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(54) **METHOD AND APPARATUS FOR PLACING OR INSERTING PRINTED SUPPLEMENTS INTO PRINTED CORE PRODUCTS**

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(57) **ABSTRACT**

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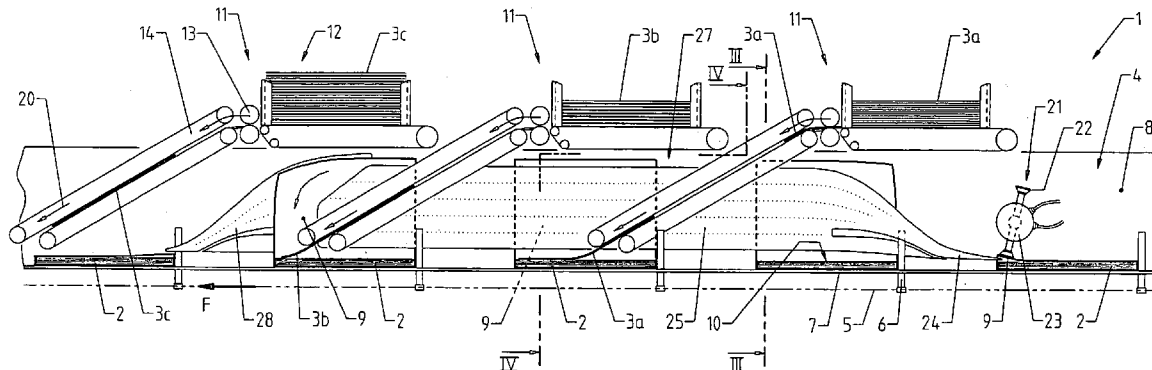
A method and an apparatus for placing and/or inserting printed supplements (3a, b, c) into printed core products (2), wherein the printed core products (2) are spaced apart from one another and essentially conveyed flatly in the direction of their format height in a conveying channel. At least one sheet (9, 32) of the printed core products (2) is opened at least to such a degree that more than half of the thusly exposed page (10) intended for the placement of the printed supplement is accessible from the vertical direction. The printed supplements (3a, b) are fed to the printed core products (2) in the conveying direction (F) of the conveying channel (4), wherein the feed direction (20) lies in a vertical plane that is defined by the conveying direction (F).

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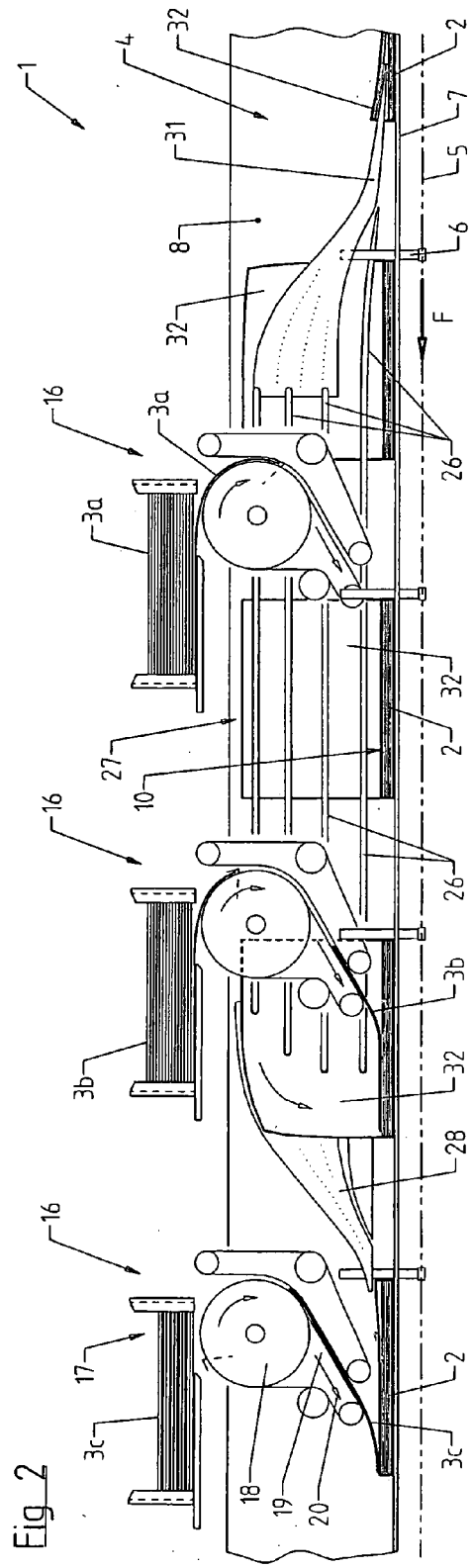
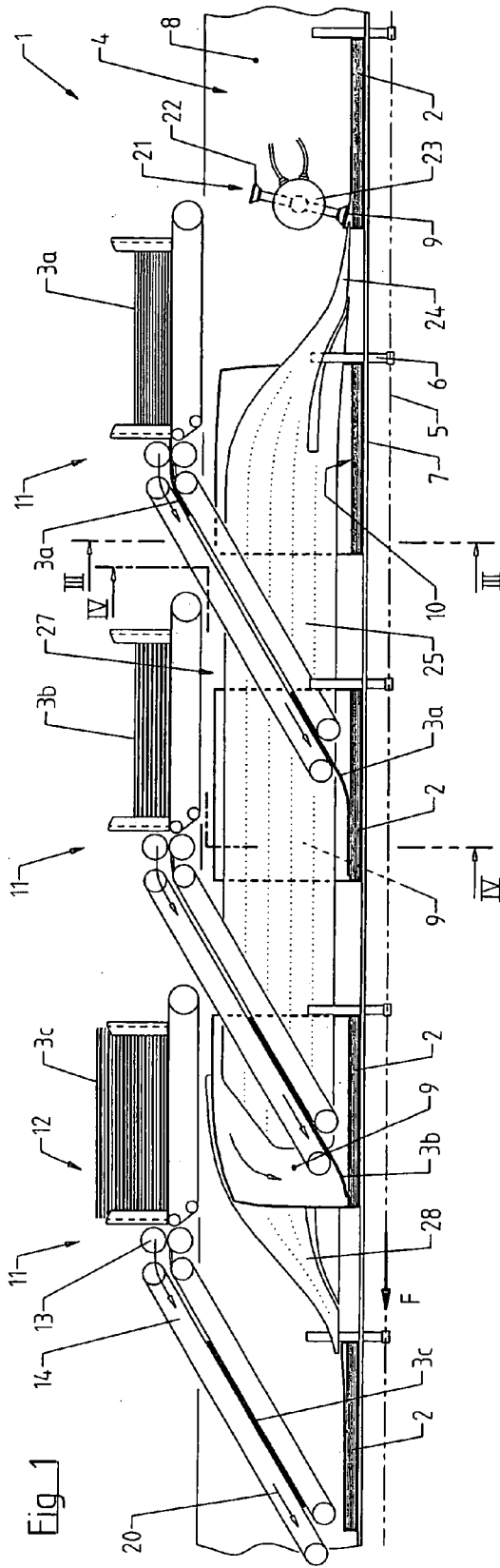


Fig 3

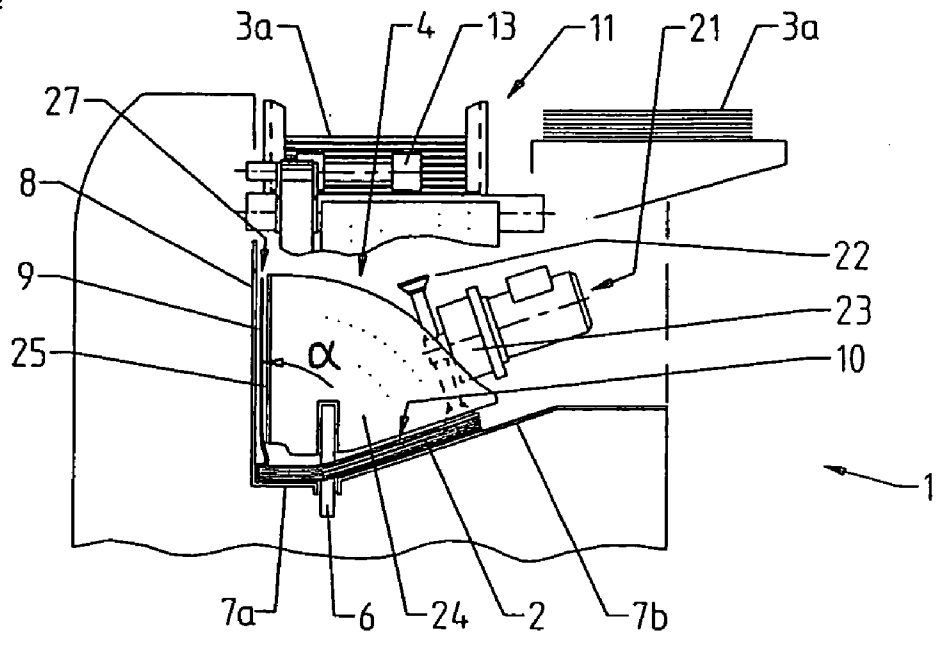
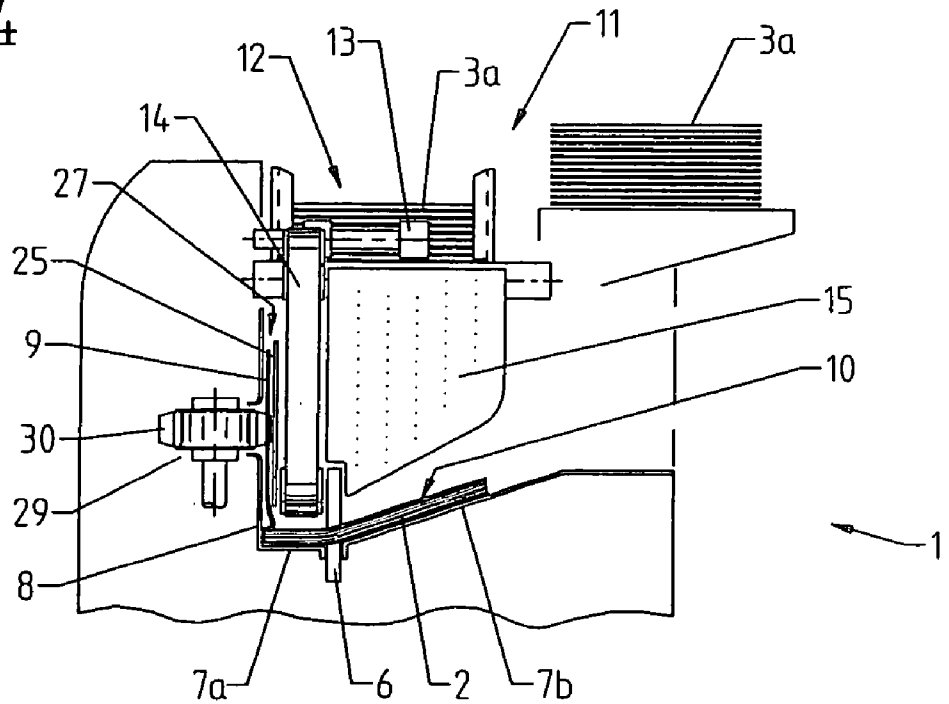


Fig 4



METHOD AND APPARATUS FOR PLACING OR INSERTING PRINTED SUPPLEMENTS INTO PRINTED CORE PRODUCTS

BACKGROUND OF THE INVENTION

[0001] The present invention pertains to a method and an apparatus for placing and/or inserting printed supplements such as, for example, sheets, folded sections, CDs, merchandise samples and the like into printed core products.

[0002] In print converting, the term insertion refers to the addition of sheets, (folded) sections, CDs, merchandise samples and the like to finished products (e.g., newspapers, magazines, brochures). The printed supplements to be inserted are primarily used for advertising purposes. The inserting process is carried out before the printed core product in question is packaged. Known packaging systems with a modular design consist of a printed core product feeder, a series of supplement feeders and label dispensers for respectively placing or inserting the printed supplements on or into the printed core products, a foil wrapping machine for packaging the printed core products containing the printed supplements, an inkjet printer as well as a zip code control, diverters and compensating stackers.

[0003] The printed core products are conveyed into a conveying channel by pushers of a conveying means in a spaced-apart fashion, namely in the direction of their format height, i.e., such that their spine bindings extend along the conveying direction. In order to insert the printed supplements, the printed core products are opened by lifting the front edge of the first sheet off the printed core product by means of a rotating suction element and transferring this first sheet to downstream deflectors. The first sheet is guided on the deflectors at an acute angle of no more than 30-45° referred to the main section of the printed core product. This means that, in essence, only the front section of the printed core product is opened while more than 60% of the page intended for the placement of the printed supplement is still covered by the opened sheet. If not only the first sheet needs to be lifted off, the printed core product is pushed against an opening blade with its leading foot or head side. After the insertion of the printed supplements, the printed core products are closed again by returning the opened sheets into the closed position and additional printed supplements can then be deposited onto the upper side of the printed core product, if so required.

[0004] The printed supplements are separately withdrawn from magazines with conventional rotary or drum feeders that are oriented transverse to the conveying direction of the printed core products and fed to the continuously conveyed printed core products essentially transverse to the conveying direction in order to be inserted into the opening in the front section of the printed core products. After their arrival, the printed supplements are subjected to a change in direction such that the depositing capacity of these inserting machines is limited with respect to a reliable and careful feed of the printed supplements.

[0005] EP 1 231 176 A1 describes an apparatus for feeding the printed supplements transverse to the conveying direction of the printed core products in an essentially horizontal plane, wherein the leading lateral edge of the printed supplements extends parallel to the guide wall of the conveying channel. The transverse conveying direction results in a

speed component in the conveying direction of the printed core products such that the acceleration thrust caused by the pushers of the conveying channel is reduced on the trailing edge of the printed supplements. The speed component perpendicular to the conveying channel is reduced such that the speed of impact of the printed supplements on the opposite guide wall or the spine of the printed core product is reduced.

[0006] EP 0 738 682 A1 discloses a feeder for printed supplements, in which the printed supplements are fed transverse to the conveying direction and pre-accelerated in the conveying direction by means of two vacuum disks that rotate in the same direction. The vacuum disks are essentially arranged horizontally and respectively provided with a suction opening, wherein said vacuum disks respectively take hold of the printed supplements at one point and impose a corresponding translatory movement upon the printed supplements during a 90° rotation. Due to the acceleration forces occurring during this process, this apparatus is only suitable for processing light and stable printed supplements.

SUMMARY OF THE INVENTION

[0007] The present invention is based on the objective of making available a method and an apparatus for reliably and carefully feeding the printed supplements to the printed core products with a high processing capacity. Another objective of the invention is the placing or inserting the printed supplements in a precisely positioned fashion.

[0008] According to the invention, the objective with respect to the method is attained in opening at least one sheet of the printed core product at least to such a degree that more than half of the thusly exposed page for placing the printed supplement is accessible from the vertical direction, and feeding the printed supplements to the printed core products in the conveying direction of the conveying channel, wherein the feed direction lies in a vertical plane that is defined by the conveying direction. The objective with respect to the apparatus is attained with a guide that forms a supporting and guiding surface inclined relative to the conveying channel bottom such that the at least one sheet of the printed core product is opened at least to such a degree that more than half of the thusly exposed page intended for the placement of the printed supplement is accessible from the vertical direction. The feeder is oriented in the conveying direction of the conveying channel with respect to the feed direction of the printed supplements.

[0009] The inventive idea can be seen in that the printed core product is opened to such a degree that the printed supplements can be deposited onto the intended page from the top. This makes it possible to feed the printed supplements to the printed core products in the same conveying direction. Abrupt changes in direction no longer occur during the conveyance of the printed supplements such that a careful feed can be realized with high speeds. Unstable printed supplements, in particular, are no longer twisted and deposited exactly at the intended location. It is no longer required to place or insert the printed supplements while the trailing edge of the printed supplement is in contact with the pusher and/or a lateral edge is in contact with the spine of the printed core product. This means that the printed supplements can be precisely positioned at the predetermined location in the printed core product. At least the first sheet

of the printed core product is preferably opened by approximately 90° such that the printed supplements can be fed to a position near the spine binding and precisely positioned on the intended page.

BRIEF DESCRIPTION OF THE DRAWING

[0010] The following description of preferred embodiments is made with reference to the accompanying drawing, wherein

[0011] **FIG. 1** is a side view of an inserting machine with feeders for printed supplements;

[0012] **FIG. 2** shows a second embodiment of an inserting machine;

[0013] **FIG. 3** is a section through the inserting machines according to **FIG. 1** along the line III-III; and

[0014] **FIG. 4** is a second section through the inserting machine along the line IV-IV.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0015] **FIGS. 1 and 2** respectively show an inserting machine that is identified as a whole by the reference symbol **1** and equipped with two feeders **11** and **16** for inserting printed supplements **3a**, **3b** into brochures **2** and a third feeder **11** or **16** for depositing a printed supplement **3c** onto said brochures. The differences between the inserting machine shown in **FIG. 1** and the variation shown in **FIG. 2** are discussed further below.

[0016] The brochures **2** are continuously conveyed forward in a conveying channel **4** by the pushers **6** of a chain conveyor **5** such that they are equidistantly spaced apart from one another, wherein the spine bindings of the essentially flatly conveyed brochures **2** are oriented along the conveying direction **F** of the conveying channel **4**. This conveying channel is composed of a channel bottom **7** and a lateral guide wall **8**. According to **FIGS. 3 and 4**, the conveying channel **4** comprises a conveying channel of the type used in gathering machines, wherein this conveying channel has a horizontal channel bottom **7a** and a channel bottom **7b** that is obliquely inclined relative to the conveying direction **F** and toward the guide wall **8**, and wherein the spines of the brochures **2** are guided on the guide wall **8**.

[0017] The brochures **2** need to be opened in order to insert the printed supplements **3a**, **b**, **c**. In the embodiment shown in **FIG. 1**, this is realized with a rotary opening mechanism **21** that is arranged near the front section of the brochures **2** and takes hold of the respectively first sheet **9** of the brochures **2** by means of suction elements **22** that are controlled by a rotary valve **23**. The first sheet is then transferred to a deflector **24**. The rotational movement of the suction elements **22** is adjusted such that the leading edge of the first sheet **9** is taken hold of and lifted off the brochures **2** with a nearly synchronous speed. In the embodiment shown in **FIG. 2**, a stationarily arranged opening blade **31** is used that is provided with a correspondingly shaped point that pricks the foot or head section of the brochure **2** and thusly lifts several top sheets **32** off the respective brochures **2**.

[0018] As the brochures **2** are conveyed forward, the respective lifted sheets **9** and **32** are additionally opened by

the deflector **24** that is progressively twisted along the longitudinal axis and the opening blade **31**, respectively, wherein said sheets are then respectively transferred to guide plates **25** and guide rods **26**. During this process, the respective sheets **9** and **32** are opened by an angle α of nearly 90°. The guide plates **25** and the guide rods **26** respectively provide the sheets **9** and **32** with a supporting and guiding surface and form a guide channel **27**, in which the lifted sheets **9** and **32** are securely guided, together with the guide wall **8**. After opening the upper portion of the brochures that comprises, in particular, several sheets **32**, a flawless conveyance of the brochures **2** is ensured due to the support provided for the lifted sheets **32** during this process. This is achieved in that cams **30** of an endless conveyor belt **29** arranged along the guide channel **27** push the brochures **2** forward in addition to the respective pushers **6** of the chain conveyor **5**.

[0019] Due to the 90° opening angle, nearly the entire page **10** intended for the placement of the printed supplements **3a**, **b** to be inserted is accessible in the vertical direction. This makes it possible to feed the printed supplements **3a**, **b** in the conveying direction **F** of the brochures **2**. In the inserting machine **1** shown in **FIG. 1**, so-called suction belt feeders **11** are used in which the respective printed supplement **3a**, **b**, **c** situated on the bottom is pushed forward in the conveying direction **F** from the magazines **12** in synchronism with the chain conveyor **5** and fed to pull-off rollers **13**. The printed supplements **3a**, **b** are synchronously deposited onto the intended page **10** of the brochures **2** by means of a clamping conveyor **14** with assigned lateral support plates **15**, wherein this conveyor feeds the printed supplements to the brochures **2** in a direction that extends obliquely downward. The resulting feed direction **20** lies in a vertical plane that is defined by the conveying direction **F**.

[0020] In the second embodiment of an inserting machine **1** that is shown in **FIG. 2**, so-called drum feeders **16** are provided for feeding the printed supplements **3a**, **b**, **c** instead of a suction belt feeder **11**. These drum feeders respectively contain a separating drum **18** that withdraws the printed supplement **3a**, **b** or **c** from a magazine **17** arranged on top thereof and then transfers the printed supplement to a transfer conveyor **19** in order to deposit the printed supplement **3a** or **3b** onto the intended page **10** of the brochure **2** in a feed direction **20** that extends obliquely downward.

[0021] After inserting the printed supplements **3a**, **b**, the respective opened sheets **9** and **32** are returned to the brochure **2** by means of a return plate **28** that begins in the guide wall **8**. This means that the brochures **2** with the printed supplements **3a**, **b** inserted therein is closed. Additional printed supplements **3c** can also be deposited onto the upper side of the brochures **2**. An additional suction belt feeder **11** or an additional drum feeder **16** is respectively illustrated in **FIGS. 1 and 2** for this purpose.

[0022] The method according to the invention for the first time makes it possible to feed printed supplements **3a**, **b**, **c** to printed core products **2** in the same conveying direction **F**, **20**. Lateral movements or changes in the conveying direction are not required in this case. The printed supplements are deposited with a synchronous conveying speed such that a positionally accurate feed can be realized without one edge of the printed supplements **3a**, **b** having to be guided either along the binding or in front of a pusher **6**. This

makes it possible to achieve particularly high processing capacities. In addition, it is possible to fix the printed supplements 3a, b within the printed core product 2 in certain positions, for example, to glue cards or to electrostatically fix printed supplements 3a, b in position for the reliable additional processing in the subsequent packaging. More than 50% of the surface of the page 10 intended for the placement of the printed supplements are already accessible from the top at an opening angle α of 60°. This means that a feed in the conveying direction F is also possible for smaller printed supplements 3a, b.

1. A method for placing printed supplements into printed core products having a format height and which are spaced apart from one another and conveyed essentially flatly in a conveying channel in the direction of their format height, wherein at least one sheet of the printed core products is opened and subsequently closed again in order to insert the printed supplements, comprising:

opening at least one sheet of the printed core product at least to such a degree that more than half of the thusly exposed page for placing the printed supplement is accessible from the vertical direction; and

feeding the printed supplements to the printed core products in the conveying direction of the conveying channel, wherein the feed direction lies in a vertical plane that is defined by the conveying direction.

2. The method according to claim 1, wherein the at least one sheet of the printed core product is opened to such a degree that the exposed page of the printed core product is almost completely accessible from the vertical direction.

3. The method according to claim 1, wherein the at least one sheet of the printed core product is guided in channel-like guides after being opened.

4. The method according to claim 1, wherein the at least one sheet of the printed product is conveyed and simultaneously supported by additional conveying means after being opened.

5. The method according to claim 1, wherein the printed supplements are conveyed in synchronism with the printed core products at least in the instant in which they are deposited onto the exposed page.

6. The method according to claim 1, wherein the printed supplements are fed to the printed core products along an essentially straight line, such that the feed direction is inclined relative to the main surface.

7. An apparatus for placing printed supplements into printed core products, comprising:

a conveying channel having a channel bottom and at least one guide wall;

a pusher device by which the printed core products are conveyed in a spaced-apart and essentially flat fashion in said conveying channel;

an opening mechanism for lifting at least one sheet off the printed core product;

a guide downstream of the opening mechanism to deflect the at least one sheet of the printed core product; and

at least one feeder for feeding the printed supplements;

wherein said guide forms a supporting and guiding surface that is inclined relative to the channel bottom in such a way that the at least one sheet of the printed core product is opened at least to such a degree that more than half of the thusly exposed page intended for the placement of the printed supplement is accessible from the vertical direction, and

wherein said feeder is oriented in the conveying direction of the conveying channel with respect to the feed direction of the printed supplements.

8. The apparatus according to claim 7, wherein the supporting and guiding surface is respectively composed of guide rods or guide plates.

9. The apparatus according to claim 7, wherein the supporting and guiding surface is defined by a guide channel.

10. The apparatus according to claim 7, wherein the supporting and guiding surface is essentially oriented perpendicular to the conveying channel bottom.

11. The apparatus according to claim 7, comprising conveying means for supporting the at least one sheet of the printed core product on the supporting and guiding surface during its conveyance.

12. The apparatus according to claim 7, comprising a horizontal channel bottom or a channel bottom that is inclined transverse to the conveying direction of the conveying channel.

13. The apparatus according to claim 7, comprising a channel bottom that is composed of a horizontal channel bottom and a channel bottom that is inclined transverse to the conveying direction and to the guide wall.

14. The apparatus according to claim 7, wherein the feeder comprises a drum feeder for rotatively separating and feeding the printed supplements, such that the printed supplements are deposited in the conveying direction of the conveying channel.

15. The apparatus according to claim 7, wherein the feeder comprises a suction belt feeder for separating and feeding the printed supplements in the conveying direction.

16. The apparatus according to claim 7, wherein the feeder comprises a card gluer for gluing an insert selected from the group consisting of response cards, advertising supplements, CDs, and merchandise samples, onto the opened page of the printed core product.

17. The apparatus according to claim 8, wherein the supporting and guiding surface is essentially oriented perpendicular to the conveying channel bottom.

18. The apparatus according to claim 9, wherein the supporting and guiding surface is essentially oriented perpendicular to the conveying channel bottom.

19. The apparatus according to claim 8, comprising conveying means for supporting the at least one sheet of the printed core product on the supporting and guiding surface during its conveyance.

20. The apparatus according to claim 9, comprising conveying means for supporting the at least one sheet of the printed core product on the supporting and guiding surface during its conveyance.

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