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(54) **WRAPPING ASSEMBLY**

(57) A wrapping assembly (1) comprising a rotatable carousel (2) provided with a plurality of radial grippers (3) for immobilizing at least one product (A), with the interposition of at least one packaging sheet (B), and with a series of folding stations (4, 5, 6, 7) arranged along the trajectory of the grippers (3), for folding the flaps of the at least one sheet (B) onto the at least one product (A) in order to cover it.

The assembly (1) comprises, at a main folding station (5),
- at least one pusher (8) for immobilizing the at least one

product (A) partially covered with at least one respective sheet (B) on the main folding station (5),
- at least one actuation device (9) for opening at least one of the grippers (3), with consequent release of the respective at least one product (A),
- at least one folding lamina (10) for juxtaposing a protruding flap (C) of the at least one sheet (B) on a side face of at least one respective product (A), thus providing a substantially tubular covering around the at least one product (A).

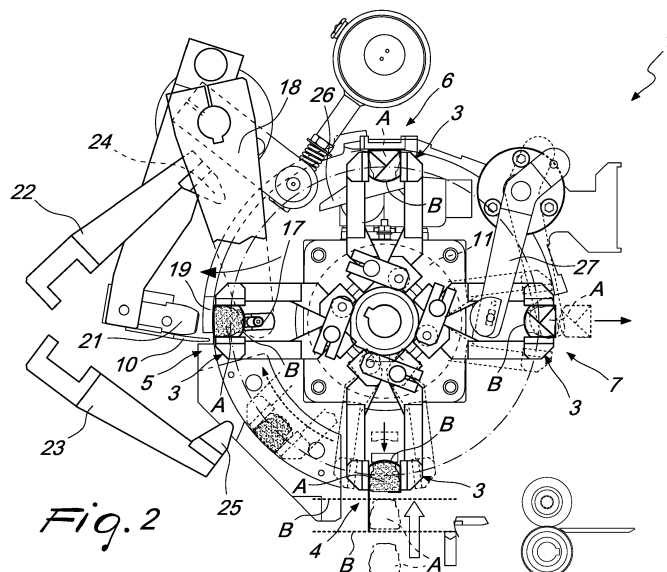


Fig. 2

Description

[0001] The present invention relates to a wrapping assembly, in particular designed to wrap individual products such as chocolates, pastries, confectionery products, candy and foods of various types.

[0002] Generally the products listed previously are individually wrapped so that the covering protects them from contact with the outside environment.

[0003] The wrapping can be done with sheets of paper, polymeric sheets and/or metallic sheets (in particular sheets of aluminum).

[0004] The conventional wrapping technique entails winding the sheet on each single product and folding the respective flaps that protrude onto the product proper.

[0005] The size of the sheet corresponds substantially to the extension of the product, so that, once a kind of tube has been formed with the sheet around the product, the end flaps of the sheet are substantially juxtaposed.

[0006] This type of packaging is sufficiently stable for products that are accommodated in dedicated seats (for example boxes in which each product is inserted into a respective seat). But when the products are distributed to the end customer in loose form, i.e. not accommodated in a respective seat of a box, it can happen that the wrapping can shift, thus becoming unstable and not completely effective in protecting the product.

[0007] In particular, the two juxtaposed flaps (which are usually located below the product) can shift, in so doing uncovering a portion of product. This condition means the product can come into contact with the outside environment, with consequent possible damage and/or contamination.

[0008] This need is particularly felt for confectionery products and chocolates wrapped in sheets of aluminum: the high frequency of mutual shift of the juxtaposed flaps makes the traditional wrapping partially ineffective and little appreciated by the customers.

[0009] The aim of the present invention is to solve the above mentioned drawbacks, by providing a wrapping assembly that makes it possible to provide a stable packaging of individual products.

[0010] Within this aim, an object of the invention is to provide a wrapping assembly that produces a wrapping with aesthetic characteristics similar to conventional wrappings but which guards against accidental opening and exposure of a portion of product to the outside environment.

[0011] Another object of the invention is to provide a wrapping assembly with encumbrances and structural architecture that are substantially similar to those of conventional wrapping assemblies.

[0012] Another object of the present invention is to provide a wrapping assembly which is low cost, easily and practically implemented, and safe in use.

[0013] This aim and these and other objects that will become more apparent hereinafter are achieved by a wrapping assembly of the type comprising a rotatable

carousel provided with a plurality of radial grippers for immobilizing at least one product, with the interposition of at least one packaging sheet, and with a series of folding stations arranged along the trajectory of said grippers, for folding the flaps of said at least one sheet onto the at least one product in order to cover it, characterized in that it comprises, at a main folding station,

- at least one pusher for immobilizing the at least one product partially covered with at least one respective sheet on said main folding station,
- at least one actuation device for opening at least one of said grippers, with consequent release of the respective at least one product,
- at least one folding lamina for juxtaposing a protruding flap of said at least one sheet on a side face of at least one respective product, thus providing a substantially tubular covering around the at least one product.

[0014] Further characteristics and advantages of the invention will become better apparent from the detailed description that follows of a preferred, but not exclusive, embodiment of the wrapping assembly according to the invention, which is illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a schematic perspective view of part of a wrapping assembly according to the invention;

Figure 2 is a schematic front elevation view of a wrapping assembly according to the invention in a first step of operation;

Figure 3 is a schematic front elevation view of a wrapping assembly according to the invention in a second step of operation;

Figure 4 is a schematic front elevation view of a wrapping assembly according to the invention in a third step of operation;

Figure 5 is a schematic front elevation view of a wrapping assembly according to the invention in a fourth step of operation;

Figure 6 is a schematic front elevation view of a wrapping assembly according to the invention in a fifth step of operation;

Figure 7 is a schematic front elevation view of a wrapping assembly according to the invention;

Figures 8, 9, 10, 11, 12, 13, 14 and 15 are perspective views of the steps of the wrapping sequence carried out by the wrapping assembly according to the invention.

[0015] With reference to the figures, the reference numeral 1 generally designates a wrapping assembly according to the invention.

[0016] The wrapping assembly 1 comprises a rotatable carousel 2 provided with a plurality of radial grippers 3 for immobilizing at least one product A, with the interposition of at least one packaging sheet B.

[0017] The assembly 1 is further provided with a series of folding stations 4, 5, 6, 7 arranged along the trajectory of the grippers 3 (therefore along a peripheral ring with respect to the carousel 2): the stations 4, 5, 6, 7 are adapted to fold the flaps of the at least one sheet B onto the at least one product A in order to cover it.

[0018] At a main folding station 5, the assembly 1 according to the invention comprises at least one pusher 8 for immobilizing the at least one product A, partially covered with at least one respective sheet B, on the main folding station 5.

[0019] Also at the main station 5, the assembly 1 further comprises at least one actuation device 9 for opening at least one of the grippers 3, with consequent release of the respective at least one product A.

[0020] Finally, the assembly 1 comprises, at the main station, at least one folding lamina 10 for juxtaposing a protruding flap C of the one sheet B on a side face of at least one respective product A, thus providing a substantially tubular covering around the at least one product A.

[0021] With particular reference to an embodiment of undoubted practical and applicative interest, the actuation device 9 comprises a controlled motor 11 and a cam 12.

[0022] Within such embodiment it should be noted that each gripper 3 can positively comprise at least one arm 13 which is provided with an idle end roller 14, which can rotate on the cam 12: the rotation of the shaft 15 of the controlled motor 11 and therefore of the cam 12 will generate a movement of the arm 13 by virtue of the action of the idle end roller 14, with consequent opposite movement of the other arm 16 functionally associated therewith. The movements of the arms 13 and 16 described previously define the opening of the gripper 3.

[0023] With particular reference to an efficient and functional embodiment, the pusher 8 can conveniently comprise an abutment block 17 arranged on the end of a tilting arm 18.

[0024] The tilting arm 18 will be movable between a first, passive configuration, in which the block 17 is spaced apart from the respective folding station 5 (the main station), and an active configuration, in which the block 17 is proximate to a fixed plate 19 of the station 5, with the interposition, between the block 17 and the plate 19, of the at least one product A partially covered with the at least one respective sheet B and the corresponding immobilization in such position.

[0025] The controlled motor 11 of the actuation device 9 and the tilting arm 18 of the pusher 8 are synchronized and controlled by a control and management unit that can drive their movements according to conveniently synchronized laws of motion.

[0026] In particular, the active configuration of the pusher 8 (in which it retains the product A partially wrapped by the sheet B against the fixed plate 19 of the station 5) and the opening of the grippers 3 will be substantially simultaneous in order to deliver the product A by way of the grippers 3 to the pusher 8 (and then sub-

sequently pick it up again with the grippers 3 when execution of the folds has been carried out completely).

[0027] According to a particularly efficient embodiment that is simple in practical application, the at least one folding lamina 10 is rigidly coupled to a slider 20 which can move between an inactive configuration, in which it is retracted with respect to the at least one partially covered product A accommodated inside the main folding station 5 and in which the lamina 10 is spaced apart from the product A proper, and an active configuration, in which the lamina 10 is juxtaposed against a side face of the at least one product A with the interposition of the movable flap C of the sheet B that previously rested on the face during the advancement of the lamina 10.

[0028] In the transition from the inactive configuration to the active configuration of the slider 20, the lamina 10 coupled thereto advances toward the product A, folding the flap C of the sheet B, which protrudes with respect to the outline of the product A proper, on a face of the product A and therefore completely encasing the product A with the sheet B (which assumes a tubular shape structure).

[0029] It is moreover useful to highlight that the slider 20 can also positively support two parallel side teeth 21 that are arranged at a distance that is similar to the length of the product A to be wrapped.

[0030] In the active configuration of the slider 20, the teeth 21 will be juxtaposed against respective end heads of the at least one product A with the interposition of wings D of the sheet B which protrude with respect to the head, which are flattened onto it during the advancement of the respective teeth 21.

[0031] The wrapping assembly 1 according to the invention further comprises at least one pair of tilting levers 22, 23 which are provided with end beaks 24, 25 for folding mutually opposite wings E, F of the sheet B, which are contiguous with the wings folded by the teeth 21 (i. e. the wings D).

[0032] With particular reference to the embodiment shown for the purposes of example in the accompanying figures, the pairs of tilting levers 22, 23 are two in number, mutually opposite with respect to the main folding station 5: a first pair of levers 22 tilts above the partially wrapped product A in order to fold the upper wings F that protrude from the respective heads of the product A; a second pair of levers 23 tilts below the partially wrapped product A in order to fold the lower wings E that protrude from the respective heads of the product A.

[0033] Finally it should be noted that the wrapping assembly 1 according to the invention comprises a secondary folding station 6, arranged downstream of the main folding station 5 with respect to the trajectory of the grippers 3 during the rotation of the carousel 2.

[0034] Between the main station 5 and the secondary station 6 a static folding unit 26 can be conveniently arranged for folding the last wings G, which protrude from the respective heads of the product A.

[0035] In essence the product A, during the transfer

from the main station 5 to the secondary station 6, will pass through a pair of static folding units 26 arranged at a mutual distance equal to the length of the product A: during such pass-through, the wings G will be folded back onto the respective head of the product A gradually (because the static folding units 26 have a helical shape structure, they will intervene on the wing G progressively, gradually bringing it closer to the respective head).

[0036] It should be noted that there is also a terminal station 7 in which the wrapped product A is expelled onto a pickup line: the expulsion can be positively carried out by way of an expulsion lever mechanism 27.

[0037] The folding of the flap C so as to overlap the opposite flap of the sheet B, achieved through the folding carried out by the lamina 10, ensures that the product A is correctly protected and that the wrapping remains stably arranged along the outer surfaces of the product A proper, isolating them from the outside environment.

[0038] The movements for opening and closing the grippers 3, separate from the step of opening that takes place in the station 5 when the product A is delivered to the pusher 8, are generated by way of cams arranged on the carousel 2 and not shown in the accompanying figures (and which in any case are conventional).

[0039] Advantageously the present invention solves the above mentioned problems, by providing a wrapping assembly 1 that makes it possible to provide a stable packaging of individual products A.

[0040] Conveniently the wrapping assembly 1 provides a wrapping with aesthetic characteristics similar to conventional wrappings but which guards against accidental opening and exposure of a portion of product A to the outside environment.

[0041] Conveniently the wrapping assembly 1 has encumbrances and structural architecture that are substantially similar to those of conventional wrapping assemblies: for this reason it can be installed simply in conventional production systems.

[0042] Positively the wrapping assembly 1 is easily and practically implemented and is low cost: such characteristics make the assembly 1 according to the invention an innovation that is safe in use.

[0043] The invention, thus conceived, is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. Moreover, all the details may be substituted by other, technically equivalent elements.

[0044] In the embodiments illustrated, individual characteristics shown in relation to specific examples may in reality be interchanged with other, different characteristics, existing in other embodiments.

[0045] In practice, the materials employed, as well as the dimensions, may be any according to requirements and to the state of the art.

[0046] The disclosures in Italian Patent Application No. 102016000116650 (UA2016A008331) from which this application claims priority are incorporated herein by reference.

[0047] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

10 Claims

1. A wrapping assembly of the type comprising a rotatable carousel (2) provided with a plurality of radial grippers (3) for immobilizing at least one product (A), with the interposition of at least one packaging sheet (B), and with a series of folding stations (4, 5, 6, 7) arranged along the trajectory of said grippers (3), for folding the flaps of said at least one sheet (B) onto the at least one product (A) in order to cover it, **characterized in that** it comprises, at a main folding station (5),

- at least one pusher (8) for immobilizing the at least one product (A) partially covered with at least one respective sheet (B) on said main folding station (5),

- at least one actuation device (9) for opening at least one of said grippers (3), with consequent release of the respective at least one product (A),

- at least one folding lamina (10) for juxtaposing a protruding flap (C) of said at least one sheet (B) on a side face of at least one respective product (A), thus providing a substantially tubular covering around the at least one product (A).

2. The wrapping assembly according to claim 1, **characterized in that** said actuation device (9) comprises a controlled motor (11) and a cam (12), each gripper (3) comprising at least one arm (13) which is provided with an idle end roller (14), which can rotate on said cam (12), the rotation of the shaft (15) of said controlled motor (11), and therefore of said cam (12), generating a movement of said arm (13) by virtue of the action of said idle end roller (14), with consequent opposite movement of the other arm (16) functionally associated therewith, said movements defining the opening of said gripper (3).

3. The wrapping assembly according to claim 1, **characterized in that** said pusher (8) comprises an abutment block (17) arranged on the end of an arm (18) that oscillates between a first, passive configuration, in which said block (17) is spaced apart from the respective folding station (5), and an active configuration, in which said block (17) is proximate to a fixed plate (19) of said station (5), with the interposition, between said block (17) and said plate (19),

of said at least one product (A) partially covered with the at least one respective sheet (B) and the corresponding immobilization.

4. The wrapping assembly according to one or more of the preceding claims, **characterized in that** said controlled motor (11) of said actuation device (9) and said oscillating arm (18) of said pusher (8) are synchronized and controlled by a control and management unit, said active configuration of said pusher (8) and the said opening of said grippers (3) being substantially simultaneous. 5

5. The wrapping assembly according to claim 1, **characterized in that** said at least one folding lamina (10) is rigidly coupled to a slider (20), which can move between an inactive configuration, in which said slider (20) is retracted with respect to the at least one partially covered product (A) accommodated inside said main folding station (5) and said lamina (10) is spaced apart from it, and an active configuration, in which said lamina (10) is juxtaposed against a side face of said at least one product (A) with the interposition of the movable flap (C) of the sheet (B) that previously rested on said face during the advancement of said lamina (10). 10 15 20 25

6. The wrapping assembly according to claim 5, **characterized in that** said slider (20) also supports two parallel side teeth (21) that are arranged at a distance that is similar to the length of the product (A) to be wrapped, in said active configuration said teeth (21) being juxtaposed against respective end heads of said at least one product (A) with the interposition of wings (D) of the sheet (B) which protrude with respect to said head, which are flattened onto it during the advancement of the respective teeth (21). 30 35

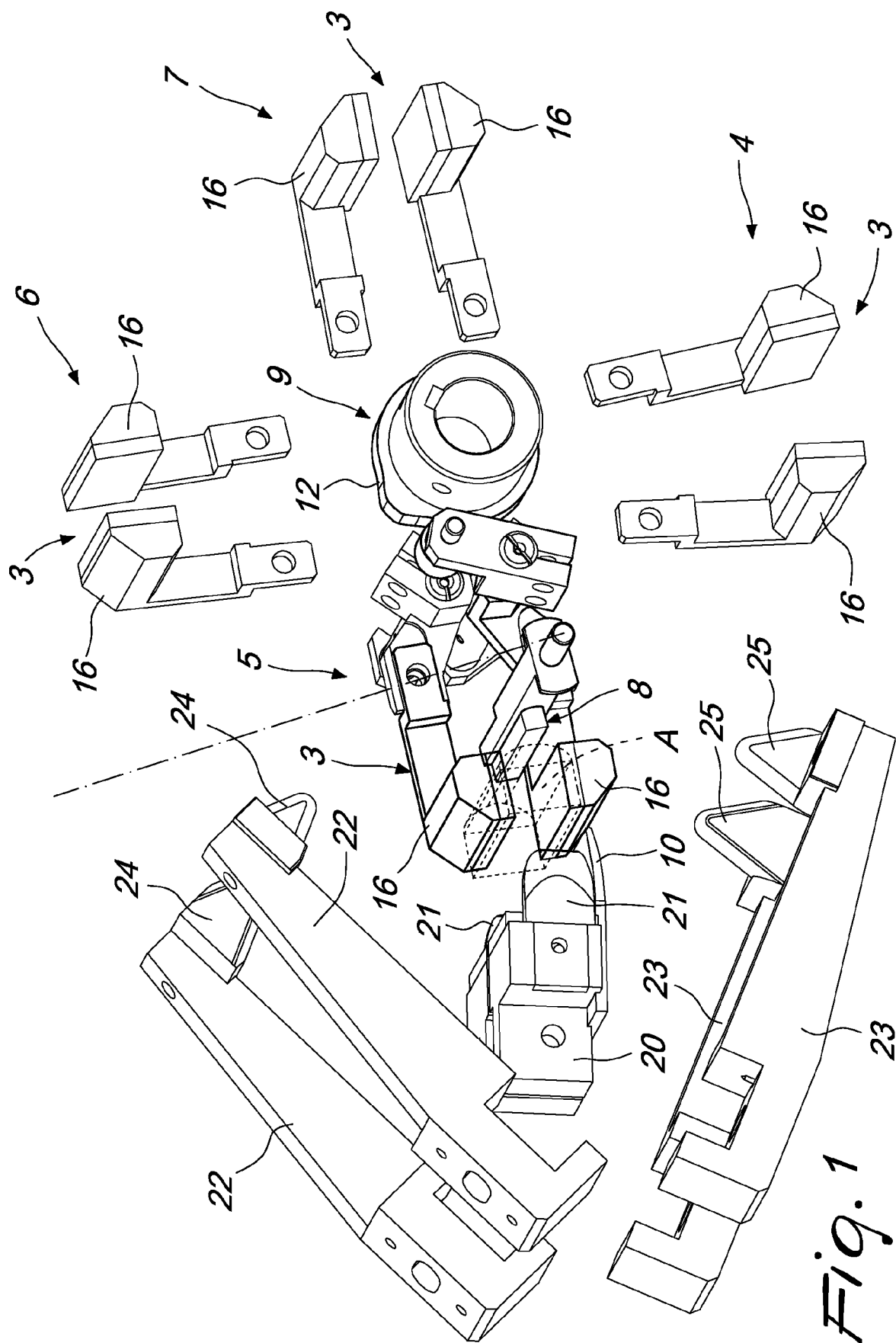
7. The wrapping assembly according to claim 6, **characterized in that** it comprises at least one pair of tilting levers (22, 23) provided with end beaks (24, 25) for folding mutually opposite wings (E, F) of said sheet (A), which are contiguous with the wings folded by said teeth (21). 40 45

8. The wrapping assembly according to claim 7, **characterized in that** said pairs of tilting levers (22, 23) are two in number, mutually opposite with respect to said main folding station (5), a first pair of levers (22) tilting above said partially wrapped product (A) in order to fold the upper wings (F) that protrude from the respective heads of said product (A), a second pair of levers (23) tilting below said partially wrapped product (A) in order to fold the lower wings (E) that protrude from the respective heads of said product (A). 50 55

9. The wrapping assembly according to one or more of

the preceding claims, **characterized in that** it comprises a secondary folding station (6), downstream of said main folding station (5) with respect to the trajectory of said grippers (3), a static folding unit (26) being arranged between said main station (5) and said secondary station (6) for folding the last wings (G) that protrude from the respective heads of said product (A).

10. The wrapping assembly according to one or more of the preceding claims, **characterized in that** it comprises a terminal station (7) for expelling the wrapped product (A) onto a pickup line.



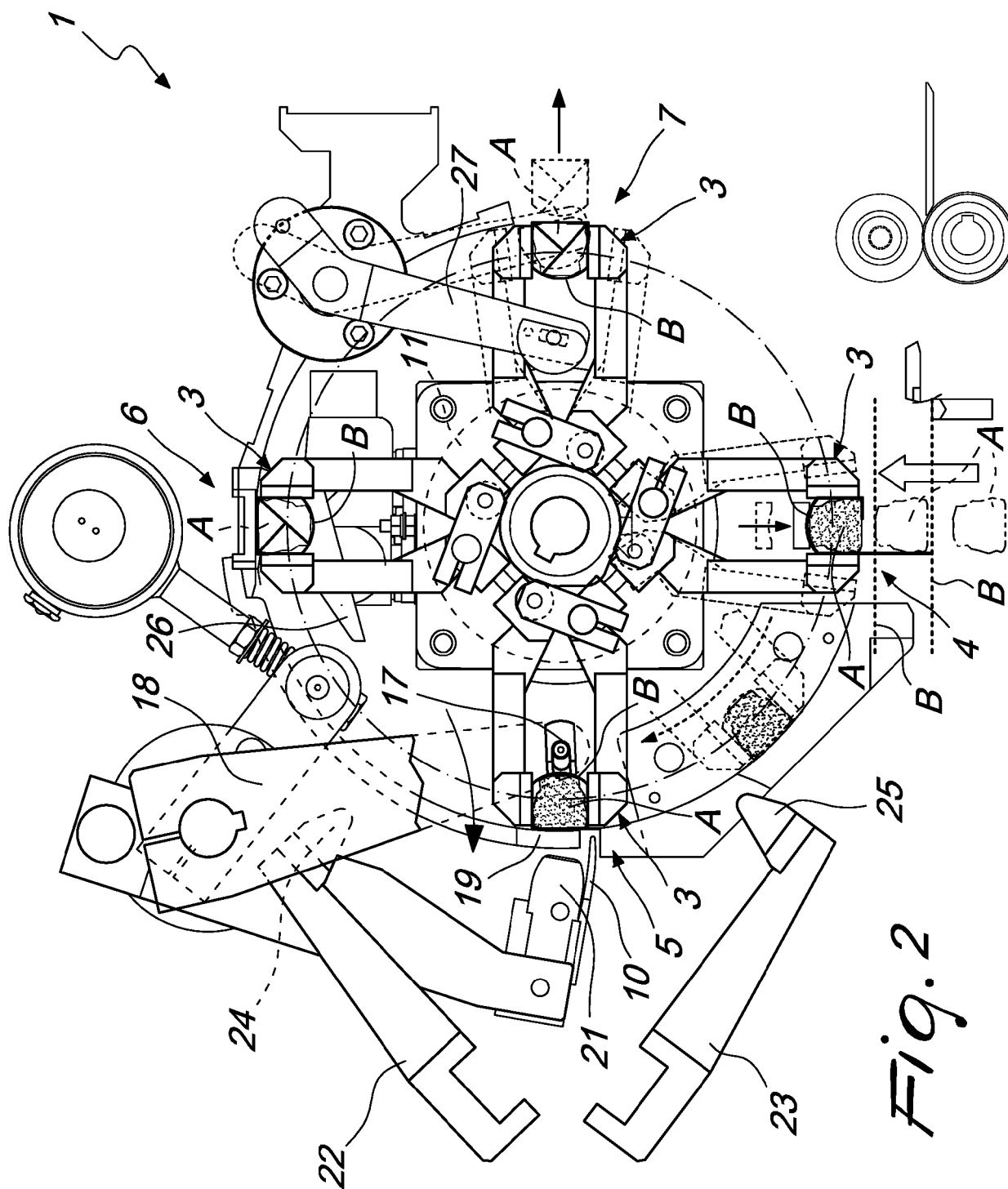
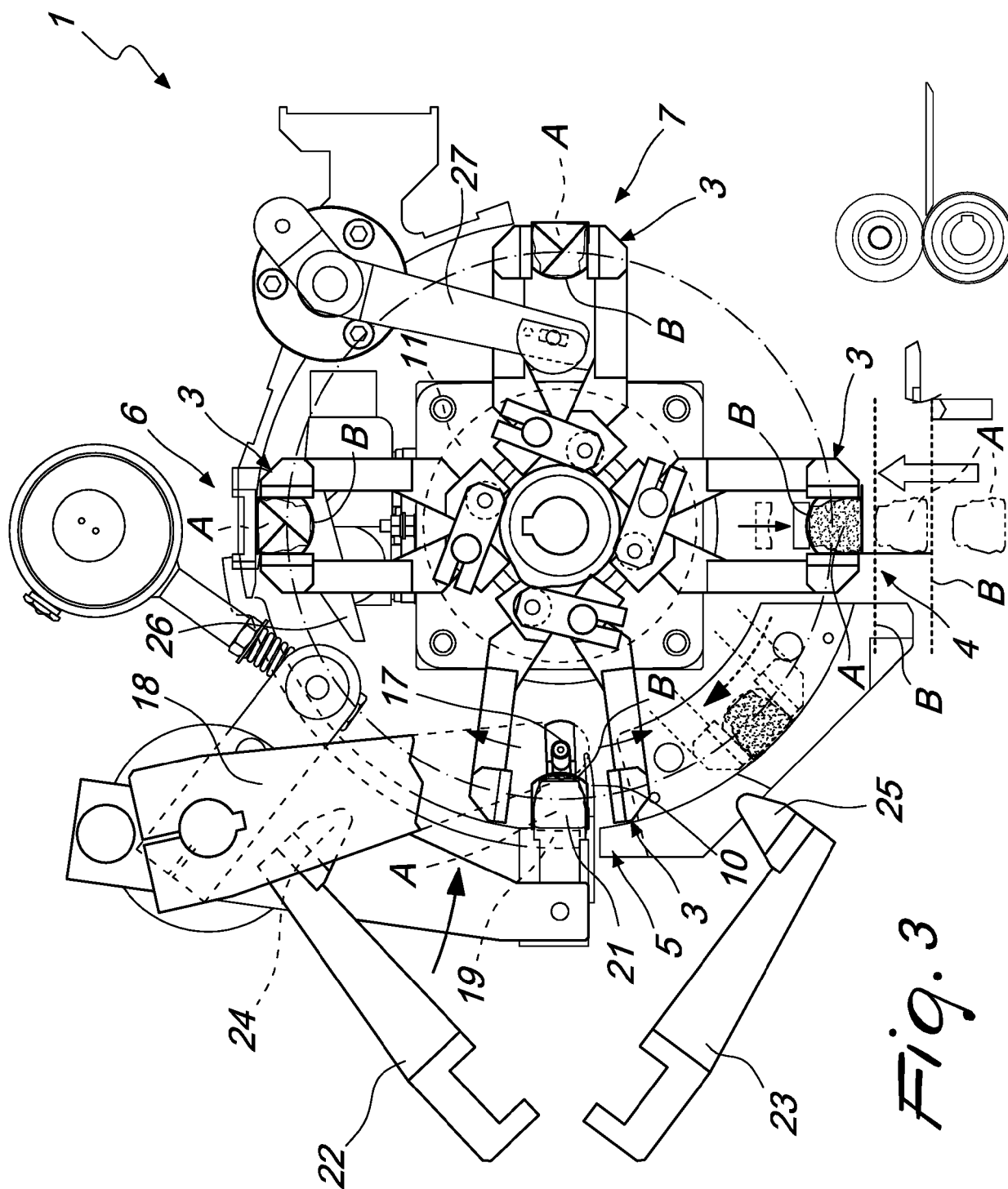


Fig. 2



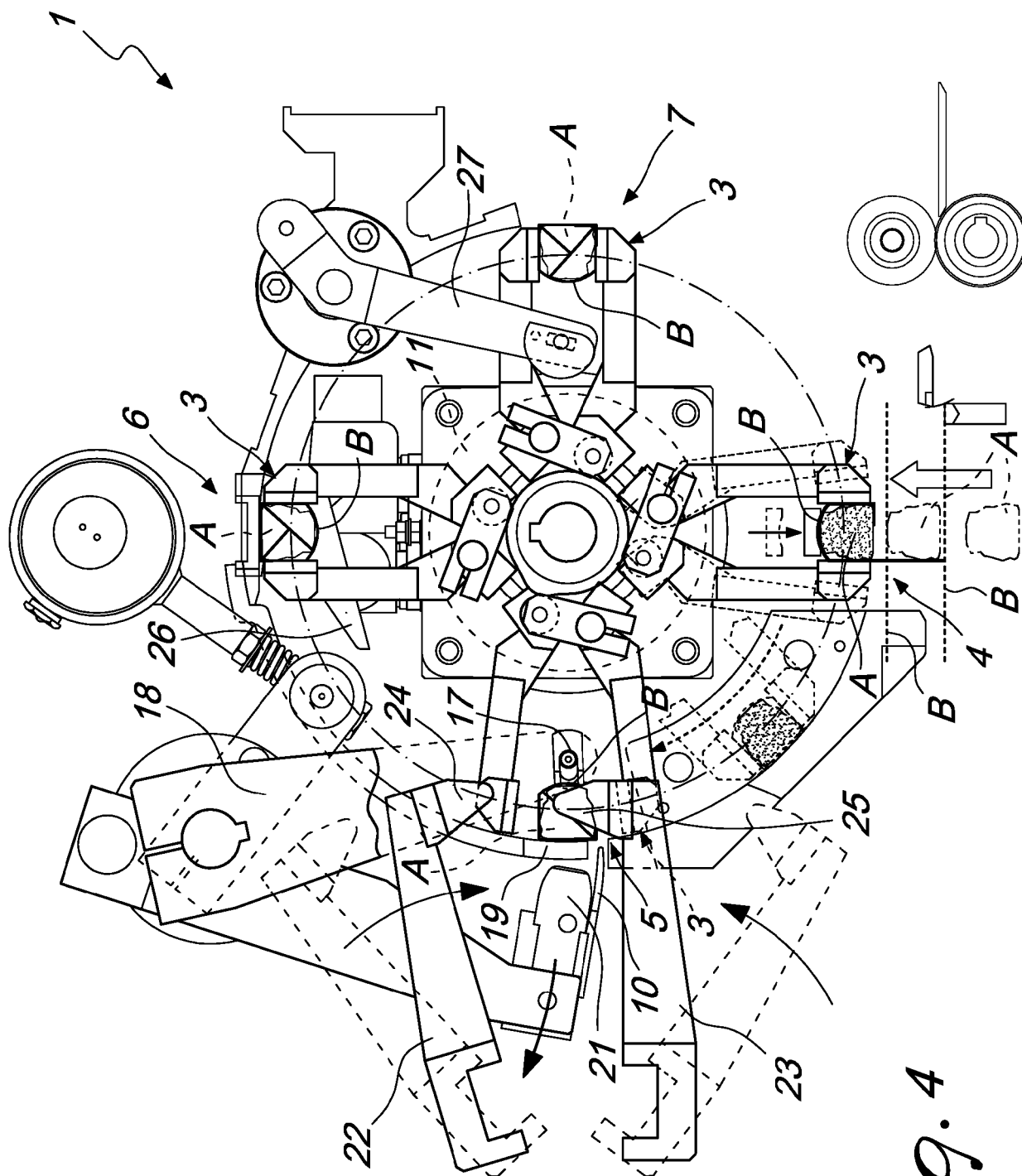


Fig. 4

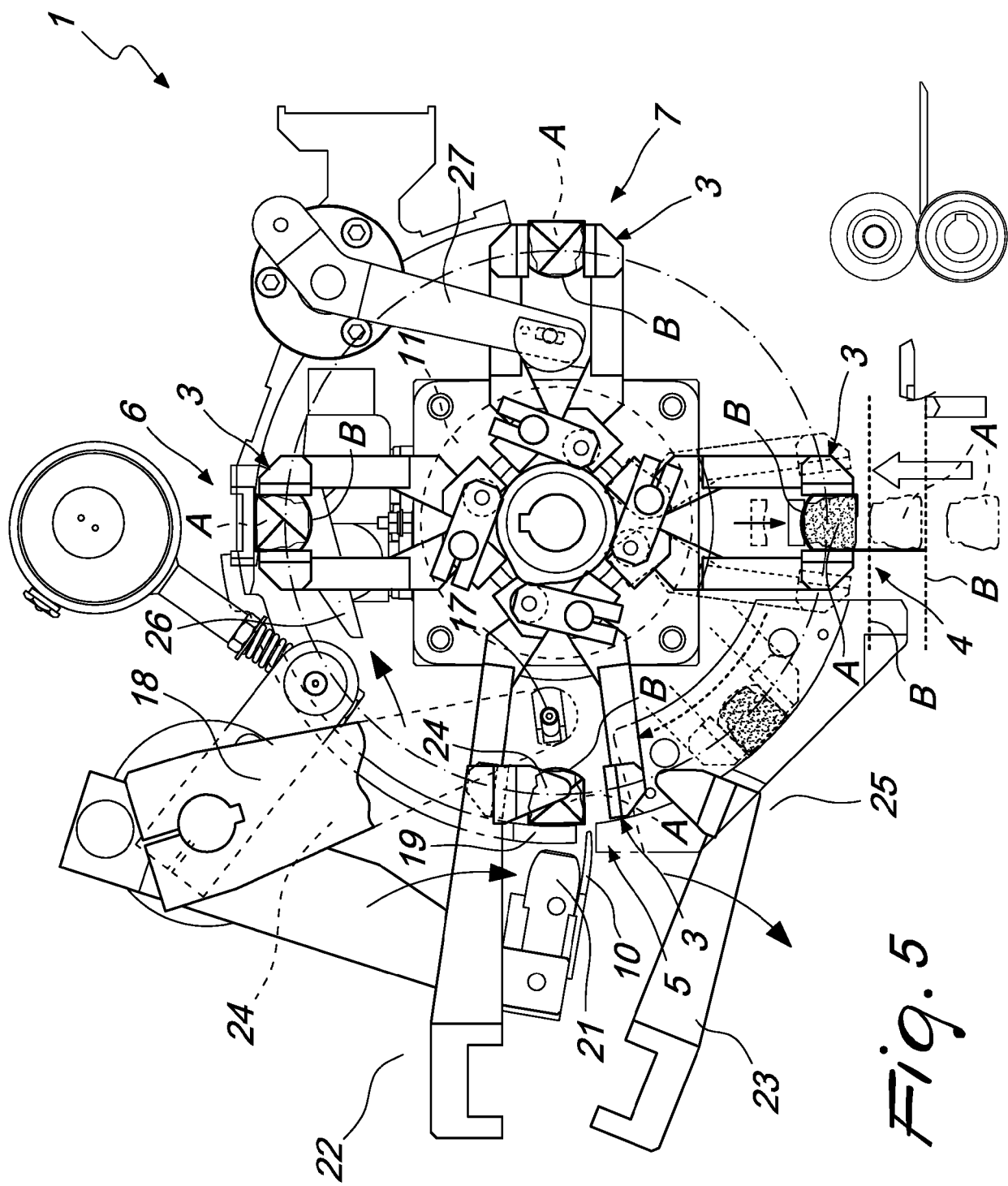
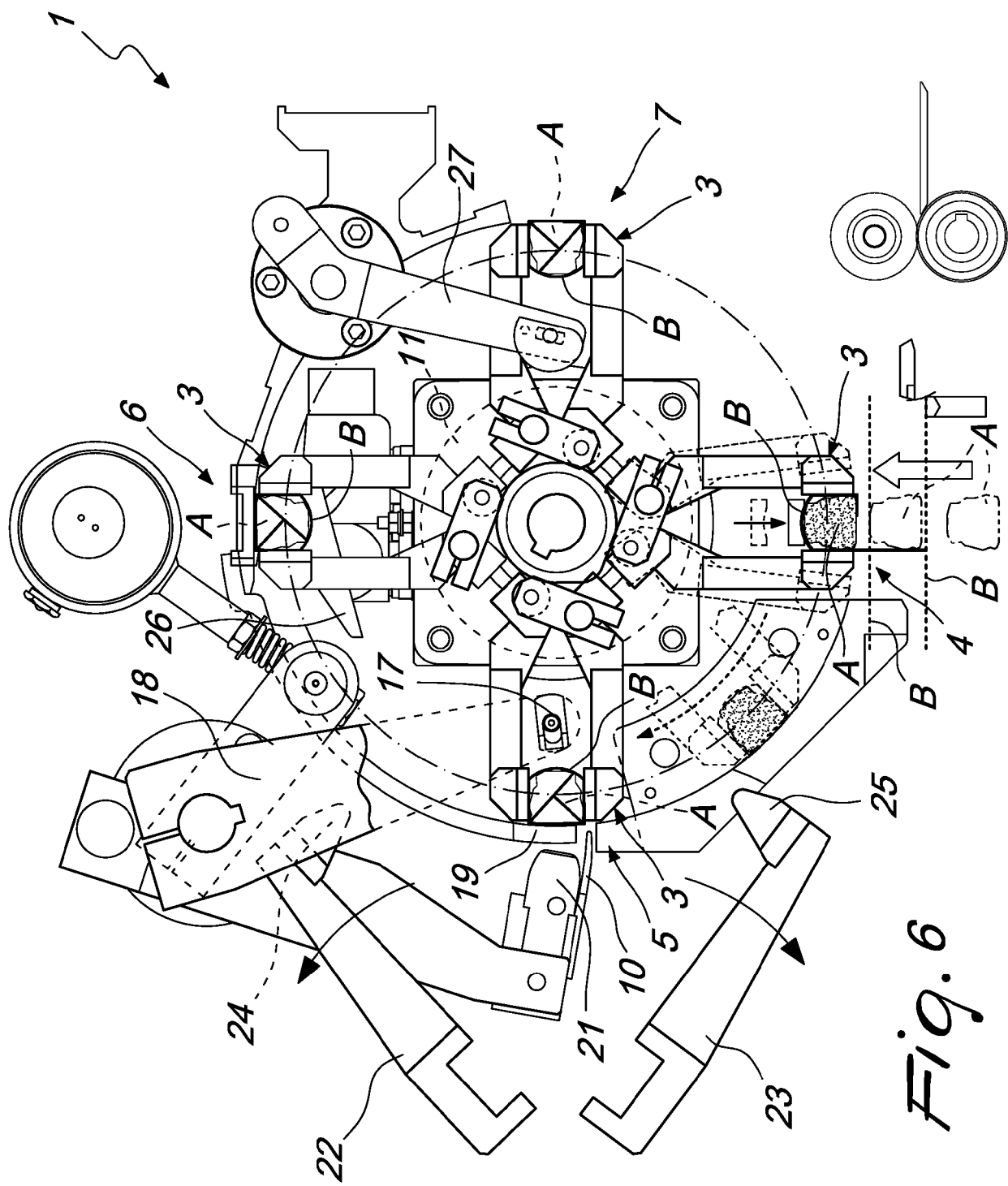
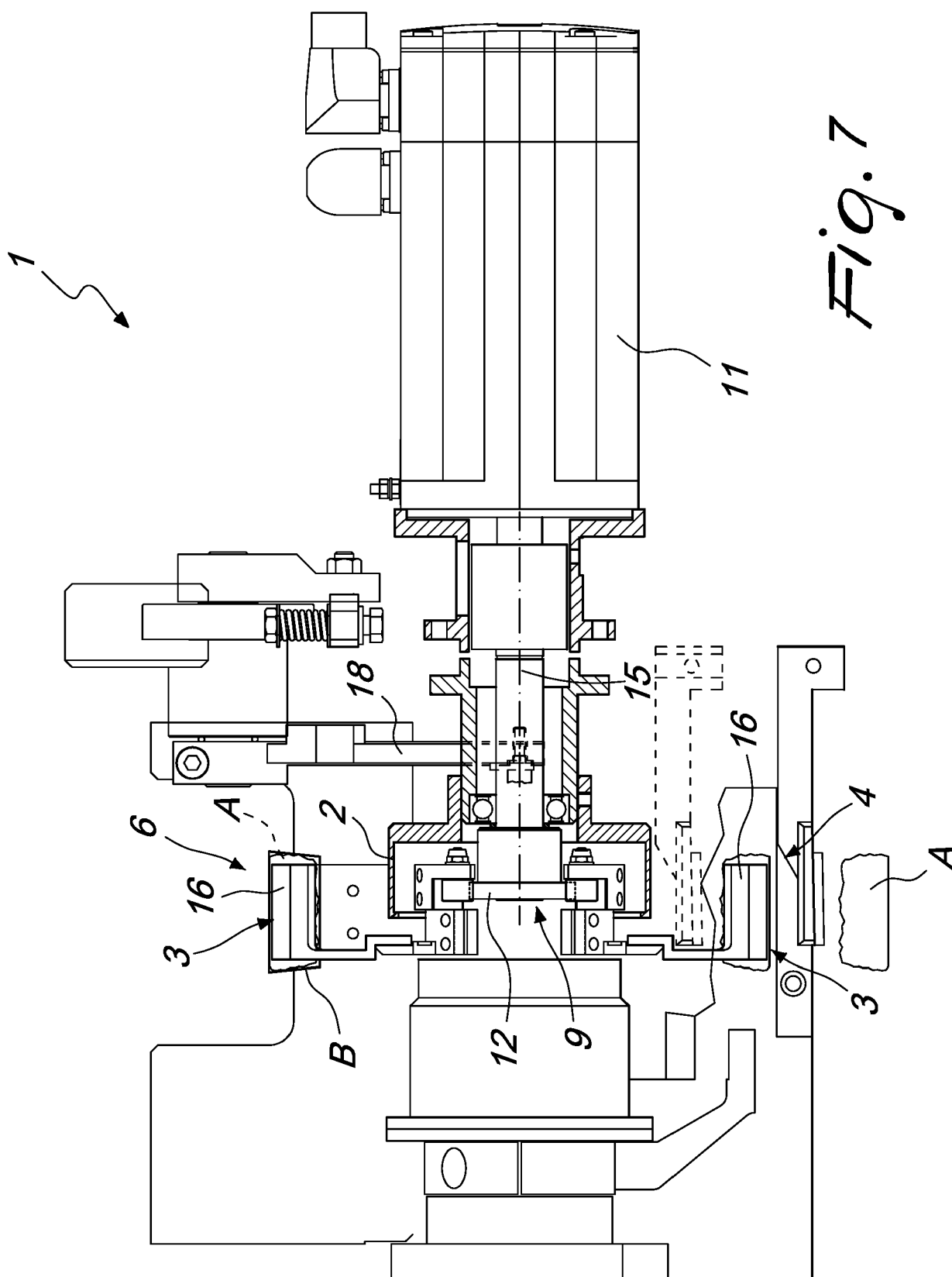


Fig. 5





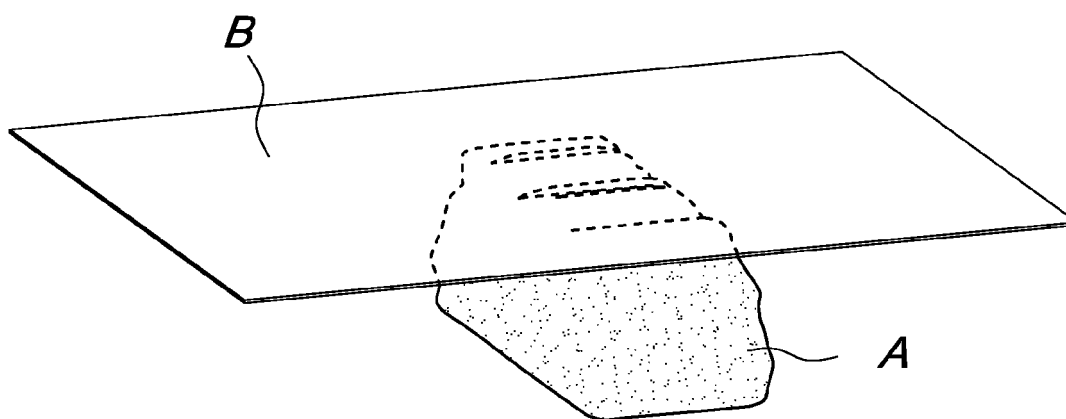


Fig. 8

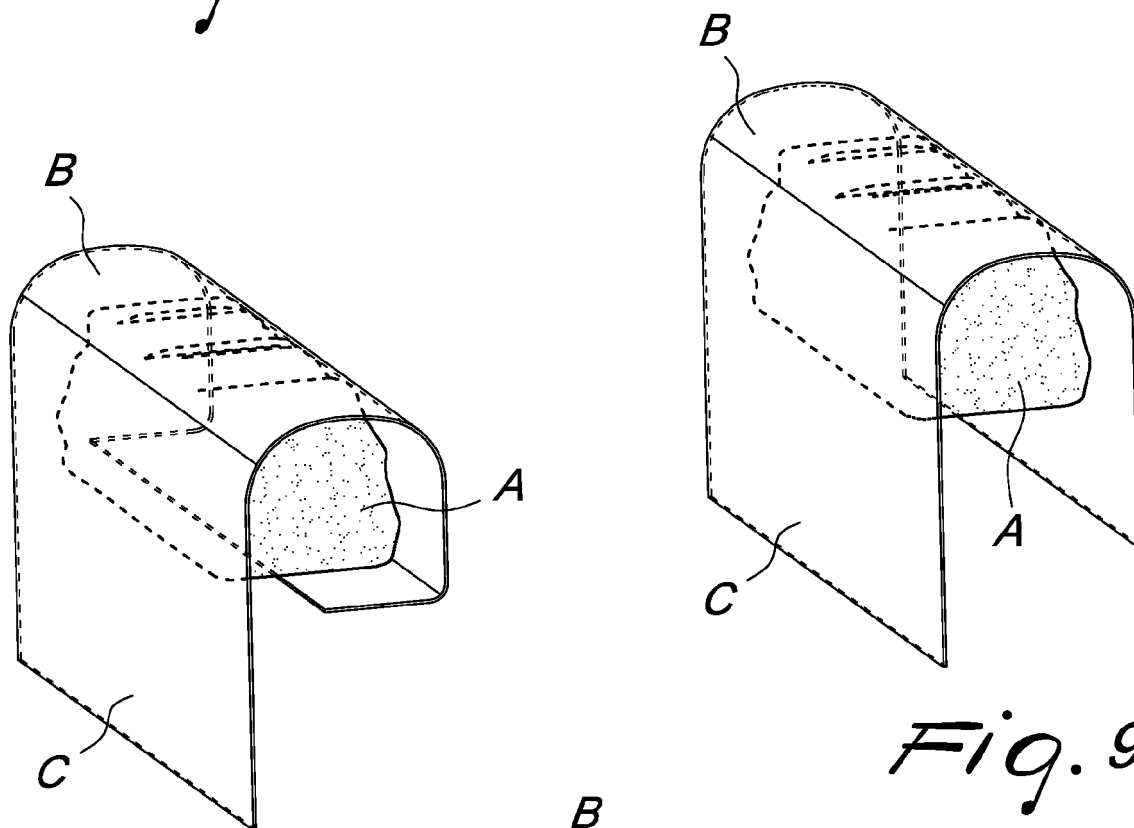
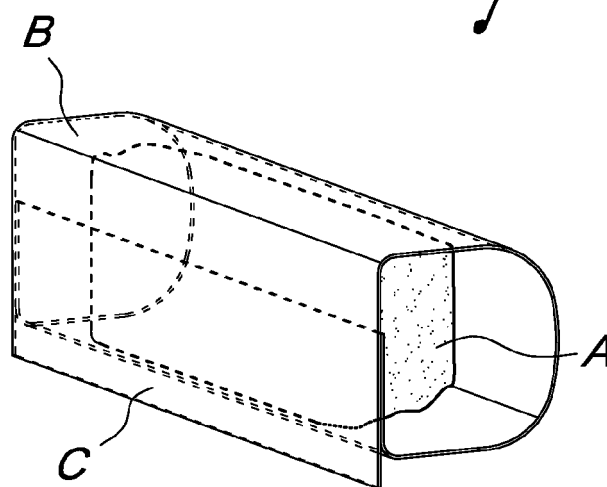


Fig. 9

Fig. 10

Fig. 11



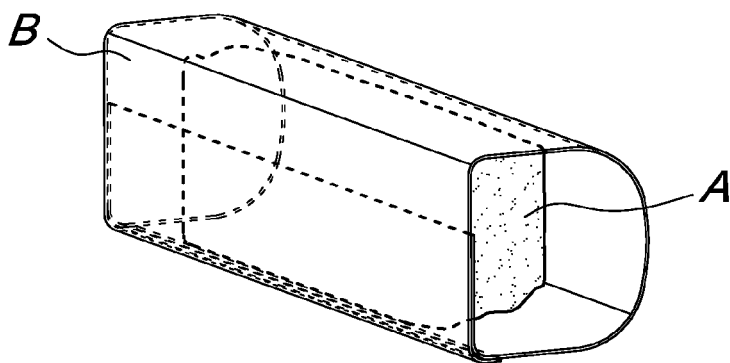


Fig. 12

Fig. 13

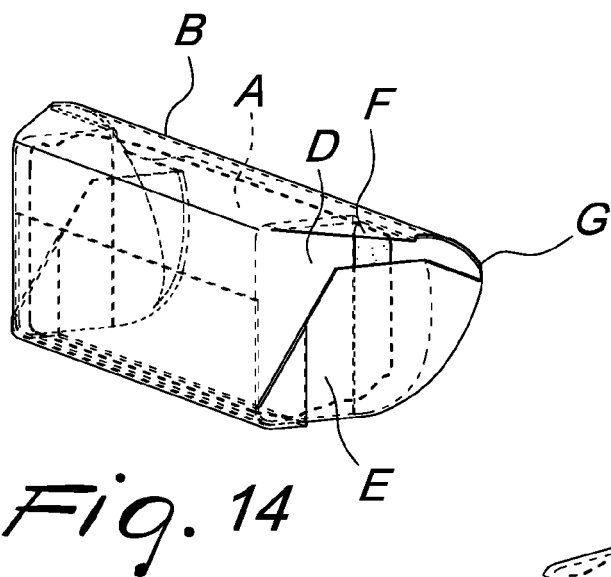
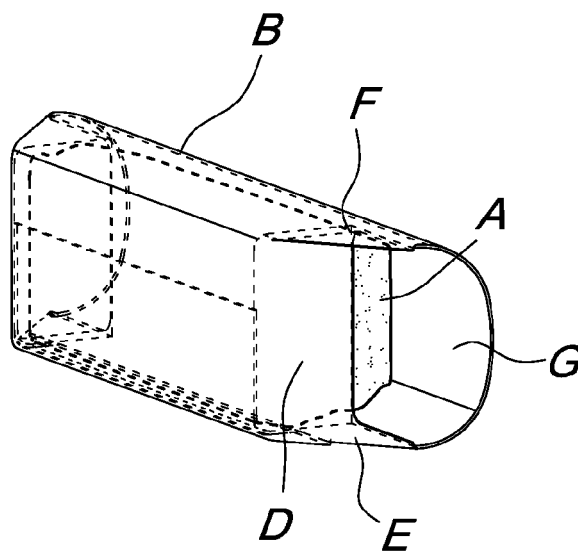
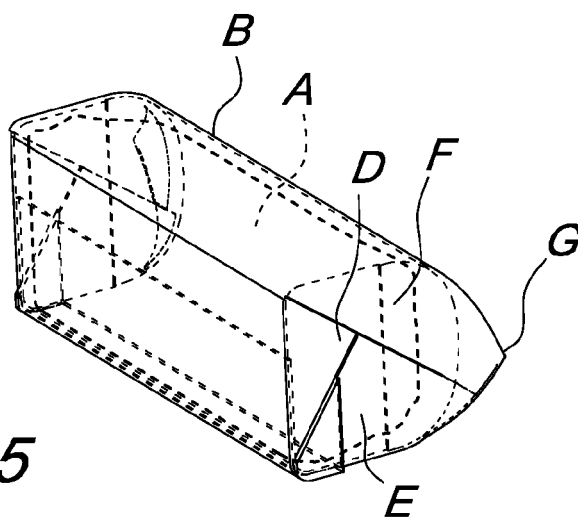


Fig. 14

Fig. 15





EUROPEAN SEARCH REPORT

 Application Number
EP 17 20 2121

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 11 December 2017	Examiner Yazici, Baris
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)



Application Number

EP 17 20 2121

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1, 2

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

EP 17 20 2121

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1, 2

a cam mechanism with rollers for generating the movement of gripper arms.

2. claims: 3, 4

a pusher which comprises an abutment block.

3. claims: 5-10

one folding lamina which is rigidly coupled to a slider, a secondary folding station and a terminal station.

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 20 2121

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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