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(54) **MACHINE FOR APPLYING GLUES OR ADHESIVES TO FABRICS OR THE LIKE**

(57) A machine for applying glues or adhesives to fabrics or the like, which comprises a frame (11) which supports:

- a distribution roller (12) for distributing glue on the fabric (13) which rotates about an axis (A),
- a pressing roller (14) for pressing the fabric (13) against the distribution roller (12),
- dosing means (15) for dosing the glue on the distribution

roller (12).

The distribution roller (12) comprises a body (16), which is coupled to the frame (11) and rotates about the axis (A), and a tubular jacket (17) around the body (16), which rotates integrally with it and can be removed from it. The jacket (17) is adapted to bear, on its outer surface, the glue to be deposited on the fabric (13).

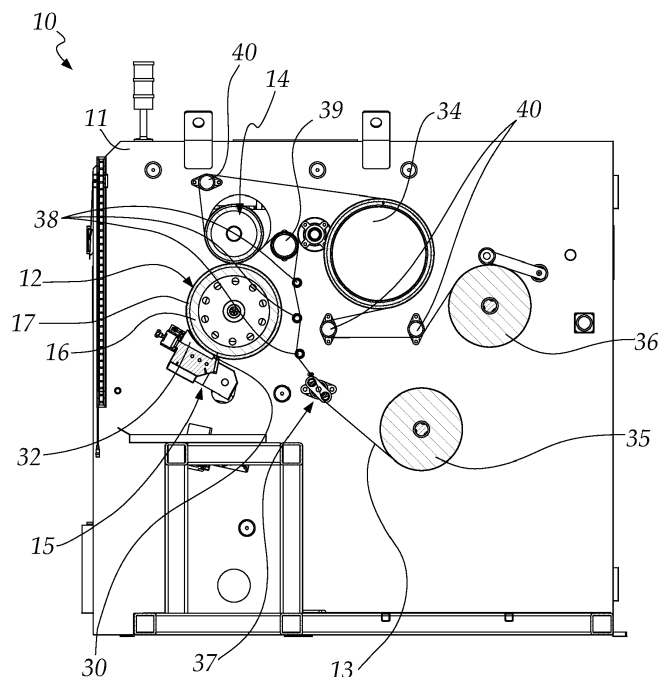


Fig.4

Description

[0001] The present invention relates to a machine for applying glues or adhesives to fabrics or the like.

[0002] The invention has applications, in particular, where it is necessary to apply: high-temperature adhesives (known in the sector as "hot-melt" adhesives), thermoplastic adhesives, or reactive adhesives.

[0003] Nowadays machines are known for spreading adhesive films on fabrics, which comprise a frame which supports:

- a roller for dosing adhesive, which rotates about a rotation axis, or a doctor,
- a distribution roller for distributing adhesive, which rotates about another axis,
- a pressing roller for pressing the fabric, membrane or the like, against the distribution roller, for spreading the adhesive film,
- means of bringing the dosing roller and the distribution roller against each other.

[0004] The fabric to be worked is made to pass between the distribution roller and the pressing roller, so that the distribution roller spreads a film of the adhesive that it carries on a face of this fabric.

[0005] However, the application of an adhesive film on a fabric prevents the transpiration of the fabric.

[0006] Where the application of a fabric or of a membrane or the like on another fabric must not negate the breathability of the final product, the practice is widespread of adhesive bonding in a matrix of points.

[0007] In such case, the machines comprise an adhesive distribution roller that presents a matrix of impressions on its surface, and a doctor, with a reservoir of adhesive, that fills the impressions with adhesive and cleans the remaining surface. In this manner the fabric that passes between the distribution roller and the pressing roller is subjected to a distribution of adhesive in points.

[0008] These machines are not devoid of drawbacks.

[0009] First of all, in changes of production, for example for a change of fabric, or for a different thickness of gluing points, rapid operations are needed to change the distribution roller, in order to limit downtimes.

[0010] Furthermore, often such machines are used in production facilities employing workers who are for the most part female, for whom the operations to change a roller may be demanding.

[0011] In the machines known nowadays, the distribution roller is constituted by a cylindrical body made of carbon steel, which is hollow inside and which has an oil passage in its cavity which is heated with an armored electrical resistance.

[0012] In order to change the type of engraving or the basis weight of the glue, it is necessary to substitute the cylindrical body, the weight and encumbrance of which are such as to require the use of an overhead crane to

lift it.

[0013] The aim of the present invention is to provide a machine for applying glues or adhesives to fabrics or the like which is capable of improving the known art in one or more of the above mentioned aspects.

[0014] Within this aim, an object of the invention is to provide a machine that is adaptable to changes in production, rapidly and requiring the least physical effort possible from the operators.

[0015] Another object of the invention is to facilitate operations to substitute the distribution roller.

[0016] A further object of the present invention is to overcome the drawbacks of the background art in a manner that is alternative to any existing solutions.

[0017] Another object of the invention is to provide a machine that is highly reliable, easy to implement and low cost.

[0018] This aim and these and other objects which will become better apparent hereinafter are achieved by a machine for applying glues or adhesives to fabrics or the like, which comprises a frame which supports:

- a distribution roller for distributing glue on the fabric which rotates about an axis,
- a pressing roller for pressing the fabric against said distribution roller,
- dosing means for dosing said glue on said distribution roller,

said machine being characterized in that said distribution roller comprises a body, which is coupled to said frame and rotates about said axis, and a tubular jacket around said body, which rotates integrally with it and can be removed from it, said jacket being adapted to bear, on its outer surface, the glue to be deposited on the fabric.

[0019] Further characteristics and advantages of the invention will become better apparent from the description of a preferred, but not exclusive, embodiment of the machine according to the invention, which is illustrated by way of non-limiting example in the accompanying drawings wherein:

- Figure 1 is a perspective view of the machine according to the invention, open on one side to show its internals;
- Figure 2 is a view similar to Figure 1 of the machine according to the invention, during substitution of the jacket;
- Figure 3 is a perspective view of the machine according to the invention, partially open on one side;
- Figure 4 is a cross-sectional side view of the machine according to the invention;
- Figure 5 shows the machine, in views similar to Figure 1 and Figure 2, in a different configuration.

[0020] With reference to the figures, the machine according to the invention, generally designated by the reference numeral 10, comprises a frame 11 which sup-

ports:

- a distribution roller 12 for distributing glue on the fabric 13 which rotates about an axis A,
- a pressing roller 14 for pressing the fabric 13 against the distribution roller 12,
- dosing means 15 for dosing the glue on the distribution roller 12.

[0021] Three portions can be identified in the machine 10, of which one is innermost, indicated with 50, in which the fabric is processed, the above mentioned rollers and means being present therein, and two external portions 51 and 52, on opposite sides of the internal portion 50, in which means for aiding the operation of the previously-mentioned components are boxed, which are described below.

[0022] In Figures 1, 2, 3 and 5 some walls of the box-like bodies have been removed, where the external portions are identified, in order to show the means for aiding.

[0023] The peculiarity of the invention lies in the fact that the distribution roller 12 comprises a body 16 with a tubular jacket 17 around the body 16. In particular, the body is coupled to the frame 11 with respect to which it rotates about the axis A, and the jacket 17 rotates integrally with the body 16 and can be removed from it. Furthermore, the jacket 17 is adapted to bear, on its outer surface, the glue to be deposited on the fabric.

[0024] The body 16 preferably has a cylindrical shape. However, in other versions, not shown, the body 16, and hence also the jacket 17, can have a conical shape.

[0025] The jacket 17 is preferably made of carbon steel, while the body 16 is preferably made of aluminum, especially heat-treated to ensure stability and resistance to wear.

[0026] The body 16 is internally hollow and on the inner surface electric resistance heaters are distributed for transmitting heat to the body 16 itself and therefore to the jacket 17. The operating temperature at which the jacket 17 is used is preferably approximately 150°C.

[0027] The jacket 17 has a tubular shape structure with a matrix of impressions 18 on its outer surface, which bear the glue to be deposited on the fabric.

[0028] On the outer surface of the body 16, at one of its ends, there is a screw head 33 and at one end of the jacket 17 there is an indentation, obtained preferably by milling, with which it is arranged at the screw head 33. The screw head 33 is indicated in Figure 1.

[0029] On the outer surface of the body 16 there is also a helical groove 47 which, when the jacket 17 is coupled with the body 16, acts as a coil for the passage of a cooling fluid, preferably air.

[0030] Figure 1 and Figure 2 show the machine 10 in the same perspective view and during an operation to substitute the jacket 17. In particular, Figure 1 shows the jacket 17 mounted on the body 16, while Figure 2 shows the jacket 17 just removed or about to be mounted, in the external portion 51 of the machine.

[0031] When the machine 10 is inactive, for example for maintenance or to change the jacket 17, the body 16 is coupled in a cantilever fashion to the frame 11, where it is kept guided by bearings.

[0032] Advantageously, it is possible to substitute the jacket 17 with adapted means: the machine 10 comprises means for translating 19 the jacket 17 along the axis A coupled with the body 16 and uncoupled, which in turn comprise parallel rails 22, which can be extracted in a drawer-like fashion, with a carriage 20 adapted to move the jacket 17 into and out of the machine. The machine 10 according to the invention also comprises means for lifting 21 the rails 22 and the carriage 20.

[0033] Figure 5 shows the carriage 20 completely extracted from the machine 10.

[0034] The carriage 20 comprises idle wheels 23 which roll on the parallel rails 22. The wheels 23 support a structure for resting the jacket 17, constituted by two lateral shoulders 24 that contain the jacket 17 itself and, between these, two contoured pans 25, in the front part and in the rear part, contoured with an upward-facing concavity, for resting the jacket 17 (as shown in Figure 2).

[0035] To extract the rails 22 with the carriage in the manner of a drawer, a handle 26 can be used.

[0036] The lifting means 21 comprise a screw gear reducer 27 below the rails 22, to be actuated manually using an handwheel 28 with a handle. The reducer is indicated in Figure 1.

[0037] The rails 22, the carriage 20 and the reducer 27 are conveniently installed in the external portion 51, from which the rails 22 and the carriage 20 can be extracted from the machine 10 for substitution of the jacket 17.

[0038] There are also presence sensors 29 which detect the position of the carriage 20. These are installed at the rails 22: two of them 29a, 29b are installed in the external portion 51, and another one 29c is installed in the internal portion 50.

[0039] The sensor 29a is adapted to detect the presence of the carriage 20 when this is fully extracted from the external portion 51, by detecting the presence of a notch on the carriage.

[0040] The sensor 29b is adapted to detect the presence of the carriage 20 if it is lifted.

[0041] The sensor 29c in the internal portion 50, indicated in Figure 5, is adapted to detect the presence of the carriage 20 in the internal portion 50 of the machine.

[0042] The dosing means 15 comprise a doctor 30, preferably made of harmonic steel, which is provided with means for movement 31 toward or away from the distribution roller 12. The doctor 30 is indicated in Figure 4.

[0043] The sensor 29c that detects the presence of the carriage 20 in the internal portion 50 sends a signal to software controlling the machine that prevents the doctor 30 from approaching.

[0044] If the sensor 29a detects the presence of the carriage 20, i.e. that the carriage has been extracted, the software allows the doctor 30 to approach the distribution roller 12.

[0045] The means for movement 31 comprise two actuators, one per side of the machine, like the one shown in the view in Figure 3, which are adapted to raise and lower a support 32 carrying the doctor 30, and two pneumatic pistons 46, one per side, which are adapted to rotate the support 32, which is hinged to the frame 11 about an axis parallel to the axis A.

[0046] The translation and rotation of the support 32 determine the approach of the doctor 30 to the distribution roller 12, in a controlled manner as a function of the thickness of the jacket 17 mounted on the body 16.

[0047] The support 32 also carries a reservoir for the glue, heated in order to maintain the glue at a (preferable) temperature of 150°C during use of the machine 10.

[0048] Figure 4 shows a cross-section of the machine 10, during its use.

[0049] The following are shown and indicated:

- the distribution roller 12, with body 16 and jacket 17,
- the pressing roller 14,
- the dosing means 15, with the support 32 for the doctor 30 (here brought near the jacket 17),
- a cooling roller 34,
- a spool of untreated fabric 35,
- a spool of treated fabric 36,
- the fabric 13 on its path to be treated.

[0050] In succession, the fabric 13 being treated also encounters other elements:

- a tension regulator 37, conventional, with two portions of passage of the fabric on opposite sides of a fulcrum, which is adapted to ensure a constant tension on the fabric 13,
- a series of preceding idle rollers 38,
- a stretching roller 39 for stretching the fabric, known in the sector as a "tentering screw", upstream of the distribution roller 12 and of the pressing roller 14, which is adapted to stretch out the selvages of the fabric with its rotation,
- a series of other idle rollers 40, one of which is downstream of the distribution roller 12 and of the pressing roller 14, and the others are downstream of the cooling roller 34.

[0051] From the views of Figure 1 and of Figure 2 the following can be identified:

- an electric motor 41 which is adapted to rotate a pulley 42 which is keyed on a transmission shaft for transmitting the rotation to the stretching roller 39,
- a linkage 43 for adjusting the position of the pressing roller 14 (which is coupled thereto at the end), toward and away from the distribution roller 12, such linkage 43 being pivoted at the right-hand end, with respect to the illustration, and moved by a pneumatic actuator 44 at the opposite end,
- a chiller 45, protruding with a connector of a tube for

the passage of water or other coolant liquid, from the end of the cooling roller 34.

[0052] As a function of the thickness of the fabric and of the jacket 17, the position of the pressing roller 14 is modified, in so doing calibrating the distance from the jacket 17 in order to ensure the right level of pressure.

[0053] Operation of the machine, according to the invention, is the following.

[0054] The fabric 13 is made to pass between the pressing roller 14 and the distribution roller 12. The pressing roller 14, which is conveniently rubberized, exerts a pressure on the surface of the jacket 17, causing the adhesion of the gluing points, which are in the matrix, on the fabric 13.

[0055] The fabric 13 is brought into contact with the cooling roller 34 which crystallizes the gluing points.

[0056] When it becomes necessary to modify the gluing points, for example for a different basis weight or for a fabric of different thickness, the jacket 17 is substituted for one with a different diameter and/or with a different matrix of impressions: this requires the cooling of the distribution roller 12, following which the jacket can be easily extracted on the carriage 20 toward the lateral external portion 51.

[0057] Before extraction, the doctor 30 is moved away from the distribution roller 12, in the position shown in Figures 1 and 2.

[0058] The rails 22 with the carriage 20 are brought below the jacket 17, in the internal portion 50 of the machine. The jacket 17 on the supporting structure is then made to translate outside with the carriage 20 and with the rails 22.

[0059] Another jacket 17 is positioned on the carriage 20, and this is made to translate vertically using the screw gear reducer 27, in order to obtain the centering of the new jacket 17 on the rotation axis A.

[0060] The jacket 17 is then made to translate toward the innermost portion 50 so as to fit over the body 16, according to a single angular position defined by the screw head 33.

[0061] As long as the sensor 29c detects the presence of the carriage 20 in the internal portion, the doctor 30 will not be brought near the distribution roller 12.

[0062] Once the rails 22 and the carriage 20 are moved away, these are detected by the sensor 29a in the external portion 51. The support 32 of the doctor 30 is made to translate and rotate using actuators 31 and pneumatic pistons 46, in order to bring the doctor 30 into contact with the jacket 17 of the distribution roller 12.

[0063] The body 16 is heated using the adapted heating elements and the heat is then transmitted to the jacket 17.

[0064] The thermal expansion coefficient of aluminum, of which the body 16 is made, is approximately double that of the carbon steel of which the jacket 17 is made. This ensures that the expansion of the body 16 is greater than that of the jacket 17, thus creating a compression

on the body and so ensuring the mechanical seal between the two and the transmission of temperature to the jacket 17, which is necessary in operating conditions.

[0065] To extract the jacket, the cooling can be carried out with the air system, in order to obtain the shrinkage of the materials in the shortest possible time.

[0066] In practice it has been found that the invention fully achieves the intended aim and objects by providing a machine that can be modified as a function of changes in production, rapidly and requiring the least physical effort possible from the operators, simply by substituting a part of the distribution roller.

[0067] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. Moreover, all the details may be substituted by other, technically equivalent elements.

[0068] In practice the materials employed, provided they are compatible with the specific use, and the contingent dimensions and shapes, may be any according to requirements and to the state of the art.

[0069] The disclosures in Italian Patent Application No. 102020000004402 from which this application claims priority are incorporated herein by reference.

[0070] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A machine for applying glues or adhesives to fabrics or the like, which comprises a frame (11) which supports:

- a distribution roller (12) for distributing glue on the fabric (13) which rotates about an axis (A),
- a pressing roller (14) for pressing the fabric (13) against said distribution roller (12),
- dosing means (15) for dosing said glue on said distribution roller (12),

said machine (10) being **characterized in that** said distribution roller (12) comprises a body (16), which is coupled to said frame (11) and rotates about said axis (A), and a tubular jacket (17) around said body (16), which rotates integrally with it and can be removed from it, said jacket (17) being adapted to bear, on its outer surface, the glue to be deposited on the fabric (13).

2. The machine according to claim 1, **characterized in that** said jacket (17) has a tubular shape with a matrix of impressions (18) on its outer surface, which bear

the glue to be deposited on said fabric (13).

3. The machine according to one or more of the preceding claims, **characterized in that** said body (16) has a cylindrical shape.
4. The machine according to one or more of the preceding claims, **characterized in that** said jacket (17) is made of carbon steel and said body (16) is made of aluminum.
5. The machine according to one or more of the preceding claims, **characterized in that** on the outer surface of said body (16) there is a helical groove (47) which, when the jacket (17) is coupled to said body (16), acts as a coil for the passage of cooling fluid.
6. The machine according to one or more of the preceding claims, **characterized in that** said dosing means (15) comprise a doctor (30) which is provided with means for movement (31) toward and away from said distribution roller (12).
7. The machine according to one of one or more of the preceding claims, **characterized in that** it comprises means for translating (19) said jacket (17) along said axis (A) coupled with said body (16) and uncoupled.
8. The machine according to one or more of the preceding claims, **characterized in that** said means for translating (19) comprise parallel rails (22) with a carriage (20) which are adapted to support said jacket (17).
9. The machine according to one or more of the preceding claims, **characterized in that** it comprises means for lifting (21) said rails (22) and said carriage (20).
10. The machine according to one or more of the preceding claims, **characterized in that** said means for lifting (21) comprise a screw gear reducer (27).

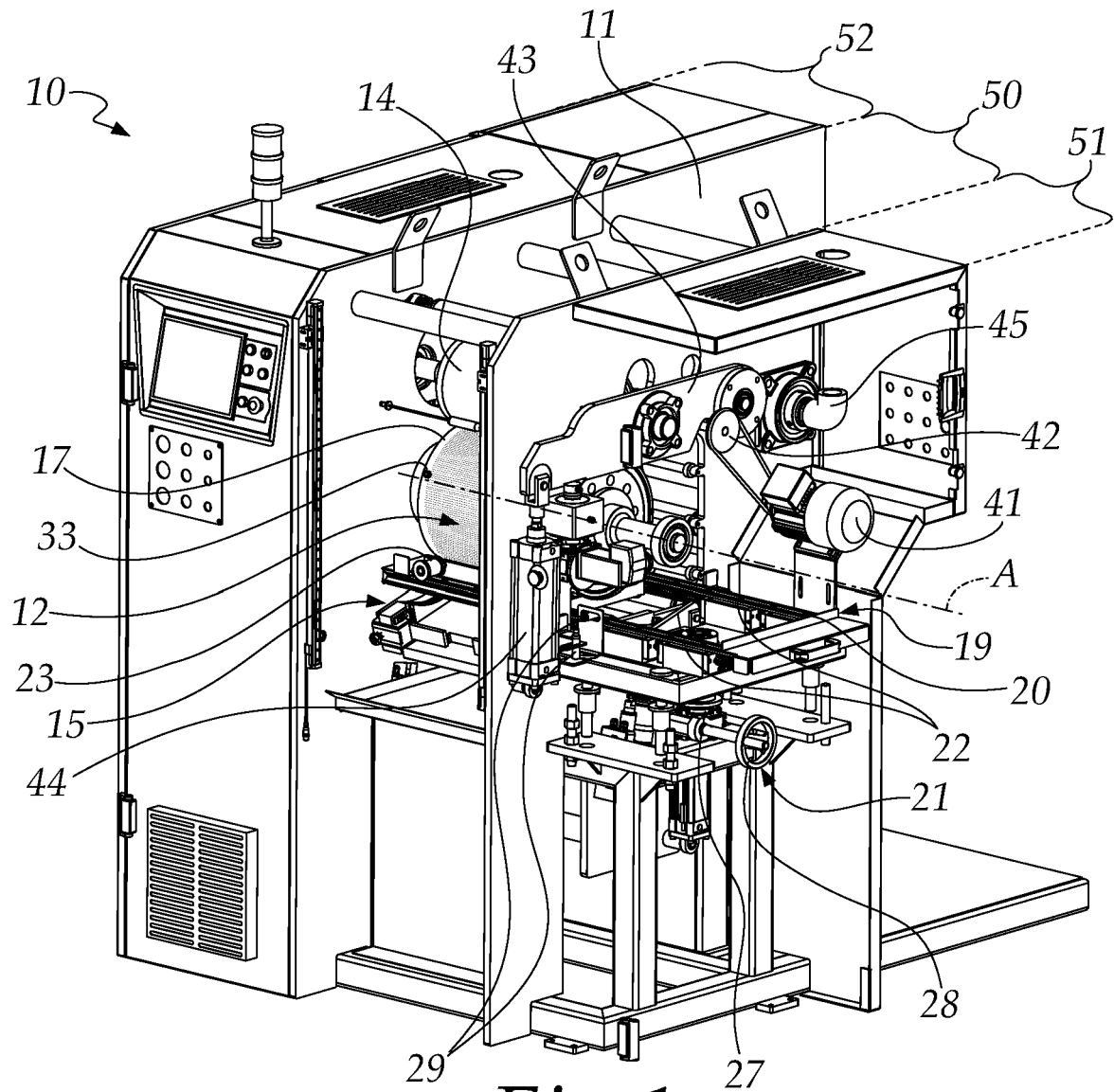


Fig.1

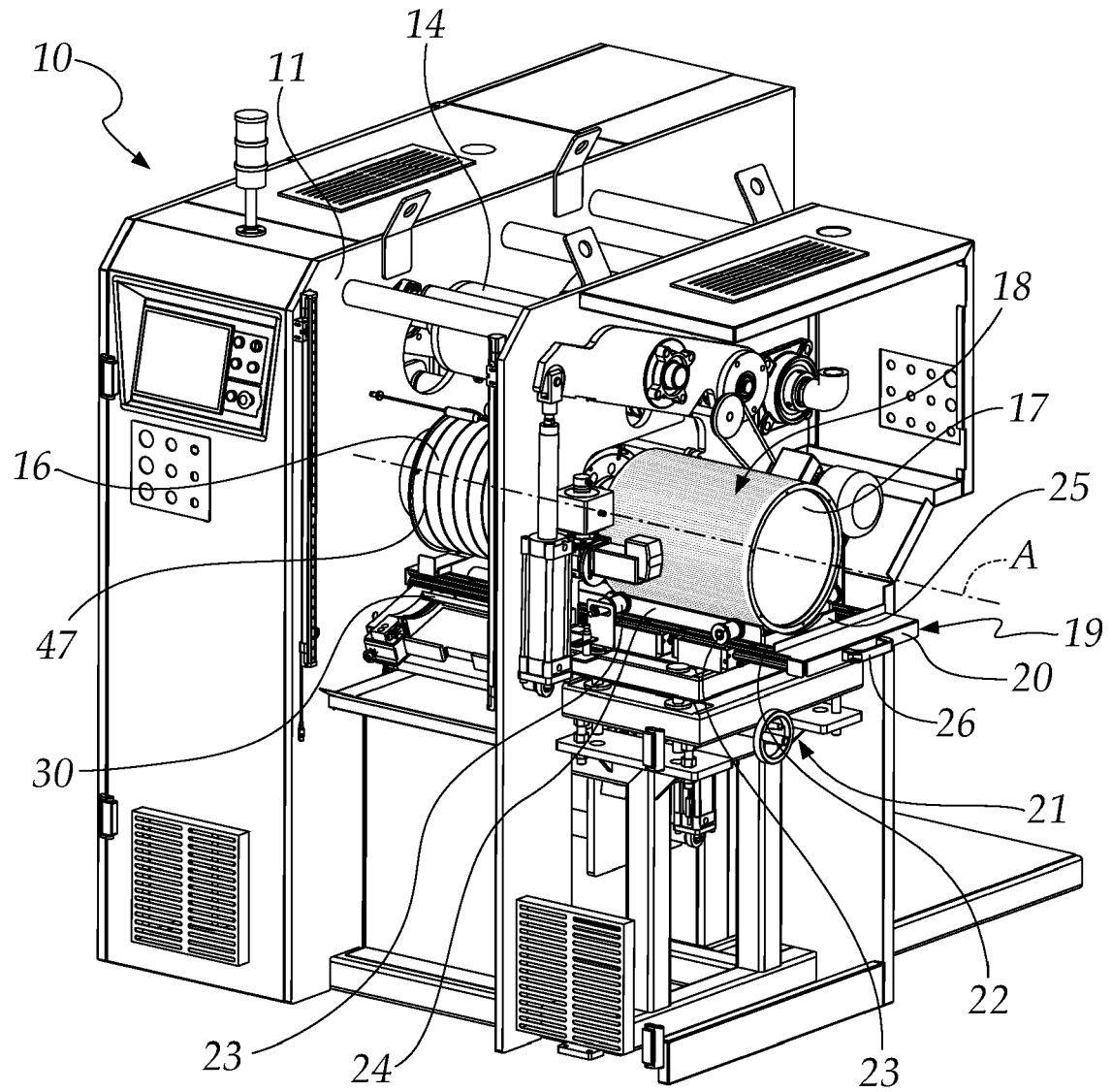
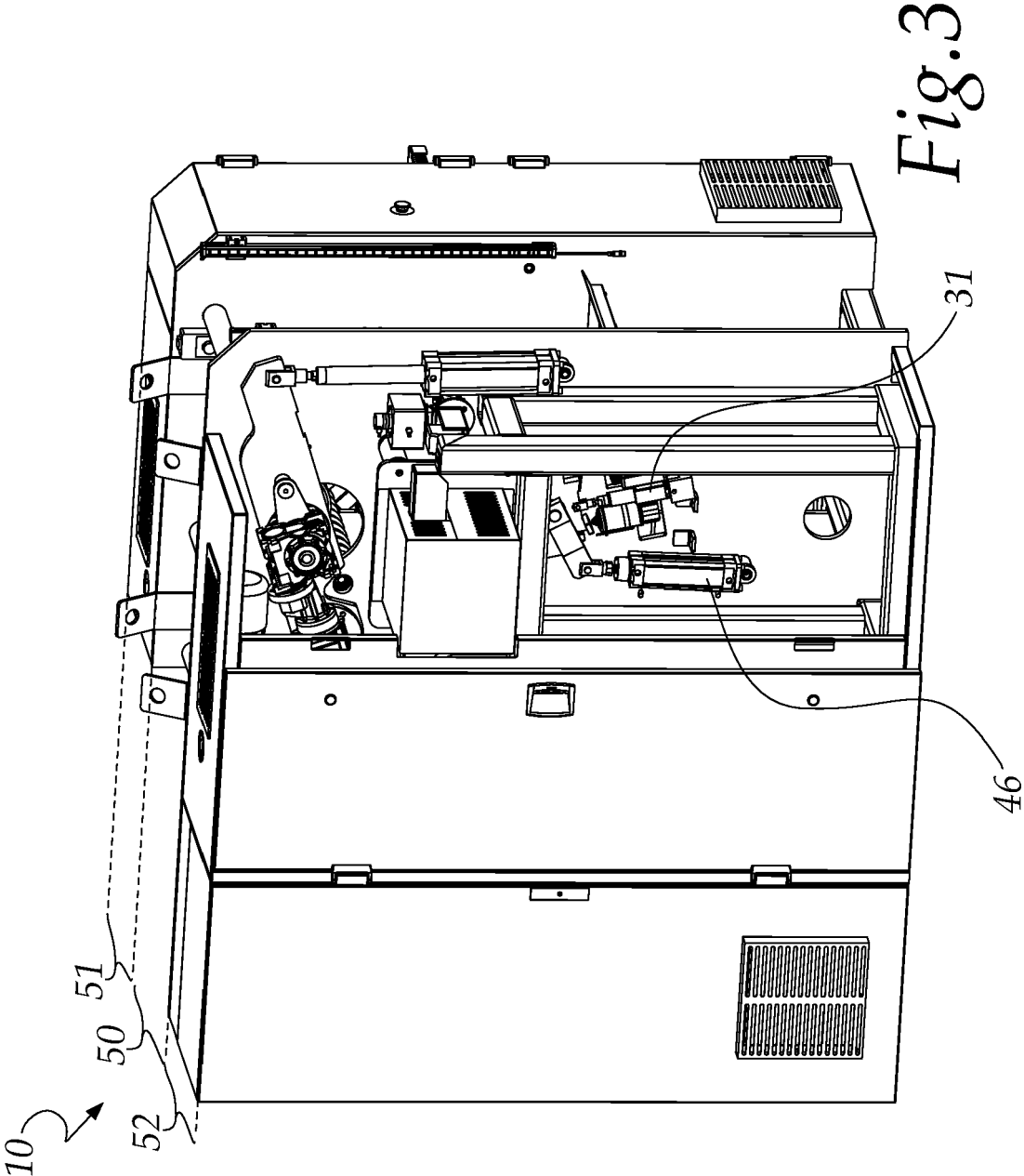


Fig.2



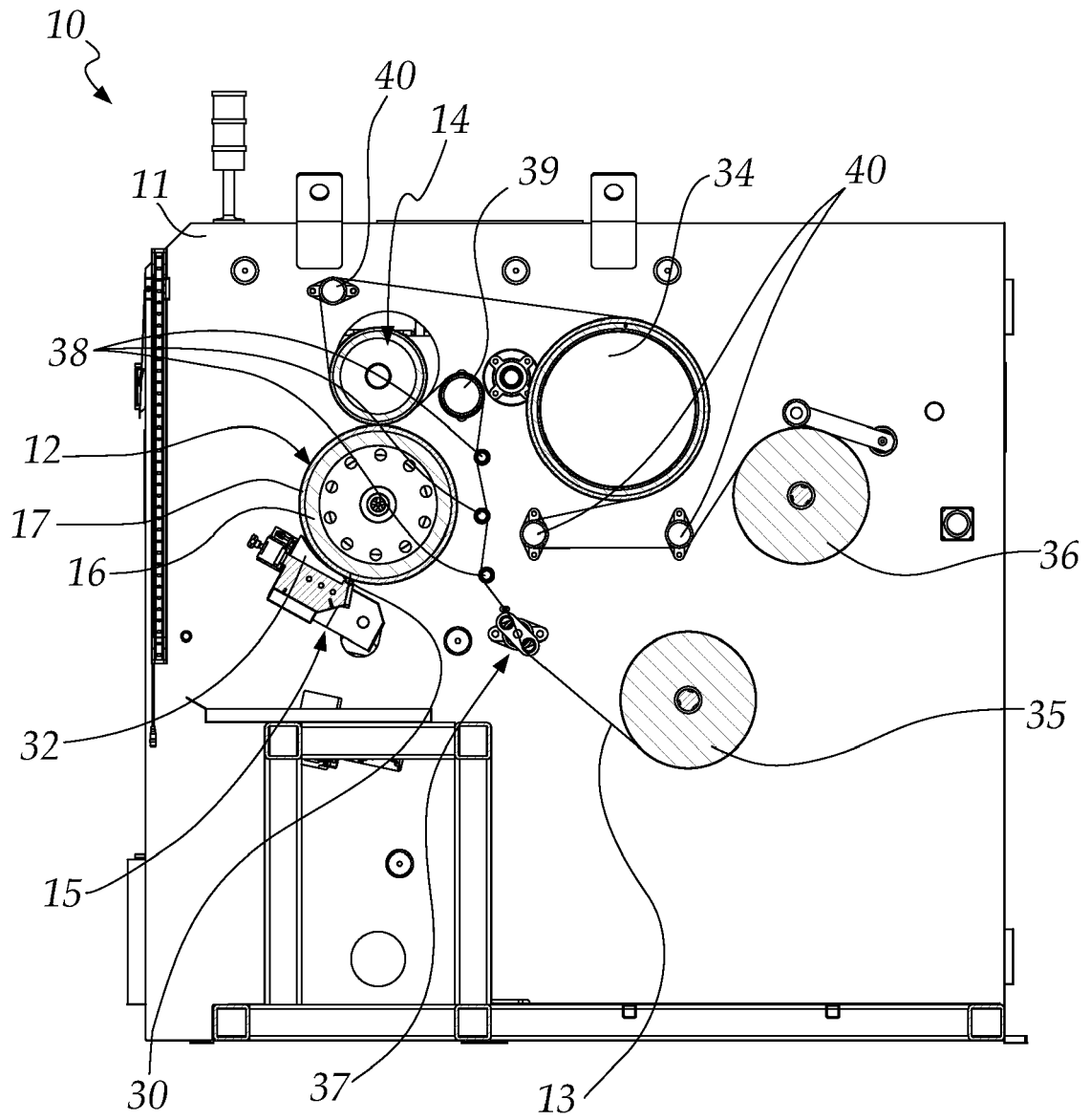


Fig.4

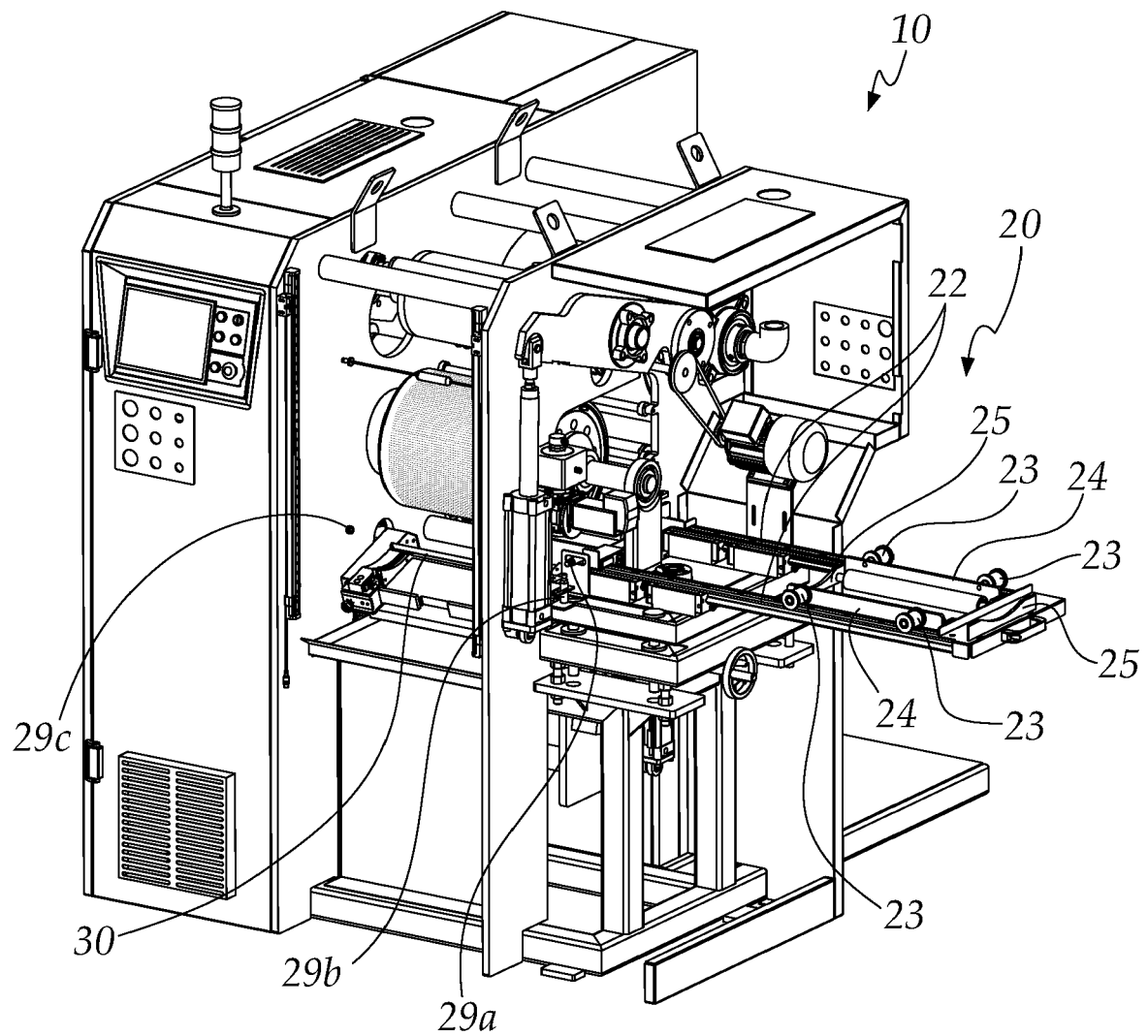


Fig.5



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Application Number
EP 21 15 5957

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 28 June 2021	Examiner Roldán Abalos, Jaime
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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