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### (54) METHOD AND MACHINE FOR MAKING MULTISEGMENT ARTICLES

VERFAHREN UND VORRICHTUNG ZUR HERSTELLUNG VON MEHRSEGMENTARTIKELN

MÉTHODE ET MACHINE DE FABRICATION D'ARTICLES À SEGMENTS MULTIPLES

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## Description

### Technical field

[0001] This invention relates to a method and a machine for making multisegment articles, specifically for assembling rod-shaped articles, preferably for the tobacco industry or the like (aerosol generators).

### Background art

[0002] At the present time, composite filters may be made by progressively assembling different segments in suction seats of a conveying system, as described in EP1393640.

[0003] According to this solution, each suction seat receives successive filter segments until each seat contains the same complete sequence of filter segments. These complete sequences, which correspond to two composite filters to be obtained, are then released into a single forming beam, where they are wrapped in a paper web and then cut to obtain a succession of composite filters.

[0004] Disadvantageously, this technical solution may lead to the production of complete sequences of excessive length, or in any case, non-standard length. This introduces production constraints on the lengths obtainable for these sequences or, alternatively, requires configuring the machine in accordance with non-standard sizes which, what is more, may lead to further complications when the sequences are subsequently transferred to the forming beam, especially if the transfer devices used are those known as "spider" devices, which would need to operate with non-standard lengths.

### Disclosure of the invention

[0005] In this context, the basic technical purpose of this invention is to provide a method and a machine for making multisegment articles to overcome the above mentioned disadvantages of the prior art.

[0006] More specifically, the aim of this invention is to provide a method and a machine for making multisegment articles and which are operable in a simple and reliable manner.

[0007] A further aim of the invention is to provide a method and a machine for making multisegment articles and which allow making a wide range of articles, specifically articles of different sizes.

[0008] The technical purpose indicated and the aims specified are substantially achieved by a method and a machine for making multisegment articles comprising the technical features described in claims 1, 11 and 15, respectively, and/or in one or more of the appended claims.

[0009] The method according to the invention is implemented in the context of a "single-rod" machine, that is to say, in a machine in which the sequences of segments are fed to a single continuous rod, which is subsequently

wrapped and cut into single multisegment articles.

[0010] The method comprises the steps of preparing a plurality of segments of different kinds, assembling the segments of different kinds to make an alternating succession of first and second units advancing transversely to the longitudinal axis of the segments and wherein at least the first units are each made up of at least two segments of different kinds, and assembling the units in a single forming beam to form a single continuous rod defined by a predetermined sequence of segments of different kinds, wherein the step of assembling the segments of different kinds to make an alternating succession of first and second units is carried out in such a way that the segments of each of the aforesaid different kinds form part only of the first or the second unit.

[0011] In other words, the segments of each kind are fed in the form of respective successions of segments advancing transversely to their axes and the step of assembling the segments of different kinds to make an alternating succession of first and second units is carried out in such a way that the segments of each succession (having the same properties) form part of only the first or only the second unit but not both.

[0012] Consequently, the multisegment articles obtained with this method, defined by combining the segments of a first and a second unit, adjacent with each other, comprise segments having different properties since segments having the same properties are never placed in both the first and the second units.

[0013] Further, the continuous rod is formed by combining the first and second units in such a way that the first and second units are abutted end to end or, alternatively, have empty spaces between them.

[0014] According to the invention, the individual segments may contain or be made from filter material, aerosol generating material, cooling material, heating elements or they may be made in the form of hollow tubular segments. According to the method of the invention, three or more of these kinds may be fed in and assembled in the specified manner.

[0015] The segments have the shape of rods, differing in length and, more specifically, are cylindrical in shape, with circular cross section.

[0016] In a preferred embodiment, the method according to the invention comprises the following steps:

- preparing at least one succession of first segments, one succession of second segments and one succession of third segments, wherein the first, second and third segments are segments of different kinds;
- assembling the first, second and third segments to make an alternating succession of first and second units advancing transversely to the longitudinal axis of the segments and wherein the first units comprise at least a first and a second segment and the second units comprise at least a third segment;
- assembling the units in a single forming beam to form a single continuous rod defined by a predetermined

sequence of segments of different kinds;

wherein the step of assembling the segments of different kinds to make an alternating succession of first and second units is carried out in such a way that the first and second segments form part only of the first units and the third segments form part only of the second units.

**[0017]** Any additional successions of segments with further, different properties are assembled in such a way as to be included exclusively in the first or the second units.

**[0018]** In a possible embodiment, the segments forming part of the respective unit may be further processed before being assembled to form the continuous rod: for example, they may be cut and spaced apart to allow a segment of a different kind to be inserted between them. Furthermore, the segments may be cut and spaced before they are released to form part of the respective unit, and thus, more specifically, released in pairs with a space in the middle to allow inserting a successive segment having different properties.

**[0019]** According to an aspect of the invention, the method may be carried out by assembling at least first, second and third segments (having respective different properties) on conveying means to make an alternating succession of first and second units advancing transversely to the longitudinal axis of the segments wherein the first units comprise at least one first segment and the second units comprise at least one second segment, and wherein the first units and the second units each also comprise a third segment, wherein the step of assembling the segments of different kinds to make an alternating succession of first and second units is carried out in such a way that the first segments form part only of the first units and the second segments form part only of the second units and in such a way that the first and second units each comprise a third segment, and wherein the step of assembling the first, second and third segments on the conveying means is carried out by releasing each third segment on the conveying means before releasing the first and/or the second segments, preferably before releasing both the first and the second segments. In other words, in this solution, the third segments (common to both units) are released onto the conveying means at a release zone located upstream of the respective release zone where the first and/or the second segments are released onto the conveying means. According to the solution last mentioned, the method may also comprise feeding fourth segments (of a different kind from the first, second and third segments) and the step of assembling the segments of different kinds to make an alternating succession of first and second units is carried out in such a way that the first and second units each also comprise a fourth segment in addition to the third segment. For example, but not necessarily, the fourth segment may be positioned in contact with the third segment. In this embodiment, therefore, the first and second units each comprise a third and a fourth segment, while

only the first units comprise one or more first segments and only the second units comprise one or more second segments. Preferably, also, the third and fourth segments are fed to the respective units in distinct steps. Alternatively, they may be assembled with each other before they are released into the units and thus they may be released simultaneously.

**[0020]** In a variant embodiment, the method is carried out by assembling at least first, second, third and fourth segments (having respective different properties) on conveying means to make an alternating succession of first and second units advancing transversely to the longitudinal axis of the segments wherein the first units comprise at least a first and a second segment (but not third and fourth segments) and, conversely, the second units comprise at least a third and a fourth segment (but not first and second segments).

**[0021]** In an embodiment falling within the scope of this variant, each first unit comprises a second segment interposed between two first segments, while each second unit comprises a fourth segment interposed between two third segments. Preferably, the two units are symmetrical about a common plane of symmetry.

**[0022]** In this variant, also, the first and the second units may be made on axially offset zones of a single drum and are then axially centred to define a single alternating succession of the first and second units. The overall lengths of the first and second units may be identical or different.

**[0023]** An assembling machine for making multisegment articles according to this invention, and specifically configured for implementing the method described in the foregoing, comprises a plurality of feed lines configured to feed respective successions of segments having different properties, and conveying means disposed and/or configured to receive respective segments from the feed lines, wherein the conveying means define a succession of receiving seats, configured to receive one or more of the segments each and to advance the segments transversely, and wherein the machine is configured and/or set in such a way that at least a first and a second of the feed lines release the respective segments exclusively in first seats of the conveying means and at least a third of the feed lines releases the respective segments exclusively in second seats of the conveying means, where the first and second seats are disposed alternately along a conveying direction defined by the conveying means. Each unit is accommodated in a corresponding seat.

**[0024]** Any additional feed lines for feeding segments having further different properties release the respective segments exclusively into the first or the second seats of the conveying means.

**[0025]** Preferably, the conveying means comprise a succession of drums, at least some of which are configured to define a pair of axially juxtaposed, peripheral conveying surfaces, for example, forming contiguous portions of a single peripheral mantle. The first of these peripheral conveying surfaces is designed to combine

and/or transport first units obtained by a first combination of segments, while the other peripheral surface is designed to combine and/or transport second units obtained by a second combination of segments, different from the first combination. The first and second units are then centred by a centring drum to define a single alternating succession of first and second units.

### **Brief description of the drawings**

**[0026]** Further features and advantages of this invention are more apparent in the indicative, hence non-limiting description of a preferred but non-exclusive embodiment of a method and a machine for making multisegment articles, as illustrated in the accompanying drawings, in which:

- Figure 1 is a side view of a machine for making multisegment articles in accordance with the invention;
- Figures 2A-2D schematically represent different modes of implementing a method for making multisegment articles according to the invention;
- Figure 3 schematically represents a final step of the method illustrated in Figure 2A;
- Figure 4 schematically represents a further mode of implementing a method for making multisegment articles according to the invention;
- Figure 5 schematically represents a further mode of implementing a method for making multisegment articles according to the invention;
- Figure 6 schematically represents a further mode of implementing a method for making multisegment articles according to the invention;
- Figure 7 schematically represents a further mode of implementing a method for making multisegment articles according to the invention.

### **Detailed description of preferred embodiments of the invention**

**[0027]** In the accompanying drawings, the numeral 1 denotes in its entirety a machine for making multisegment articles in accordance with this invention.

**[0028]** In the context of this invention, the individual segments may be segments of filter material, segments of aerosol generating material, segments of tobacco, segments of cooling material, heating elements or hollow tubular segments. According to the method of the invention, three or more of these kinds may be fed in and assembled in the specified manner.

**[0029]** The segments have the shape of rods, which may differ in length and which, more specifically, are cylindrical in shape, with circular cross section.

**[0030]** In the embodiments illustrated, segments of filter material for making composite filters are considered; however, the same concepts in terms of operating steps also apply to segments of a different kind, for example, belonging to the above list of segments. In the assembling

method according to the invention, the segments used may not only be segments of the same nature but having different properties (for example, filter segments with different filtering properties) but also segments of a different nature (for example, tubular segments in combination with segments of filter material and heating segments). Thus, all the possible combinations fall within the scope of the invention.

**[0031]** In accordance with a traditional configuration, the machine 1 comprises a plurality of feed lines 10, 20, 30, 40 (four in the embodiment illustrated, but the number may be any number greater than or equal to three), each configured to feed filter segments 1, 2, 3, 4 of a specific kind. In other words, the filter segments 1, 2, 3, 4 fed by each feed line 10, 20, 30, 40 are all of the same kind, which is different from the filter segments 1, 2, 3, 4 fed by the other feed lines. Preferably, these filter segments have a rod shape, for example, with circular transverse cross section.

**[0032]** Each feed line 10, 20, 30, 40 comprises, respectively, an upper buffer hopper 11, 21, 31, 41, intended to contain the respective segments 1, 2, 3, 4, and one or more transfer drums 12, 13, 14; 22, 23, 24; 32, 33, 34; 42, 43, 44, located downstream of the respective buffer hopper 11, 21, 31, 41 and provided with peripheral seats, specifically suction seats, for holding respective filter segments.

**[0033]** In the case where the length of the segments 1, 2, 3, 4 accumulated in the hoppers 11, 21, 31, 41 is a multiple length of the length of the segments to be used in the assembling process, one or more of the transfer drums 12, 13, 14; 22, 23, 24; 32, 33, 34; 42, 43, 44 may be provided with blades for cutting the segments 1, 2, 3, 4.

**[0034]** The machine 1 also comprises conveying means 50, located in a bottom portion of the machine and interconnected with at least one transfer drum 12, 13, 14; 22, 23, 24; 32, 33, 34; 42, 43, 44 of each feed line 10, 20, 30, 40. The conveying means 50 are disposed and/or configured to receive respective segments 1, 2, 3, 4 from the feed lines 10, 20, 30, 40 and define a succession of receiving seats configured to receive one or more of the segments 1, 2, 3, 4 and to feed the segments 1, 2, 3, 4 transversely. In the embodiment illustrated, the conveying means 50 comprise a succession of suction drums.

**[0035]** Figure 2A shows a first operating diagram of the machine 1 described above.

**[0036]** With reference to this diagram, the filter segments 1, 2, 3, 4 of different kinds coming from the feed lines 10, 20, 30, 40 are transferred to the receiving seats of the conveying means 50 to make an alternating succession of filter units 60, 70 advancing transversely to the longitudinal axis of the segments 1, 2, 3, 4 and located inside consecutive receiving seats.

**[0037]** At least the first filter units 60 are each made up of at least two segments 1, 2 of different kinds, fed by different feed lines 10, 20 (not necessarily adjacent to each other).

**[0038]** Preferably, also, the second filter units 70 are also each made up of at least two segments 3, 4 of different kinds, fed by different feed lines 30, 40 (not necessarily adjacent to each other).

**[0039]** The first and second filter units 60, 70 thus made and completed may have the same length or different lengths according to the size of the individual filter segments 1, 2, 3, 4 which make them up.

**[0040]** The second filter units 70 also comprise at least one filter segment 3 of double length and, in the embodiment of Figures 2C and 2D, consist of a single filter segment 3 of double length.

**[0041]** The filter units 60, 70 are then assembled with each other in a single forming beam 80 (Figure 3) to which they are fed by a transfer "spider" 90 of known type (specifically provided with working units mounted pivotably on a horizontal-axis transfer wheel and driven in such a way that, as the wheel rotates, the working units keep the same orientation, specifically horizontal) to form a single continuous rod 100 defined by a predetermined sequence of segments of different kinds. Next, this continuous rod 100 is wrapped in a continuous web, specifically a paper web, and then cut into composite filters 110 by a transverse cut, preferably made at the double length segment 3.

**[0042]** In a preferred embodiment, if the two filter units 60, 70 differ in length, the transfer "spider" 90 is adjusted or set in such a way as to compensate for the difference in length between two consecutive filter units 60, 70. This is accomplished by setting (that is to say, selecting a specific wheel size) or adjusting the individual working units in such a way as to position them at a distance from each other (measured circumferentially at the pivot pins of the working units) which is equal to the average length of the two filter units 60, 70, gripped and transferred by respective consecutive working units of the transfer spider 90, and which, if necessary, may be increased or decreased by a correction factor depending, for example, on the geometry of the working units. That way, the part of the length exceeding the theoretical length of the longer filter unit compensates for the gap left by the shorter filter unit.

**[0043]** Advantageously, using alternate seats for the first units 60 and the second units 70 allows obtaining a continuous rod 80 made up of a sequence of segments 1, 2, 3, 4 which may even be very long (it would be complicated, if not impossible, to manage a "long" sequence if the segments 1, 2, 3, 4 were all in the same seat).

**[0044]** Advantageously, the step of assembling the filter segments 1, 2, 3, 4 of different kinds to make an alternating succession of first and second filter units 60, 70 is carried out in such a way that the segments 1, 2, 3, 4 of each kind are fed only to the first or the second filter unit 60, 70. In other words, the first units 60 and the second units 70 do not have segments in common.

**[0045]** In the embodiment illustrated, for example, the first filter units 60 comprise only first and second filter segments 1, 2 belonging to respective kinds, but not third

and fourth filter segments 3, 4, which, in turn, form part only of the second filter units 70 (but not of the first units 60).

**[0046]** In the subsequent step of assembling the filter units 60, 70 to form the continuous rod 80, each composite filter 90 comprises segments of all the kinds released by the active feed lines 10, 20, 30, 40.

**[0047]** In an embodiment not illustrated, the continuous rod 80 may have gaps between a first and a second unit 60, 70 (and/or vice versa) instead of each first and each second unit 60, 70 being positioned in contact with each other.

**[0048]** In a possible embodiment, the machine 1 comprises (in addition to the four feed lines 10, 20, 30, 40) one or more further feed lines configured to feed one or more successions of further filter segments of kinds different from the first, second, third and fourth filter segments 1, 2, 3, 4. In this case, the step of assembling the filter segments of different kinds is in any case carried out in such a way that the further filter segments of each kind form part only of the first or the second filter units (but not both).

**[0049]** In a variant embodiment illustrated in Figure 2B, the method comprises substantially the same steps but the first filter segments 1, when they are already in the respective receiving seats of the conveying means 50, are cut and spaced from each other to create space for inserting a second filter segment 2 (or a pair of second filter segments 2). Similarly, the third filter segments 3 are cut and spaced from each other but in this case, this is done before the third filter segments 3 are fed into the respective receiving seats of the conveying means 50 (hence, when released, the segments of each pair are already spaced apart). Next, one double-length fourth segment 4 is inserted between the two third segments 3 which have been spaced apart or, alternatively, a pair of juxtaposed, single-length fourth segments 4 is inserted between them.

**[0050]** In the variant embodiment of Figure 2C, only three feed lines 10, 20, 30 are used and the third feed line releases double-length third filter segments 3 which themselves define the second units 70 and which at their centre line define a cutting zone where the cutting blade cuts the continuous rod, or alternatively, it releases a pair of juxtaposed, single-length third segments 3.

**[0051]** In the variant embodiment of Figure 2D, the third and fourth feed lines 30, 40 release segments of the same kind, that is to say, third filter segments 3 (double-length filter segments or, alternatively, pairs of juxtaposed single-length third segments 3) but in this case, the third and fourth feed lines 30, 40 feed the respective third segments 3 to respective alternate receiving seats to define respective second units 70 alternated with each other so that the filters are assembled at a higher speed.

**[0052]** It is specified that according to an embodiment not illustrated and not forming part of this invention, the first units 60 and the second units 70 may comprise a single segment each. Assuming, for example, that the

first units 60 comprise only the first segment 1 and that the second units 70 comprise only the second segment 2, assembling the first units 60 and the second units 70 results in the formation of a rod comprising first segments 1 alternated with second segments 2.

**[0053]** Figure 4 shows a variant embodiment of the invention in which the method is carried out by assembling at least first, second and third segments 1, 2, 3 (having respective different properties) on conveying means to make an alternating succession of first and second units 60, 70 advancing transversely to the longitudinal axis of the segments, wherein the first units 60 comprise at least a first segment 1 and the second units 70 comprise at least a second segment 2 and wherein each first unit 60 and each second unit 70 also comprise a third segment 3. In the specific embodiment illustrated, each first unit 60 thus comprises only a first segment 1 and a third segment 3, whilst each second unit 70 comprises only a second segment 2 and a third segment 3. The step of assembling the segments 1, 2, 3 is thus carried out in such a way that the first segments 1 form part only of the first units 60 and the second segments 2 form part only of the second units 70. Further, the step of assembling the segments 1, 2, 3 is carried out in such a way that the first and second units 60, 70 each comprise a third segment 3. Preferably, the third segments 3 are released onto the conveying means before the first and/or the second segments 1, 2 are released, preferably before both the first and the second segments 1 and 2 are released. In other words, in this solution, the third segments 3 (common to both units 60, 70) are released onto the conveying means 50 at a release zone located upstream of the respective release zone where the first and/or the second segments 1, 2 are released onto the conveying means 50.

**[0054]** In a different embodiment, illustrated in Figure 5, the method of the invention may also comprise feeding first, second, third and fourth filter segments 1, 2, 3, 4 of different kinds and the step of assembling the segments of different kinds to make an alternating succession of first and second units 60, 70 is carried out in such a way that the first and second units 60, 70 each also comprise a fourth segment 4 in addition to the third segment 3. In other words, for all the units 60, 70, there is a pair of segments 3, 4 in common, preferably abutted end to end, whilst only the first units 60 comprise one or more first segments 1 and only the second units comprise one or more second segments 2. Preferably, also, the third and fourth segments 3, 4 are fed to the respective units 60, 70 in distinct steps. Alternatively, they may be assembled with each other before they are released into the units 60, 70 and thus they may be released simultaneously onto the conveying means 50.

**[0055]** More specifically, in the embodiment illustrated in Figure 5, the third segments 3 are obtained by cutting a piece of rod of multiple length into single segments 3 which are then offset transversely and some of which are translated axially to form a succession of pairs of third segments 3, one after the other and parallel, but not

aligned, with each other, thereby forming a zig-zagged succession (in other words, with the respective ends not aligned one after the other but obtained by axially displacing the two third segments 3 of each pair relative to each other). The same is done on the fourth segments 4 to form a matching (mirrored) zig-zagged configuration so that when the third segments 3 are assembled with the fourth segments 4, pairs of segments 3, 4 are obtained in which two successive third segments 3 have a fourth segment 4 inserted between them and vice versa. In other words, in the pairs obtained, the segments 3, 4 are combined alternately (3-4, 4-3 and so on). Each fourth segment 4 is thus juxtaposed with a corresponding third segment 3 and is also interposed between a third segment 3 preceding it and a third segment 3 following it. Similarly, each third segment 3 is thus juxtaposed with a corresponding fourth segment 4 and is also interposed between a fourth segment 4 preceding it and a fourth segment 4 following it.

**[0056]** With reference to Figure 5, the zig-zagged succession of the fourth segments 4 is obtained by feeding fourth segments 4 of final length, that is to say, fourth segments 4 whose length is the length they have in the first units 60 and the second units 70. Alternatively, the fourth segments 4 may be obtained by cutting a piece of rod of multiple length into single segments 4 which are then offset transversely and some of which are translated axially to form a succession of pairs of fourth segments 4, one after the other and parallel, but not aligned, with each other, thereby forming a zig-zagged succession (similarly to what is shown in Figure 5 with reference to the third segments 3).

**[0057]** In a possible solution, but not necessarily, the joints between the third segment 3 and the fourth segment 4 of the pairs of third and fourth segments 3, 4 lie in a single, common longitudinal plane.

**[0058]** Next, once each pair of segments 3, 4 has been formed in this way, at least one first segment 1 (first units 60) or at least one second segment 2 (second units 70) is brought into abutment with it on its outer side.

**[0059]** In other words, the step of assembling the segments 1, 2, 3, 4 of different kinds to make an alternating succession of first and second units 60, 70 is carried out in such a way that each third segment 3 is also juxtaposed with a corresponding fourth segment 4 so that the third segment 3 of the first units 60 is juxtaposed with a first side of the fourth segment 4 and the third segment 3 of the second units 70 is juxtaposed with a second side (opposite to the first side) of the fourth segment 4.

**[0060]** In a different embodiment, illustrated in Figure 6, the method is carried out by assembling at least first, second, third and fourth segments 1, 2, 3, 4 of different kinds to make an alternating succession of first and second units 60, 70 advancing transversely, wherein the first units 60 comprise at least a first and a second segment 1, 2 (but not third and fourth segments 3, 4) and, conversely, the second units 70 comprise at least a third and a fourth segment 3, 4 (but not first and second segments

1, 2). Preferably, the two units 60, 70 do not have any segment in common.

**[0061]** More in detail, each first unit 60 comprises a second segment 2 interposed between two first segments 1, while each second unit 70 comprises a fourth segment 4 interposed between two third segments 3. Preferably, the two units 60, 70 are shaped and disposed symmetrically about a common plane of symmetry.

**[0062]** In the specific embodiment of Figure 6, the two units 60, 70 are formed by axially spacing pairs of segments of the same kind (specifically, pairs of first and third segments 1, 3) in a succession of downfeed rollers forming part of the respective feed line 10, 30.

**[0063]** In an alternative embodiment, illustrated in Figure 7, the first and second units 60, 70 are, instead, made on axially offset zones of a single drum of the conveying means 50 and are then axially centred to define a single alternating succession of the first and second units 60, 70.

**[0064]** In the configuration of Figure 6, the first segments 1 are preferably obtained by cutting a piece of rod of multiple length using a spacing drum located on the respective feed line 10 of the first segments 1 (hence on a "downfeed" stretch where the segments move down towards the conveying means 50). The same applies to the third segments 3, at the respective feed line 30.

**[0065]** Figure 7 shows a variant embodiment very similar to that of Figure 6 but differing in that the second units 70 are formed on the conveying means 50, hence in a zone at the bottom of the assembling machine and, more specifically, on the same drum (or on the same drums) that transports the first units 60 but in such a way that the first units 60 and the second units 70 are housed on respective, axially spaced (side by side) portions (peripheral surfaces) of the same drum or of the same drums, hence while they are being transported and/or assembled side by side and preferably with spacing that is twice the final spacing to be obtained. Next, when both the first units 60 and the second units 70 have been completed, they are assembled with each other on a centring drum to form a single alternating succession of first units 60 and second units 70, one after the other with single spacing.

**[0066]** The present invention achieves the preset aims, overcoming the disadvantages of the prior art.

**[0067]** The machine and method according to the invention allow making multisegment articles using, for each article, two consecutive seats of the conveying means so as to divide the length of the sequences into two parts (first and second units). This also allows varying the lengths of the individual segments in a range wide enough to cover a large number of formats but without having to set the machine to non-standard format conditions.

## Claims

1. A method for making multisegment articles (110), comprising the steps of

- preparing a plurality of segments (1, 2, 3, 4) of different kinds;
- assembling the segments (1, 2, 3, 4) of different kinds to make an alternating succession of first and second units (60, 70) advancing transversely to the longitudinal axis of the segments (1, 2, 3, 4) and wherein at least the first units (60) are each made up of at least two segments (1, 2, 3, 4) of different kinds;
- assembling the units (60, 70) in a single forming beam (80) to form a single continuous rod (100) defined by a predetermined sequence of segments (1, 2, 3, 4) of different kinds;

wherein the step of assembling the segments (1, 2, 3, 4) of different kinds to make an alternating succession of first and second units (60, 70) is carried out in such a way that the segments (1, 2, 3, 4) of each of the aforesaid different kinds form part only of the first or the second unit (60, 70).

2. The method according to claim 1, wherein the first and second units (60, 70) have different lengths.

3. The method according to claim 1, wherein the first and second units (60, 70) have the same length.

4. The method according to any one of the preceding claims, wherein the second units (70) comprise at least one segment (3) of double length, intended for subsequent cutting into two segments, and in particular consisting of a single segment (3) of double length.

5. The method according to any of the preceding claims, wherein the steps are carried out in the following way:

- preparing at least one succession of first segments (1), one succession of second segments (2) and one succession of third segments (3), wherein the first, second and third segments (1, 2, 3) are segments of different kinds;
- assembling the first, second and third segments (1, 2, 3) to make an alternating succession of first and second units (60, 70) advancing transversely to the longitudinal axis of the segments (1, 2, 3) and wherein the first units (60) comprise at least a first and a second segment (1, 2) and the second units (70) comprise at least a third segment (3);
- assembling the units (60, 70) in a single forming beam (80) to form a single continuous rod (100)

defined by a predetermined sequence of segments (1, 2, 3) of different kinds;

wherein the step of assembling the segments (1, 2, 3) of different kinds to make an alternating succession of first and second units (60, 70) is carried out in such a way that the first and second segments (1, 2) form part only of the first units (60) and the third segments (3) form part only of the second units (70).

6. The method according to claim 5, wherein the step of preparing a plurality of segments (1, 2, 3, 4) further comprises a step of feeding a succession of fourth segments (4) of a kind different from the first, second and third segments (1, 2, 3) and wherein the step of assembling the segments (1, 2, 3, 4) of different kinds is carried out in such a way that the fourth segments (4) form part only of one of the first or second units (60, 70), preferably the second units (70).

7. The method according to claim 5, wherein the step of preparing a plurality of segments (1, 2, 3, 4) further comprises a step of feeding a succession of fourth segments (4) of a kind identical to the third segments (3) and wherein the step of assembling the segments (1, 2, 3, 4) of different kinds is carried out in such a way that the third and fourth segments (4) form part of respective second units (70) disposed alternately.

8. The method according to any one of claims 5 to 7, wherein the step of preparing a plurality of segments (1, 2, 3, 4) further comprises a step of feeding a plurality of successions of further segments of a kind different from the first, second and third segments (1, 2, 3) and wherein the step of assembling the segments (1, 2, 3, 4) of different kinds is carried out in such a way that each kind of the further segments forms part only of one of the first or second units (60, 70).

9. The method according to any one of the preceding claims, further comprising a step of wrapping the single continuous rod (100) in a web, preferably of paper, and then cutting the wrapped rod (100) to obtain a succession of multisegment articles (110), the cut being made, in particular, at the segment (3) of double length.

10. The method according to claim 2, wherein the step of assembling the units (60, 70) in a single forming beam (80) to form a single continuous rod (100) is carried out by a transfer device comprising a supporting wheel and a plurality of pivoting working units mounted on the supporting wheel and driven in such a way that as the supporting wheel rotates, the working units remain fixed in orientation, which is, in particular, horizontal, and wherein the working units are spaced at a distance from each other which, meas-

ured circumferentially, is equal to the mean length of the first and second units (60, 70).

11. A method for making multisegment articles (110), comprising the following steps:

- preparing at least one succession of first segments (1), one succession of second segments (2) and one succession of third segments (3), wherein the first, second and third segments (1, 2, 3) are segments of different kinds;
- assembling the first, second and third segments (1, 2, 3) on conveying means (50) to make an alternating succession of first and second units (60, 70) advancing transversely to the longitudinal axis of the segments (1, 2, 3) wherein the first units (60) comprise at least a first segment (1) and the second units (70) comprise at least a second segment (2) and wherein each first unit (60) and each second unit (70) comprise a third segment (3);
- assembling the units (60, 70) in a single forming beam (80) to form a single continuous rod (100) defined by a predetermined sequence of segments (1, 2, 3) of different kinds;

wherein the step of assembling the segments (1, 2, 3) of different kinds to make an alternating succession of first and second units (60, 70) is carried out in such a way that the first segments (1) form part only of the first units (60) and the second segments (2) form part only of the second units (70) and in such a way that the first and second units (60, 70) each comprise a third segment (3); and wherein the step of assembling the first, second and third segments (1, 2, 3) on the conveying means (50) is carried out by releasing each third segment (3) on the conveying means (50) before the first and second segments (1, 2) are released.

12. The method according to claim 11, wherein the step of preparing at least one succession of first, second and third segments (1, 2, 3) is carried out by also preparing a succession of fourth segments (4) of a kind different from the first, second and third segments (1, 2, 3) and wherein the step of assembling the segments (1, 2, 3, 4) of different kinds makes an alternating succession of first and second units (60, 70) such that the first and second units (60, 70) each also comprise a fourth segment (4) disposed preferably to abut against the third segment (3); also the fourth segments (4) being preferably released onto the conveying means (50) before the first and second segments (1, 2) are released.

13. The method according to claim 12, wherein each third segment (3) is obtained by cutting a piece of rod of multiple length into a plurality of third segments

(3) which are then offset transversely and wherein one or more of the transversely offset third segments (3) are moved axially to form a zig-zagged succession of third segments (3); the step of assembling the first, second and third segments (1, 2, 3) on the conveying means (50) is carried out by releasing the zig-zagged succession of third segments (3) onto the conveying means (50).

14. The method according to claim 13, wherein the step of preparing a succession of fourth segments (4) comprises preparing a zig-zagged succession of fourth segments (4) to match the zig-zagged succession of third segments (3); the step of assembling the segments (1, 2, 3, 4) of different kinds to make an alternating succession of first and second units (60, 70) being carried out in such a way that each third segment (3) is also juxtaposed with a corresponding fourth segment (4) so that the third segment (3) of the first units (60) is juxtaposed with a first side of the fourth segment (4) and the third segment (3) of the second units (70) is juxtaposed with a second side of the fourth segment (4).

15. An assembling machine for making multisegment articles, comprising a plurality of feed lines (10, 20, 30, 40) configured to feed respective successions of segments (1, 2, 3, 4) having different properties, and conveying means (50) disposed and/or configured to receive respective segments (1, 2, 3, 4) from the feed lines (10, 20, 30, 40), wherein the conveying means (50) define a succession of receiving seats, configured to receive one or more of the segments (1, 2, 3, 4) each and to advance the segments (1, 2, 3, 4) transversely, and wherein the machine (1) is configured and/or set in such a way that at least a first and a second of the feed lines (10, 20, 30, 40) release the respective segments (1, 2, 3, 4) exclusively in first seats of the conveying means (50) and at least a third of the feed lines (10, 20, 30, 40) releases the respective segments (1, 2, 3, 4) exclusively in second seats of the conveying means (50), the first and second seats being disposed alternately along a conveying direction defined by the conveying means (50).

16. The machine according to claim 15, wherein the plurality of feed lines (10, 20, 30, 40) also comprises one or more further feed lines for feeding respective successions of segments, and wherein each further feed line of the machine (1) causes the respective segments to be released exclusively in the first or second seats of the conveying means (50).

17. The machine according to claim 15 or 16, wherein the feed lines (10, 20, 30, 40) each comprise a buffer hopper (11, 21, 31, 41) for accumulating respective segments (1, 2, 3, 4) of single or multiple length and

one or more transfer drums (12, 13, 14; 22, 23, 24; 32, 33, 34; 42, 43, 44) disposed downstream of the respective buffer hopper (11, 21, 31, 41), and wherein the conveying means (50) are disposed in a bottom portion of the machine (1) and are interconnected with at least one transfer drum (12, 13, 14; 22, 23, 24; 32, 33, 34; 42, 43, 44) of each of the feed lines (11, 21, 31, 41), the conveying means (50) preferably comprising a succession of suction drums.

18. The machine according to any one of claims 15 to 17, wherein the conveying means (50) comprise a succession of drums and wherein at least some of the drums are configured to define a pair of axially juxtaposed, peripheral conveying surfaces, the first of these peripheral conveying surfaces being designed to combine and/or transport first units (60) obtained by a first combination of the segments (1, 2, 3, 4), and the other peripheral surface is designed to combine and/or transport second units (70) obtained by a second combination of the segments (1, 2, 3, 4), different from the first combination, the first and second units (60, 70) being subsequently centred by a centring drum to define a single alternating succession of first and second units (60, 70).

## Patentansprüche

1. Verfahren zur Herstellung von Mehrsegmentartikeln (110), umfassend die folgenden Schritte:

- Vorbereiten einer Vielzahl von Segmenten (1, 2, 3, 4) unterschiedlicher Arten;
- Zusammensetzen der Segmente (1, 2, 3, 4) unterschiedlicher Arten, um eine abwechselnde Abfolge von ersten und zweiten Einheiten (60, 70) herzustellen, die quer zur Längsachse der Segmente (1, 2, 3, 4) vorgeschoben wird, und wobei zumindest die ersten Einheiten (60) jeweils aus mindestens zwei Segmenten (1, 2, 3, 4) unterschiedlicher Arten bestehen;
- Zusammensetzen der Einheiten (60, 70) in einem einzelnen Formungsbalken (80), um einen einzelnen durchgehenden Stab (100) zu formen, der durch eine vorgegebene Abfolge von Segmenten (1, 2, 3, 4) unterschiedlicher Arten definiert ist;

wobei der Schritt zum Zusammensetzen der Segmente (1, 2, 3, 4) unterschiedlicher Arten, um eine abwechselnde Abfolge von ersten und zweiten Einheiten (60, 70) herzustellen, so durchgeführt wird, dass die Segmente (1, 2, 3, 4) einer jeden der genannten unterschiedlichen Arten nur jeweils zur ersten oder zweiten Einheit (60, 70) gehören.

2. Verfahren nach Anspruch 1, wobei die ersten und

die zweiten Einheiten (60, 70) unterschiedliche Längen aufweisen.

3. Verfahren nach Anspruch 1, wobei die ersten und die zweiten Einheiten (60, 70) die gleiche Länge aufweisen.
4. Verfahren nach einem der vorhergehenden Ansprüche, wobei die zweiten Einheiten (70) mindestens ein Segment (3) doppelter Länge umfassen, das dazu bestimmt ist, später in zwei Segmente geschnitten zu werden, und das insbesondere aus einem einzelnen Segment (3) doppelter Länge besteht.
5. Verfahren nach einem der vorhergehenden Ansprüche, wobei die Schritte auf folgende Weise durchgeführt werden:

Vorbereiten von mindestens einer Abfolge erster Segmente (1), einer Abfolge zweiter Segmente (2) und einer Abfolge dritter Segmente (3), wobei die ersten, zweiten und dritten Segmente (1, 2, 3) Segmente unterschiedlicher Arten sind;

Zusammensetzen der ersten, zweiten und dritten Segmente (1, 2, 3), um eine abwechselnde Abfolge von ersten und zweiten Einheiten (60, 70) herzustellen, die quer zur Längsachse der Segmente (1, 2, 3) vorgeschoben wird, und wobei die ersten Einheiten (60) mindestens ein erstes und ein zweites Segment (1, 2) umfassen und die zweiten Einheiten (70) mindestens ein drittes Segment (3) umfassen;

Zusammensetzen der Einheiten (60, 70) in einem einzelnen Formungsbalken (80), um einen einzelnen durchgehenden Stab (100) zu formen, der durch eine vorgegebene Abfolge von Segmenten (1, 2, 3) unterschiedlicher Arten definiert ist;

wobei der Schritt zum Zusammensetzen der Segmente (1, 2, 3) unterschiedlicher Arten, um eine abwechselnde Abfolge von ersten und zweiten Einheiten (60, 70) herzustellen, so durchgeführt wird, dass die ersten und zweiten Segmente (1, 2) nur zu den ersten Einheiten (60) gehören und die dritten Segmente (3) nur zu den zweiten Einheiten (70) gehören.

6. Verfahren nach Anspruch 5, wobei der Schritt zum Vorbereiten einer Vielzahl von Segmenten (1, 2, 3, 4) zudem einen Schritt zum Zuführen einer Abfolge von vierten Segmenten (4) einer von den ersten, zweiten und dritten Segmenten (1, 2, 3) unterschiedlichen Art umfasst, und wobei der Schritt zum Zusammensetzen der Segmente (1, 2, 3, 4) unterschiedlicher Arten so durchgeführt wird, dass die vierten Segmente (4) nur zu einer der ersten oder zweiten Einheiten (60, 70), vorzugsweise der zwei-

ten Einheiten (70), gehören.

7. Verfahren nach Anspruch 5, wobei der Schritt zum Vorbereiten einer Vielzahl von Segmenten (1, 2, 3, 4) zudem einen Schritt zum Zuführen einer Abfolge von vierten Segmenten (4) einer Art umfasst, die mit den dritten Segmenten (3) identisch ist, und wobei der Schritt zum Zusammensetzen der Segmente (1, 2, 3, 4) unterschiedlicher Arten so durchgeführt wird, dass die dritten und vierten Segmente (4) zu jeweiligen zweiten Einheiten (70), die abwechselnd angeordnet sind, gehören.
8. Verfahren nach einem der Ansprüche 5 bis 7, wobei der Schritt zum Vorbereiten einer Vielzahl von Segmenten (1, 2, 3, 4) zudem einen Schritt zum Zuführen einer Vielzahl von Abfolgen von weiteren Segmenten einer von den ersten, zweiten und dritten Segmenten (1, 2, 3) unterschiedlichen Art umfasst, und wobei der Schritt zum Zusammensetzen der Segmente (1, 2, 3, 4) unterschiedlicher Arten so durchgeführt wird, dass eine jede Art der weiteren Segmente nur zu einer der ersten oder zweiten Einheiten (60, 70) gehört.
9. Verfahren nach einem der vorhergehenden Ansprüche, zudem umfassend einen Schritt zum Einwickeln des einzelnen durchgehenden Stabs (100) in eine Bahn, vorzugsweise aus Papier, und dann zum Schneiden des eingewickelten Stabs (100), um eine Abfolge von Multisegmentartikeln (110) zu erhalten, wobei der Schnitt insbesondere am Segment (3) doppelter Länge erfolgt.
10. Verfahren nach Anspruch 2, wobei der Schritt zum Zusammensetzen der Einheiten (60, 70) in einem einzelnen Formungsbalken (80), um einen einzelnen durchgehenden Stab (100) zu formen, von einer Transfervorrichtung durchgeführt wird, die ein Stützrad und eine Vielzahl von Schwenkarbeitseinheiten umfasst, die auf dem Stützrad montiert sind und so angetrieben werden, dass die Arbeitseinheiten in Ausrichtung, die insbesondere horizontal ist, fixiert bleiben, wenn sich das Stützrad dreht, und wobei die Arbeitseinheiten an einem Abstand voneinander beabstandet sind, der umfangseitig gemessen gleich der Durchschnittslänge der ersten und zweiten Einheiten (60, 70) ist.
11. Verfahren zur Herstellung von Mehrsegmentartikeln (110), umfassend die folgenden Schritte:
  - Vorbereiten von mindestens einer Abfolge erster Segmente (1), einer Abfolge zweiter Segmente (2) und einer Abfolge dritter Segmente (3), wobei die ersten, zweiten und dritten Segmente (1, 2, 3) Segmente unterschiedlicher Arten sind;

- Zusammensetzen der ersten, zweiten und dritten Segmente (1, 2, 3) auf Fördermitteln (50), um eine abwechselnde Abfolge von ersten und zweiten Einheiten (60, 70) herzustellen, die quer zur Längsachse der Segmente (1, 2, 3) vorge-  
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 schoben wird, wobei die ersten Einheiten (60) mindestens ein erstes Segment (1) umfassen und die zweiten Einheiten (70) mindestens ein zweites Segment (2) umfassen, und wobei eine  
 10  
 jede erste Einheit (60) und eine jede zweite Einheit (70) ein drittes Segment (3) umfassen;  
 - Zusammensetzen der Einheiten (60, 70) in einem einzelnen Formungsbalken (80), um einen  
 15  
 einzelnen durchgehenden Stab (100) zu formen, der durch eine vorgegebene Abfolge von Segmenten (1, 2, 3) unterschiedlicher Arten definiert ist;

wobei der Schritt zum Zusammensetzen der Segmente (1, 2, 3) unterschiedlicher Arten, um eine  
 20  
 abwechselnde Abfolge von ersten und zweiten Einheiten (60, 70) herzustellen, so durchgeführt wird, dass die ersten Segmente (1) nur zu den ersten Einheiten (60) gehören und die zweiten Segmente (2) nur zu den zweiten Einheiten (70) gehören, und so, dass  
 25  
 die ersten und zweiten Einheiten (60, 70) jeweils ein drittes Segment (3) umfassen, und wobei der Schritt zum Zusammensetzen der ersten, zweiten und dritten Segmente (1, 2, 3) auf den Fördermitteln (50) durchgeführt wird, indem ein jedes dritte Segment  
 30  
 (3) auf den Fördermitteln (50) freigegeben wird, bevor die ersten und zweiten Segmente (1, 2) freigegeben werden.

**12.** Verfahren nach Anspruch 11, wobei der Schritt zum Vorbereiten von mindestens einer Abfolge von ersten, zweiten und dritten Segmenten (1, 2, 3) durchgeführt wird, indem auch eine Abfolge von vierten Segmenten (4) einer von den ersten, zweiten und dritten Segmenten (1, 2, 3) unterschiedlichen Art vor-  
 35  
 bereitet wird, und wobei der Schritt zum Zusammensetzen der Segmente (1, 2, 3, 4) unterschiedlicher Arten eine abwechselnde Abfolge von ersten und zweiten Einheiten (60, 70) herstellt, sodass die ersten und zweiten Einheiten (60, 70) jeweils ein viertes  
 40  
 Segment (4) umfassen, das vorzugsweise so angeordnet ist, dass es am dritten Segment (3) anschlägt, wobei auch die vierten Segmente (4) vorzugsweise auf den Fördermitteln (50) freigegeben werden, bevor die ersten und zweiten Segmente (1, 2) freigegeben werden.

**13.** Verfahren nach Anspruch 12, wobei ein jedes dritte Segment (3) erhalten wird, indem ein Stück Stab mehrfacher Länge in eine Vielzahl von dritten Segmenten (3) geschnitten wird, die dann quer versetzt werden, und wobei eins oder mehr der quer versetzten dritten Segmente (3) axial bewegt wird/werden,

um eine Zickzack-Abfolge von dritten Segmenten (3) zu formen, wobei der Schritt zum Zusammensetzen der ersten, zweiten und dritten Segmente (1, 2, 3) auf den Fördermitteln (50) durchgeführt wird, indem die Zickzack-Abfolge von dritten Segmenten (3) auf den Fördermitteln (50) freigegeben wird.

**14.** Verfahren nach Anspruch 13, wobei der Schritt zum Vorbereiten einer Abfolge von vierten Segmenten (4) das Vorbereiten einer Zickzack-Abfolge von vierten Segmenten (4) umfasst, passend zur Zickzack-Abfolge von dritten Segmenten (3), wobei der Schritt zum Zusammensetzen der Segmente (1, 2, 3, 4) verschiedener Arten, um eine abwechselnde Abfolge von ersten und zweiten Einheiten (60, 70) herzustellen, so durchgeführt wird, dass ein jedes dritte Segment (3) auch neben ein entsprechendes viertes Segment (4) gestellt ist, sodass das dritte Segment (3) der ersten Einheiten (60) neben eine erste Seite des vierten Segments (4) gestellt ist und das dritte Segment (3) der zweiten Einheiten (70) neben eine zweite Seite des vierten Segments (4) gestellt ist.

**15.** Zusammensetzmaschine zur Herstellung von Multisegmentartikeln, umfassend eine Vielzahl von Zuführungslinien (10, 20, 30, 40), die ausgelegt sind, um jeweilige Abfolgen von Segmenten (1, 2, 3, 4), aufweisend unterschiedliche Eigenschaften, zuzuführen, und Fördermittel (50), die angeordnet und/oder ausgelegt sind, um jeweilige Segmente (1, 2, 3, 4) von den Zuführungslinien (10, 20, 30, 40) aufzunehmen, wobei die Fördermittel (50) eine Abfolge von Aufnahmesitzen definieren, die jeweils ausgelegt sind, um eins oder mehrere der Segmente (1, 2, 3, 4) aufzunehmen und die Segmente (1, 2, 3, 4) quer vorzuschieben, und wobei die Maschine (1) so ausgelegt und/oder eingerichtet ist, dass mindestens eine erste und eine zweite der Zuführungslinien (10, 20, 30, 40) die jeweiligen Segmente (1, 2, 3, 4) ausschließlich in ersten Sitzen der Fördermittel (50) freigeben, und mindestens eine dritte der Zuführungslinien (10, 20, 30, 40) die jeweiligen Segmente (1, 2, 3, 4) ausschließlich in zweiten Sitzen der Fördermittel (50) freigibt, wobei die ersten und zweiten Sitze abwechselnd entlang einer Förderrichtung angeordnet sind, die durch die Fördermittel (50) definiert ist.

**16.** Maschine nach Anspruch 15, wobei die Vielzahl von Zuführungslinien (10, 20, 30, 40) auch eine oder mehrere weitere Zuführungslinien zum Zuführen jeweiliger Abfolgen von Segmenten umfasst, und wobei eine jede weitere Zuführungslinie der Maschine (1) veranlasst, dass die jeweiligen Segmente ausschließlich in den ersten oder zweiten Sitzen der Fördermittel (50) freigegeben werden.

**17.** Maschine nach Anspruch 15 oder 16, wobei die Zu-

führungslinien (10, 20, 30, 40) jeweils einen Pufferbunker (11, 21, 31, 41) zum Akkumulieren jeweiliger Segmente (1, 2, 3, 4) einer Einzel- oder Mehrfachlänge und eine oder mehrere Transfertrommeln (12, 13, 14; 22, 23, 24; 32, 33, 34; 42, 43, 44), die stromabwärts des jeweiligen Pufferbunkers (11, 21, 31, 41) angeordnet sind, umfassen, und wobei die Fördermittel (50) in einem Bodenabschnitt der Maschine (1) angeordnet und mit mindestens einer Transfertrommel (12, 13, 14; 22, 23, 24; 32, 33, 34; 42, 43, 44) einer jeden der Zuführungslinien (11, 21, 31, 41) verbunden sind, wobei die Fördermittel (50) vorzugsweise eine Abfolge von Saugtrommeln umfassen.

18. Maschine nach einem der Ansprüche 15 bis 17, wobei die Fördermittel (50) eine Abfolge von Trommeln umfassen und wobei mindestens einige der Trommeln ausgelegt sind, um ein Paar axial nebeneinander angeordneter Umfangsförderoberflächen zu definieren, die erste dieser Umfangsförderoberflächen ausgestaltet ist, um erste Einheiten (60) zu kombinieren und/oder zu transportieren, die durch eine erste Kombination von Segmenten (1, 2, 3, 4) gewonnen wurden, und die andere Umfangsoberfläche ausgestaltet ist, um zweite Einheiten (70) zu kombinieren und/oder zu transportieren, die durch eine zweite Kombination von Segmenten (1, 2, 3, 4) gewonnen wurden, die sich von der ersten Kombination unterscheidet, die ersten und die zweiten Einheiten (60, 70) nacheinander von einer Zentriertrommel zentriert werden, um eine einzelne abwechselnde Abfolge von ersten und zweiten Einheiten (60, 70) zu definieren.

## Revendications

1. Procédé de fabrication d'articles à segments multiples (110), comprenant les étapes de :
- préparer une pluralité de segments (1, 2, 3, 4) de différents types ;
  - assembler les segments (1, 2, 3, 4) de différents types pour réaliser une succession alternée de premières et de deuxièmes unités (60, 70) avançant transversalement à l'axe longitudinal des segments (1, 2, 3, 4) et dans lequel au moins les premières unités (60) sont chacune constituées d'au moins deux segments (1, 2, 3, 4) de différents types ;
  - assembler les unités (60, 70) dans une seule poutre de formation (80) pour former une seule tige continue (100) définie par une séquence prédéterminée de segments (1, 2, 3, 4) de différents types ;

dans lequel l'étape d'assemblage des segments (1,

2, 3, 4) de différents types pour réaliser une succession alternée de premières et de deuxièmes unités (60, 70) est effectuée de telle sorte que les segments (1, 2, 3, 4) de chacun des différents types susmentionnés fassent partie uniquement de la première ou de la deuxième unité (60, 70) .

2. Procédé selon la revendication 1, dans lequel les premières et deuxièmes unités (60, 70) ont des longueurs différentes.
3. Procédé selon la revendication 1, dans lequel les premières et deuxièmes unités (60, 70) ont la même longueur.
4. Procédé selon l'une quelconque des revendications précédentes, dans lequel les deuxièmes unités (70) comprennent au moins un segment (3) de longueur double, destiné à être coupé ultérieurement en deux segments, et constitué, en particulier, d'un seul segment (3) de longueur double.
5. Procédé selon l'une quelconque des revendications précédentes, dans lequel les étapes sont réalisées de la manière suivante :

préparer au moins une succession de premiers segments (1), une succession de deuxièmes segments (2) et une succession de troisièmes segments (3), les premiers, deuxièmes et troisièmes segments (1, 2, 3) étant des segments de différents types ;

assembler les premiers, deuxièmes et troisièmes segments (1, 2, 3) pour réaliser une succession alternée de premières et deuxièmes unités (60, 70) avançant transversalement à l'axe longitudinal des segments (1, 2, 3) et dans lequel les premières unités (60) comprennent au moins un premier et un deuxième segment (1, 2) et les deuxièmes unités (70) comprennent au moins un troisième segment (3) ;

assembler les unités (60, 70) dans une seule poutre de formation (80) pour former une seule tige continue (100) définie par une séquence prédéterminée de segments (1, 2, 3) de différents types ;

dans lequel l'étape d'assemblage des segments (1, 2, 3) de différents types pour former une succession alternée de premières et deuxièmes unités (60, 70) est effectuée de telle sorte que les premiers et deuxièmes segments (1, 2) fassent partie uniquement des premières unités (60) et que les troisièmes segments (3) fassent partie uniquement des deuxièmes unités (70).

6. Procédé selon la revendication 5, dans lequel l'étape de préparation d'une pluralité de segments (1, 2, 3, 4) comprend de plus une étape d'alimentation d'une

- succession de quatrièmes segments (4) d'un type différent des premiers, deuxième et troisième segments (1, 2, 3) et dans lequel l'étape d'assemblage des segments (1, 2, 3, 4) de différents types est effectuée de telle sorte que les quatrièmes segments (4) fassent partie uniquement de l'une des premières ou des deuxième unités (60, 70), de préférence des deuxième unités (70).
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7. Procédé selon la revendication 5, dans lequel l'étape de préparation d'une pluralité de segments (1, 2, 3, 4) comprend de plus une étape d'alimentation d'une succession de quatrièmes segments (4) d'un type identique aux troisième segments (3) et dans lequel l'étape d'assemblage des segments (1, 2, 3, 4) de différents types est réalisée de telle sorte que les troisième et quatrièmes segments (4) fassent partie des deuxième unités (70) respectives disposées en alternance.
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8. Procédé selon l'une quelconque des revendications 5 à 7, dans lequel l'étape de préparation d'une pluralité de segments (1, 2, 3, 4) comprend de plus une étape d'alimentation d'une pluralité de successions de segments supplémentaires d'un type différent des premiers, deuxième et troisième segments (1, 2, 3) et dans lequel l'étape d'assemblage des segments (1, 2, 3, 4) de différents types est effectuée de telle sorte que chaque type de segment supplémentaire fasse partie uniquement d'unités entre les premières ou les deuxième unités (60, 70).
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9. Procédé selon l'une quelconque des revendications précédentes, comprenant de plus une étape consistant à envelopper la seule tige continue (100) dans une bande, de préférence en papier, et puis à couper la tige (100) enveloppée pour obtenir une succession d'articles à segments multiples (110), la coupe étant effectuée, en particulier, en correspondance du segment (3) de longueur double.
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10. Procédé selon la revendication 2, dans lequel l'étape d'assemblage des unités (60, 70) en une seule poutre de formation (80) pour former une seule tige continue (100) est réalisée par un dispositif de transfert comprenant une roue de support et une pluralité d'unités de travail pivotantes montées sur la roue de support et entraînées de telle sorte que, lorsque la roue de support tourne, les unités de travail restent fixes dans leur orientation, qui est, en particulier, horizontale, et dans lequel les unités de travail sont espacées les unes des autres d'une distance qui, mesurée sur la circonférence, est égale à la longueur moyenne des premières et deuxième unités (60, 70).
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11. Procédé de fabrication d'articles à segments multiples (110), comprenant les étapes suivantes :
- préparer au moins une succession de premiers segments (1), une succession de deuxième segments (2) et une succession de troisième segments (3), les premiers, deuxième et troisième segments (1, 2, 3) étant des segments de différents types ;
  - assembler les premiers, deuxième et troisième segments (1, 2, 3) sur des moyens de transport (50) pour réaliser une succession alternée de premières et deuxième unités (60, 70) avançant transversalement à l'axe longitudinal des segments (1, 2, 3) dans lequel les premières unités (60) comprennent au moins un premier segment (1) et les deuxième unités (70) comprennent au moins un deuxième segment (2) et dans lequel chaque première unité (60) et chaque deuxième unité (70) comprennent un troisième segment (3) ;
  - assembler les unités (60, 70) dans une seule poutre de formation (80) pour former une seule tige continue (100) définie par une séquence prédéterminée de segments (1, 2, 3) de différents types ;
- dans lequel l'étape d'assemblage des segments (1, 2, 3) de différents types pour réaliser une succession alternée de premières et de deuxième unités (60, 70) est effectuée de telle sorte que les premiers segments (1) fassent partie uniquement des premières unités (60) et les deuxième segments (2) fassent partie uniquement des deuxième unités (70) et de telle sorte que les premières et deuxième unités (60, 70) comprennent chacune un troisième segment (3) ; et dans lequel l'étape d'assemblage des premiers, deuxième et troisième segments (1, 2, 3) sur les moyens de transport (50) est réalisée en libérant chaque troisième segment (3) sur les moyens de transport (50) avant que les premiers et deuxième segments (1, 2) ne soient libérés.
12. Procédé selon la revendication 11, dans lequel l'étape de préparation d'au moins une succession de premiers, deuxième et troisième segments (1, 2, 3) est réalisée en préparant également une succession de quatrièmes segments (4) d'un type différent des premiers, deuxième et troisième segments (1, 2, 3) et dans lequel l'étape d'assemblage des segments (1, 2, 3, 4) de différents types réalise une succession alternée de premières et deuxième unités (60, 70) de sorte que les premières et deuxième unités (60, 70) comprennent également chacune un quatrième segment (4) disposé de préférence de manière à se mettre en butée contre le troisième segment (3) ; de plus, les quatrièmes segments (4) étant de préférence libérés sur les moyens de transport (50) avant que les premiers et deuxième segments (1, 2) ne soient libérés.

13. Procédé selon la revendication 12, dans lequel chaque troisième segment (3) est obtenu en coupant un morceau de tige de longueur multiple en une pluralité de troisièmes segments (3) qui sont ensuite décalés transversalement et dans lequel un ou plusieurs des troisièmes segments (3) décalés transversalement sont déplacés axialement pour former une succession en zigzag de troisièmes segments (3) ; l'étape d'assemblage des premiers, deuxièmes et troisièmes segments (1, 2, 3) sur les moyens de transport (50) est effectuée en libérant la succession en zigzag des troisièmes segments (3) sur les moyens de transport (50).
14. Procédé selon la revendication 13, dans lequel l'étape de préparation d'une succession de quatrièmes segments (4) comprend la préparation d'une succession en zigzag de quatrièmes segments (4) pour correspondre à la succession en zigzag de troisièmes segments (3) ; l'étape consistant à assembler les segments (1, 2, 3, 4) de différents types pour former une succession alternée de premières et de deuxièmes unités (60, 70) étant effectuée de telle sorte que chaque troisième segment (3) soit également juxtaposé à un quatrième segment (4) correspondant, de sorte que le troisième segment (3) des premières unités (60) soit juxtaposé à un premier côté du quatrième segment (4) et que le troisième segment (3) des deuxièmes unités (70) soit juxtaposé à un deuxième côté du quatrième segment (4).
15. Machine d'assemblage pour la fabrication d'articles à segments multiples, comprenant une pluralité de lignes d'alimentation (10, 20, 30, 40) configurées pour alimenter des successions respectives de segments (1, 2, 3, 4) ayant des propriétés différentes, et des moyens de transport (50) disposés et/ou configurés pour recevoir des segments (1, 2, 3, 4) respectifs des lignes d'alimentation (10, 20, 30, 40), dans laquelle les moyens de transport (50) définissent une succession de sièges de réception, configurés pour recevoir un ou plusieurs des segments (1, 2, 3, 4) chacun et pour faire avancer les segments (1, 2, 3, 4) transversalement, et dans laquelle la machine (1) est configurée et/ou réglée de telle sorte qu'au moins une première et une deuxième des lignes d'alimentation (10, 20, 30, 40) libèrent les segments (1, 2, 3, 4) respectifs exclusivement dans des premiers sièges des moyens de transport (50) et qu'au moins une troisième des lignes d'alimentation (10, 20, 30, 40) libère les segments (1, 2, 3, 4) respectifs exclusivement dans des deuxièmes sièges des moyens de transport (50), les premiers et deuxièmes sièges étant disposés alternativement le long d'une direction de transport définie par les moyens de transport (50).
16. Machine selon la revendication 15, dans laquelle la pluralité de lignes d'alimentation (10, 20, 30, 40) comprend également une ou plusieurs lignes d'alimentation supplémentaires pour alimenter des successions respectives de segments, et dans laquelle chaque ligne d'alimentation supplémentaire de la machine (1) provoque la libération des segments respectifs exclusivement dans les premiers ou les deuxièmes sièges des moyens de transport (50).
17. Machine selon la revendication 15 ou 16, dans laquelle les lignes d'alimentation (10, 20, 30, 40) comprennent chacune une trémie tampon (11, 21, 31, 41) pour accumuler des segments (1, 2, 3, 4) respectifs de longueur unique ou multiple et un ou plusieurs tambours de transfert (12, 13, 14 ; 22, 23, 24 ; 32, 33, 34 ; 42, 43, 44) disposés en aval de la trémie tampon (11, 21, 31, 41) respective, et dans laquelle les moyens de transport (50) sont disposés dans une partie inférieure de la machine (1) et sont interconnectés avec au moins un tambour de transfert (12, 13, 14 ; 22, 23, 24 ; 32, 33, 34 ; 42, 43, 44) de chacune des lignes d'alimentation (11, 21, 31, 41), les moyens de transport (50) comprenant de préférence une succession de tambours d'aspiration.
18. Machine selon l'une quelconque des revendications 15 à 17, dans laquelle les moyens de transport (50) comprennent une succession de tambours et dans laquelle au moins certains des tambours sont configurés pour définir une paire de surfaces de transport périphériques axialement juxtaposées, la première de ces surfaces de transport périphériques étant conçue pour combiner et/ou transporter des premières unités (60) obtenues par une première combinaison des segments (1, 2, 3, 4), et l'autre surface périphérique est conçue pour combiner et/ou transporter des deuxièmes unités (70) obtenues par une deuxième combinaison des segments (1, 2, 3, 4), différente de la première combinaison, les premières et deuxièmes unités (60, 70) étant ensuite centrées par un tambour de centrage pour définir une seule succession alternée de premières et deuxièmes unités (60, 70).

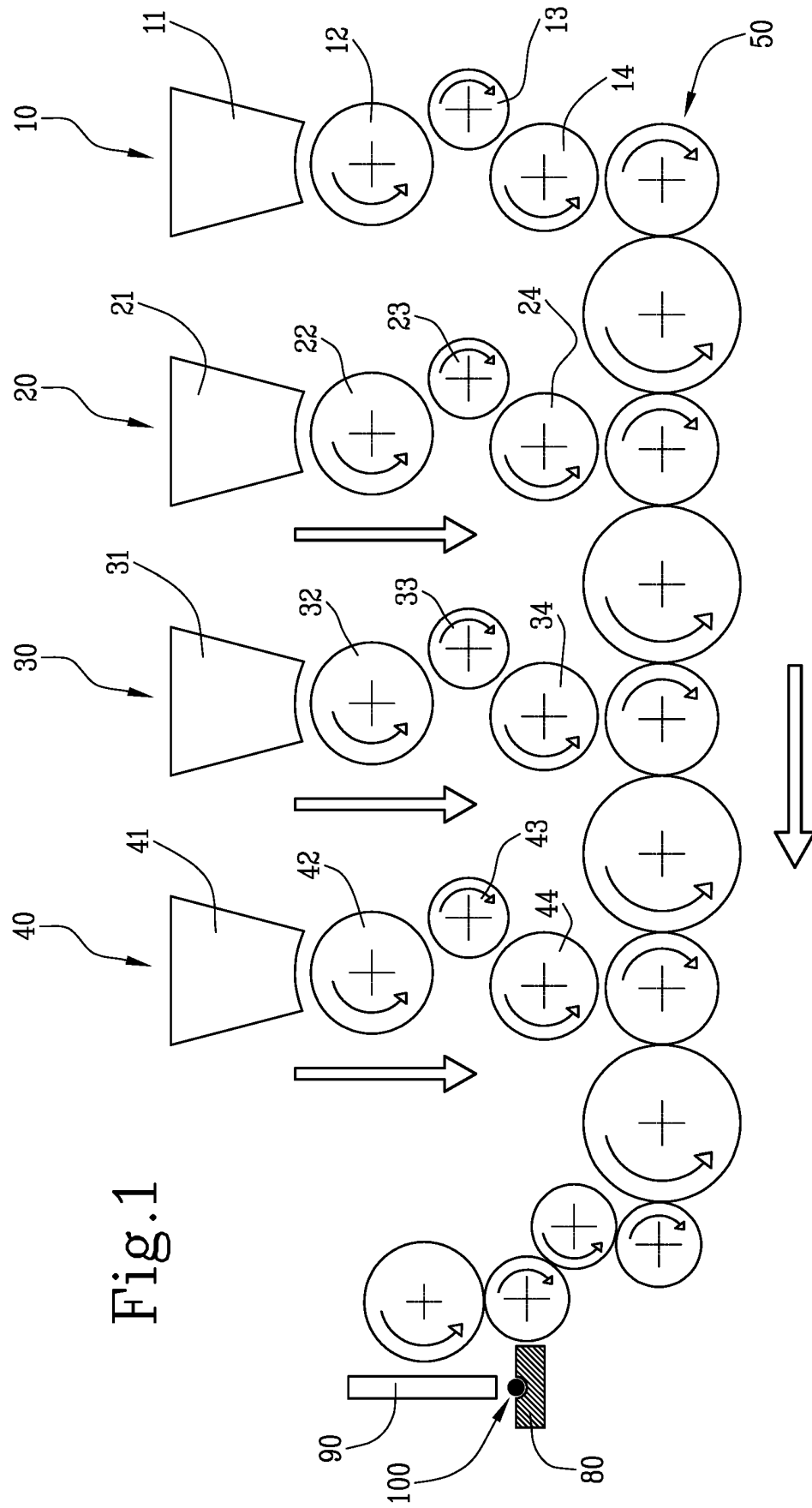


Fig.1

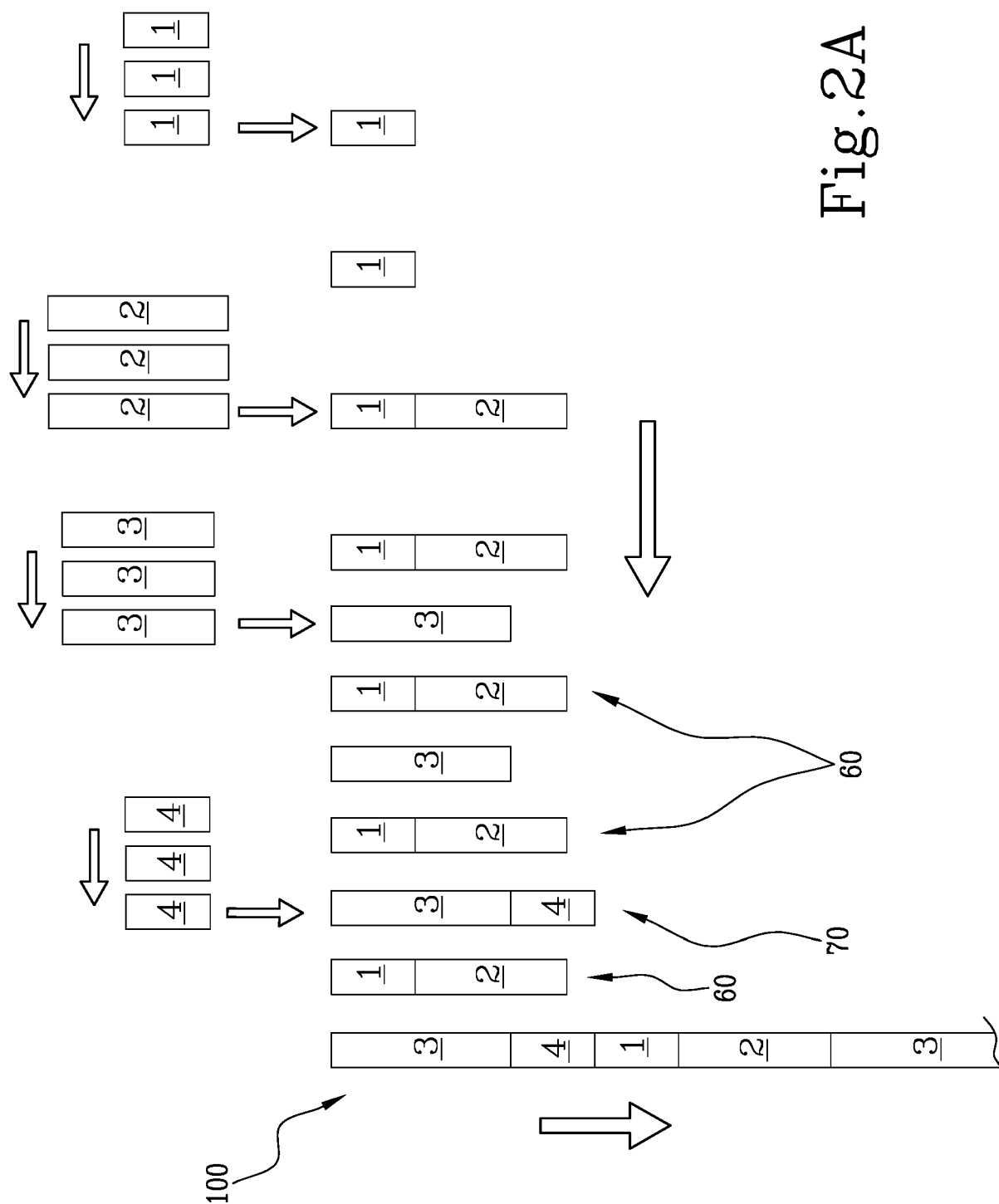


Fig. 2A

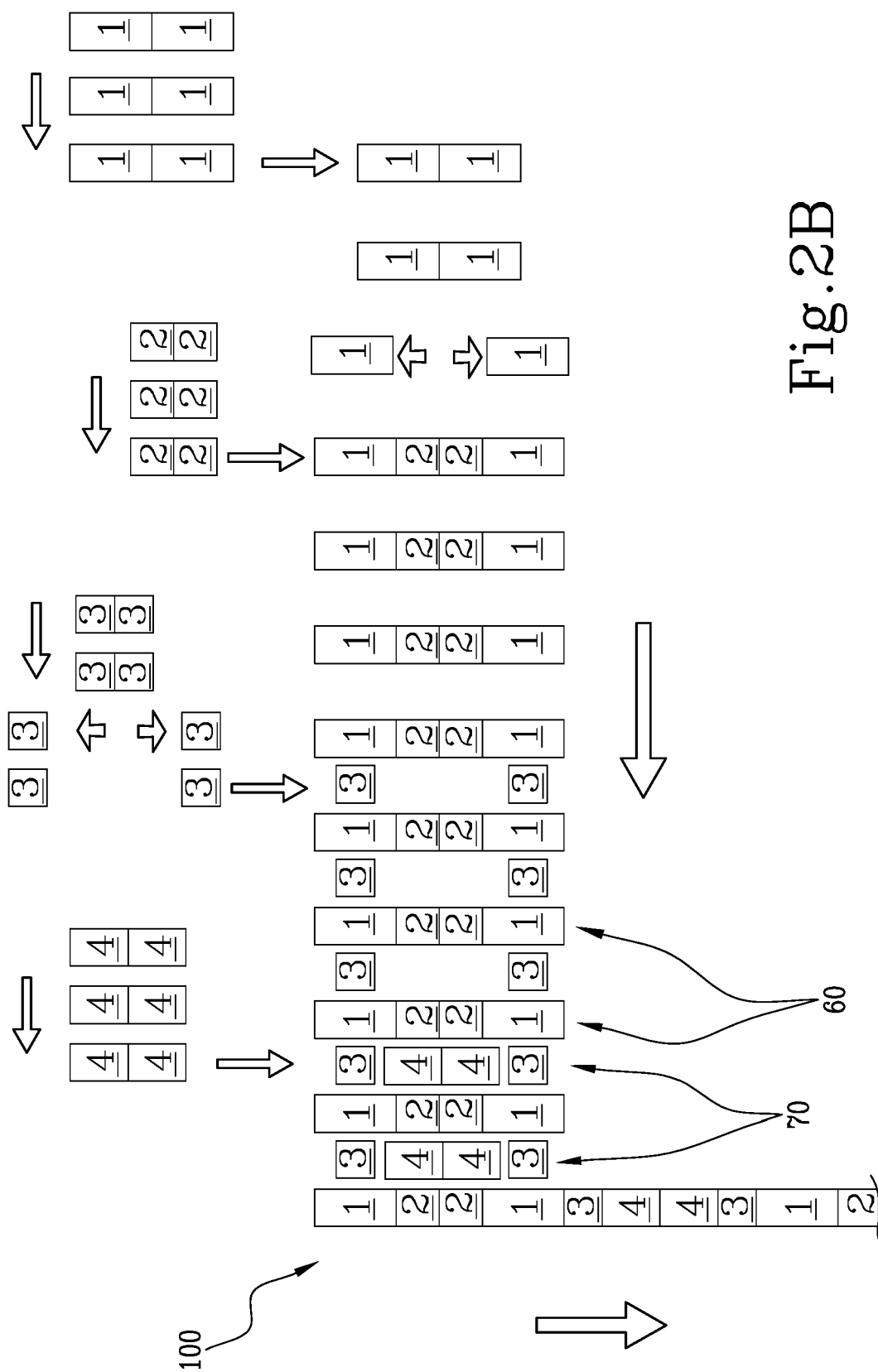


Fig. 2B

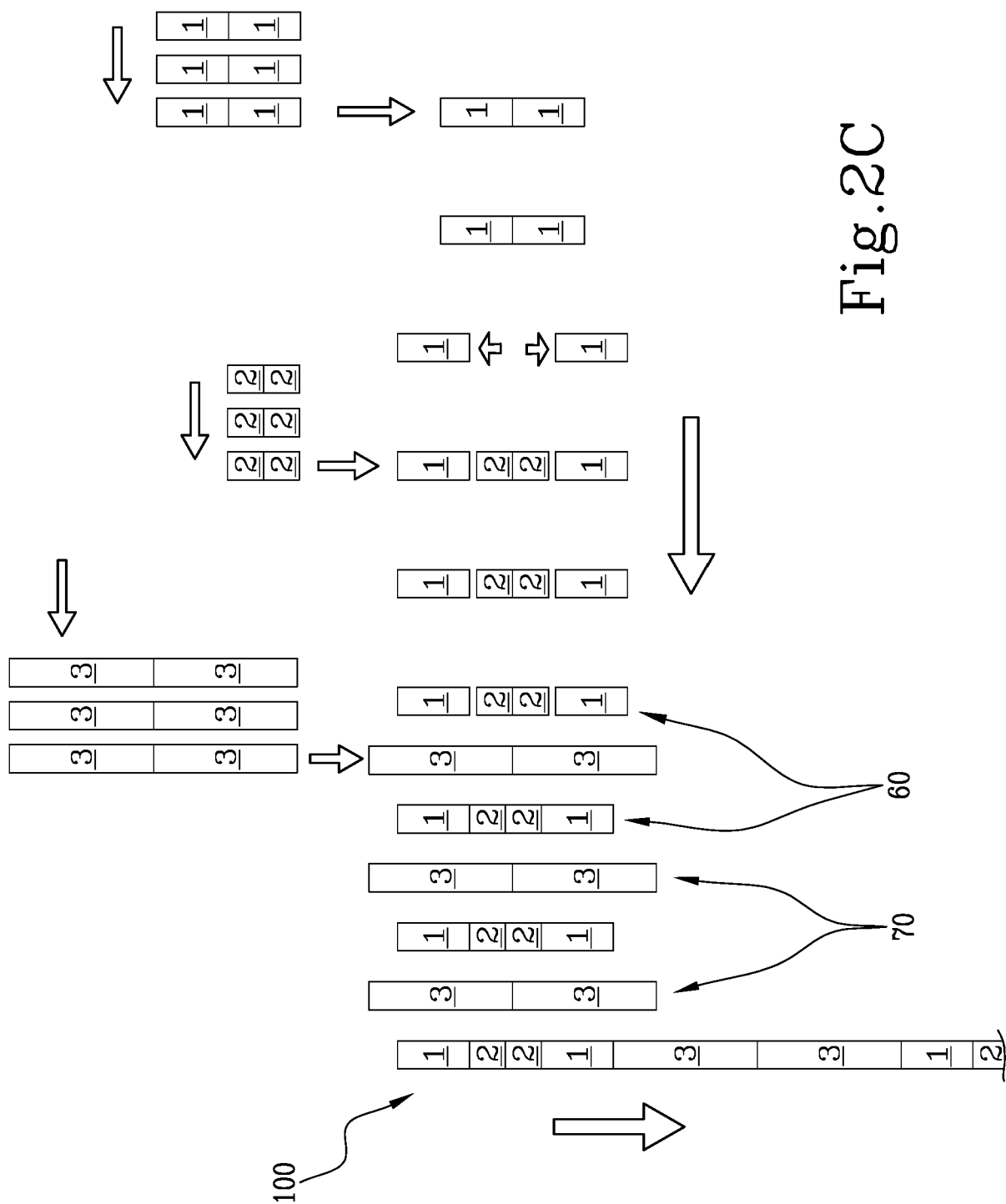


Fig. 20

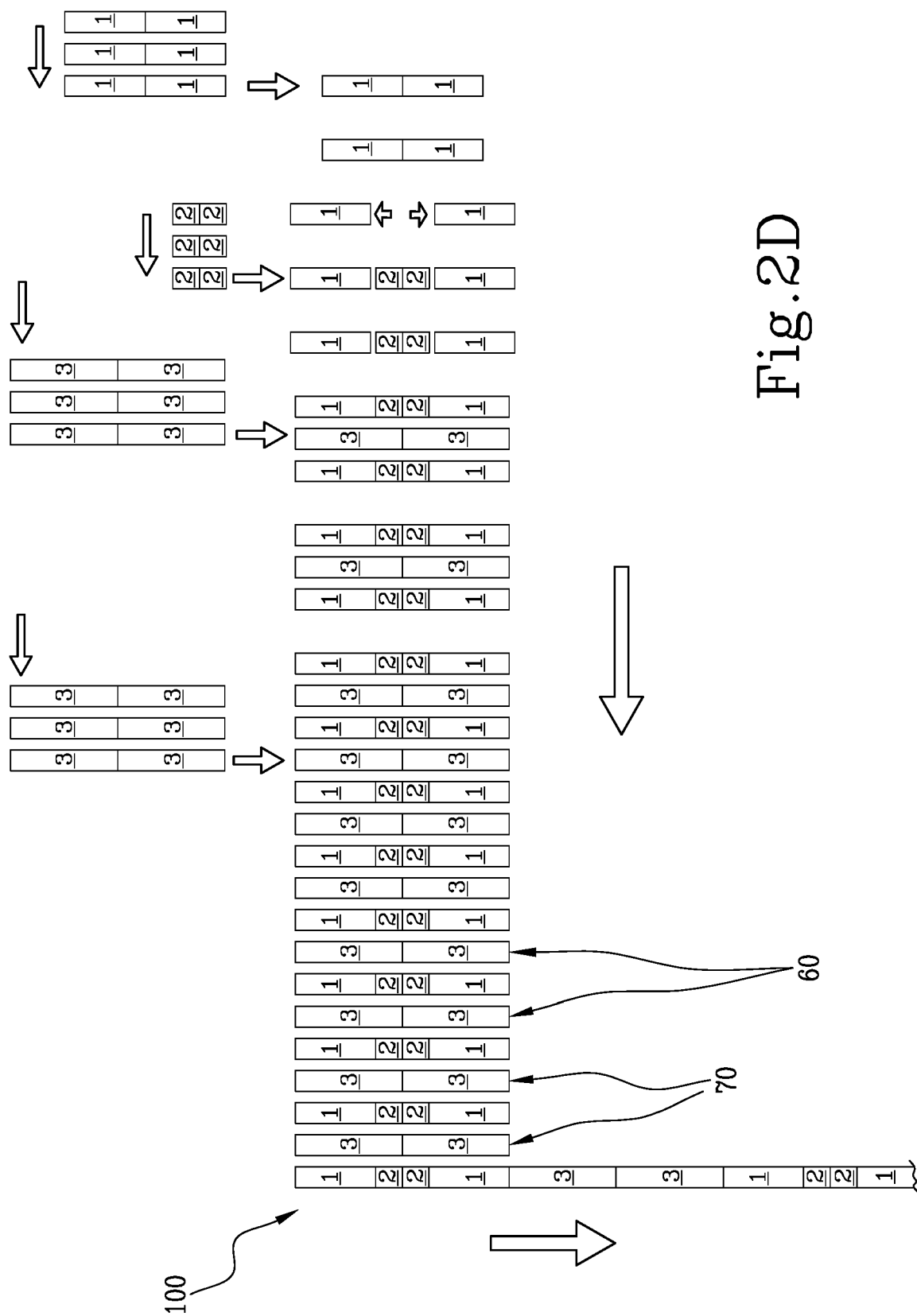
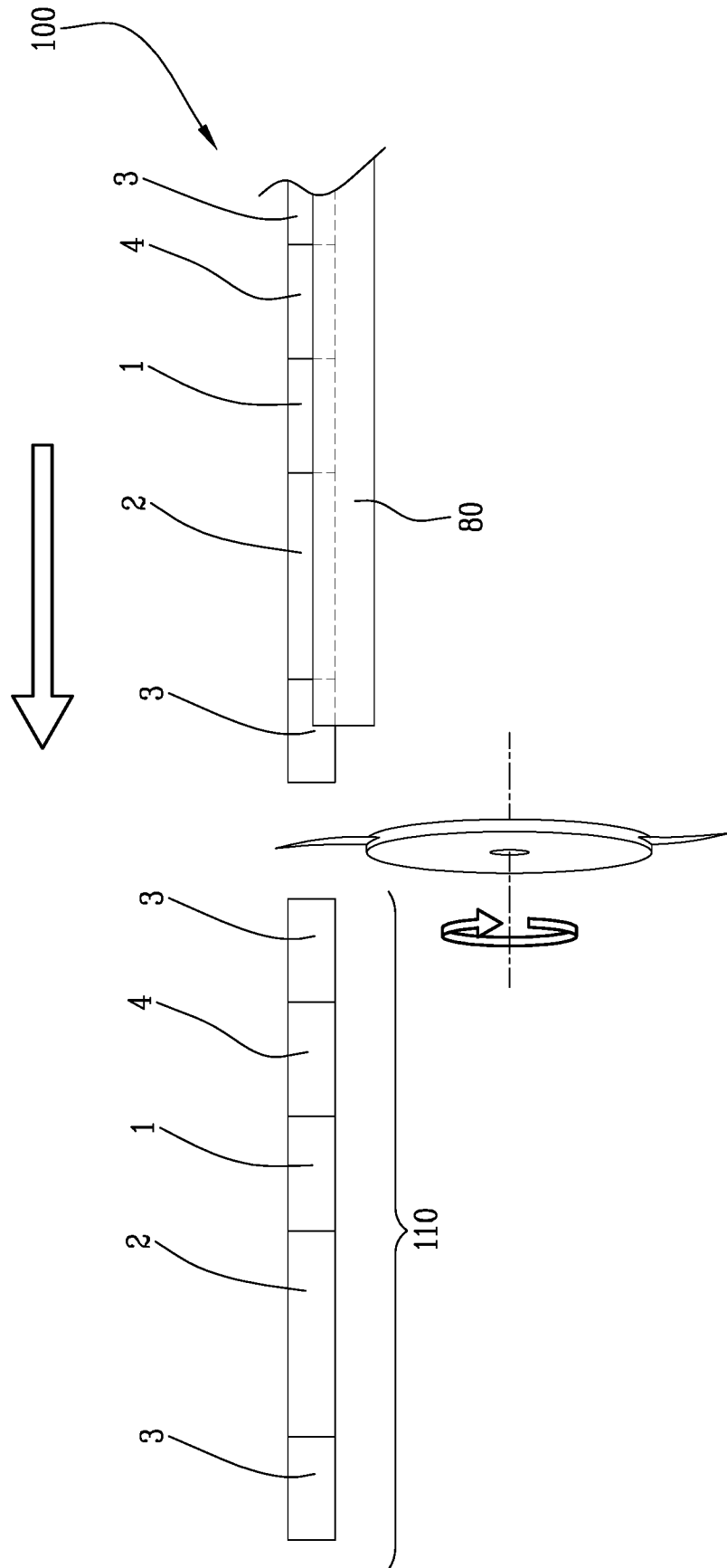


Fig.2D

Fig. 3



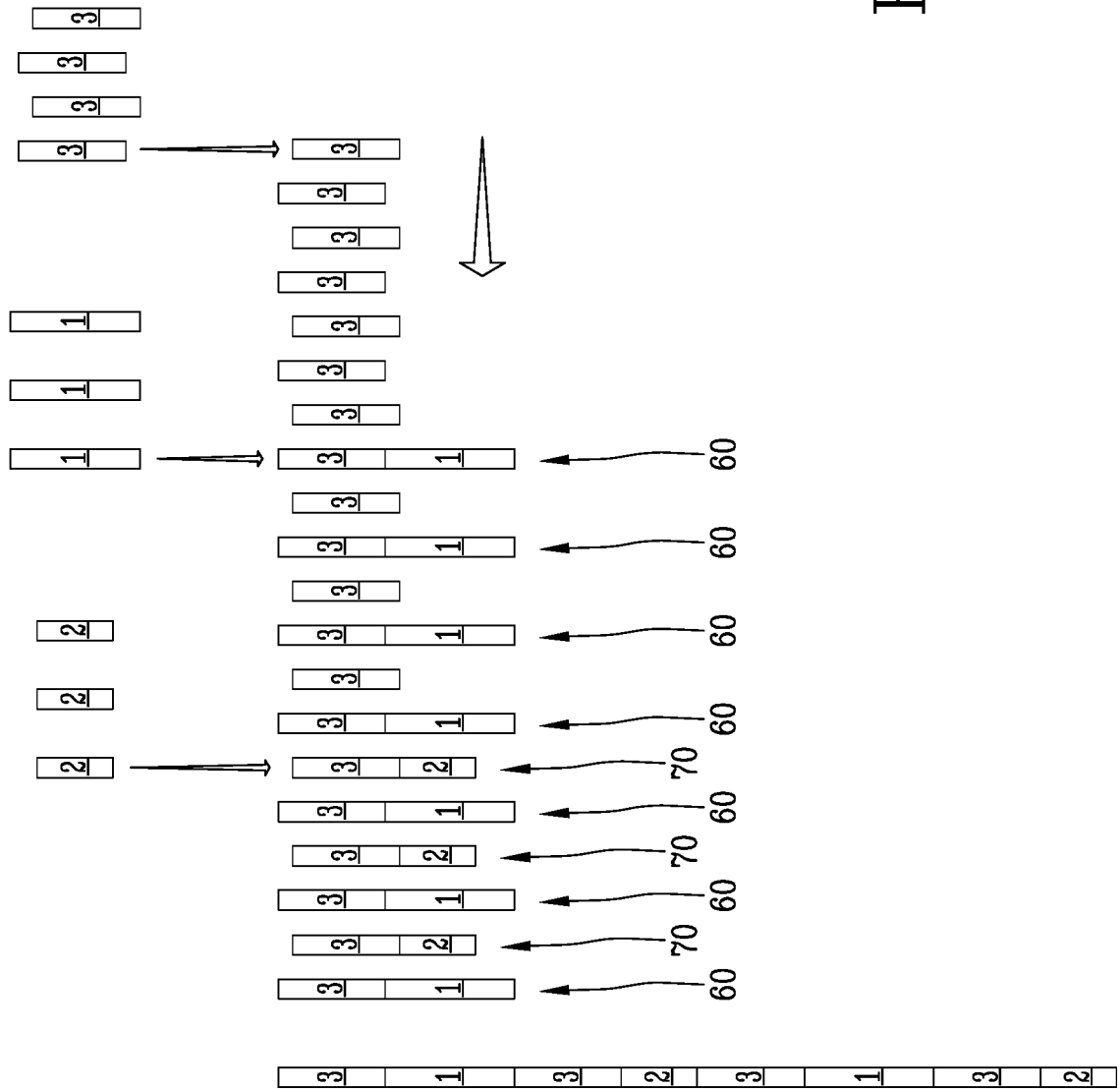


Fig. 4

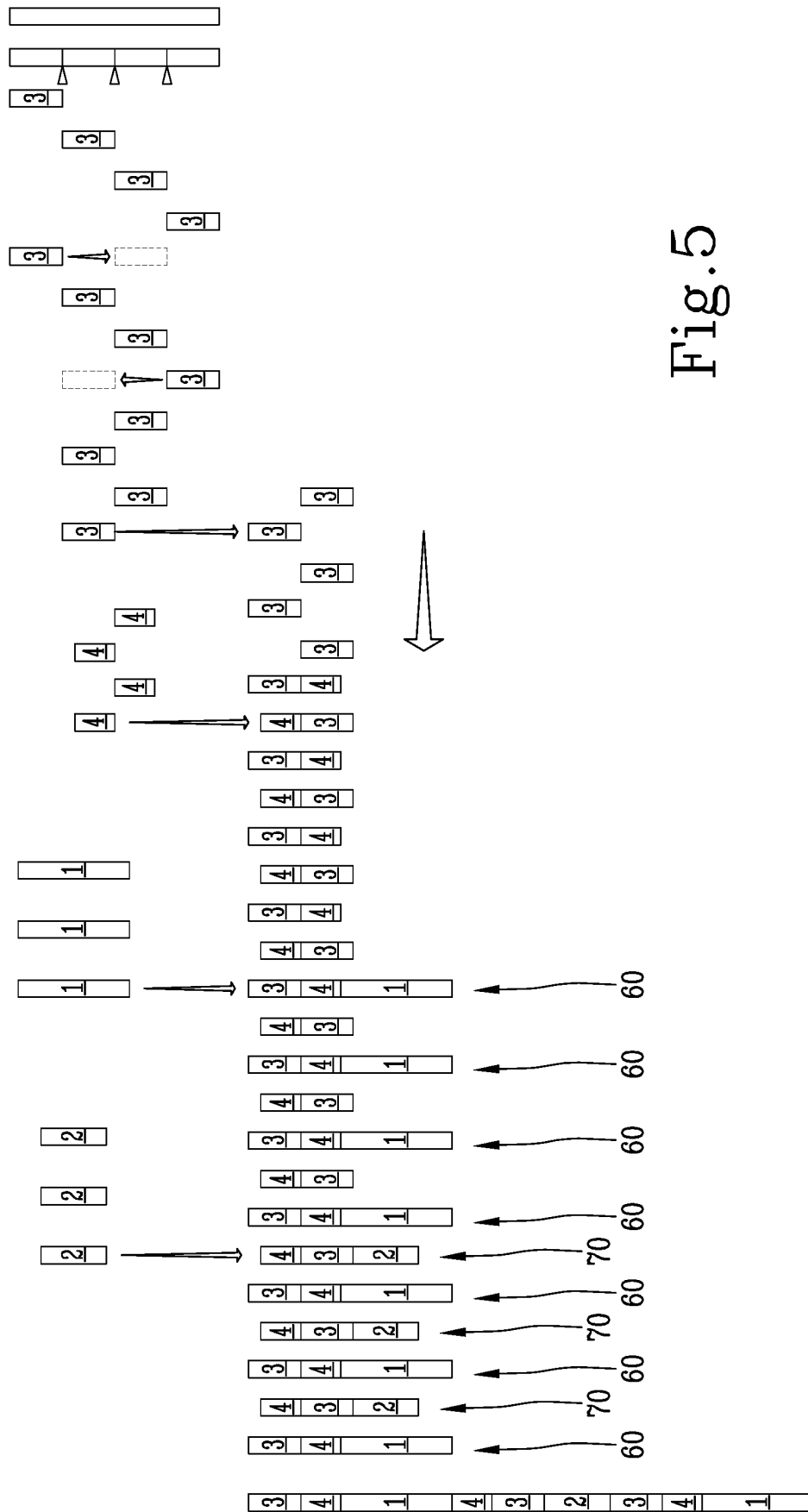


Fig.5

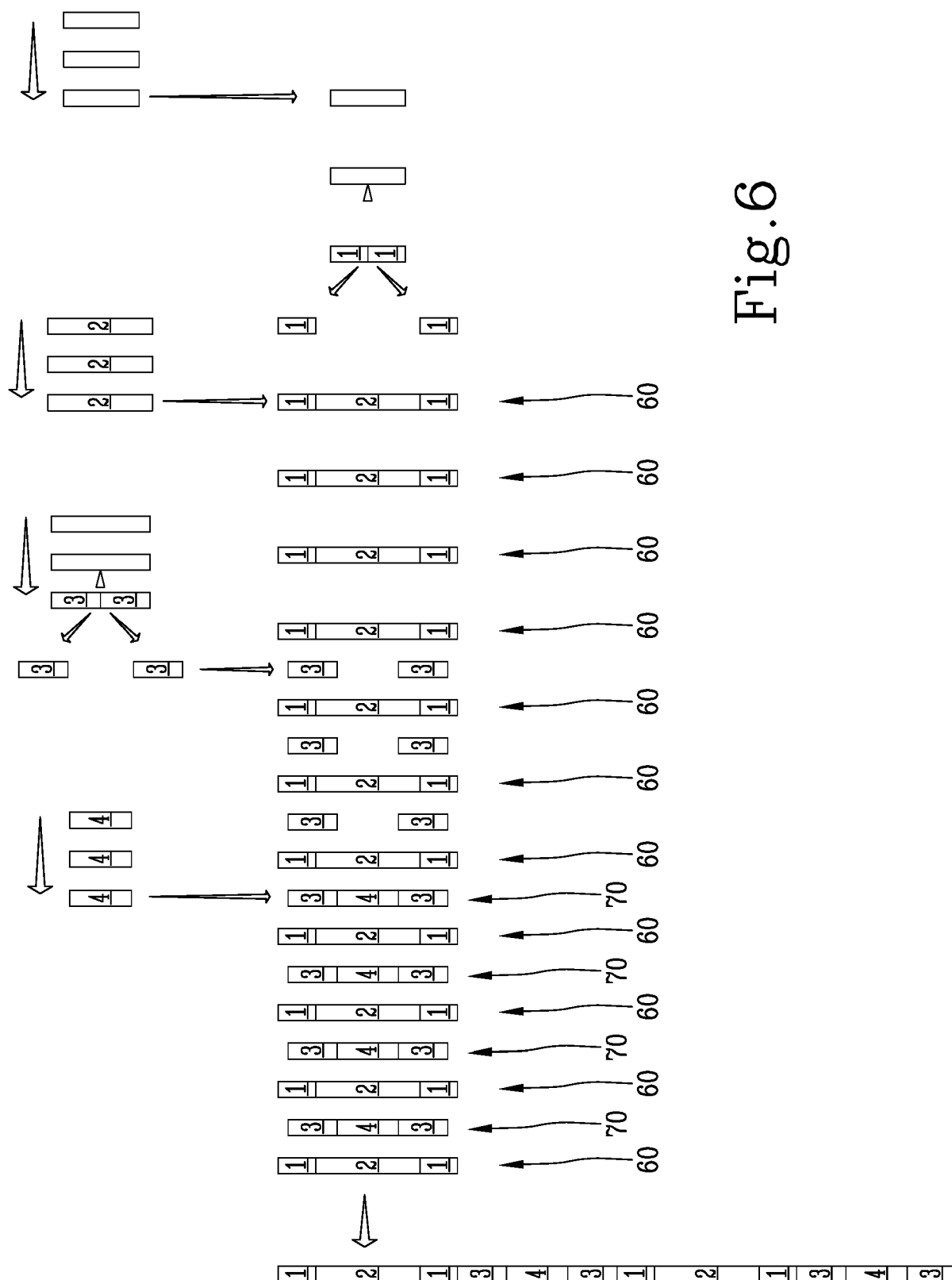
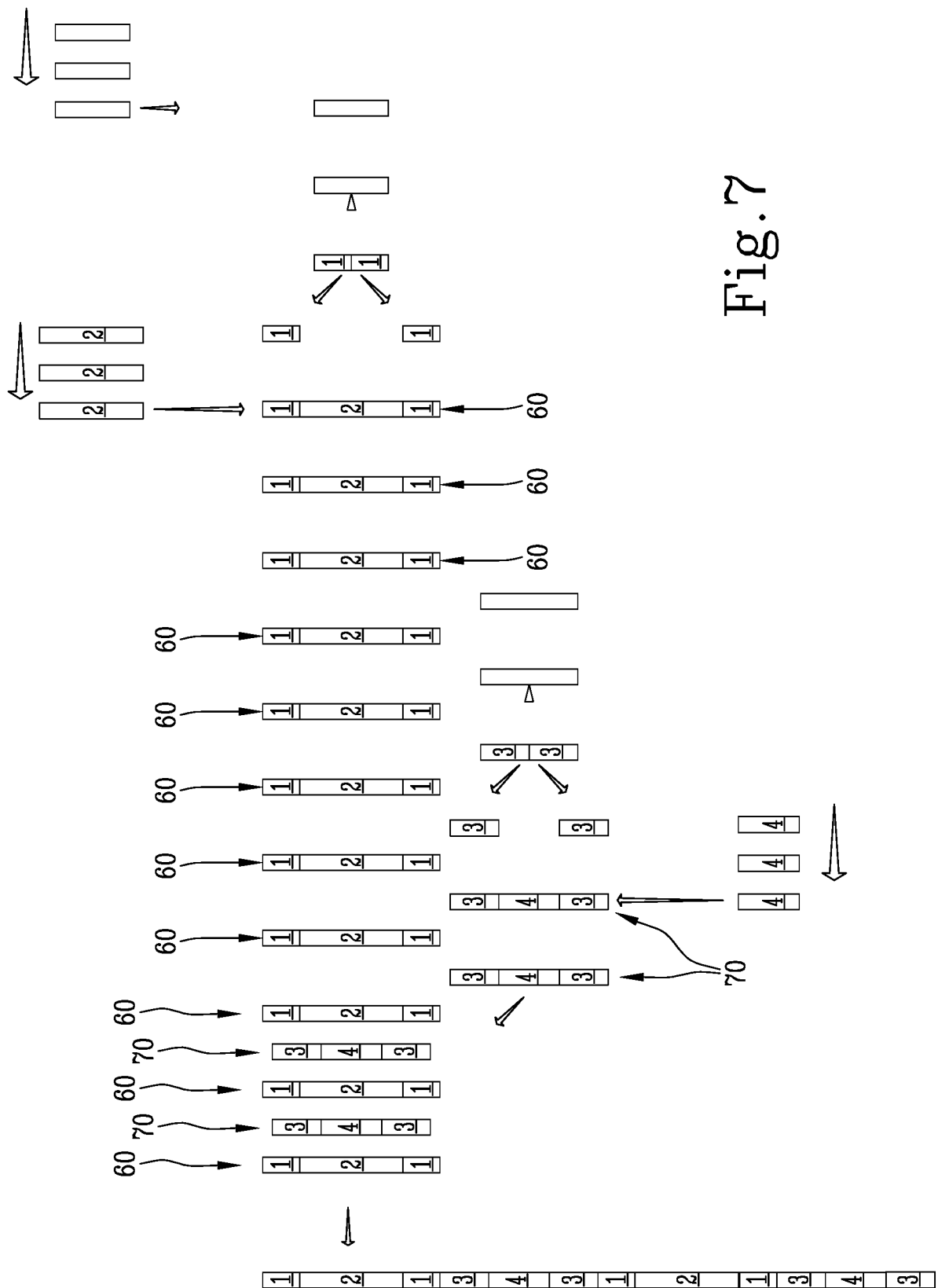


Fig. 6



# Fi. 2

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- EP 1393640 A [0002]