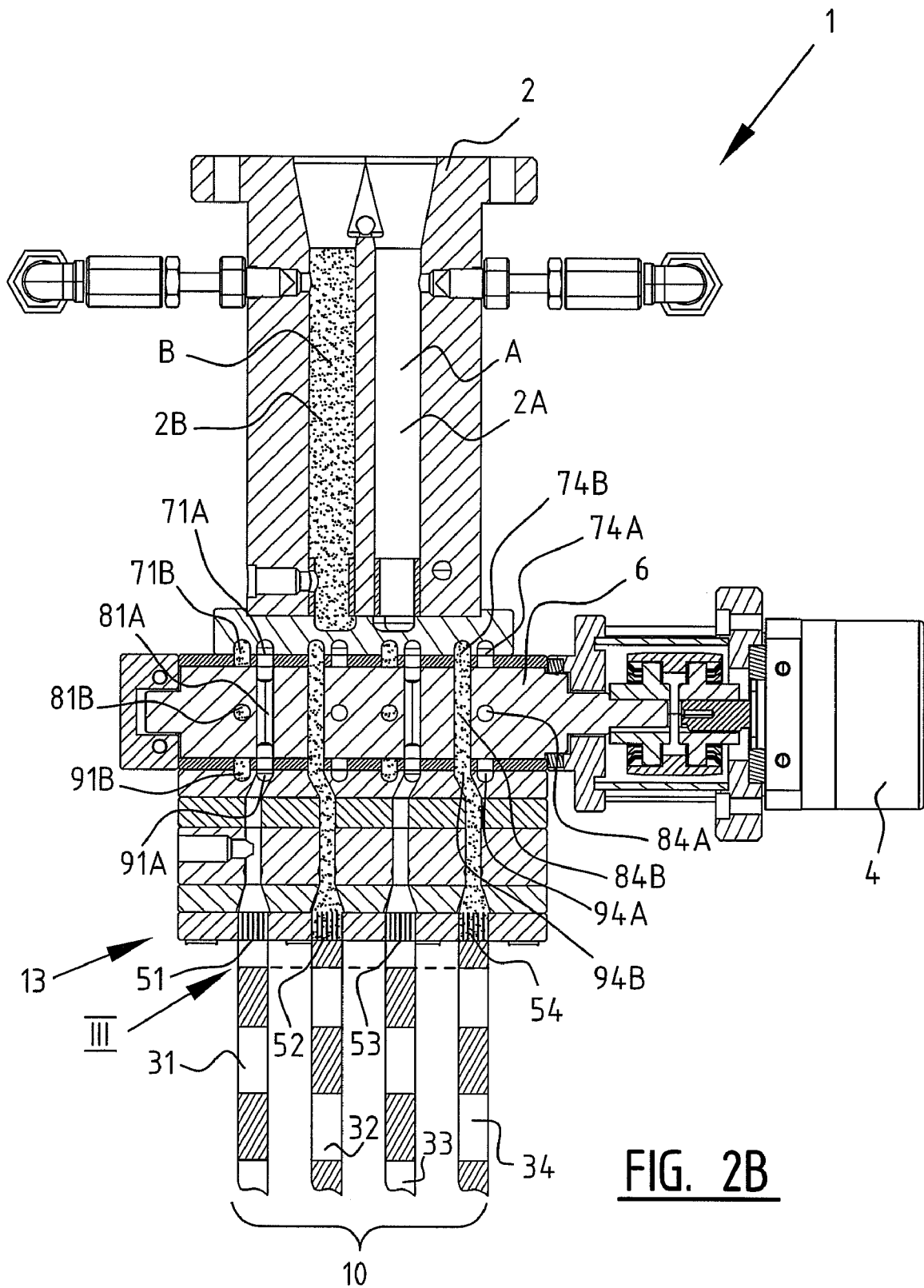
11. A device for use in producing extruded food products,
comprising at least two inlets for supplying partial mass
flows and at least one outlet, wherein the device comprises
a switching device for alternately activating and
5 deactivating at least one of the partial mass flows to the
outlet of the outlet channel.
12. A device according to claim 11, wherein the switching device
comprises a rotary switching shaft, wherein the inlet
10 channels and the outlet channel of the device extend up to
the circumferential surface of the switching shaft, and
wherein the switching shaft comprises at least one passage
which extends up to said circumferential surface for
alternately connecting at least one inlet channel to an
15 outlet channel.
13. A device according to claim 12, wherein the switching shaft
comprises a passage for each inlet channel of the device.
- 20 14. A device according to claim 12 or 13, wherein the passages
in the switching shaft and/or the inlet channels of the
device extend in such a manner on the circumferential
surface of the switching shaft that an outlet channel will
continuously be connected to an inlet channel of the device
25 during rotation of the shaft.
15. A device according to any one of the preceding claims 11-14,
wherein the device comprises several outlets, whilst each
of the outlet channels of the outlets can be alternately
30 connected to at least one inlet channel of the device.

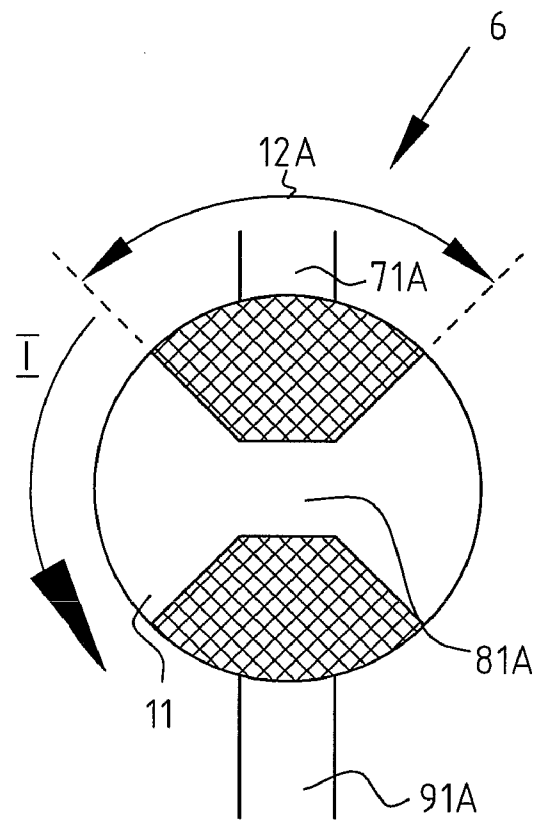
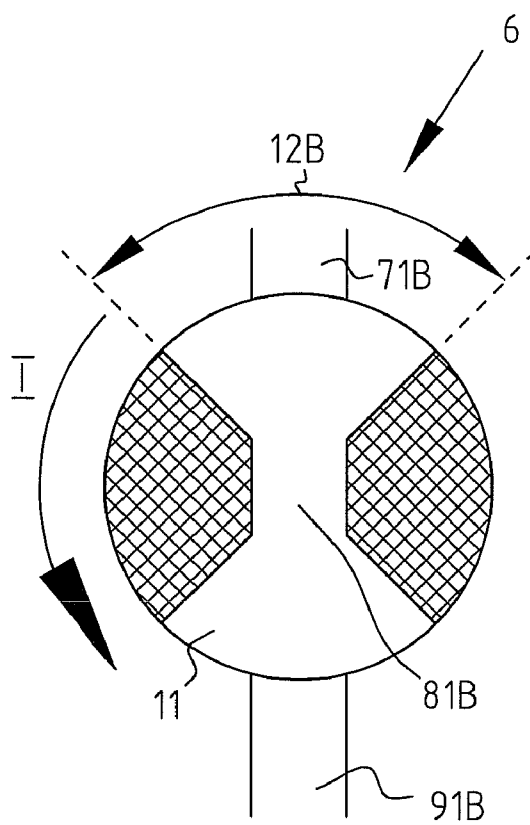
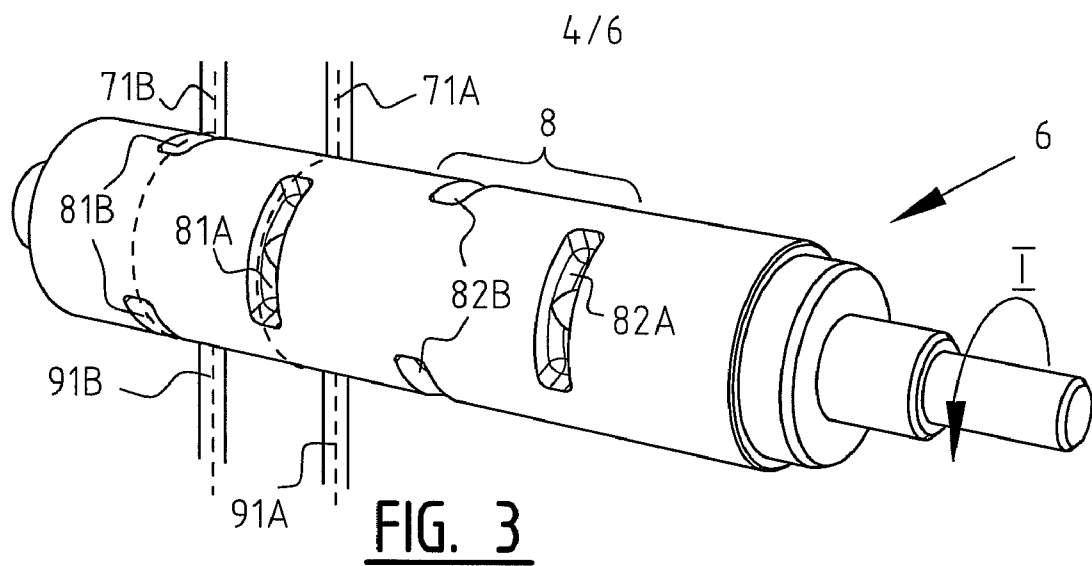
1/6





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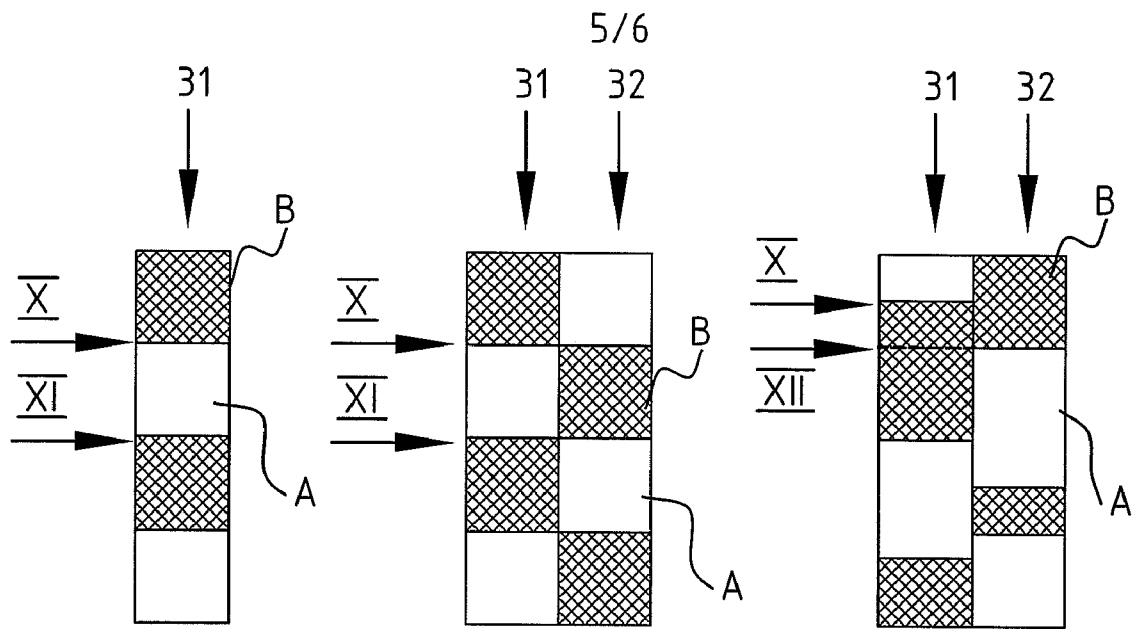


FIG. 5A

FIG. 5B

FIG. 5C

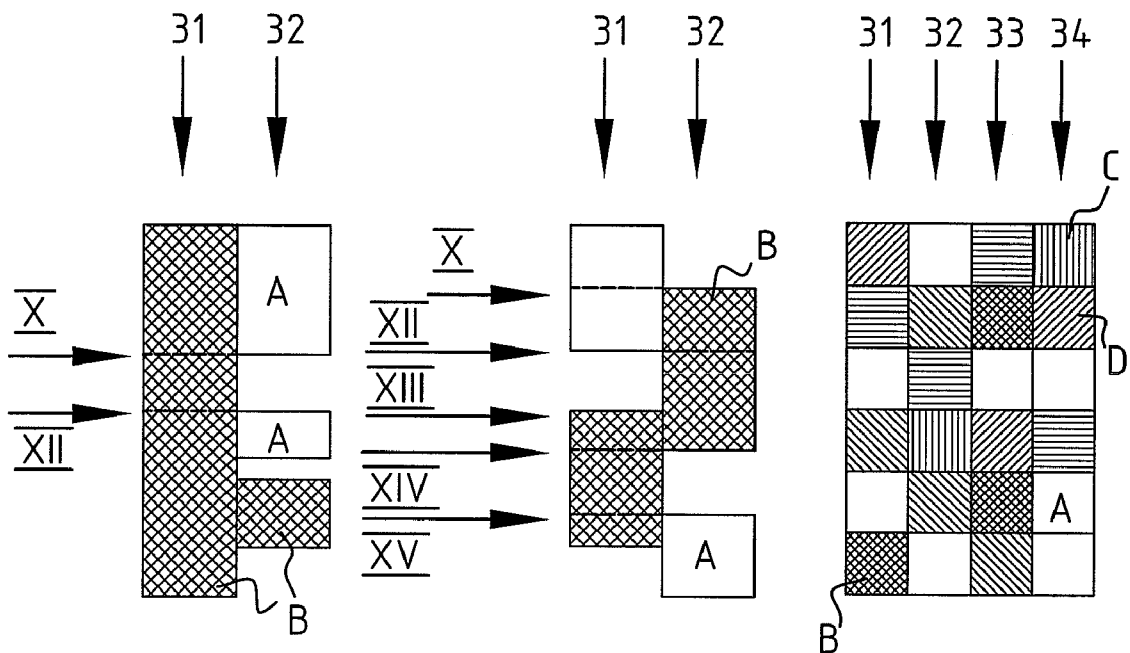


FIG. 5D

FIG. 5E

FIG. 5F

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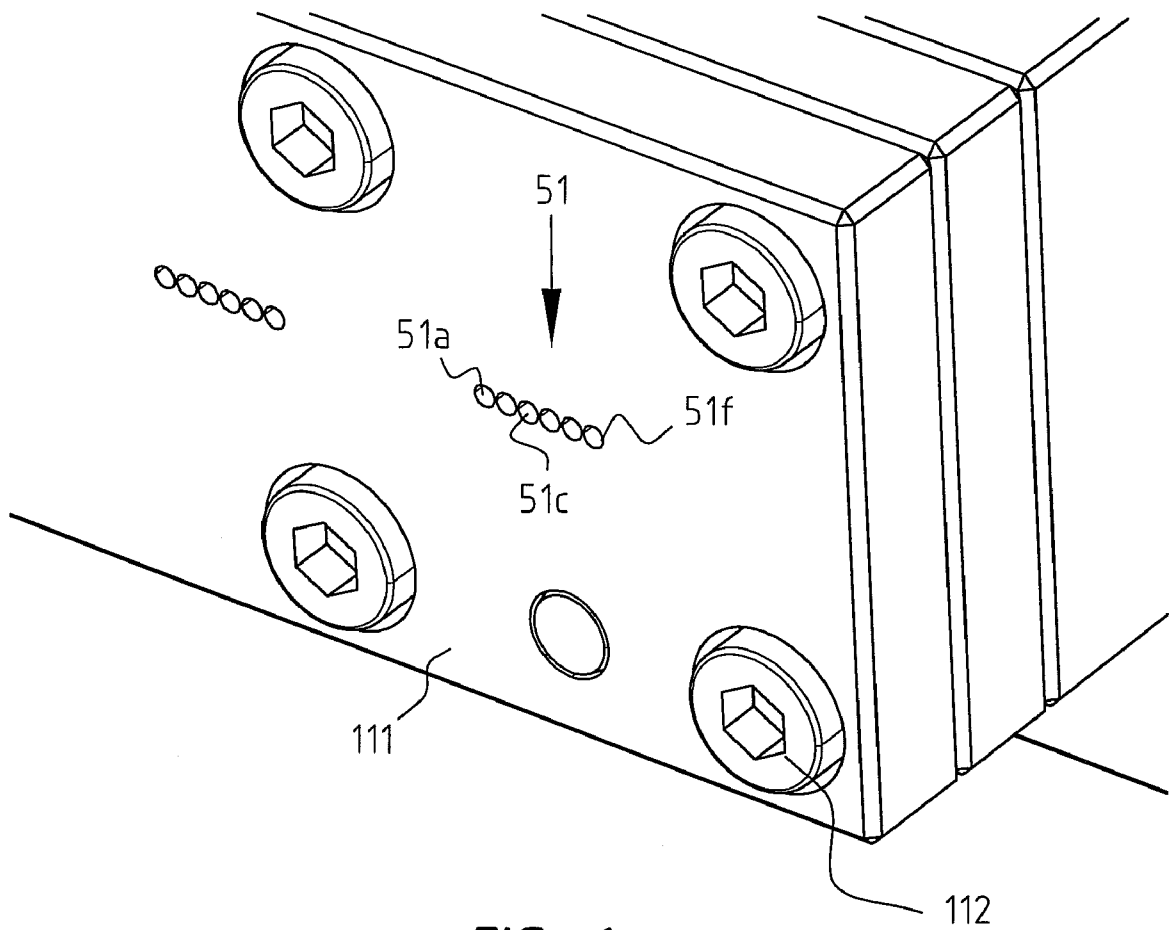


FIG. 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/NL2009/050030

A. CLASSIFICATION OF SUBJECT MATTER

INV. A23G3/20 A23G3/28 A23P1/12 B29C47/04

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)

A23G A23P

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 practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2007/092096 A (WRIGLEY W M JUN CO [US]; CLARK JAMES C [US]) 16 August 2007 (2007-08-16) paragraphs [0037], [0038], [0040], [0045] - [0048], [0054], [0059]; figures -----	1-15
X	WO 2007/047227 A (WRIGLEY W M JUN CO [US]; FORNAGUERA JOAN FABRE [ES]) 26 April 2007 (2007-04-26) paragraphs [0067], [0068], [0073], [0100], [0103] - [0106], [0110], [0111]; figures 1,20-23 -----	1-6, 8-11,15
A		7,12,13
X	US 3 295 467 A (GROPEN EDWARD M) 3 January 1967 (1967-01-03) column 2, line 19 - column 3, line 40 column 4, line 10 - line 41 ----- -/-	1-15

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search

17 March 2009

Date of mailing of the international search report

02/04/2009

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INTERNATIONAL SEARCH REPORT

International application No

PCT/NL2009/050030

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 537 096 A (TOGUM SOC [FR])	11-15
A	14 April 1993 (1993-04-14) column 3, line 5 - column 4, line 48; claim 7; figures -----	1-14

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/NL2009/050030

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