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Amended claims in accordance with Rule 137(2) EPC.

(54) **MODULAR MANUFACTURING MACHINE FOR THE PRODUCTION OF SMOKING ARTICLES OR PARTS OF SMOKING ARTICLES**

(57) A modular manufacturing machine (1) for the production of smoking articles or parts of smoking articles. The manufacturing machine (1) has a plurality of modules (2) which are placed one after another and beside one another and are arranged between an input station (S1), where a material or a semi-finished product enters the manufacturing machine (1) and an output station (S2), where a finished product leaves the manufacturing machine (1). The manufacturing machine (1) has: an input module (2), where the first input station (S1) is defined, an output module (2), where the output station (S2) is defined, and at least one processing module (2), which is interposed between the input module (2) and the output module (2) and is configured to process the material or the semi-finished product. A module (2) has a generator (9) designed to generate an operating means, in particular suction or water vapour. A module (2) has a socket (12) designed to receive, from the outside, energy in particular electrical energy or pneumatic energy in the form of compressed air. First connection members (10) are provided between two adjacent modules (2) to transmit the operating means between the two adjacent modules (2). Second connecting members (13) are provided between two adjacent modules (2) to transmit energy between the two adjacent modules (2).

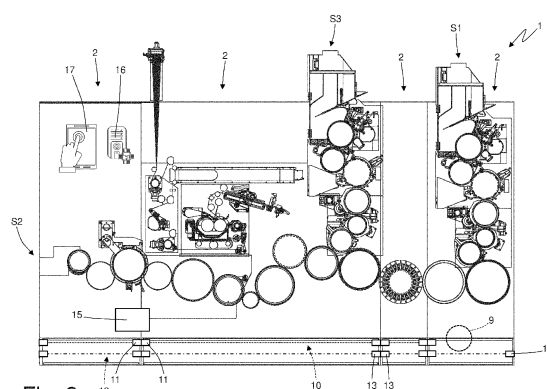


Fig. 3

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This Patent Application claims priority from Italian Patent Application No. 102020000027263 filed on November 13, 2020.

TECHNICAL FIELD

[0002] The present invention relates to a modular manufacturing machine for the production of smoking articles or parts of smoking articles.

PRIOR ART

[0003] A traditional smoking article, namely, a traditional cigarette, is formed by the union of two parts: a tobacco rod and a filter. The filter can be a single-component (namely, a simple cellulose acetate rod) or a multi-component (filters formed by the union of four or even more different components can be found on the market).

[0004] Furthermore, new generation cigarettes in which no smoke is produced by combustion of tobacco, but in which the tobacco is heated, are normally formed by at least three (but often four to five or even more) components arranged in a row.

[0005] The market therefore requires the producers of manufacturing machines, for the production of smoking articles or parts of smoking articles, to provide a manufacturing machine that is modular, namely, formed by modules that can be quickly added or removed so as to adapt the manufacturing machine to the production of different types of smoking articles or parts of smoking articles.

[0006] By way of example, the patent applications EP3639680A1, EP3586651A2, EP3178332A1, and EP1427299A1 describe some examples of a modular manufacturing machine for the production of smoking articles or parts of smoking articles.

[0007] The patent application EP3053838A1 describes a modular packaging machine comprising a plurality of processing modules, each of which has a processing unit designed to perform at least one processing step. At least one processing module (but preferably more than one) is connected to a corresponding electrical cabinet which is separated from the processing unit by a walkway raised with respect to the processing unit.

DESCRIPTION OF THE INVENTION

[0008] The aim of the present invention is to provide a modular manufacturing machine for the production of smoking articles or parts of smoking articles, which manufacturing machine allows to quickly and simply modify the combination of the modules in order to vary the type of smoking articles or parts of smoking articles that is produced.

[0009] According to the present invention, a modular manufacturing machine is provided for the production of smoking articles or parts of smoking articles as claimed in the attached claims.

[0010] The claims describe embodiments of the present invention forming an integral part of the present description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] 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 and front view of a modular manufacturing machine manufactured according to the present invention;
- Figure 2 is a schematic and perspective view, from two different angles, of a same module of the modular manufacturing machine of Figure 1;
- Figure 3 is a schematic and front view of a different modular manufacturing machine manufactured according to the present invention; and
- Figures 4, 5 and 6 are schematic and front views of individual modules which can be used to form a modular manufacturing machine manufactured according to the present invention.

PREFERRED EMBODIMENTS OF THE INVENTION

[0012] In Figure 1, number 1 denotes as a whole a modular manufacturing machine for the production of smoking articles (for example, new generation cigarettes, namely, cigarettes in which an aerosolgenerating component is heated in order to produce aerosols) or parts of smoking articles (for example, filters for traditional cigarettes or for new generation cigarettes).

[0013] The manufacturing machine 1 comprises a plurality of modules 2 (in general, at least three modules 2) arranged one after another (beside one another) between an input station S1 where a material or a semi-finished product enters the manufacturing machine 1 and an output station S2 where a finished product (smoking article or part of a smoking article) leaves the manufacturing machine 1.

[0014] According to what is illustrated in Figure 2, each module 2 has a parallelepiped shape that develops vertically starting from a base 3, which rests on the floor and is delimited by a vertical front wall 4. In the modules 2 the front wall 4 is the main wall as it is always present in all the modules 2 and provides the necessary mechanical support to the components of the module 2 itself; in other words, the front wall 4 (and only the front wall 4) forms part of the support frame of a module 2 as the components of the module 2 are fixed to the front wall 4 and consequently the front wall 4 must always be present in each module 2, the wall is mechanically robust (to be able to support the components of the module 2), and it

is not removable (dismountable) except when the entire module 2 is dismantled.

[0015] Each module 2 furthermore comprises a vertical rear wall 5 which is parallel to the front wall 4 and is supported (directly or indirectly) by the front wall 4; generally, the rear wall 5 is formed by a sheet metal casing, which only has the function of delimiting the inner space of the module 2 and can be shared between several modules 2 (namely, a same rear wall 5 could be fixed to several modules 2 beside one another instead of having a single independent rear wall 5 for each module 2).

[0016] Finally, each module 2 can also comprise two vertical side walls 6 and 7 parallel to one another and perpendicular to the front wall 4, and an upper wall 8; the side walls 6 and 7 could also be absent (both the side walls 6 and 7 could be absent or only one of the two side walls 6 and 7 could be absent).

[0017] In all the modules 2, the walls 4 and 5 are normally (closed, i.e., they do not have free through openings that place the two sides of the walls 4 and 5 in communication; instead, the side walls 6 and 7 (if present) have free through openings (more or less extended) which are necessary to place two adjacent modules 2 in communication one with the other. A side wall 6 or 7 is closed (i.e., it does not have free through openings that place the two sides of the side wall 6 or 7 in communication) only in the end modules 2 (namely, head and tail), that is, in an input module 2 and an output module 2. Obviously, in a module 2 the walls 4, 5, 6 and 7 could have through openings which are not free, namely, are normally engaged (closed) by respective hinged doors which are opened only when the manufacturing machine 1 is not in use, for example, for inspection, maintenance or cleaning.

[0018] According to what is illustrated in Figure 1, in the same manufacturing machine 1 the modules 2 are placed one after another and beside one another by arranging the side walls 6 and 7 of two adjacent modules 2 against one another; namely, the side wall 6 of a module 2 arranged on the left (looking at the module 2 from the front) is arranged (therefore it is parallel and facing) against the side wall 7 of an adjacent module 2 arranged on the right (looking at the module 2 from the front); as previously mentioned, the two side walls 6 and 7 of the modules 2 could also be absent.

[0019] The manufacturing machine 1 illustrated in Figure 1 comprises: an input module 2 (arranged on the right in Figure 1) in which the input station S1 is defined, an output module 2 (arranged on the left in Figure 1) in which the output station S2 is defined, and a processing module 2 (arranged in the centre in Figure 1) which is interposed between the input module 2 and the output module 2 and is configured to process the material or the semi-finished product that arrives through the input station S1.

[0020] A module 2 of the manufacturing machine 1 (in particular, the input module in the embodiment illustrated in Figure 1) comprises a generator 9 designed to generate an operating means, in particular suction or water

vapour (namely, the generator 9 can be an aspirator to generate the vacuum or a boiler to generate water vapour). The operating means (suction or water vapour) can be used by one or more modules 2 of the manufacturing machine 1; for this purpose, the manufacturing machine 1 comprises connection members 10 between two adjacent modules 2 to transmit the operating means (suction or water vapour) between the two adjacent modules 2. The connection members 10 comprise pipes which transport the operating means (suction or water vapour) from the side wall 6 to the side wall 7 of a same module 2 and also comprise connectors 11 which are arranged at the side walls 6 and 7 (as better illustrated in Figure 2) and have the function of connecting two adjacent modules 2 together so as to transfer the operating means (suction or water vapour) between the two adjacent modules 2. In particular, in each module 2 at least one side wall 6 or 7 has a connector 11 which is the same for all the modules 2 (namely, it is standard for all the modules 2), is designed to transmit the operating means (suction or water vapour), and engages a corresponding connector 11 of an adjacent module 2. Potentially, all the modules 2 have two connectors 11: one on the side wall 6 and the other on the side wall 7; however, the input module 2 and the output module 2 could have a single connector 11 having only to connect to a single adjacent module 2.

[0021] In the embodiment illustrated in the attached figures, the connectors 11 are arranged at the side walls 6 and 7, whereas according to a different embodiment not illustrated the connectors 11 are arranged at the upper walls 8.

[0022] According to a preferred embodiment, the two connectors 11 are identical and flat and a gasket is interposed between them. According to an alternative embodiment, female or male connectors 11 are used in all the modules 2 which are connected together by means of extensions (relatively short, for example, less than a meter long) having male or female connectors at the ends (for example, all the modules 2 could have only female connectors 11 and the extensions could only have male connectors).

[0023] A module 2 of the manufacturing machine 1 (in particular the input module in the embodiment illustrated in Figure 1) comprises a socket 12 (that is, an input point) designed to receive, from the outside, energy in particular electrical energy or pneumatic energy in the form of compressed air. The (electrical or pneumatic) energy can be used by one or more modules 2 of the manufacturing machine 1; for this purpose, the manufacturing machine 1 comprises connection members 13 between two adjacent modules 2 to transmit (electrical or pneumatic) energy between the two adjacent modules 2. The connection members 13 comprise electrical cables or pipes which transport the (electrical or pneumatic) energy from the side wall 6 to the side wall 7 of a same module 2 and also comprise connectors 14 which are arranged at the side walls 6 and 7 (as better illustrated in Figure 2) and

have the function of connecting two adjacent modules 2 to one another to transfer the (electrical or pneumatic) energy between the two adjacent modules 2. In particular, in each module 2 at least one side wall 6 or 7 has a connector 14 which is the same for all modules 2 (namely, it is standard for all modules 2), it is designed to transmit the (electrical or pneumatic) energy, and engages a corresponding connector 14 of an adjacent module 2. Potentially, all the modules 2 have two connectors 14: one on the side wall 6 and the other on the side wall 7; however, the input module 2 and the output module 2 could have a single connector 14 having to connect to a single adjacent module 2.

[0024] In the embodiment illustrated in the attached figures, the connectors 14 are arranged at the side walls 6 and 7, while according to a different embodiment, not illustrated, the connectors 14 are arranged at the upper walls 8.

[0025] According to a preferred embodiment, in all the modules 2 female or male connectors 14 are used, which are connected together by means of extensions (relatively short, for example, less than a meter long) having male or female connectors at the ends (for example, all the modules 2 could have only female connectors 14 and the extensions could have male connectors only). According to a further embodiment, in order to enable the mutual connection, a module 2 has a male connector 14 and an adjacent module 2 has a female connector 14 in the same position; for example, the connectors 14 on the side walls 6 could be male and the connectors 14 and on the side walls 7 could be a female.

[0026] The operating means (suction or water vapour) and the (electrical or pneumatic) energies form the so-called "*utilities*" that are used to enable the functioning of the modules 2. As previously mentioned, the "*utilities*" can be generated inside the manufacturing machine 1 or they can come from outside the manufacturing machine 1.

[0027] According to a possible embodiment, a module 2 (the same that also comprises the generator 9 or different from the module 2 that comprises the generator 9) could comprise an additional generator designed to generate an operating means (suction or water vapour) other than the operating means generated by generator 9; for example, the generator 9 could generate suction while the additional generator could generate water vapour. Also in this case, connection members can be provided between two adjacent modules 2 to transmit the operating means (suction or water vapour) generated by the additional generator between the two adjacent modules 2.

[0028] According to a possible embodiment, a module 2 (the same that also comprises the socket 12 or different from the module 2, which comprises the socket 12) could comprise an additional socket to receive, from the outside, an (electrical or pneumatic) energy different from the energy received from the socket 12; for example, the socket 12 could receive electrical energy whereas the

additional socket could receive pneumatic energy (in the form of compressed air). Also in this case, connection members can be provided between two adjacent modules 2 to transmit the (electrical or pneumatic) energy received from the additional socket between the two adjacent modules 2.

[0029] According to a preferred but not binding embodiment, only a single module 2 comprises the generator 9 for generating an operating means (suction or water vapour) which is brought to the other modules 2 through the connection members 10. Similarly, only a single module 2 comprises the socket 12 that receives the (electrical or pneumatic) energy which is brought to the other modules 2 through the connection members 13.

[0030] According to a preferred embodiment, at least one module 2 (the output module in the embodiment illustrated in Figure 1) comprises a collection unit 15 to collect production waste (namely, products rejected because they are defective) and/or to collect production residues (that is, remnants of materials at the end of processing).

[0031] According to a preferred embodiment, at least one module 2 (the output module in the embodiment illustrated in Figure 1) comprises, on the inside, a machine 1 controller 16, which oversees the operation of the entire manufacturing machine 1 (namely, of all the modules 2 that form the manufacturing machine 1).

[0032] According to a preferred embodiment, at least one module 2 (the output module in the embodiment illustrated in Figure 1) comprises, on the inside, a user interface 17 (also called "*HMI - Human Machine Interfaces*") provided with a touch screen to interact with a machine operator.

[0033] Figure 3 illustrates a different modular manufacturing machine 1 formed by the union of four modules 2: an input module 2 (arranged on the right in Figure 3) where the input station S1 is defined, an output module 2 (arranged on the left in Figure 3) where the output station S2 is defined, and two processing modules 2 (arranged in the centre in Figure 3) which are interposed between the input module 2 and the output module 2 and are configured to perform respective processing on the material or the semi-finished product that arrives through the input station S1 and also on the material or the semi-finished product that arrives through an input station S3 obtained in the second module 2. In other words, in the manufacturing machine 1 illustrated in Figure 3, in a module 2 the input station S3 is defined (additional and separate from the input station S1) in which a second material or a second semi-finished product enters the manufacturing machine 1.

[0034] According to what is illustrated in Figure 4, a modular manufacturing machine 1 could generally comprise: a module 2 in which the descent of cylindrical materials is carried out by means of four transfer drums (module 2 shown first starting from the left), a module 2 in which the descent of cylindrical materials is carried out by means of six transfer drums (module 2 shown second

starting from the left), a module 2 in which the descent of two different cylindrical materials is carried out by means of six transfer drums (module 2 shown third starting from the left), or a module 2 in which the descent of cylindrical materials is carried out by means of six transfer drums together with a modification of the pitch (module 2 shown last starting from the left or first starting from the right). Alternatively, in the module 2 shown third starting from the left, the descent of a single type of cylindrical materials could be achieved by means of six transfer drums; in this case the descent is double to reduce the drawing speed in the case of delicate cylindrical materials.

[0035] According to what is illustrated in Figure 5, a modular manufacturing machine 1 could generally comprise: a module 2 in which a change of pitch is performed between adjacent objects (module 2 shown first starting from the left) or an elongation or shortening of the pitch between adjacent objects, a module 2 in which an optical or pneumatic quality check is carried out on the products (module 2 shown second starting from the left), an output module 2 (module 2 shown third starting from the left), or a module 2 in which a laser drilling on materials or products is made (module 2 shown last starting from the left or first starting from the right).

[0036] According to what is illustrated in Figure 6, a modular manufacturing machine 1 could comprise: a module 2 in which a combination of several materials is made (module 2 shown on the left), namely, a combination of at least two objects that are placed next to one another head-to-head, or a module 2 in which a combination of several materials is made together with the descent of cylindrical materials by means of six transfer drums (module 2 shown on the right). The combination of at least two objects that are placed next to one another head-to-head could also provide for a joining of objects next to one another head-to-head by wrapping a band around the objects placed next to one another head-to-head.

[0037] According to other alternatives not illustrated, a modular manufacturing machine 1 can comprise: a module 2 in which a transformation from longitudinal to traverse motion or vice versa is made, a module 2 in which a transformation of motion that remains transverse but not parallel between input and output is performed (for example, by using conical drums), a module 2 in which a tobacco rod is made (produced), a module 2 in which a filter rod is made (produced), or a module 2 in which an insertion of a solid material (for example, capsules containing flavouring substances) or powdery material (for example, carbon powder) is made.

[0038] In other words, each manufacturing machine 1 is built (configured) by combining the modules 2 based on the design requirements for the product to be manufactured by the manufacturing machine 1 itself.

[0039] The modules 2 are independent from one another and each perform a single basic function, for example: the entry of materials or semi-finished products

(coming from an upstream manufacturing machine 1) indicated by the term "*Downdrop*" (the downward descent indicated by the term "*Downdrop*" is the most common solution but there can also be possible solutions in which the entry of materials or semi-finished products takes place laterally), the change of pitch indicated by the term "*Retiming*", the combination of several objects with or without joining by means of a band indicated by the term "*Combining*", laser perforation, execution of quality check, output of products. There can be modules 2 which, for reasons of cost and size optimization, perform two or more basic functions, for example the entry of materials or semi-finished products and the combination of several objects.

[0040] It is important to underline that a manufacturing machine 1 can have a linear arrangement in plan, an "L" arrangement, a "T" arrangement, or a "U" arrangement.

[0041] From the point of view of the product flow, the individual modules 2 can be the "*input*" type (typically the input module 2, with only the input of material or pre-processed products), the "*through*" type (the products arrive from the previous modules 2 and continue towards the following modules 2), or the "*output*" type (in which the products definitively leave the manufacturing machine 1). A particular example is a module 2 provided with an input station for materials or semi-finished products which can be the "*input*" type if in the first position in the manufacturing machine 1 or the "*through*" type if placed in any other position in the manufacturing machine 1. The "*through*" modules 2 within given limits can be exchanged one with the other (the discussion in detail could be more complex and a reconfiguration of parts of the modules 2 could be necessary).

[0042] In a "*through*" module 2, the part dealing with the input from the previous module 2 can be disabled or removed, thus transforming the "*through*" module 2 into an "*input*" module 2; this transformation can be temporary (in case of software or mechanical disablement) or permanent (in case of removal/non-installation of parts). Obviously, the contrary is also valid: an "*input*" module can be transformed into a "*through*" module 2.

[0043] The modules 2 can in turn have modular parts inside the same: for example a sub-module (for example, formed by descent drums) that deals with the input of materials or semi-finished products, a sub-module that performs the main function (for example, a quality check), a sub-module that deals with the input of products from the previous module 2, a sub-module that deals with the output of products towards the next module 2 or towards the outside in the case of finished product, a sub-module dedicated to the interface of the "*utilities*" with the other modules 2, a sub-module for the generation of the "*utilities*".

[0044] The interface between modules 2 (namely, the exchange of products between modules 2) is standardized, so that each module 2 exchanges products with adjacent modules 2 according to well-defined rules (which determine, for example, the feed pitch and the

feed speed of products). In a same manufacturing machine 1 modules 2 can be provided with different feed pitches and, in this case, in order to connect the modules 2 with different pitches together, pitch change modules 2 are interposed.

[0045] A production plant (not illustrated) could comprise three distinct modular manufacturing machines 1 each formed by the union of several modules 2: a first manufacturing machine 1 and a second manufacturing machine 1 produce semi-finished products which are supplied to the input station S3 of a third manufacturing machine 1 that manufactures the final product. According to a possible embodiment, the first manufacturing machine 1 receives the materials BR_{a1} in its input station S1 and supplies the semi-finished products SP_a to its output station S2, the second manufacturing machine 1 receives materials BR_{b1} in its input station S1 and supplies semi-finished products SP_b, in its output station S2 and the third manufacturing machine 1 receives the materials BR_{C1} in its input station S1 and receives the semi-finished products SP_a or, alternatively, the semi-finished products SP_b in its own input station S3.

[0046] The three modular manufacturing machines 1 described above could be replaced by the single manufacturing machine 1 which has three input stations, receives materials BR_{c1} in the first input station, receives materials BR_{b1} in the second input station, and receives materials BR_{a1} in the third input station.

[0047] The embodiments described herein can be combined with one another without departing from the scope of the present invention.

[0048] The modular manufacturing machine 1 described above has numerous advantages.

[0049] Firstly, the modular manufacturing machine 1 described above allows to substantially reduce the reconfiguration times and costs, not only for format change but above all in case of product change; namely, the modular manufacturing machine 1 described above reduces to a minimum the time required to reconfigure, namely to start the production of a different product.

[0050] Furthermore, the modular manufacturing machine 1 described above has a high scalability/expandability: it is possible to build an initially simple manufacturing machine 1, with few functions, and then add more complex functions as needed or recombine modules 2 of several simple manufacturing machines 1 into one more complex but more optimized manufacturing machine 1.

[0051] The scalability also allows to be able to design with great freedom, and change at a later time, the organization of a production line, passing for example from an architecture with two or more levels, in which various manufacturing machines 1 (formed by modules 2) produce semi-finished products that gradually feed downstream manufacturing machines 1 until the final product is obtained (in this organization distribution routes are provided for the semi-finished products from one manufacturing machine 1 to another and typically also inter-

mediate storage units), to a less structured and more compact architecture, in which, for example, a single manufacturing machine 1, much more complex than those of the previous case, directly produces the final product in a single step (in this case it is possible to reduce or even avoid the presence of distribution channels and intermediate storage units).

10 Claims

1. A modular manufacturing machine (1) for the production of smoking articles or parts of smoking articles;

the manufacturing machine (1) comprises a plurality of modules (2), each substantially having the shape of a parallelepiped; the modules (2) are placed one after another and beside one another and are arranged between a first input station (S1), where a first material or a first semi-finished product enters the manufacturing machine (1), and an output station (S2), where a finished product leaves the manufacturing machine (1);

the manufacturing machine (1) comprises: an input module (2), where the first input station (S1) is defined, an output module (2), where the output station (S2) is defined, and at least one processing module (2), which is interposed between the input module (2) and the output module (2) and is configured to process the first material or the first semi-finished product;

the manufacturing machine (1) is **characterized in that:**

a module (2) comprises a first generator (9), which is designed to generate a first operating means, in particular suction or water vapour;

a module (2) comprises a first socket (12), which is designed to receive, from the outside, a first energy, in particular electrical energy or pneumatic energy in the form of compressed air;

first connection members (10) are provided between two adjacent modules (2) to transmit the first operating means between the two adjacent modules (2); and

second connection members (13) are provided between two adjacent modules (2) to transmit the first energy between the two adjacent modules (2).

2. The manufacturing machine (1) according to claim 1, wherein each module (2) has a first connector (11), which is part of the first connection members (10), is designed to transmit the first operating means and

engages a corresponding first connector (11) of an adjacent module (2).

3. The manufacturing machine (1) according to claim 2, wherein the first connector (11) is the same for all modules (2). 5
4. The manufacturing machine (1) according to claim 1, 2 or 3, wherein each module (2) has a second connector (14), which is part of the second connection members (13), is designed to transmit the first energy and engages a corresponding second connector (14) of an adjacent module (2). 10
5. The manufacturing machine (1) according to claim 4, wherein the second connector (14) is the same for all modules (2). 15
6. The manufacturing machine (1) according to claim 4 or 5, wherein a module (2) has a second male or female connector (14) and an adjacent module (2) has a second male or female connector (14). 20
7. The manufacturing machine (1) according to one of the claims from 1 to 6; wherein 25
a module (2) comprises a second generator, which is designed to generate a second operating means, in particular suction or water vapour, different from the first operating means; and third connection members are provided between two adjacent modules (2) to transmit the second operating means between the two adjacent modules (2). 30
8. The manufacturing machine (1) according to one of the claims from 1 to 7; wherein: 35

a module (2) comprises a second socket, which is designed to receive, from the outside, a second energy, in particular electrical energy or pneumatic energy in the form of compressed air, different from the first energy; and 40
fourth connection members are provided between two adjacent modules (2) to transmit the second energy between the two adjacent modules (2). 45
9. The manufacturing machine (1) according to one of the claims from 1 to 8, wherein a second input station (S3) is defined in the processing module (2), where a second material or a second semi-finished product enters the manufacturing machine (1). 50
10. The manufacturing machine (1) according to one of the claims from 1 to 9, wherein at least one module (2) comprises a collection unit (15) to collect production waste and/or production residues. 55
11. The manufacturing machine (1) according to one of

the claims from 1 to 10, wherein the processing module (2) is configured to alternatively carry out:

a change in the distance between adjacent objects, namely a lengthening or a shortening of a distance between adjacent objects;
a combination of at least two objects, which are placed next to one another head-to-head;
a joining of objects placed next to one another head-to-head by wrapping a band around the objects placed next to one another head-to-head;
a laser perforation;
a quality check;
a transformation from longitudinal motion to cross motion or vice versa;
a manufacturing of a tobacco rod;
a manufacturing of a filter rod;
an insertion of a solid or powdery material.

12. The manufacturing machine (1) according to one of the claims from 1 to 11, wherein at least one module (2) comprises, on the inside, at least one controller (16) for the machine (1), which controls the operation of the manufacturing machine (1).
13. The manufacturing machine (1) according to one of the claims from 1 to 12, wherein at least one module (2) comprises, on the inside, a user interface (17) provided with a screen, preferably a touch screen, to interact with a machine operator.

Amended claims in accordance with Rule 137(2) EPC.

1. A modular manufacturing machine (1) for the production of smoking articles or parts of smoking articles;

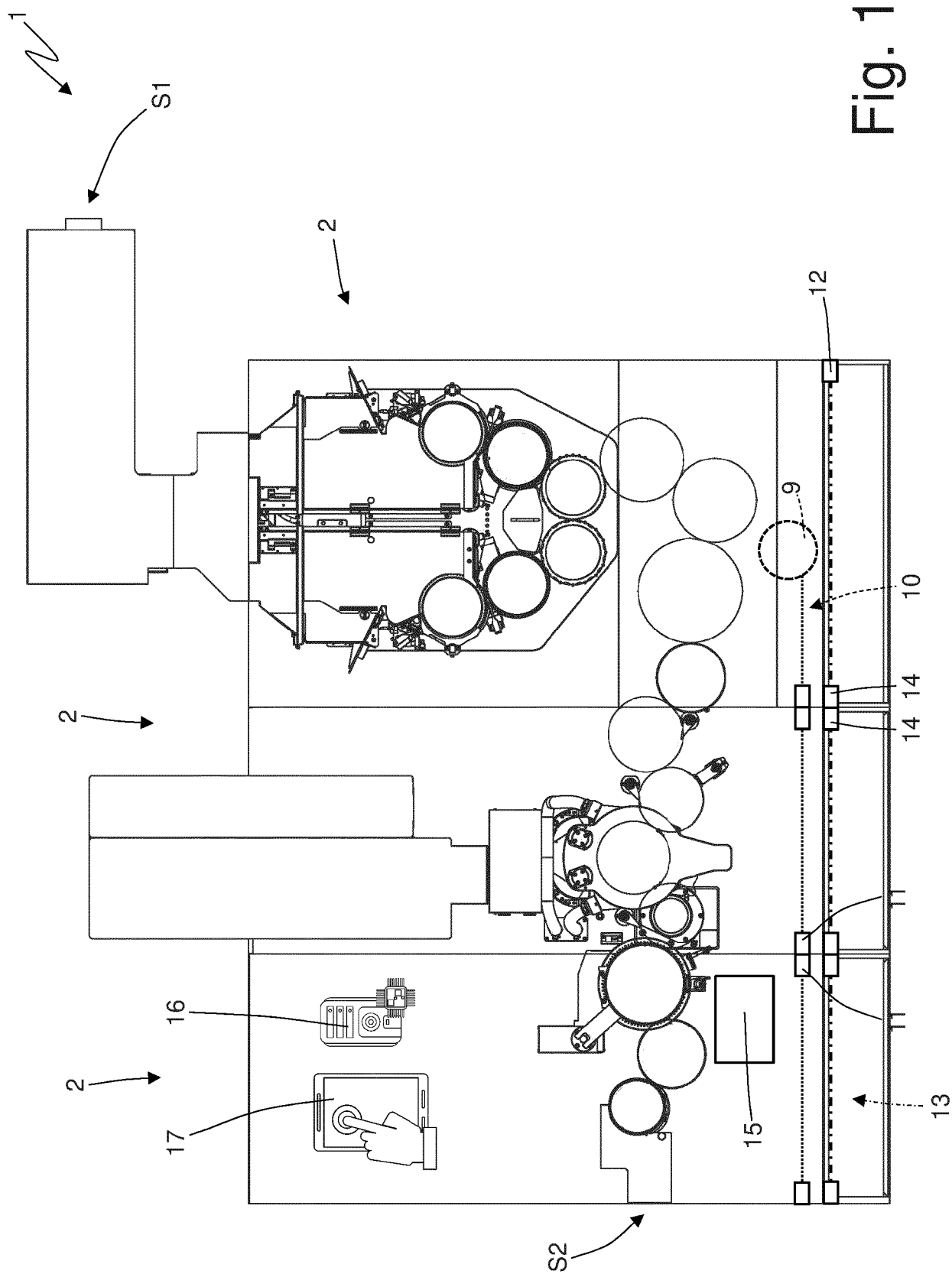
the manufacturing machine (1) comprises a plurality of modules (2), each substantially having the shape of a parallelepiped; the modules (2) are placed one after another and beside one another and are arranged between a first input station (S1), where a first material or a first semi-finished product enters the manufacturing machine (1), and an output station (S2), where a finished product leaves the manufacturing machine (1);
the manufacturing machine (1) comprises: an input module (2), where the first input station (S1) is defined, an output module (2), where the output station (S2) is defined, and at least one processing module (2), which is interposed between the input module (2) and the output module (2) and is configured to process the first material or the first semi-finished product;

wherein a module (2) comprises a first socket (12), which is designed to receive, from the outside, a first energy, in particular electrical energy or pneumatic energy in the form of compressed air;
the manufacturing machine (1) is **characterized in that:**

- a module (2) comprises a first generator (9), which is designed to generate a first operating means, in particular suction or water vapour;
first connection members (10) are provided between two adjacent modules (2) to transmit the first operating means between the two adjacent modules (2);
second connection members (13) are provided between two adjacent modules (2) to transmit the first energy between the two adjacent modules (2);
each module (2) has a first connector (11), which is part of the first connection members (10), is designed to transmit the first operating means and engages a corresponding first connector (11) of an adjacent module (2); and
each module (2) has a second connector (14), which is part of the second connection members (13), is designed to transmit the first energy and engages a corresponding second connector (14) of an adjacent module (2).
- 2. The manufacturing machine (1) according to claim 1, wherein the first connector (11) is the same for all modules (2).
- 3. The manufacturing machine (1) according to claim 1 or 2, wherein the second connector (14) is the same for all modules (2) .
- 4. The manufacturing machine (1) according to claim 1, 2 or 3, wherein a module (2) has a second male or female connector (14) and an adjacent module (2) has a second male or female connector (14) .
- 5. The manufacturing machine (1) according to one of the claims from 1 to 4; wherein
a module (2) comprises a second generator, which is designed to generate a second operating means, in particular suction or water vapour, different from the first operating means; and third connection members are provided between two adjacent modules (2) to transmit the second operating means between the two adjacent modules (2).
- 6. The manufacturing machine (1) according to one of the claims from 1 to 5; wherein:

a module (2) comprises a second socket, which is designed to receive, from the outside, a second energy, in particular electrical energy or pneumatic energy in the form of compressed air, different from the first energy; and
fourth connection members are provided between two adjacent modules (2) to transmit the second energy between the two adjacent modules (2).

- 7. The manufacturing machine (1) according to one of the claims from 1 to 6, wherein a second input station (S3) is defined in the processing module (2), where a second material or a second semi-finished product enters the manufacturing machine (1).
- 8. The manufacturing machine (1) according to one of the claims from 1 to 7, wherein at least one module (2) comprises a collection unit (15) to collect production waste and/or production residues.
- 9. The manufacturing machine (1) according to one of the claims from 1 to 8, wherein the processing module (2) is configured to alternatively carry out:
 - a change in the distance between adjacent objects, namely a lengthening or a shortening of a distance between adjacent objects;
 - a combination of at least two objects, which are placed next to one another head-to-head;
 - a joining of objects placed next to one another head-to-head by wrapping a band around the objects placed next to one another head-to-head;
 - a laser perforation;
 - a quality check;
 - a transformation from longitudinal motion to cross motion or vice versa;
 - a manufacturing of a tobacco rod;
 - a manufacturing of a filter rod;
 - an insertion of a solid or powdery material.
- 10. The manufacturing machine (1) according to one of the claims from 1 to 9, wherein at least one module (2) comprises, on the inside, at least one controller (16) for the machine (1), which controls the operation of the manufacturing machine (1).
- 11. The manufacturing machine (1) according to one of the claims from 1 to 10, wherein at least one module (2) comprises, on the inside, a user interface (17) provided with a screen, preferably a touch screen, to interact with a machine operator.



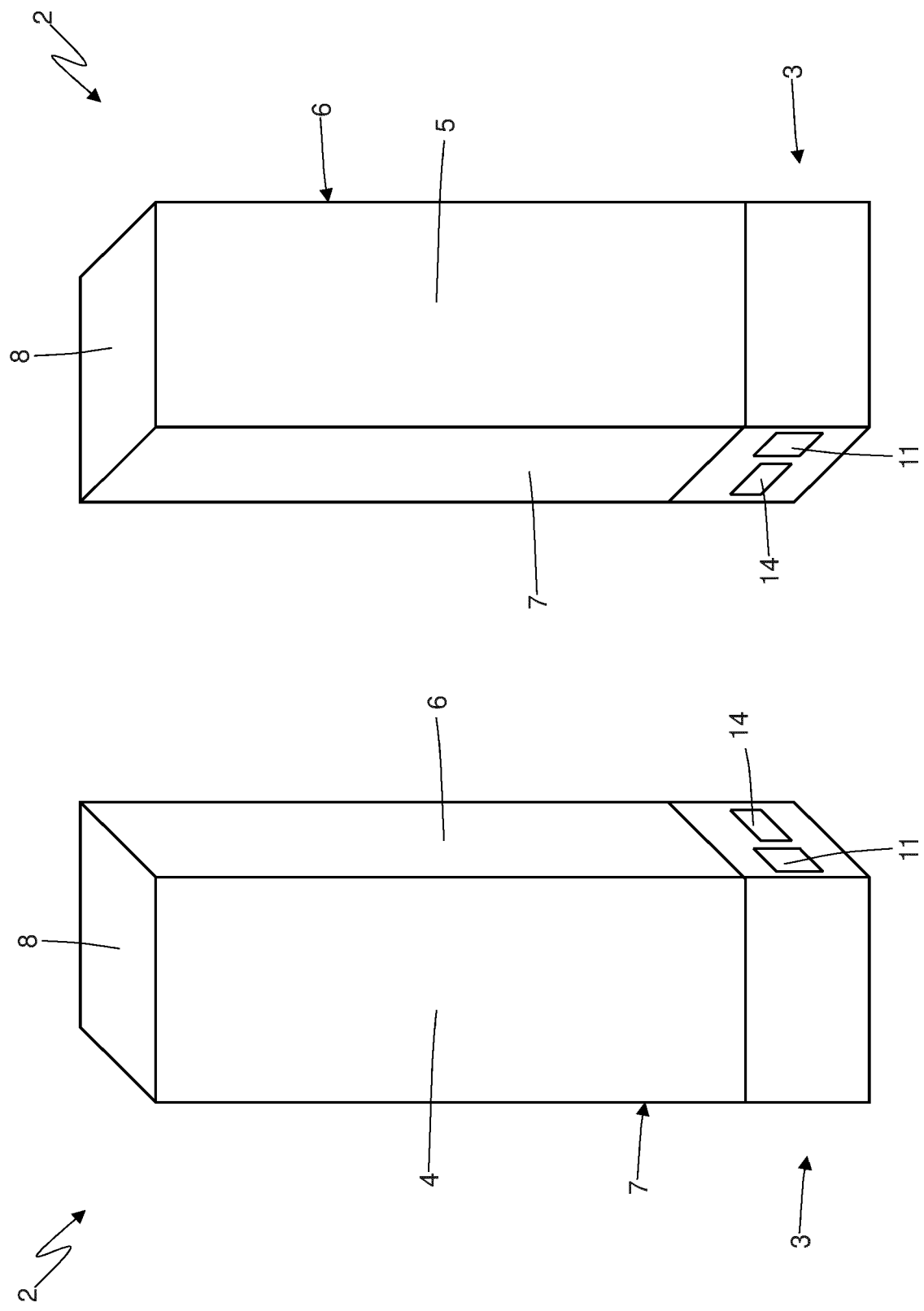


Fig. 2

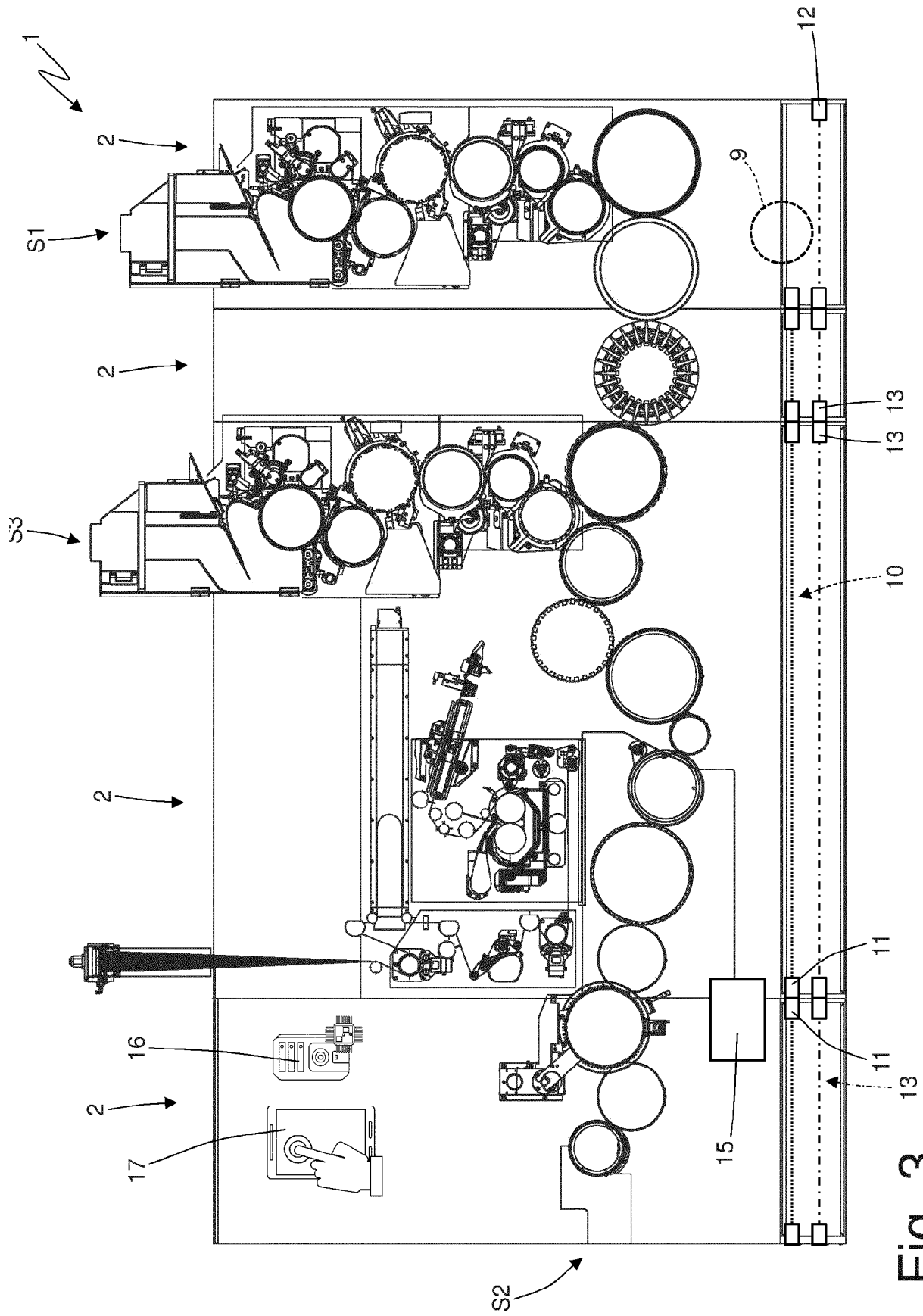


Fig. 3

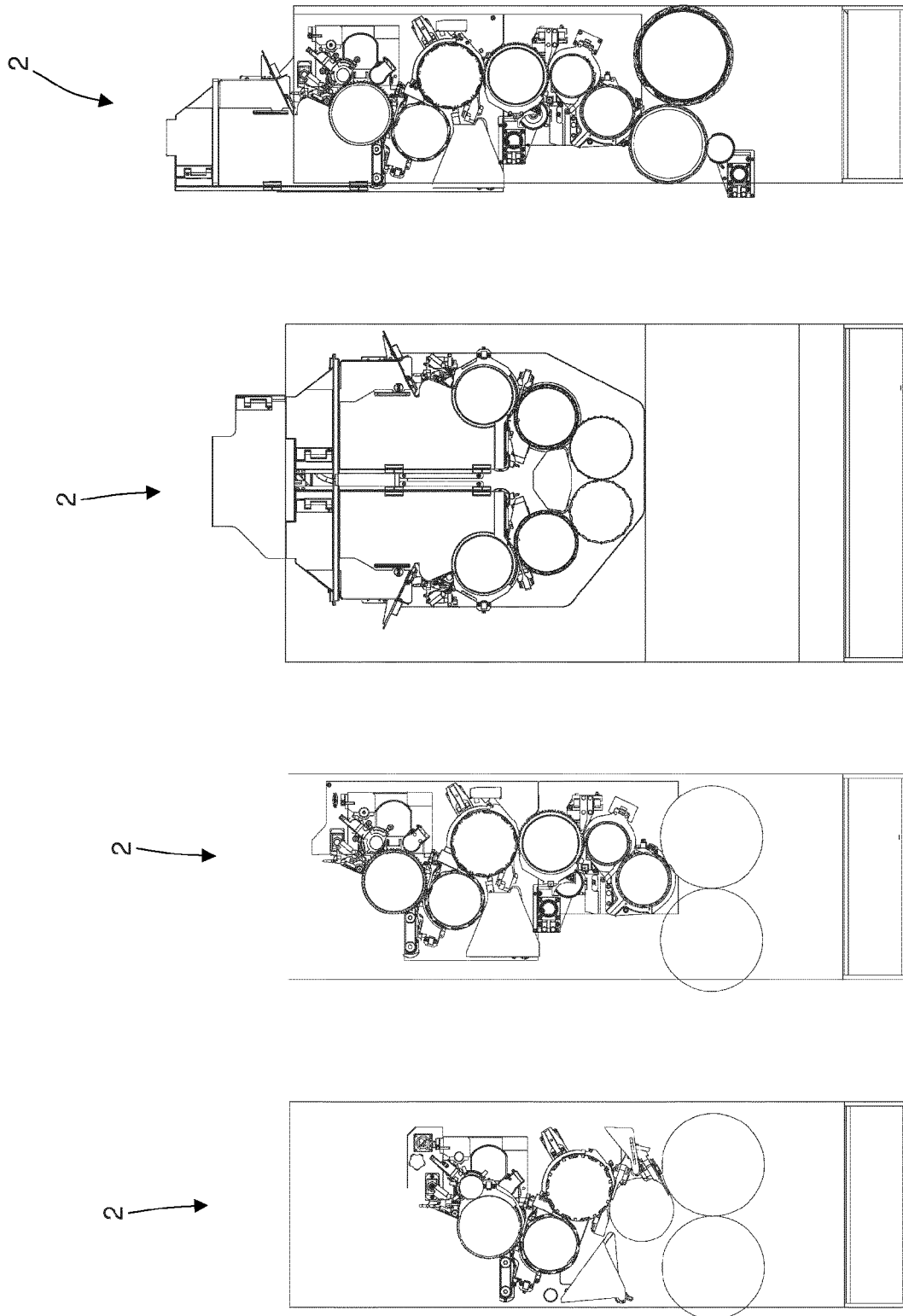


Fig. 4

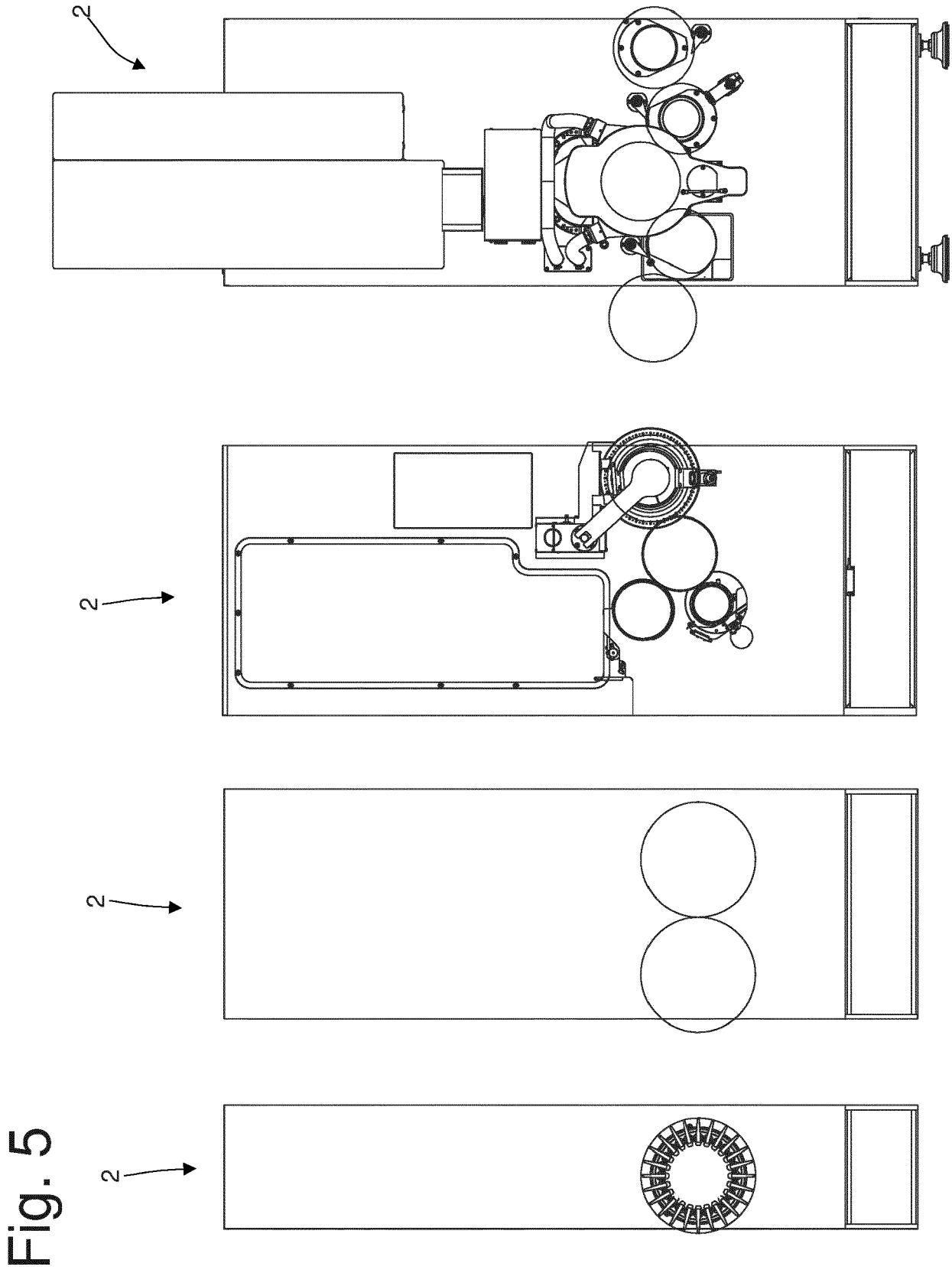
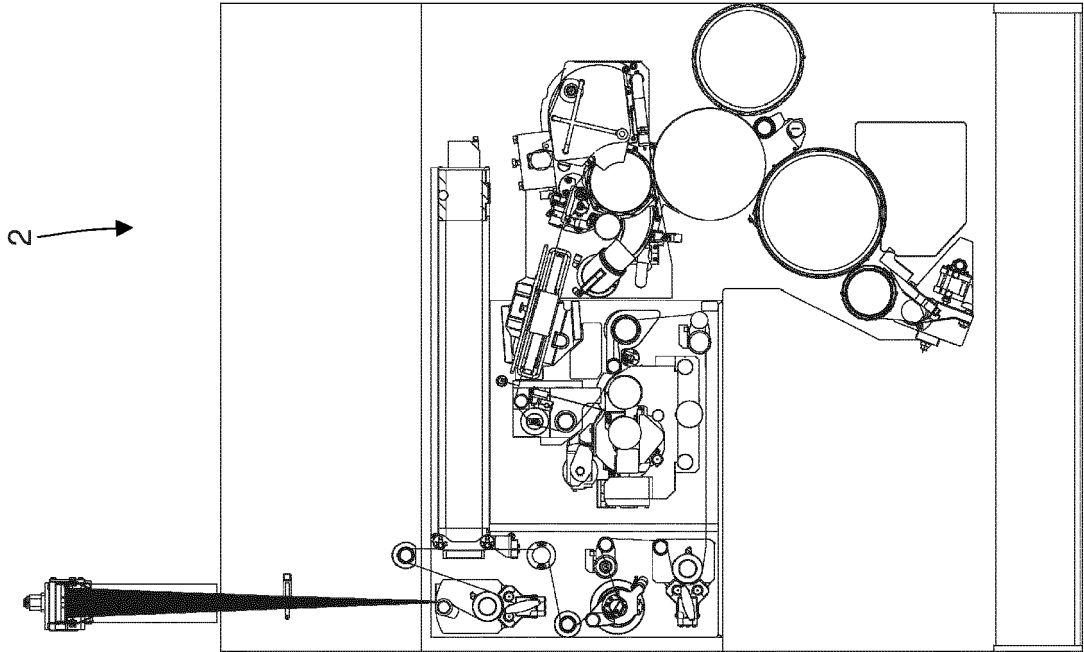
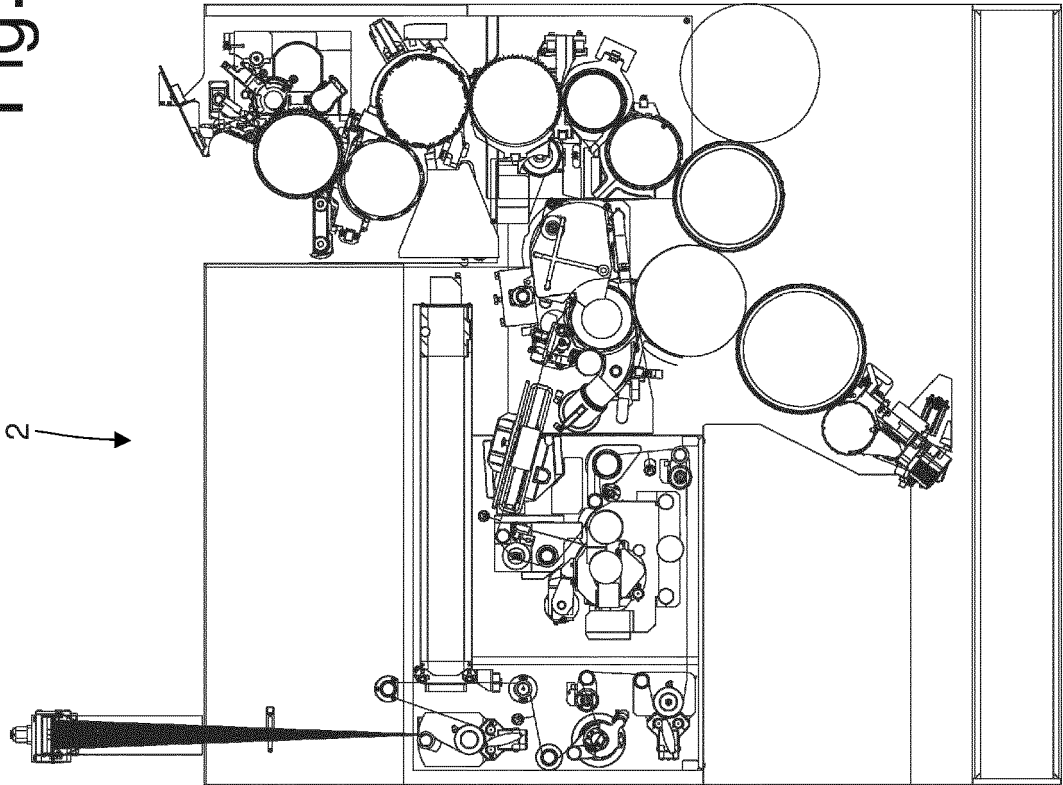


Fig. 6





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Place of search Munich		Date of completion of the search 8 February 2022	Examiner Damiani, Alberto
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