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(54) A MANUFACTURING MACHINE FOR PRODUCING A STRAND OF MATERIAL FOR A SMOKING ARTICLE AND A RELATED METHOD

(57) A manufacturing machine (100) for producing a strand of material (M) for a smoking article, wherein the manufacturing machine comprises: a feeding unit (101), a processing unit (102) and a forming unit (103) configured to form a continuous material strand by gathering the web material (M) received by the processing unit (102). The web material (M) is moved longitudinally along an advancing path (AP) defined between an inlet station (SI) of the feeding unit (101), in correspondence of which the web material (M) enters into the manufacturing machine (100) and an outlet station (SO) of the forming unit (103) in correspondence of which the continuous material strand exits from the manufacturing machine (100); wherein the advancing path (AP) defines an advancing direction (AD) of the web material (M). The manufacturing machine comprises a transport support (105) comprising in turn a flat support for supporting the web material (M), which is arranged thereon, and which is stacked on at least one stack (1) arranged on the transport support (105). The web material (M) comprises a plurality of folds which extends transversally, in particular orthogonally, to the longitudinal extension (L) of the web material (M); each fold is made in alternating opposite folding directions (FD), so that two subsequent layers obtained by folding the web are parallel to each other.

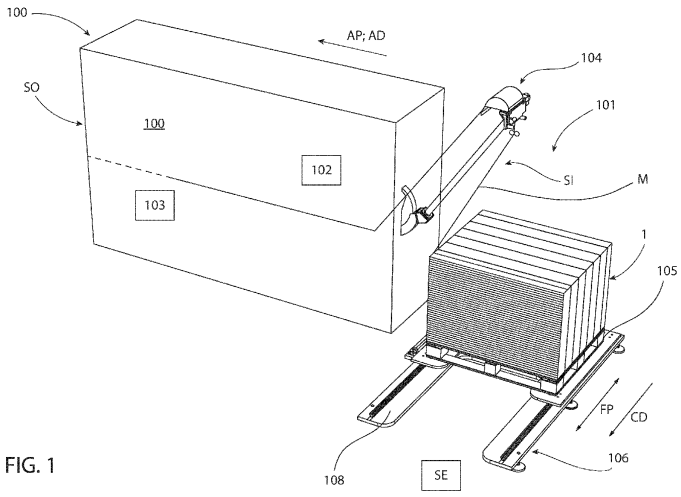

FIG. 1

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Description

PRIOR ART

[0001] In the tobacco industry, in particular in the field of filter making machines, typically a web material is fed by unwinding the material itself from a bobbin. Bobbin are elements, wherein the web material is wound neatly on a support (generally made up of a tube) in shapes that vary, depending on the purpose, from cylindrical to truncated cone shape. However, bobbins have the disadvantage that only a limited quantity (ion particular length) of web material can be wound on it. Therefore, many machine stops are requested for splicing the web material. During the splice of the material an end of the currently used bobbin is spliced with an end of a new bobbin which replace the coil that is about to end. The splicing of the web material requires, however, unwanted machine downtimes, with a consequent drop in the productivity of the machine itself.

[0002] In addition, the products produced with the web material comprising the spliced portions of the two webs, are typically discarded.

DESCRIPTION OF THE INVENTION

[0003] The aim of the present invention is to provide a manufacturing machine for producing a strand of material for a smoking article and a related method, which are without the drawbacks described above and which are easy and economical to implement.

[0004] According to the present invention, a manufacturing machine for producing a strand of material for a smoking article, according to what is claimed in the appended claims is furnished.

[0005] According to another aspect of the present invention, method of producing said material strand, according to what is claimed in the appended claims is furnished.

[0006] The claims describe preferred embodiments of the present invention forming an integral part of the present description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The present invention will now be described with reference to the attached drawings, which illustrate some non-limiting embodiments thereof, wherein:

- Figure 1 is a schematic perspective view (with parts removed for clarity) of a manufacturing machine according to a first embodiment of the present invention;
- Figure 2 is a schematic front view (with parts removed for clarity) of the manufacturing machine of figure 1;
- Figures 3 and 4 are two lateral views (with parts removed for clarity) of the manufacturing machine of figure 1, with the transport support in two different positions;
- Figures 5 and 6 are two top views (with parts removed for clarity) of the manufacturing machine of figures 3 and 4;
- Figures 7 and 8 are two schematic top view (with parts removed for clarity) of the manufacturing machine according to a second embodiment of the present invention, with the transport support in two different positions;
- Figure 9 is a schematic view of a possible material feeding of the manufacturing machine of figures 7 and 8; and
- Figure 10 is an enlarged view of a part of figure 9.

PREFERRED EMBODIMENTS OF THE INVENTION

[0008] In Figure 1, number 100 denotes, as a whole, a manufacturing machine for producing a strand of material M for a smoking article, in particular for producing a subunit of the smoking article. Preferably, the manufacturing machine 100 is a filter making machine configured to produce at least a segment of a filter (subunit) of the smoking article. According to a possible alternative embodiment, the manufacturing machine 100 is a maker machine configured to produce at least a segment (subunit) comprising tobacco or a substrate forming aerosol.

[0009] Preferably the subunit is achieved by cutting a continuous material strand produced by the manufacturing machine 100. The manufacturing machine 100 comprises a feeding unit 101, a processing unit 102 and a forming unit 103.

[0010] In the attached figures, which are schematically the fed material M is illustrated at least partially with a line. It is understood that the fed material M has dimensions (in particular thickness and depth) ; both measured orthogonal to its longitudinal extension L which, on the contrary, as illustrated, are not null.

[0011] The feeding unit 101 comprises a feeding head 104 configured to draw the material M from a transport support 105. The transport support 105 is configured to be fed to the manufacturing machine 100 of the tobacco industry through a conveying unit 106. The transport support 105 is configured to feed the material M to the manufacturing machine 100. Advantageously, but not limitedly, the transport support 105 being a pallet (also known as skid or storage rack).

[0012] The processing unit 102 is configured to receive the web material M from the feeding unit 101 and to process the web material M. In particular, the processing unit 102 is configured to subject the material M to treatments in preparation of its gathering for forming the continuous material strand (as disclosed in detail below).

[0013] In particular, the processing unit 102 comprises a crimping device (of known type and not further described or illustrated).

[0014] The forming unit 103 is arranged downstream to the processing unit 102. The forming unit 103 is config-

ured to receive the web material M from the processing unit 102. The forming unit 103 comprises a forming device configured to form a continuous material strand by gathering the web material M received by the processing unit 102. The forming device is of the known type and comprises a forming beam configured to gather the web material M which passes into it and preferably to wrap the continuous material strand with a paper strip so as to achieve a wrapped continuous material strand.

[0015] The web material M is moved longitudinally along an advancing path AP defined between an inlet station SI of the feeding unit 101, in correspondence of which the web material M enters into the manufacturing machine 100 and an outlet station SO of the forming unit 103 in correspondence of which the continuous material strand exits from the manufacturing machine 100. The advancing path AP defines an advancing direction AD of the web material M.

[0016] The manufacturing machine 100 comprises the transport support 105 comprising in turn a flat support for supporting the web material M, which is arranged thereon (i.e., on the flat support) and which is stacked on at least one stack 1 arranged on the transport support 105.

[0017] The web material M comprises a plurality of folds defined by folding lines 3, which extends transversally, in particular orthogonally, to the longitudinal L extension of the web material M. Each fold is made in alternating opposite folding directions FD, so that two subsequent layers obtained by folding the web M are parallel to each other. In other words, the web material M, is "zig-zag" folded. Two subsequent layers obtained by folding the material M are superimposed on top of each other. As illustrated in the attached figures, the stacks 1 are arranged on the transport support 105. The transport support 105 comprises preferably more than one stack 1 of material M.

[0018] In particular, in the figures, each transport support 105 is provided with six stacks 1 arranged on it. The material M being continuous between all stacks 1 arranged on the transport support 105 itself. In other words, a first end, in particular the terminal end (not illustrated in detail), of a stack 1 is connected with another end, in particular the initial end (not illustrated in detail), of an adjacent second stack 1, so that the material M of all the stacks 1 of the same transport support 105 being continuous (namely, without interruption).

[0019] The feeding unit 101 comprises the conveying unit 106 provided with a conveying device 108 on which the transport support 105 is configured for being moved along a feeding path FP transversal, in particular orthogonal, with respect to the longitudinal extension L of the web material M and passing by the inlet station SI of the feeding unit 101. In particular, the feeding path is defined between a storage station SS (which is optionally and is schematically indicated in the attached figures) of the manufacturing machine 100, in which the transport supports 105 are stored before being used, and the inlet station SI; and vice versa. The feeding path FP defines a conveying direction CD of the conveying device 108 (and thus of the transport support 105) . As illustrated in the attached figures, the web material M (namely the stacks 1 of web material M) is arranged on the transport support 105, in particular fed along the feeding path FP, with its longitudinal extension L that is transversal, in particular orthogonal, to the conveying direction CD; while the web material M is fed in the inlet station SI to the processing unit 102 in the advancing direction AD parallelly to its longitudinal extension L.

[0020] In other words, the web material M is fed transversally along the feeding path FP and longitudinally along the advancing path AP. In correspondence of the inlet station SI (which is shared between the feeding path FP and the advancing path AP) the feeding path FP and the advancing path AP are transversally, in particular orthogonal one to the other. The conveying unit 106 feeds one transport support 105 (as illustrated in figures 1-6) or more than one transport support 105 (as illustrated in figures 7-9). The conveying device 108 is conveyed on the feeding path FP in a stepwise manner. In other words, at least one transport support 105 is conveyed on the feeding path FP, each of which is fed stepwise (i.e., a law of motion that provides for a cyclical alternation of advancing and resting). In particular, the conveying unit 106 is configured to advance the transport support 105 along the feeding path FP so as to alternate cyclically along the conveying direction CD:

- the resting, in which the first stack 1 from which the web material M is fed is already in the inlet station SI and wherein the longitudinal extension L of the web material M in correspondence of the inlet station SI is aligned with to the advancing direction AD; and
- an advancing, occurring when the first stack 1 is finished (substantially finished) and the successive second stack 1, from which the material M has to be fed, has to be moved to inlet station SI, with its longitudinal extension L (namely of the second stack 1) aligned with the advancing direction AD of the web material M into the manufacturing machine 100.

[0021] In other words, the conveying unit 106 is configured to move the transport support 105 arranged in correspondence of the inlet station SI from a first working position (for example the position illustrated in figures 3 and 5), in which the web material M is taken from a first stack 1 arranged on the transport support 105, to a second working position (not illustrated), in which the web material M is taken from a second stack 1 of web material M arranged on the transport support 105, so as that the longitudinal extension L of the web material M is aligned with a feeding direction FD of the feeding unit 101. The two stacks 1 are adjacent to each other and are arranged on the same transport support 105. According to one of the illustrated embodiment, which are not limitative, the two stacks 1 are arranged on the same transport support 105 and the conveying unit 106 is configured

to alternate the resting and advancing movement of the transport support 105 for passing from drawing the web material M from the first stack 1 to drawing the web material M from the second stack 1, which is arranged downstream (in the conveying direction CD) to the first stack 1.

[0022] Advantageously, but not limitedly, the manufacturing machine 100 comprises a sensor 109 configured to detect the filling level of the first stack 1 from which the web material M is actually fed. Preferably, the sensor 109 is arranged on the feeding head 104. The sensor 109 could be a sensor using a laser beam for detecting the filling level of the stack 1. For example, the laser beam is configured to measure the height (namely the distance from the floor) of an upper edge of the web material M.

[0023] Advantageously, but not limitedly, the conveying unit 106 is configured to command the advancing of the transport support 105, if the sensor 109 detects that the web material M of the first stack 1 is substantially empty, so as to guarantee that the longitudinal extension L of the web material M of the second stack 1 is aligned with the advancing direction AD.

[0024] Advantageously, but not limitedly, the conveying device 108 comprises a conveyor belt or linear guides or a roller conveyor.

[0025] According to the embodiment of figures 7-9, which is not limitative, the conveying device 108 is configured to move along the feeding path FP at least two transport support 105 (in particular, three transport support 105). Advantageously, but not limitedly, the manufacturing machine 100 comprises a sensor 110 configured to detect whether the web material M of the first transport support 105 and the web material M of the second transport support 105 are connected to each other.

[0026] In particular, in the case were the conveying device 108 is configured to move along the feeding path FP at least two transport support 105, the sensor 110 detects whether the web material M of the first transport support 105 and the web material of the second transport support 105 are connected to each other.

[0027] Preferably the sensor 110 is arranged on the feeding head 104. The sensor 110 could be a sensor using a laser beam for detecting the splicing of the stacks 1.

[0028] Advantageously, but not limitedly, the manufacturing machine 100 comprises a splicing device (of known type and not further described or illustrated) configured to splice automatically or semi automatically the web material M of the first transport support 105 with the web material M of the second transport support 105, if the sensor 110 detects that the terminal ends are not already spliced. According to an alternative embodiment, the splicing can be made manually. In this case, if the sensor 110 detects that the ends are not spliced, the manufacturing machine 100 is configured to reduce the speed so as to permit a manual or semiautomatic splice.

[0029] Advantageously, the manufacturing machine 100 comprise a splicing preparation unit (not illustrated) in which at least one (preferably both) of the two webs M that have to be spliced is subjected to a preliminary process such as trimming and/or the application of a jointing adhesive. Advantageously, the manufacturing machine 100 comprises also further sensor such as: sensors configured to detect the splicing seam of the material M, which will successively discharged. The sensor could detect the splicing seam by measuring the thickness of the material M or by measuring the transparency of the material.

[0030] According to a possible not limitative embodiment (partially illustrated in the embodiment of figures 7-9), the conveying device 108 defines a closed feeding path FP and is movable along one conveying direction CD. A "closed path" is a path in which the beginning and the end coincide. Therefore, the conveying direction CD is a single direction. Each empty transport support 105 is moved forwards along the conveying direction CD to an extraction station SE in which the empty transport support 105 is extracted (i.e., removed) from the feeding path FP, while it is replaced by a new one. In particular, figures 7 and 8 illustrate two opposite conveying directions CD and therefore the extraction station SE could be arranged as illustrated in figure 7 or as illustrated in figure 8. In both cases, the extraction station SE is arranged downstream to the inlet station SI.

[0031] According to a possible embodiment, in the extraction station SE the transporting structure is removed laterally (i.e., orthogonally to the conveying direction CD, for example by a pushing member.

[0032] According to an alternative not limitative embodiment (illustrated in figures 1-6), the conveying device 108 defines a non-closed feeding path FP. A "non closed path" is a path defined by a segment of conveying device 108, wherein the beginning and the end are different (i.e., they do not coincide). Therefore, the conveying directions CD are two, one opposing the other. In particular, each transport support 105 is movable along the first conveying direction CD for feeding the web material M to the manufacturing machine 100 by drawing from a first transport support 105; and along a second conveying direction CD (which is opposite to the first conveying direction CD) in particular for positioning a second transport support 105 which is new. In other words, the conveying device 108 moves along the first conveying direction CD by feeding the web material M and along the second conveying direction CD (which is opposite) to bring a new transport support 105 in position, so that the longitudinal extension L of the web material M is aligned with the advancing direction AD.

[0033] According to an additional aspect of the present invention, a method of producing a strand of material for a smoking article, is provided.

[0034] Advantageously but not limitedly, the method is carried out by the manufacturing machine 100 previously described.

[0035] The method mainly comprises (but not exclu-

sively) the steps of:

- providing the web material M, arranged on a flat support a of a transport support 105, which is stacked on at least one stack 1 and comprises a plurality of folds defined by folding lines 3 which extends transversally, in particular orthogonally, to the longitudinal extension L of the web material M; each fold is made in alternating opposite folding directions FD, so that two subsequent layers obtained by folding the web are parallel to each other;
- feeding the web material M through the feeding unit 101 comprising a feeding head 104 configured to draw the web material M from the transport support 105;
- processing the web material M through a processing unit 102 configured to receive the web material M from the feeding unit 101 and to process the web material M;
- forming the continuous material strand through the forming unit 103 by gathering the web material M through the forming device of the forming unit 103;
- moving the web material M longitudinally along the advancing path AP defined between the inlet station SI of the feeding unit 101, in correspondence of which the web material M enters into the manufacturing machine 100 and an outlet station SO of the forming unit 103 in correspondence of which the continuous material strand exits from the manufacturing machine 100; wherein the advancing path AP defines the advancing direction AD of the web material M

[0036] The web material M is fed in correspondence of the inlet station SI to the processing unit 102 along the advancing direction AD parallelly to its longitudinal extension L. Advantageously, but not limitedly, the method comprises a step of providing the transport support 105 on a conveying device 108 of a conveying unit 106 and moving the conveying device 108 (in particular the transport support 105 arranged on it) along the feeding path FP transversally, in particular orthogonal, with respect to the longitudinal extension (L) of the web material (M) and passing by the inlet station SI. In particular, if the storage station is present (which is optionally), the feeding path is defined between the storage station SS, in which the transport supports 105 are stored before being used, and the inlet station SI of the feeding unit 101, in which the web material M enters the manufacturing machine 100. The feeding path FP defines the conveying direction CD of the transport support 105. Preferably, as disclosed before, the moving step comprises the feeding of the web material M on the feeding path FP with its longitudinal extension L that is transversal, in particular orthogonal, to the conveying direction CD; while the web material M is fed in correspondence of the inlet station SI to the processing unit 102 along the advancing direction AD parallelly to its longitudinal extension (L). In other words, the advancing direction AD, is parallel to the longitudinal extension L of web material M when moved along the advancing direction itself.

[0037] Advantageously, but not limitedly, the method (in particular the moving step of the conveying device 108) comprises a further step of feeding stepwise (namely in a stepwise manner) the conveying device 108 (in particular the at least one transport support 105 fed by the conveying device 108). In particular, the at least one transport support 105 occurs stepwise for alternating cyclically along the conveying direction CD:

- a resting, in which the first stack 1 from which the web material M is fed is already in the inlet station SI and wherein the longitudinal extension L of the web material M in correspondence of the inlet station SI corresponds to the advancing direction AD; and
- an advancing for arranging the successive second stack 1, from which the material M has to be fed, in correspondence of the inlet station SI, with its longitudinal extension L aligned with the advancing direction AD of the web material M into the manufacturing machine 100.

[0038] Advantageously, but not limitedly, the method comprises a detecting step to detect the filling level of the stack 1 from which the web material M is actually fed and in which the advancing of the transport support 105 along the feeding path FP occurs if during the detecting step is detected that the web material M of the stack 1 from which the web material M is actually fed is substantially empty.

[0039] In particular, the detecting step is executed by the sensor 109 that detects the filling level of the first stack 1 from which the web material M is actually fed. In particular, the advancing step of the transport support 105 along the feeding path FP occurs if during the first detecting step the sensor 109 detects that the web material M of the first stack 1 is substantially empty, so as to guarantee that the longitudinal extension L of the web material M of the second stack 1 is aligned with the advancing direction AD.

[0040] Preferably the advancing of the transport structure 5 occurs after the emptiness of the stack 1 is detected.

[0041] Preferably during the advancing of the transport support 105 (independently if a splicing step has to be carried out or not), the manufacturing machine 100 temporarily slows down its speed, until the new stack 1 is positioned in the correct position (i.e., with its longitudinal extension L aligned with the advancing direction AD).

[0042] Advantageously, but not limitedly, the method comprises a detecting step to detect if the web material M of the first transport support 105 and the web material of the second transport support 105 are connected to each other.

[0043] In particular, in the case the conveying device 108 is configured to move at least two transport supports 105 along the feeding path FP, the method could com-

prise the step if detect if the web material M of the first transport support 105 and the web material of the second transport support 105 are connected to each other.

[0044] Advantageously, but not limitedly, the method comprises a splicing step in which the web material M of the first transport support 105 and the web material M of the second transport support 105 are connected to each other. The splicing step can be carried out manually; or semiautomatically or automatically by the splicing device of the manufacturing machine 100.

[0045] The present invention has a plurality of advantages. Firstly, the invention permits to store a high quantity of web material M neatly arranged in overlapping layers, and at the same time reducing the space requirements as much as possible. In other words, with the same dimensions as known feeding opportunities, like the feeding from bobbin, a higher quantity of material M can be fed.

[0046] Secondly, the present invention permits to reduce the splicing of the web material M. In particular, the present invention requires a splice of the web material M only for connecting two web materials M of two different transport supports 105. Typically, the splice will be made when the actual transport support 105 from which the web material M is drawn is about to end. No splicing between adjacent stacks 1 of the same transport support 105 are needed.

[0047] The advancing of the transport support 105 along the feeding path FP permits to feed the web material M perfectly aligned with the advancing direction AD, so as to avoid unwanted twists of the web material M.

[0048] Therefore, the web material M is fed to the processing unit 102 without creating undesired folds, which would lead to a non-optimally processed web material M.

[0049] In addition, the invention has the advantage that the feeding head 104 is fixed (i.e., does not change its position over time), while only the conveying unit 106 (in particular its conveying device 108) moves (in particular, translates). Therefore, the positioning of the web material M in correspondence of the inlet station SI is more accurate.

LIST OF FIGURE REFERENCE NUMBERS

[0050]

1 stack
3 folding lines
100manufacturing machine
101 feeding unit
102processing unit
103 forming unit
104 feeding head
105transport support
106 conveying unit
108 conveying device
109 sensor
110 sensor
AP advancing path
AD advancing direction
CD conveying direction
FD folding direction
FP feeding path
L longitudinal extension
M material
SE extraction station
SI inlet station
SO outlet station
SS storage station

Claims

1. A manufacturing machine (100) for producing a strand of material (M) for a smoking article, wherein the manufacturing machine comprises:

   a feeding unit (101) comprising a feeding head (104) configured to draw a web material (M) from a transport support (105);
   a processing unit (102) configured to receive the web material (M) from the feeding unit (101) and to process the web material (M); and
   a forming unit (103) configured to receive the web material (M) from the processing unit (102);
   the forming unit (103) comprises a forming device configured to form a continuous material strand by gathering the web material (M) received by the processing unit (102);
   wherein the web material (M) is moved longitudinally along an advancing path (AP) defined between an inlet station (SI) of the feeding unit (101), in correspondence of which the web material (M) enters into the manufacturing machine (100), and an outlet station (SO) of the forming unit (103) in correspondence of which the continuous material strand exits from the manufacturing machine (100); wherein the advancing path (AP) defines an advancing direction (AD) of the web material (M);
   the manufacturing machine (100) is **characterized by** comprising a transport support (105) comprising in turn a flat support for supporting the web material (M), which is arranged thereon and which is stacked on at least one stack (1) arranged on the transport support (105); the web material (M) comprises a plurality of folds which extends transversally, in particular orthogonally, to the longitudinal extension (L) of the web material (M) ; each fold is made in alternating opposite folding directions (FD), so that two subsequent layers obtained by folding the web are parallel to each other.

2. The manufacturing machine (100) according to claim

1, wherein the feeding unit (101) comprises a conveying unit (106) provided with a conveying device (108) on which the transport support (105) is configured for being moved along a feeding path (FP) transversal, in particular orthogonal, with respect to the longitudinal extension (L) of the web material (M) and passing by the inlet station (SI) of the feeding unit (101); wherein the feeding path (FP) defines a conveying direction (CD) of the conveying device (108).

3. The manufacturing machine (100) according to claim 2, wherein the web material (M) is arranged on the transport support (105) with its longitudinal extension (L) that is transversal, in particular orthogonal, to the conveying direction (CD); while the web material (M) is fed in correspondence of the inlet station (SI) to the processing unit (102) along advancing direction (AD) parallelly to its longitudinal extension (L).

4. The manufacturing machine (100) according to any previous claim, wherein on the transport support (105) are arranged more than one stack (1) of web material (M), each arranged adjacent one to the other; wherein each stack (1) comprises a first end, in particular an initial end, and a second end, in particular terminal end; wherein the first end of a first stack (1) of the transport support (105) is connected to the second end of the adjacent successive second stack (1) of the same transport support (105), so that the web material (M) arranged on each transport support (105) is continuous between all stacks (1) of the transport support (105) itself.

5. The manufacturing machine (100) according to claim 4, wherein the conveying unit (106) is configured to advance the at least one transport support (105) so as to alternate cyclically along the conveying direction (CD):

a resting, in which the first stack (1) from which the web material (M) is fed is already in the inlet station (SI) and wherein the longitudinal extension (L) of the web material (M) in correspondence of the inlet station (SI) is aligned with the advancing direction (AD); and
an advancing for arranging the successive second stack (1), from which the material (M) has to be fed, in correspondence of the inlet station (SI), with its longitudinal extension (L) aligned with the advancing direction (AD) of the web material (M) into the manufacturing machine (100).

6. The manufacturing machine (100) according to claim 4 or 5, comprising a first sensor (109) configured to detect the filling level of the first stack (1) from which the web material (M) is actually fed; preferably the first sensor (109) is arranged on the feeding head (104).

7. The manufacturing machine (100) according to claim 6, wherein the conveying unit (106) is configured to advance the transport support (105) along the feeding path (FP), if the first sensor (109) detects that the web material (M) of the first stack (1) is substantially empty, so as to guarantee that the longitudinal extension (L) of the web material (M) of the second stack (1) is aligned with the advancing direction (AD).

8. The manufacturing machine (100) according to claims 2 to 7, wherein the conveying device (108) is configured to move along the feeding path (FP) at least two transport support (105); the manufacturing machine (100) comprising a second sensor (110) configured to detect whether the web material (M) of the first transport support (105) and the web material (M) of the second transport support (105) are connected to each other; preferably the second sensor (110) is arranged on the feeding head (104).

9. The manufacturing machine (100) according to claim 8, comprising a splicing device configured to splice the web material (M) of the first transport support (105) with the web material (M) of the second transport support (105).

10. The manufacturing machine (100) according to any previous claim from 2 to 9, wherein the conveying device (108) defines a closed feeding path (FP) and is movable along one conveying direction (CD); and wherein each empty transport support (105) is moved forwards along the conveying direction (CD) to an extraction station (SE) in which the empty transport support (105) is removed, while it is replaced by a new one.

11. The manufacturing machine (100) according to any previous claim from 2 to 9, wherein the conveying device (108) defines a non-closed feeding path (FP) and is movable along a first conveying direction (CD), for feeding the web material (M) to the manufacturing machine (100) by drawing from a first transport support (105) and along a second conveying direction opposite to the first conveying direction (CD).

12. A method of producing a strand of material (M) for a smoking article, in particular with a manufacturing machine (100) according to any previous claim from 1 to 11; the method comprises the steps of:

- providing a web material (M), arranged on a flat support a of a transport support (105), which is stacked on at least one stack (1) and comprises a plurality of folds defined by folding lines (3)

which extends transversally, in particular orthogonally, to the longitudinal extension (L) of the web material (M); each fold is made in alternating opposite folding directions (FD), so that two subsequent layers obtained by folding the web are parallel to each other;
- feeding the web material (M) through a feeding unit (101) comprising a feeding head (104) configured to draw the web material (M) from the transport support (105);
- processing the web material (M) through a processing unit (102) configured to receive the web material (M) from the feeding unit (101) and to process the web material (M);
- forming a continuous material strand through a forming unit (103) by gathering the web material through a forming device of the forming unit (103); and
- moving the web material (M) longitudinally along an advancing path (AP) defined between an inlet station (SI) of the feeding unit (101), in correspondence of which the web material (M) enters into the manufacturing machine (100), and an outlet station (SO) of the forming unit (103) in correspondence of which the continuous material strand exits from the manufacturing machine (100); wherein the advancing path (AP) defines an advancing direction (AD) of the web material (M);

wherein the web material (M) is fed in correspondence of the inlet station (SI) to the processing unit (102) along the advancing direction (AD) parallelly to its longitudinal extension (L).

13. The method according to claim 12, comprises the further step of:

providing the transport support (105) on a conveying device (108) of a conveying unit (106); and
moving the conveying device (108) along a feeding path (FP) transversally, in particular orthogonal, with respect to the longitudinal extension (L) of the web material (M) and passing by the inlet station (SI) of the feeding unit (101); wherein the feeding path (FP) defines a conveying direction (CD) of the transport support (105); in particular, wherein the web material (M) is moved of the feeding path (FP) with its longitudinal extension (L) that is transversal, in particular orthogonal, to the conveying direction (CD).

14. The method according to claim 12 or 13, in which the step of moving the conveying device (108) comprises a further step of conveying the conveying device (108) on the feeding path (FP) in a stepwise manner.

15. The method according to claim 14, wherein:

- the step of providing the web material (M) comprises the step of providing a web material (M) which is stacked on more than one stack (1), each arranged adjacent one to the other; wherein each stack (1) comprises a first end, in particular an initial end, and a second end, in particular terminal end; wherein the first end of a first stack (1) of the transport support (105) is connected to the second end of the adjacent successive second stack (1) of the same transport support (105), so that the web material (M) arranged on each transport support (105) is continuous between all stacks (1) of the transport support (105) itself;
- the step of moving the conveying device (108) is executed in order to advance the at least one transport support (105) so as to alternate cyclically along the conveying direction (CD) :

a resting, in which a first stack (1) from which the web material (M) is fed is already in the inlet station (SI) and wherein the longitudinal extension (L) of the web material (M) in correspondence of the inlet station (SI) is aligned with the advancing direction (AD); and
an advancing for arranging a successive second stack (1), from which the material (M) has to be fed, in correspondence of the inlet station (SI), with its longitudinal extension (L) aligned with the advancing direction (AD) of the web material (M) into the manufacturing machine (100).

16. The method according to claim 15, comprising a detecting step to detect the filling level of the stack (1) from which the web material (M) is actually fed and in which the advancing of the transport support (105) along the feeding path (FP) occurs if during the detecting step is detected that the web material (M) of the stack (1) from which the web material (M) is actually fed is substantially empty.

17. The method according to any previous claim from 12 to 16, wherein the conveying device (108) is configured to move along the feeding path (FP) at least two transport supports (105); and wherein the method comprises a splicing step in which the web material (M) of the first transport support (105) and the web material (M) of the second transport support (105) are connected to each other; in particular, the method comprises a step of detecting whether the web material (M) of the first transport support (105) and the web material of the second transport support

(105) are connected to each other.

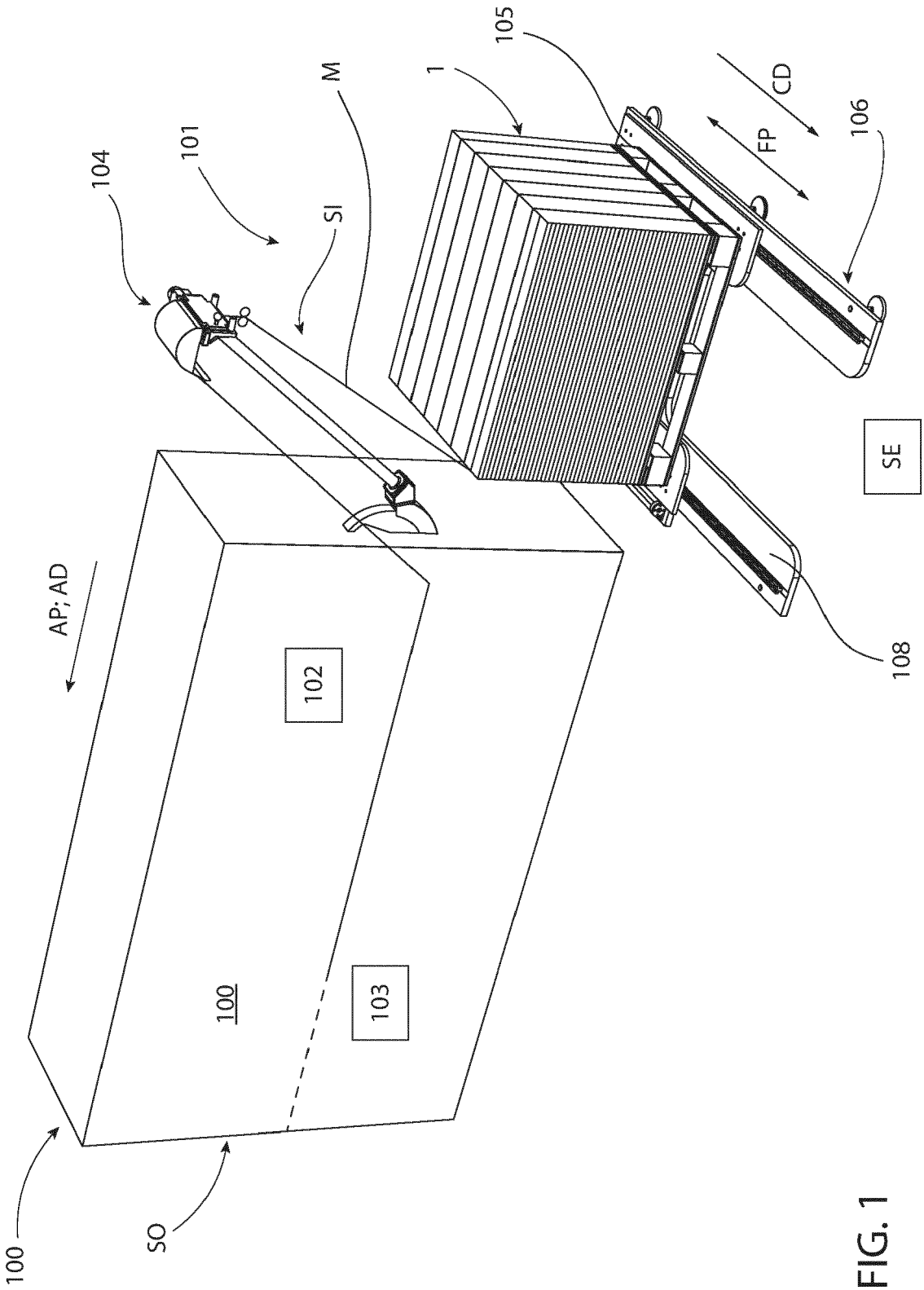


FIG. 1

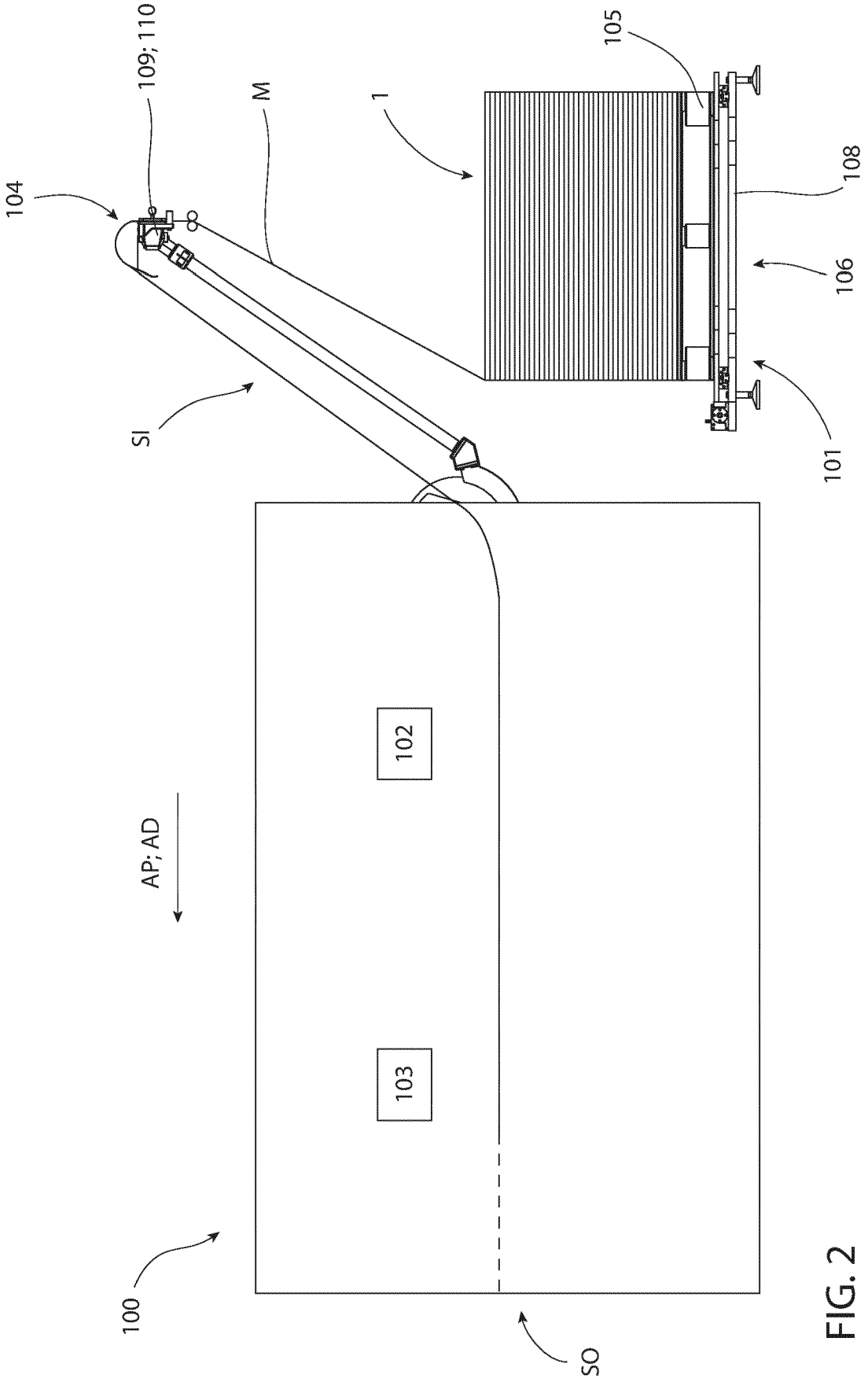


FIG. 2

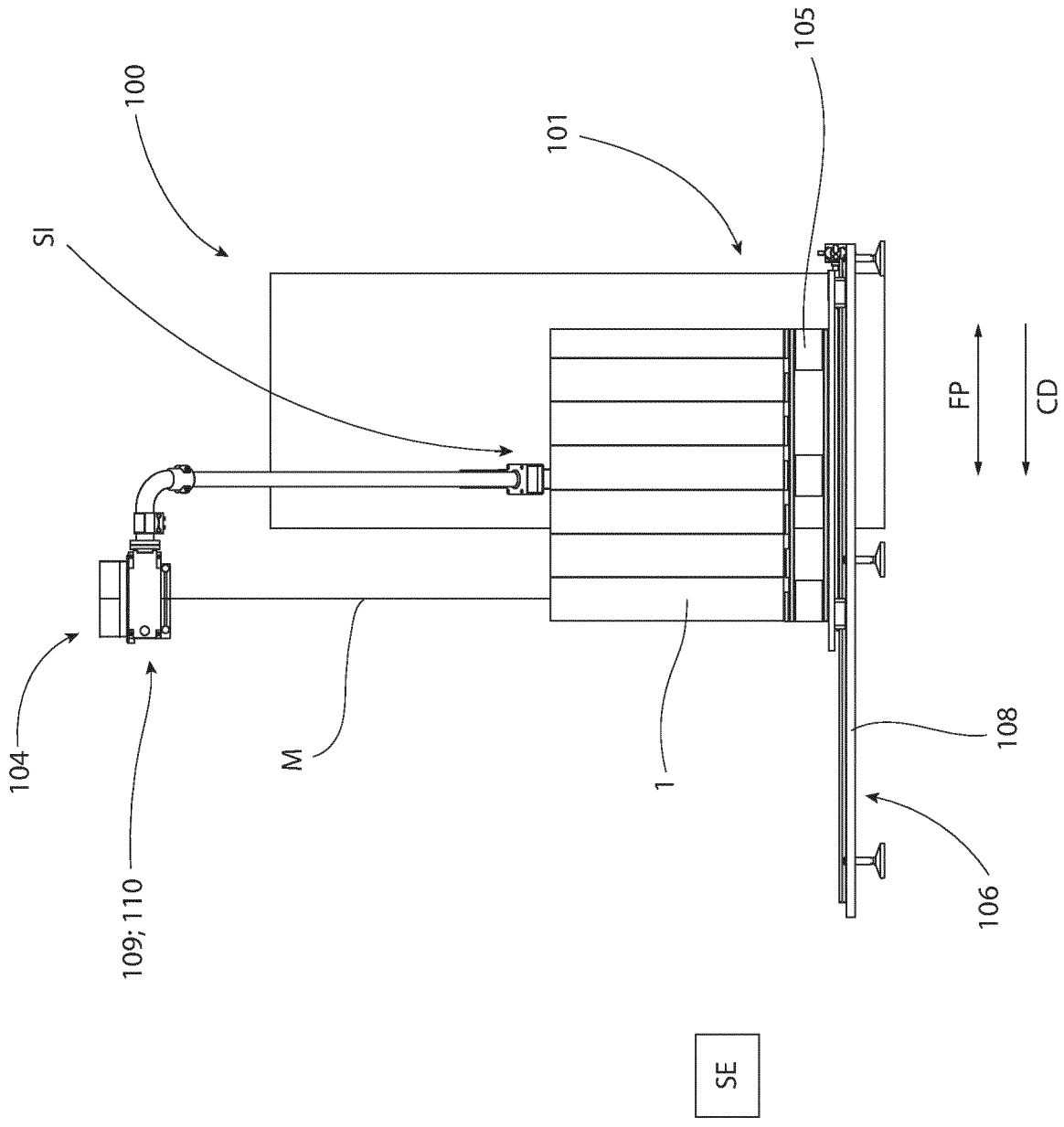
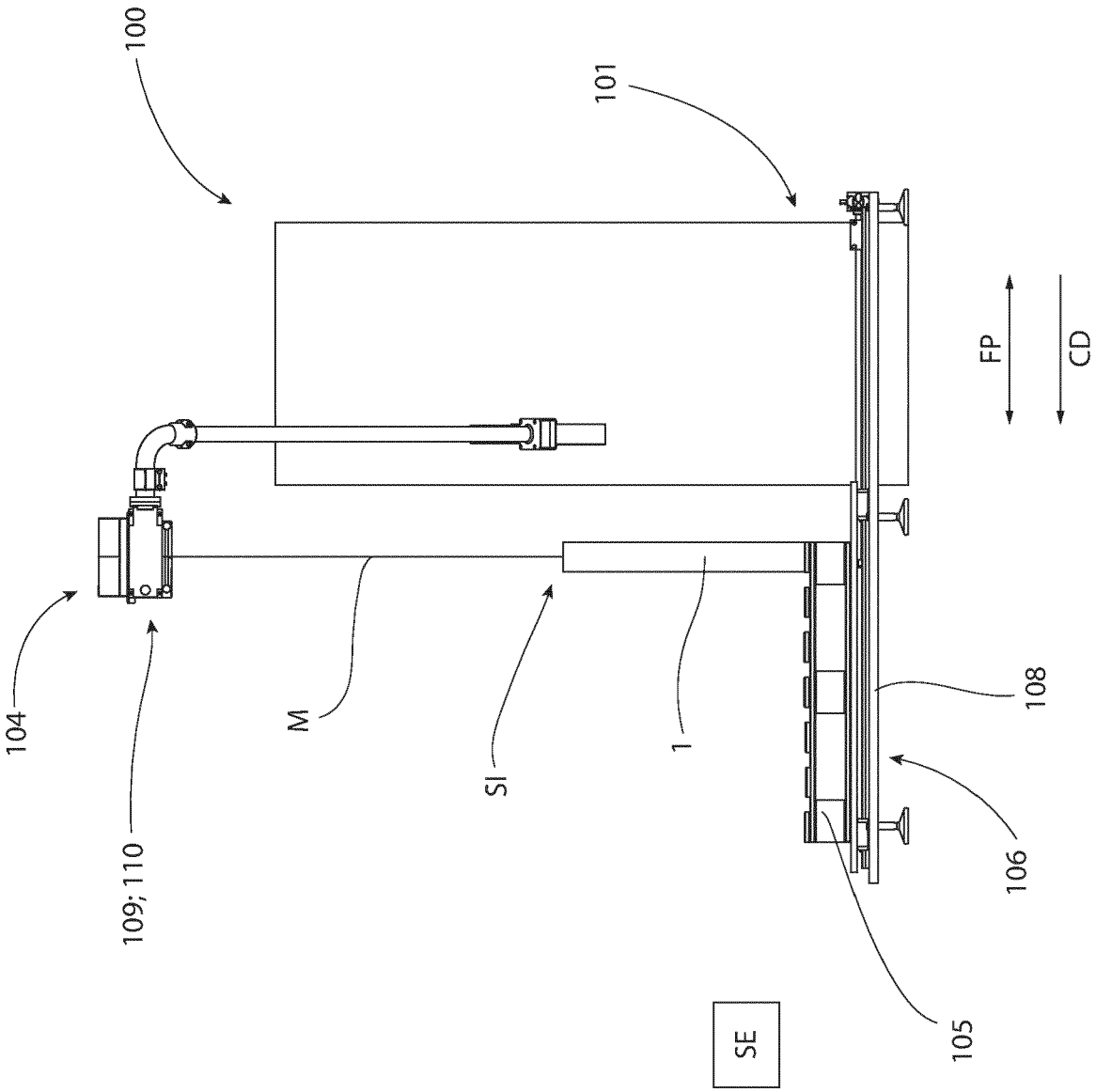


FIG. 3

FIG. 4



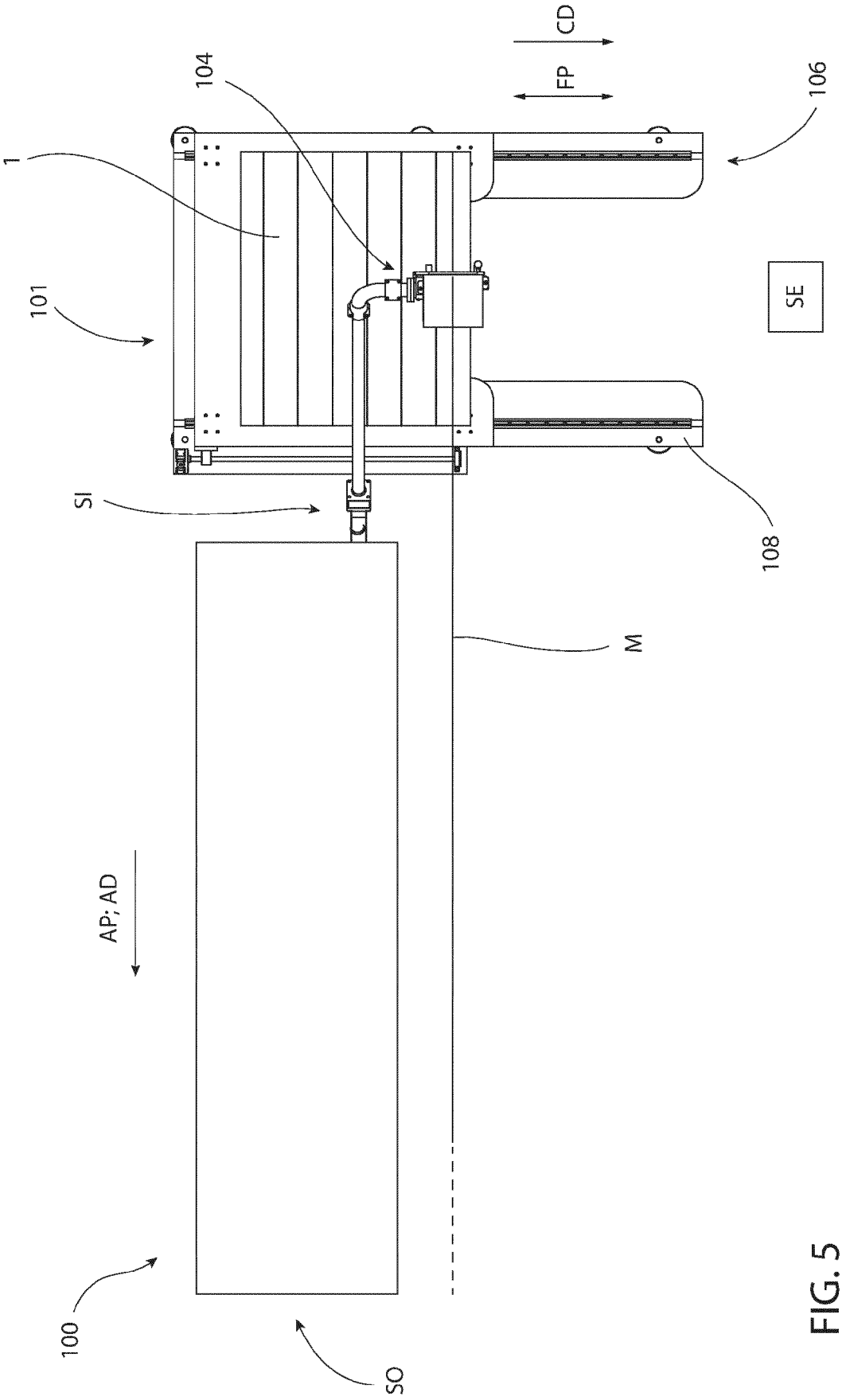


FIG. 5

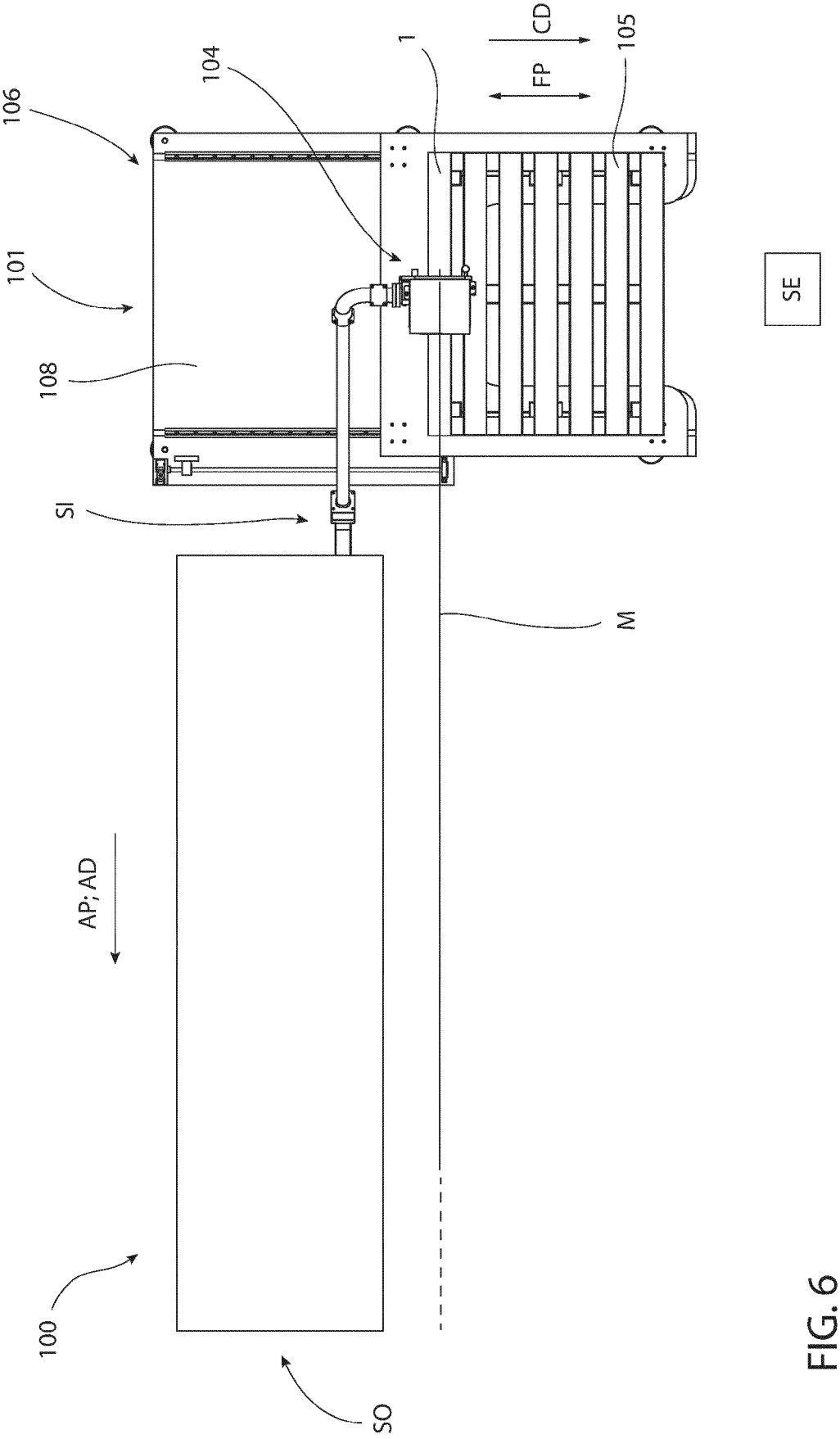


FIG. 6

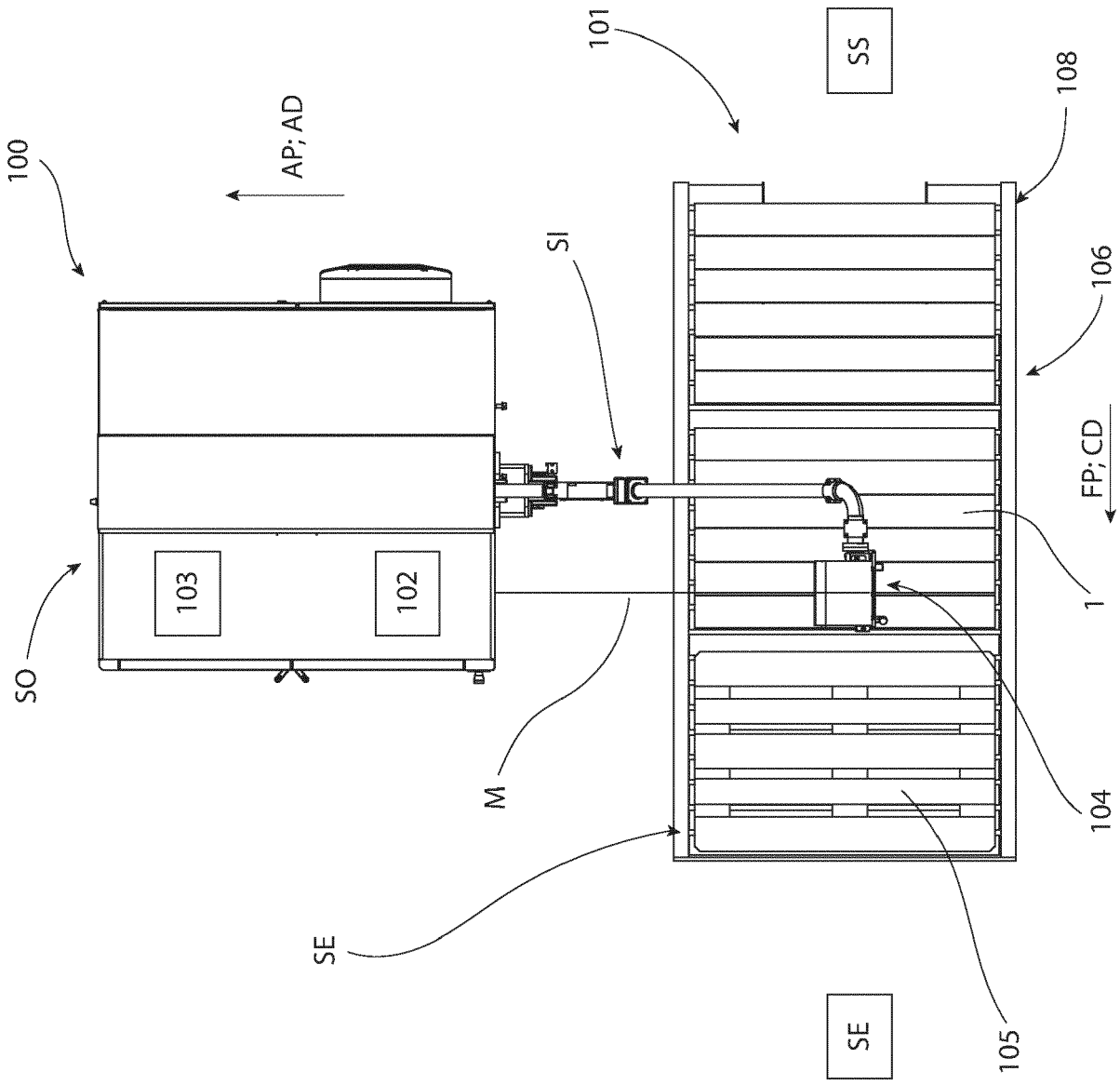
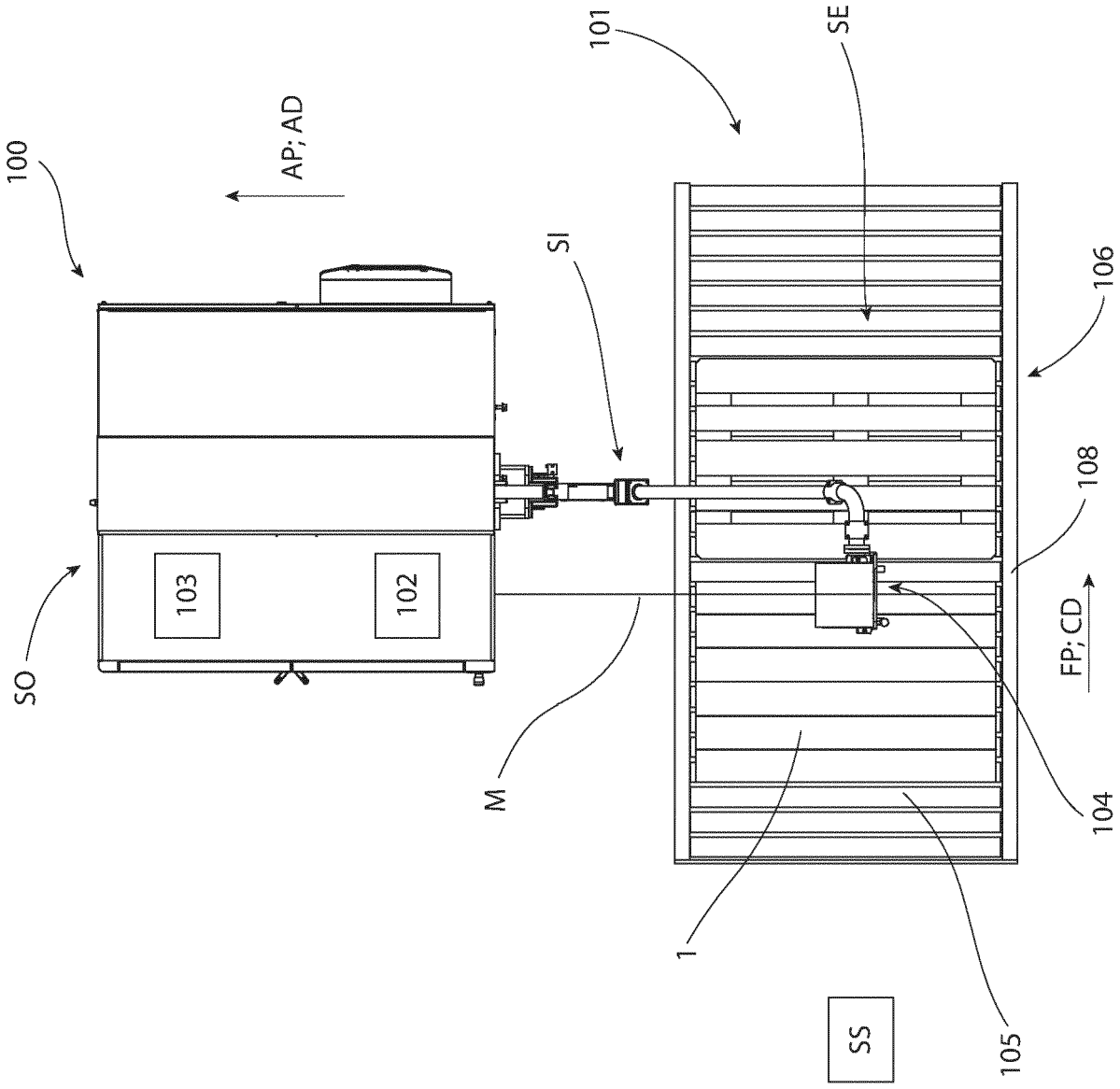


FIG. 7

FIG. 8



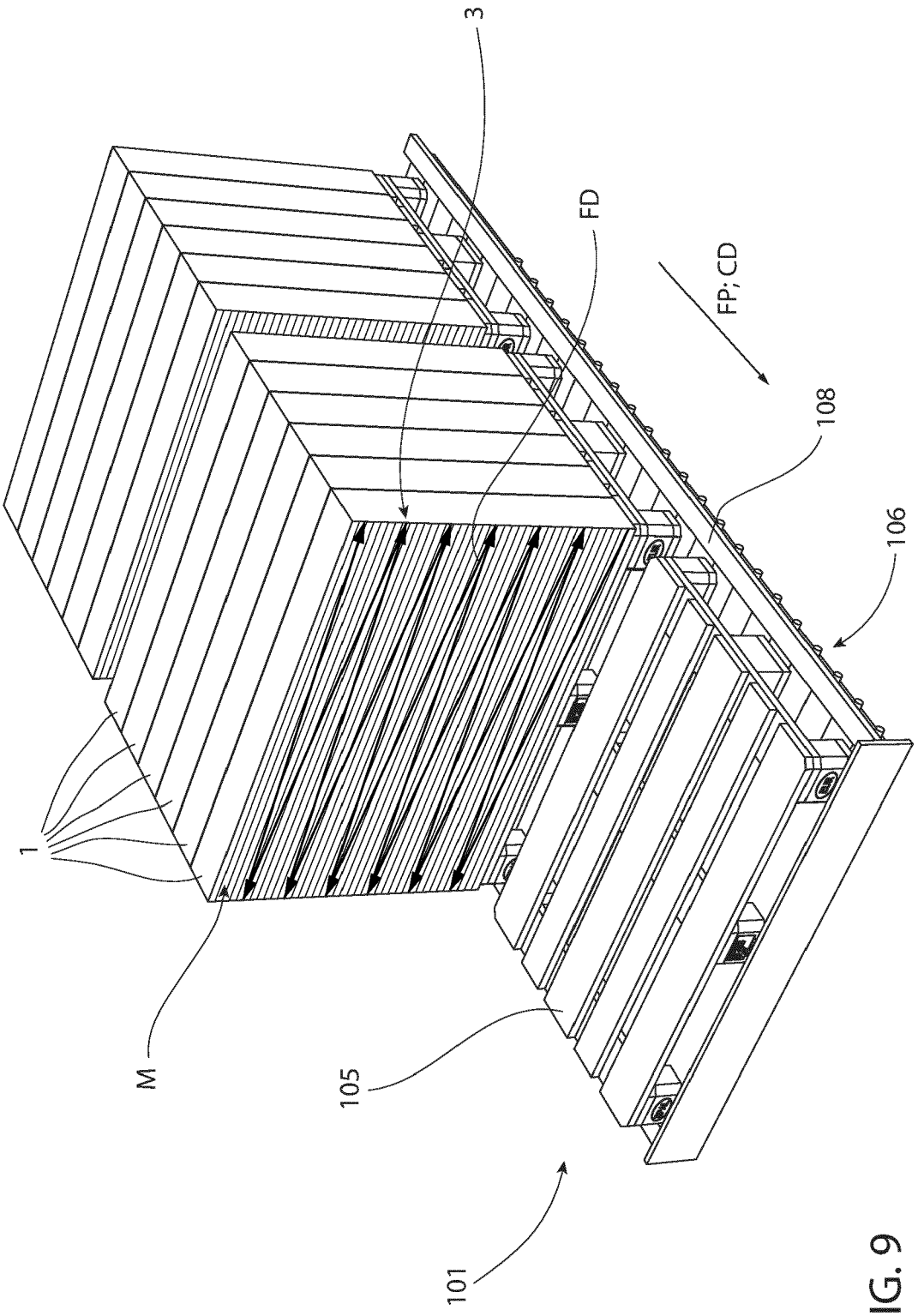


FIG. 9

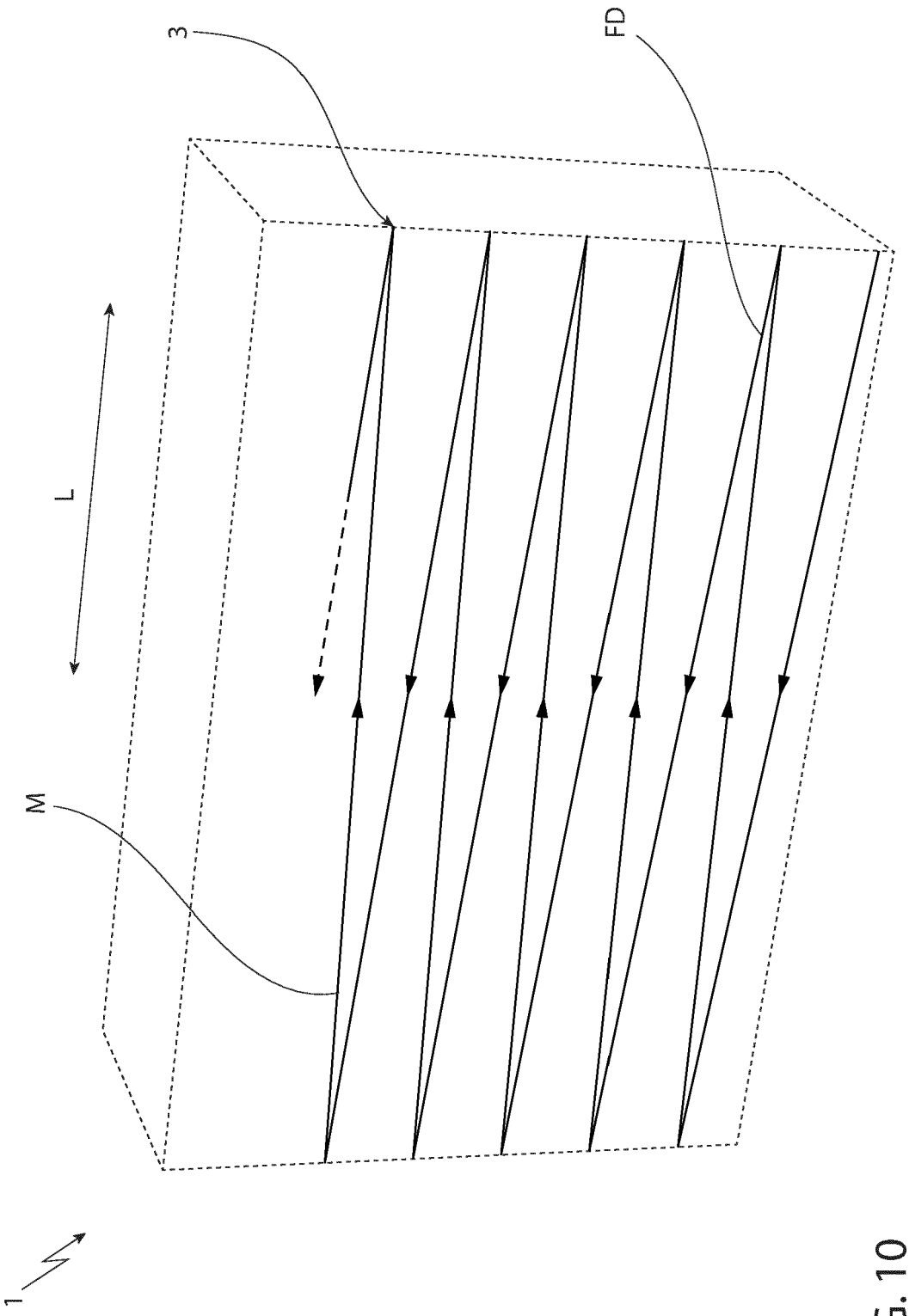


FIG. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 23 20 5441

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 800 553 A1 (HAUNI MASCHINENBAU AG [DE]) 27 June 2007 (2007-06-27) * abstract; figures 1-6 * * paragraphs [0022], [0023] * * paragraphs [0032] - [0039] * * the whole document *	1-17	INV. B65H16/02 A24C5/20 B65H20/00 B65H19/12 B65H20/28 A24D3/02
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A	EP 2 266 426 B1 (GD SPA [IT]) 7 August 2013 (2013-08-07) * abstract * * figures 1-10 * * paragraphs [0002] - [0004] * * the whole document *	1-17	

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B65H
A24F
A24C
A24D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 May 2024	Piekarski, Adam

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16-05-2024

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