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(54) **Modular manufacturing machine**

(57) The individual segments (103, 203, 303) of a tubular wireway (3) extending itself along the machine and designed to contain electrical cables and/or pipelines for fluids, or similar, are associated with and fixed each to a module (101, 102, 103) of the bed (1) and each provided with at least one branch (133, 233, 333) for the passage of the electrical cables and/or pipelines

for fluids, or similar that connect the working unit or units mounted on their respective module (101, 102, 103) of the bed (1), with other parts of the machine or installations, in which the machine is integrated, such as supply and/or control units, or similar.

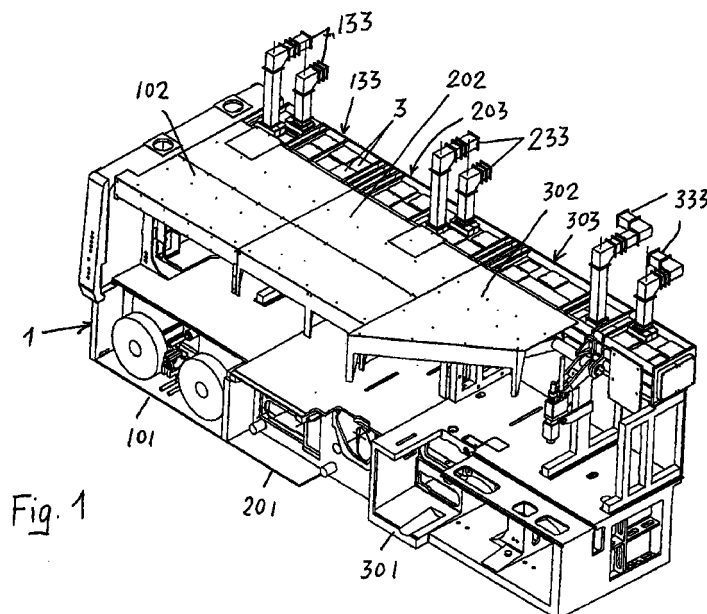


Fig. 1

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Description

[0001] The invention relates to a modular making machine, in particular a machine for processing tobacco and/or for packaging of tobacco products, such as cigarettes or similar, comprising a bed formed by a plurality of base modules placed side by side and eventually aligned with each other as well as fixed to each other preferably in a removable manner, at least one working unit or at least part of a working unit being mounted on each of at least some of these base modules, and at least one trough being provided, so called wireway, preferably in part tubular and that extends itself along the base modules and is designed to contain electrical cables and/or pipelines for fluids, or similar, to connect at least some working units with each other and/or with other parts of the machine and/or installation, in which the machine is integrated, such as supply units, drive units, control units and others, and the said wireway is formed by segments each associated with and fixed to a base module and connected to each other preferably in a removable manner.

[0002] The modular making machines of this type are the subject of collateral patent applications of the same titular and have besides the advantage that their assembly is easier, more flexible, faster and less costly, in that at least a large part of the working units or of their parts can be pre-assembled on the respective base modules, in substance already in their correct condition of work and reciprocal co-operation, whereby, after assembly of the machine by placing side by side and reciprocal fixing of the base modules, the working units will be automatically in their correct relative positions of work and co-operation and require eventually only small corrections and adjustments of position due to possible tolerances.

[0003] The present invention aims at achieving a still easier and faster assembly of the modular making machine of the above-mentioned type.

[0004] This problem is solved in substance by the invention by the fact that each of at least some of the individual segments of the wireway or wireways is equipped with at least one branch for the passage of at least one part of the electrical cables and/or pipelines for fluids, or similar, that connect the working unit or units mounted on the respective base module, with other parts of the machine and/or parts of the installation, in which the machine is integrated.

[0005] According to the invention, therefore, the working unit or units of each module of the machine can be connected with other parts of the machine or of the installation, in which the machine is integrated, such as supply and/or control units, each by at least one branch of the associated segment of the wireway, avoiding to have the cables and/or the pipelines for the fluids of the working units of all modules of the machine pass through a common, single branch of the wireway, that facilitates and speeds up the individual and independent

assembly, the disassembly and re-assembly of the different modules of the machine.

[0006] The above-mentioned feature of the machine furthermore forms the bases for a further advantageous perfecting according to the invention that consists in the fact that each of at least some modules of the machine can be equipped, already prior to the assembly of the machine, with the electrical cables and/or pipelines for fluids, or similar, necessary for connecting the working unit or units mounted on the respective base module with other parts of the machine or installation, in which the machine is integrated, such as supply and/or drive units, and the said cables and/or pipelines are passed through the branch or branches of the segment or segments of the wireways, fixed to the corresponding base module. At the final assembly of the machine on site of installation it is only required to connect with the other parts of the machine or of the installation (formed, for example, by supply units, drive units and/or control units, or similar) the electrical cables and/or pipelines for fluids, or similar, that are already connected with the respective working unit or units mounted on each base module and that are brought to the outside through the branch or branches of the segment or segments of the wireway, fixed to the same base module. Eventually, at the assembly of the machine, also the electrical cables and/or pipelines for fluids, or similar, already connected to the working unit or units mounted on the base module and designed to connect to one or more working units mounted on other base modules, are made to come out at one or both ends of the segment of the wireway or wireways fixed on the respective base module and are connected with the corresponding electrical cables and/or pipelines for fluids, or similar, housed in the segments of the wireway or wireways fixed on the adjacent base modules. In this manner, thanks to the above-mentioned individual "wiring" in advance of the individual modules of the machine by means of the branch or branches of the respective segments of the wireway or wireways of each module greatly facilitates and speeds up the fitting together and assembly of the modular making machine on site of installation.

[0007] The invention provides also further features that are subject of the other claims below.

[0008] The features of the invention and the advantages derived therefrom will be evidenced in greater detail from the following description of a preferred executive example, illustrated schematically and in form of a non limiting example in the enclosed drawings, in which:

[0009] The Fig. 1 illustrates in perspective a modular making machine according to the invention.

[0010] The Figs 2, 3, and 4 illustrate separately in perspective the frameworks of the working units mounted on the individual modules of the bed of the modular making machine according to Fig. 1.

[0011] The modular making machine illustrated is a machine for processing tobacco, and in particular a

machine for packaging of cigarettes, and is formed by a plurality of modules placed side by side. In accordance with this modular formation, the bed 1 of the machine is formed by a corresponding plurality of base modules 101, 201, 301, that are placed side by side fixed in a removable manner to each other and are made in preference in such a manner, to form a flat and substantially horizontal table. The fixing in a removable manner of the single modules 101, 201, 301 of the bed 1 to each other can be made in any suitable manner, for example by means of screws, possibly in combination with means of reciprocal positioning, such as dowel pins engaging in centering holes.

[0012] Working units or part of working units are mounted and fixed on the modules 101, 201, 301 of the bed 1 of the machine that are indicated schematically with at least one part of their framework and illustrated and described in more detail, as they can greatly vary. The frameworks of the different working units eventually form a flat and substantially horizontal table, as can be clearly seen from the drawings.

[0013] In the executive example illustrated, the modules 101, 201, 301 of the bed 1 of the machine placed side by to each other and therefore also the corresponding modules of the machine itself, are aligned in a row, but without a limiting arrangement because of this, as any other reciprocal arrangement of said modules is possible.

[0014] Furthermore the machine is equipped with two troughs 3, so called wireways, designed to contain the lines (electrical cables and/or pipelines for fluids, or similar) that connect the different working units to each other and/or to other parts, for example with supply, drive units and control cabinets, or similar, of the modular machine and/or of the installation, in which the modular machine itself is integrated. In the executive example illustrated, the two wireways 3 are made tubular, each with a rectangular cross-section, and are placed side by side to each other and extend themselves in correspondence to the rear side of the machine in the longitudinal direction of the row of modules placed side by side and aligned. The pair of tubular wireways 3 is formed by individual segments 103, 203, 303 that are each associated with a module 101, 201, 301 of the bed 1 and are each fixed to the respective modules, while they are connected to each other in a removable manner, with any suitable means, as for example by means of mating flanged couplings.

[0015] Each tubular wireway 3 of each segment 103, 203 303 of the pair of wireways 3-3 is equipped, for example on its top side, with a branch 133, 233, 333, in form, for example of an elbow.

[0016] According to the invention, prior to assembling the machine on site of installation, each module of the machine is pre-assembled and made ready in the factory, in which the machine itself is manufactured. For this purpose, on each module 101, 201, 301 of the bed 1 one or more working units, or parts of working units

are mounted and fixed, already arranged in their position of work and reciprocal co-operation. Furthermore, the working unit or units mounted on each module 101, 201, 301 of the bed 1 are connected with their respective electrical cables and/or pipelines for fluids, or similar. The electrical cables and/or pipelines for fluids, designed to connect the working unit or units of each module 101, 201, 301 of the bed 1 with other parts of the machine and/or installation, in which the machine is integrated, for example supply and/or drive units, or similar, are passed through and made to come out, individually and separately for each module of the machine, through the branches 133, 233, 333 of the segment 103, 203, 303 of the pair of tubular wireways 3-3, associated with the respective module 101, 201, 301 of the bed 1. The electrical cables and/or the pipelines for fluids, designed to connect the working unit or units of each module 101, 201, 301 of the bed 1 with one or more working units mounted on other modules of the bed 1, are instead housed in the segment 103, 203, 303 of the pair of troughs 3-3 associated with the respective module 101, 201, 301 of the bed and are taken up to one or to both ends of the said segment 103, 203, 303 itself.

[0017] For assembling the machine, for example on the site of its installation, the modules 101, 201, 301 of the bed 1 are placed side by side to each other and fixed in a preset order, and the different working units or parts of working units, pre-assembled on the modules 101, 201, 301 of the bed 1, find themselves automatically in their correct position of work and of reciprocal co-operation, and require eventually only small corrections of positioning, due to tolerances. The electrical cables and/or the pipelines for fluids, or similar, already pre-assembled in the branches 133, 233, 333 of the segments 103, 203, 303 of the pair of wireways 3-3, are connected - for example by means of respective connectors and couplings already pre-arranged - with the supply and/or drive units, or similar, thus linking to these units separately and individually the different working units mounted on the modules 101, 201, 301 of the bed 1. Eventually, also the electrical cables and/or pipelines for fluids, already pre-assembled and taken up to one and/or the other end of the segments 133, 233, 333 of the pair of wireways 3-3, are connected - for example by means of respective prearranged connectors and couplings - with the corresponding electrical cables and/or pipelines for fluids, also themselves pre-assembled and taken up to one or to both ends of the adjacent segments 133, 233, 333 of the pair of wireways 3-3 of the module or modules of the machine placed side by side, thus linking to each other the working units mounted on the different modules 101, 201, 301 of the bed 1. It is evident that in this manner, thanks to the considerable work of pre-assembly and of "pre-wiring" carried out in the factory, the final assembly of the modular machine on the site of installation turns out to be very fast and easy.

[0018] According to a further feature of the inven-

tion, The position of at least one branch 133, 233, 333 of at least one segment 103, 203, 303 of at least one tubular wireway 3-3 can be pre-selected and changed at pleasure within certain limits, to adapt to the conditions if need be.

[0019] For this purpose, in the segments 103, 203, 303 of the pair of tubular wireways 3-3 are provided two or more different openings, each set apart for the connector of one branch 133, 233, 333 and normally closed by removable covers. The branch 133, 233, 333 is mounted and fixed, preferably in a removable manner, on the opening of the desired connector and - according to the circumstances - the most suitable, which for this purpose is opened by removing the respective cover. Naturally, the invention is not limited to the executive forms described and illustrated, but can be amply varied and modified, above all constructively, without abandoning the informative principle described above and claimed hereafter.

Claims

1. Modular making machine, in particular for the processing of tobacco and/or for packaging of tobacco products, such as cigarettes or similar, comprising a bed (1) formed by a plurality of base modules (101, 201, 301) placed side by side to each other and possibly aligned in a row, as well as fixed to each other, preferably in a removable manner as at least one working unit or a part of a working unit mounted on each one of at least some of these modules, and at least one trough (3), so-called wireway, preferably at least in part tubular being provided and that extends itself along the base modules (101, 201, 301) of the bed (1) and is designed to contain electrical cables and or pipelines for fluids, or similar, for connecting at least some working units between themselves and/or with other parts of the machine or of the installation, in which the machine is integrated, such as units of supply and/or drive, or similar, and the said wireway (3) is formed by segments (103, 203, 303) each associated with and fixed to a base module (101, 201, 301) of the bed (1) and connected to each other preferably in a removable manner, characterized by the fact that each of the at least some of the individual segments (103, 203, 303) of the wireway or wireways (3) is equipped with at least one branch for the through passage of at least one part of the electrical cables and/or of the pipelines for fluids, which are linked with the working unit or units fitted on the respective module (101, 201, 301) of the bed (1) and are designed in particular to connect the respective working unit or units with other parts of the machine or of the installation, in which the machine is integrated, like units of supply or drive, or similar.
2. Machine according to claim 1, characterized by the fact that each of at least some modules of the machine is equipped, already prior to the assembly of the machine, with the electrical cables and/or with the pipelines for fluids, or similar, that are necessary for the connection of the working unit or units mounted on the respective module (101, 201, 301) of the bed (1) with other parts of the machine or of the installation, in which the machine is integrated, like units of supply and/or drive, or similar, and the said cables and/or pipelines are passed through the branch or branches (133, 233, 333) of the segment (103, 203, 303) of the wireway or wireways (3), fixed to the corresponding module (101, 201, 301) of the bed (1).
3. Machine according to the claims 1 and 2, characterized by the fact that each of the at least some modules of the machine is equipped, already prior to the assembly of the machine, with the electrical cables and/or pipelines for fluids, or similar, that are necessary for the connection of working unit or units mounted on the respective module (101, 201, 301) of the bed (1), with one or more working units mounted on other modules (101, 201, 301) of the bed (1) itself, and the said cables and/or pipelines are housed in the segment (103, 202, 303) of the wireway or wireways (3), fixed on the corresponding module (101, 201, 301) of the bed (1) and are conducted up to one and/or the other end of that segment (102, 203, 303).
4. Machine according to one or more of the preceding claims, characterized by the fact that the segment (101, 201, 301) of at least one of the tubular wireways (3), associated with at least one of the modules (101, 201, 301) of the bed (1), has one or more windows provided in different positions and intended each for the connection of a branch (133, 233, 333), the said branch can be applied and fixed at will, in preference in a removable manner, in correspondence to one of the said connecting windows, whereas the others are closed each by means of a removable cover.
5. Machine according to the preamble of the claim 1 or according to one or more of the claims 1 to 4, characterized by the fact that the frameworks of the working units mounted on at least two adjacent modules (101, 201, 301) of the bed (1) have complementary planes that form a substantially horizontal table.

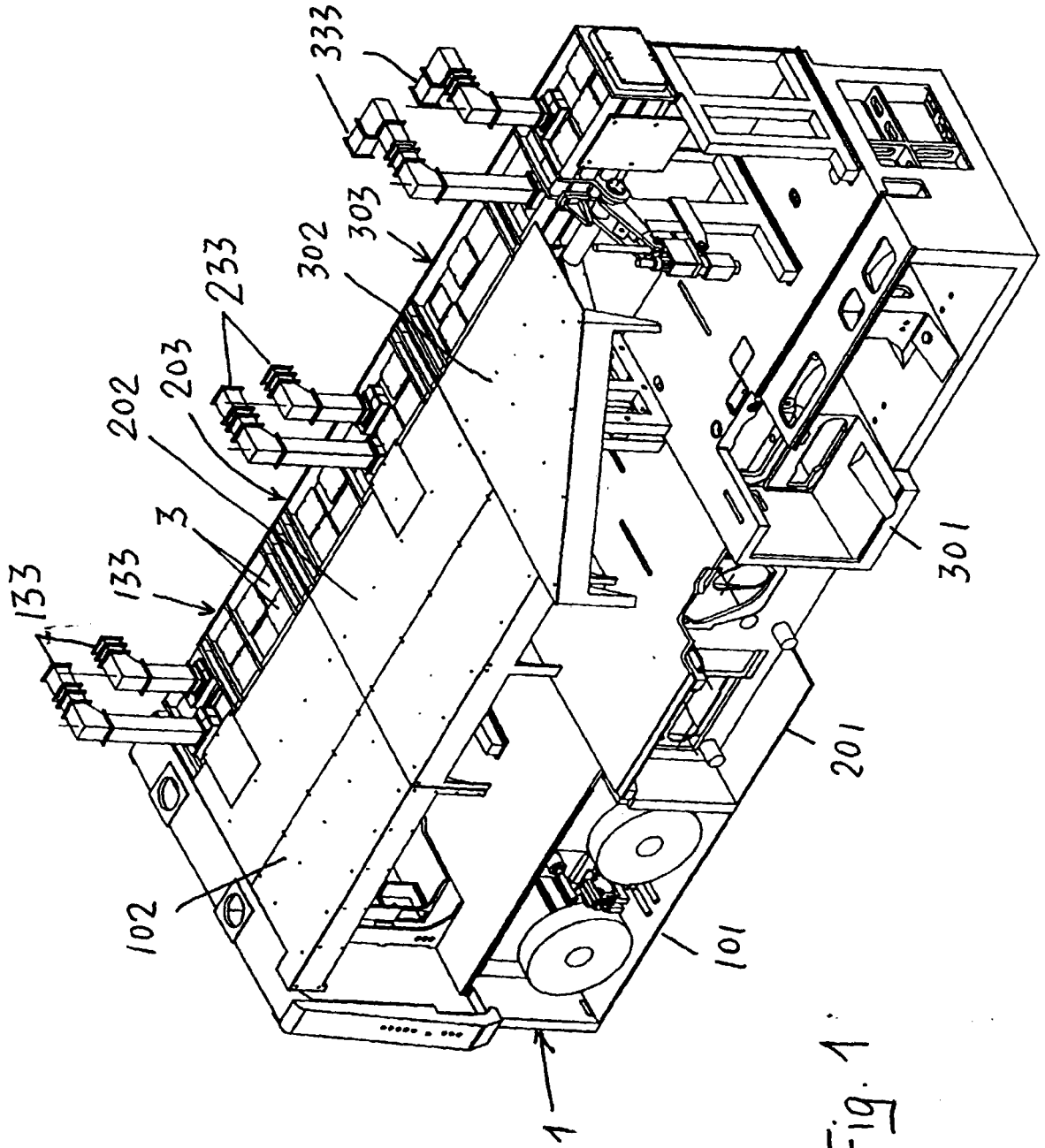
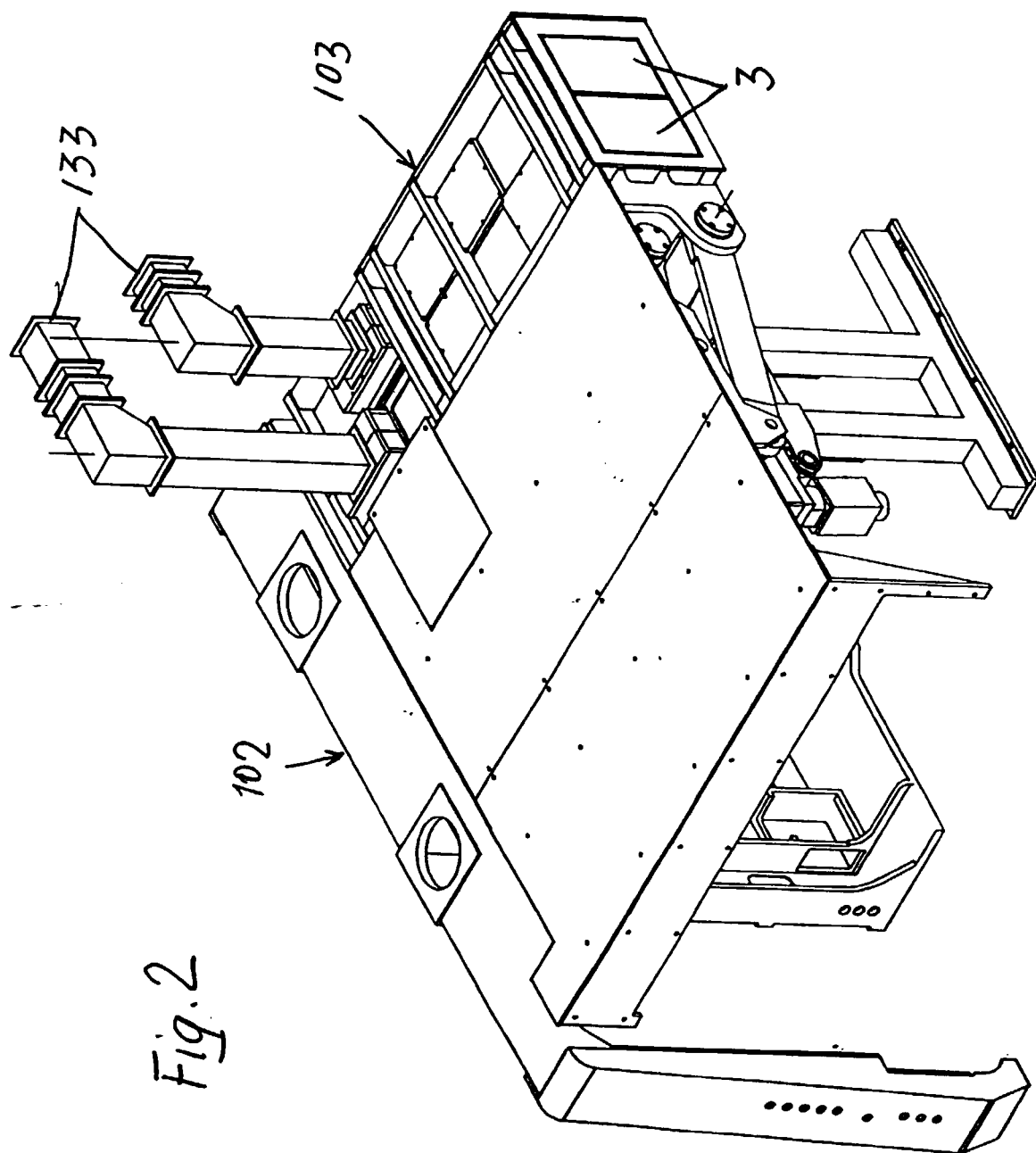
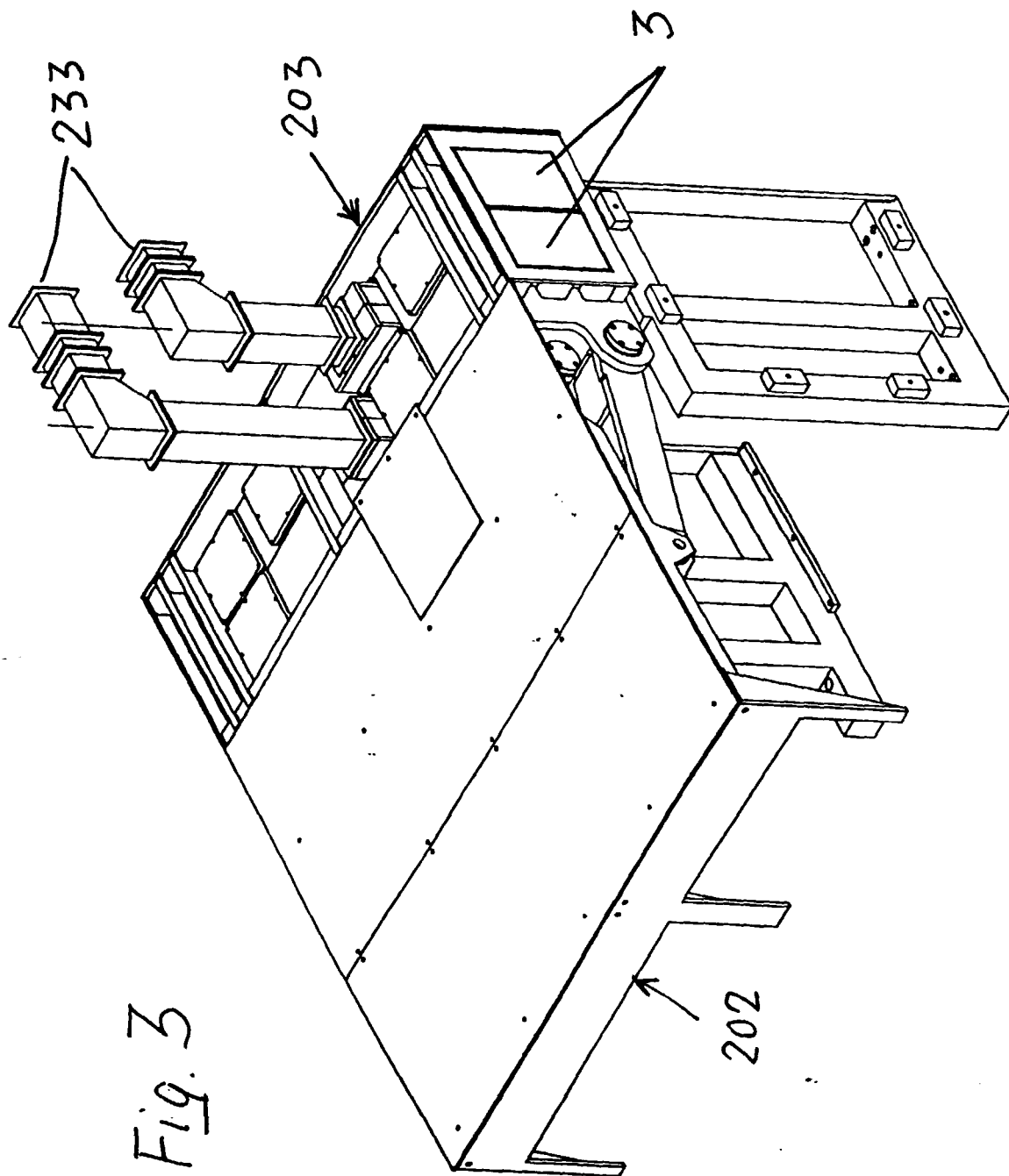


Fig. 1:





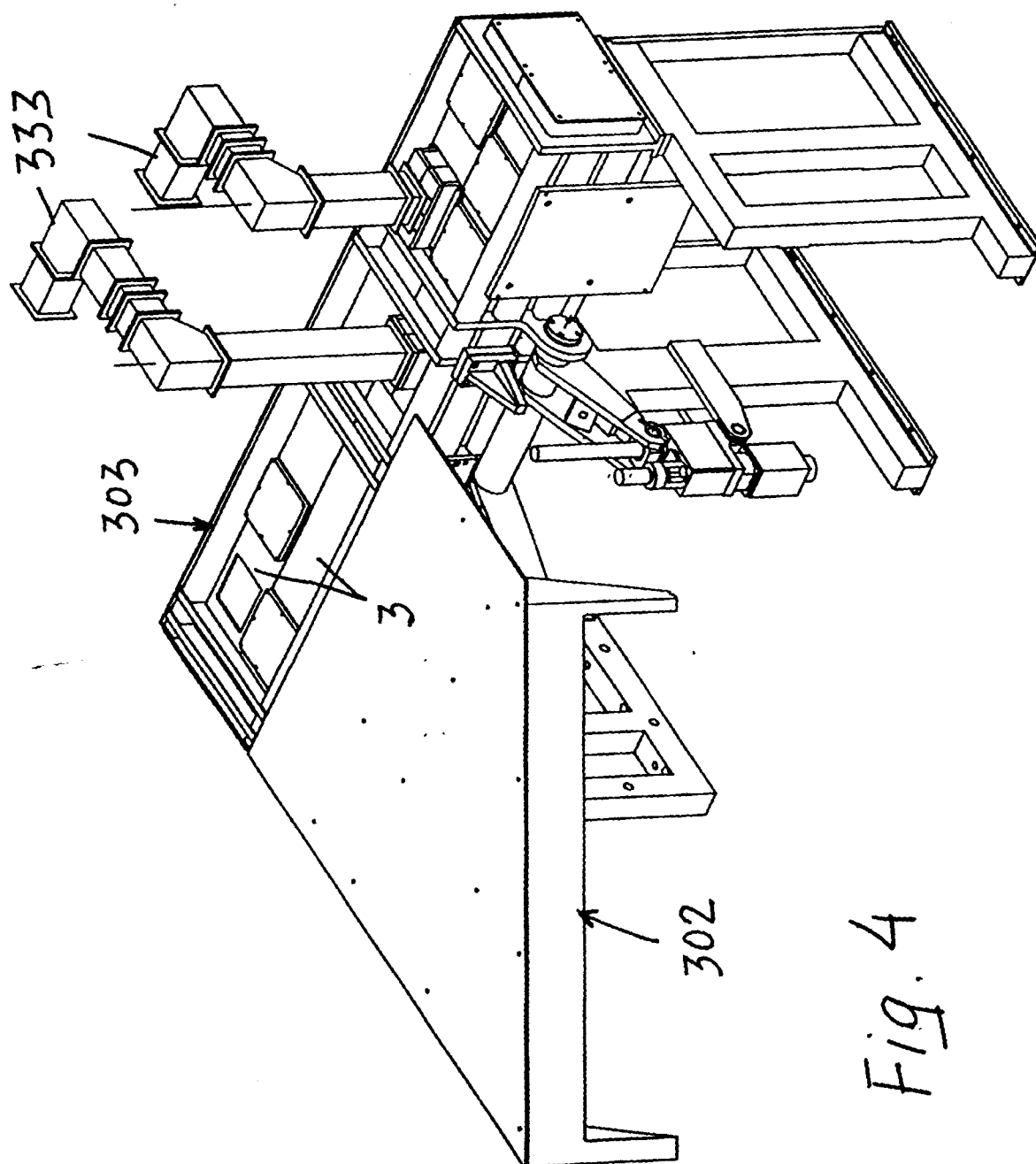


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 99 12 0331

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 41 31 800 A (AUGUST KREMPER SÖHNE) 25 March 1993 (1993-03-25) * claims 1,2; figure 1 *	1, 5	B65B59/04 B65B65/00
Y	----	4	
Y	EP 0 826 602 A (GERHARD SCHUBERT) 4 March 1998 (1998-03-04) * column 6, line 47 - column 7, line 7; figures 1,2 * -----	4	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B65B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 January 2000	Examiner Grentzius, W
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
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 12 0331

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17-01-2000

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EP 826602 A	04-03-1998	NONE	