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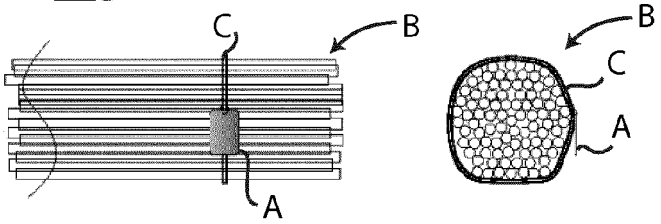
(54) **System and method for applying a support containing information about a product**

(57) The invention relates to a system for applying a support containing information about a product, wherein the rolled products have a main axis; the system for applying a support containing information about a product comprises a printer (4), suitable for picking up said support (5), printing on said support (5) said information regarding said product (3), and placing said support (5) in a collector (6) from where said support (5) can be picked up, and a robot (8), provided with a pick-up device for picking up said support (5) from said collector (6), and a welding device for welding the support (5) to the product (6).

Fig.1 -Labels on bonding lace



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Description

[0001] The present invention relates to the field of labelling machines and, more particularly, relates to a system for applying on a product a support containing information about the product itself and a method for making such application.

[0002] In detail, the invention relates to a system and a method of the type mentioned, concerning the labelling of bundles or packs of products of the lamination, wherein this is done in safety for operators and ensuring maximum visibility of the supports as well as the efficiency production.

[0003] At present there are known manual procedures for application of supports for information on bundles of rolled products. As shown in Figure 1, one of such procedures provides that the supports A are applied manually on the side of the bundle or of the pack B, hanging them on the ligation C of the pack B itself.

[0004] This manual procedure has several drawbacks, for example, the lateral position of the supports A on the bundle B implies that - once the bundles B are stacked in the area of accumulation - such supports A are not visible.

[0005] The supports A, in this case, are labels made up of paper or plastic which are commonly subject to tearing or detachment from the packs, in particular during the operations of handling and stacking the packs B, such tearing or detachments resulting in the impossibility of identifying, and then of tracing the package B itself.

[0006] A further drawback is that the traditional procedure for the application of the supports A is manual and therefore can not be carried out in proximity of the production line, for obvious safety reasons: in fact, the package B at the exit of the rolling mill has a high temperature (about 300°C); in addition, always at the output of the rolling mill, there are handling machines for bundles (using rollers, chain transfer, overhead cranes, etc..) that endangers the safety of the operator.

[0007] Implementing the steps of this traditional procedure for the application of the supports A, far away from the production line, however, causes a loss of time and therefore of productivity of the plant, in addition to requiring the constant presence of an operator.

[0008] A system for the application of such supports of information, more recent than the approach described, and shown in Figure 2, includes a resistance gun D, in which the support A, which is made up of plastic or metal, is connected to a tack E, which is welded on a bar F, in correspondence of the head of the pack B. By applying the support A on pack B, at the front, problems of tearing and of the resulting lack of traceability while stacking the packs B are solved.

[0009] In fact, the support A remains well visible exposed on the frontal position of the pack B. However, the problems described above, that are related to the manual operation, remain.

[0010] Now, moreover, also the traditional systems for automatic application of supports which provide for the welding of the latter, even at high temperature, are known.

[0011] An example of these traditional welding systems is shown in Figure 3.

[0012] In this case the support A is welded by an automatic system, for example on a billet G.

[0013] The surface on which the support A is applied to is wide and flat, so the welding is done without any problems.

[0014] However, a drawback of this conventional system is that it cannot be applied to bundles formed by numerous profiles linked together.

[0015] In fact, these profiles have an irregular head surface which may also be of small size, and they are often misaligned.

[0016] It was tried to make the automatic welding procedure with nail, but for the problems due to the technical characteristics of the bundles, as outlined above, at the moment it has not been found a suitable position for the application of a weld with the nail.

[0017] Another disadvantage of this procedure of welding with automatic nail is given by the need to provide handling systems able to fix the support to the nail that are complex and therefore expensive.

[0018] Also, the nail itself involves a considerable additional cost.

[0019] For these and other reasons, to date the application of supports for information on bundles is not done a reliable manner with automatic methods.

[0020] Within the above mentioned needs, therefore, the object of the present invention is to overcome the technical drawbacks and, in particular, to provide a system and a method for applying a support containing information on a product, that are reliable and efficient compared to the prior art.

[0021] Another purpose of the invention is to provide a system and a method for applying a support containing information about a product, which, compared to the prior art are found to be extremely flexible, resulting in a reduction of time and of implementation costs.

[0022] Further object of the present invention is to provide a system and a method for applying a support containing information on a product, capable of increasing the speed of packaging and storage of rolled products and hence the productivity.

[0023] These and other objects are achieved by providing a system for applying a support containing information about a product, according to the appended claim 1, and a related method, according to claim 5 attached, to which reference is made for the sake of brevity.

[0024] More technical details and/or special construction of the apparatus and the related plant can also be found in the further dependent claims. Advantageously, the system object of the invention is particularly versatile, since it allows continuous production and packaging of rolled products and/or profiles of various sections, always maintaining an efficient production speed.

[0025] In particular, the system of the invention comprises a printer suitable for picking up a support, printing on the support information regarding the product, and placing the support in a collector from where the support can be picked up, a robot provided with a pick-up device per picking up the support from said collector, and adapted to position said support in contact with said product; moreover, the system comprises a device for fixing said support to the product.

[0026] Advantageously, this allows performing the operations of in- line labelling, making fully automatic production of rolled products to packaging and storage.

[0027] Preferably, the system of the invention comprises a vision device, which is suitable for analysing the surface of the product, identifying an area on said surfaces, suitable for being exposed even in the case in which said product is stacked together with a plurality of additional products, determining the coordinates of said area and communicating said coordinates to said robot.

[0028] Advantageously, in this way the need of a present operator is eliminated, with a consequent increase in safety and a decrease in costs.

[0029] Moreover, according to the invention, the support is made up of a metallic material, and the device for fixing is a welding device, so that the support can be welded directly on the support.

[0030] This advantageously further speeds up the operations and eliminates the risk of damage to the label.

[0031] Always according to the invention, the system comprises a supplying apparatus, for supplying one or more products in succession, placing them in a work area.

[0032] The system - thus - can be arranged at the end of the production line of a rolling plant.

[0033] Also, the method according to the invention, i.e. the method for applying a support containing information about a product, comprises the following steps:

- transmitting, to a printer, information to be printed on a support;
- printing said information on said support, by means of said printer;
- arranging the support in a collector, so that it can be picked up by a robot;
- picking up the support from said collector, by means of said robot;
- positioning the support on a product, by means of the robot;
- welding the support on the product by means of the welding device of the robot.

[0034] Advantageously, the number of components is extremely reduced compared to the prior art, not requiring the use of nails or complex manipulation systems.

[0035] Moreover, according to the invention, before the step of arranging the support in the collector, the following steps are provided:

- analysing the surface of the product by means of a vision device,
- identifying, by means of the vision device, an area on the surface which is exposed even in the case in which said product is stacked together with a plurality of additional products,
- determining by means of the vision device the coordinates of the area of the surface,
- communicating the coordinates to the robot.

[0036] In particular, in this case, the step of positioning the support on the product provides the positioning in said area according to said coordinates.

[0037] In this way the more convenient position of application is automatically determined, according to the shape of the package or bundle, and to the head section of the profiles.

[0038] So it is possible also to determine the mode of application of the support, which can be front to the pack, to the top pack, or superior to the pack and bent so as to be visible from the front.

[0039] The purposes and the advantages above, and others which will emerge below, will appear more evident from the description which follows, relating preferred embodiments of the invention, given as an example and preferred, but not limiting, and from the accompanying drawings, wherein:

- Figure 1A is a side view of a bundle of rolled products which is applied to a support according to a first system of the prior art;
- Figure 1B is a front view of the bundle of rolled products of Figure 1A;
- Figure 2A is a side view of a bundle of rolled products which is applied to a support according to a second system of the prior art;
- Figure 2B is a front view of the bundle of rolled products of Figure 2A;
- Figure 3 shows a front view of a package of rolled products which is applied to a support according to a third system of the prior art;
- - Figure 4A is a top view of a first variant of the system of the invention, a first stage of work;
- - Figure 4B is a top view of the system of figure 4A, a second stage of work;
- - Figure 5A is a top view of a second variant of the system of the invention, a first stage of work;
- - Figure 5B is a side view of the system of figure 5A, a second stage of work;
- - Figure 5C is a front view of the system of Figure 5B;
- - Figure 5D is a top view of the system of figure 5B;
- - Figure 6A is a side view of a first embodiment of the support According to the invention;
- - Figure 6B is a view from top of a first embodiment of the support according to the invention;
- - Figure 6C is a front view of a first embodiment of the support according to the invention;
- - Figure 7A is a side view of a first embodiment of

the support according to the invention;

- - Figure 7B is a view from top of a first embodiment of the support according to the invention;
- - Figure 7C is a front view of a first embodiment of the support according to the invention;
- - Figure 8A is a side view of a first embodiment of the support according to the invention;
- - Figure 8B is a view from top of a first embodiment of the support according to the invention;
- - Figure 8C is a front view of a first embodiment of the support according to the invention.

[0040] With reference to figures 1-8 mentioned, the system of the invention is generally indicated with 1, and is present at the end of the production line 2, wherein parcels 3 of rolled products arrive.

[0041] In particular, the system 1 comprises: a printer 4 which picks up the supports 5, prints on them the set information and arranges them in a container 6 from where they can be picked up, a supplying apparatus 7 of the packs 3 (in a first variant, the front, shown in Figures 4A and 4B, or, in a second variant, lateral, shown in Figures 5A, 5B, 5C, 5D), a robot 8 provided with a head 9 that is equipped with a device for withdrawal of the supports 5 and the welding of the same.

[0042] A vision device 10 (laser or cameras) identifies the most advantageous position on the pack 3, directly on which welding of the support 5 can be performed. The support 5 is welded directly on the pack 3 without the aid of other means, such as a nail, as necessary using a system of the prior art.

[0043] The labelling operation can be done in line as described below.

[0044] Operationally, the supplying apparatus 7 supplies the packs 3 in the area of labelling 2, the support 5 is then picked up by a dispenser, not shown, then the printer 4 prints on it the requested information and then places it in a suitable area 6 for the withdrawal by the robot 8.

[0045] The vision device 10 identifies on the pack 3 the ideal position where the support 5 may be welded.

[0046] The vision device 10 then communicates the coordinates of said position to the robot 8.

[0047] The robot 8 at first picks up the support 5 then it arranges it on the pack 3, according to said coordinates, received from the vision device 10, and then it welds the support 5 on the pack 3.

[0048] After this, the supplying apparatus 7 clears the work area or labelling zone 2, removing from it the pack 3 which was labelled, and the process is repeated with a following pack 3.

[0049] According to the present invention, the support 5 can be welded in order to protrude from the pack 3 (fig. 5a) so that it can be visible even when a plurality of the packs 3 is stacked together.

[0050] A further advantage is that a metallic support 5 can be welded and does not tear when the packs 3 are stacked together.

[0051] Figures 5a, 5b, 5c and 5d show a variant embodiment of the invention, wherein the support 5 is welded so as to be visible from the front, after welding.

[0052] Figures 5a, 5b, 5c and 5d show a further advantageous variant embodiment of the invention, suitable for labelling rolled products which have flat head surface, and that provides welding of the support 5 directly on that head surface.

[0053] For example, this solution can be applied to welding a support 5 on the head surface of rods of larger diameter.

[0054] The invention has been described so far with reference to packs containing rolled products with round section, but it is to be understood that the solution can be applied to bundles of laminates having any section (for example, bundles of rolled square, flat, hexagonal, angular, or bundles of beams or U-shaped rods) of any commercial size.

[0055] Moreover, having regard to the versatility of the vision system, the same method can be used to apply the supports automatically and in line directly on packs of another type, such as coils.

[0056] From the above description the technical characteristics of the system for applying a support containing information about a product, which is the object of the present invention, are clear as the advantages are.

[0057] It is clear, finally, that numerous other variations may be made for the system in question, without departing from the principles of novelty inherent in the inventive idea, as it is clear that in the practical implementation of the invention, the materials, shapes and dimensions of the illustrated details can be any, depending on requirements, and can be replaced with other technically equivalent.

Claims

1. System (1) for applying a support (5) containing information about a product (3), comprising:

   - a printer (4), suitable for picking up said support (5), printing on said support (5) said information regarding said product (3), and placing said support (5) in a collector (6) from where said support (5) can be picked up,
   - a robot (8) provided with a pick-up device for picking up said support (5) from said collector (6), and adapted to position said support (5) in contact with said product (3),
   - a device for fixing said support (5) to said product (3).

2. System (1) according to claim 1, **characterized in** comprising a vision device (10) which is suitable for:

   - analyzing the surfaces of said product (3);
   - identifying an area, on said surfaces, which is

suitable for being exposed even in the case in which said product (3) is stacked together with a plurality of additional products (3);
- determining the coordinates of said area;
- communicating said coordinates to said robot (8).

3. System (1) according to claim 1 o 2, **characterized in that** said support (5) is made up of a metallic material, and said device for fixing is a welding device, so that said support (5) can be welded directly to the product (3).

4. System (1) according to one of claims 1-3, **characterized in** comprising a supplying apparatus (7), for supplying one or more products (3) in succession, placing them in a work area (2).

5. Method for applying a support (5) containing information about a product (3), comprising the following steps:

- providing a printer (4), a collector (6), for collecting said support (5) and from which said support (5) can be picked up, and a robot (8), provided with a pick-up device for picking up said support (5), and a device for fixing said support (5) on said product (3),
- transmitting, to a printer, information to be printed on a support;
- printing said information on said support (5), by means of said printer (4);
- arranging said support (5) in a container (6), so that said support (5) can be picked up by said robot (8);
- picking up said support (5) from said collector (6), by means of said robot (8);
- positioning said support (5) on a product (3), by means of said robot (8);
- fixing said support (5) to said product (3) by means of said device for fixing of said robot (8).

6. Method according to claim 5, **characterized in** comprising, before said step of positioning said support (5) on a product (3), by means of said robot (8), the following steps:

- analyzing the surface of said product (3) by means of a vision device (10),
- identifying, by said vision device (10), an area on said surface which is exposed even in the case in which said product (3) is stacked together with a plurality of additional products (3),
- determining by said vision device (10) the coordinates of said area of said surface,
- communicating said coordinates to said robot (8);

said step, of positioning said support (5) on a product (3), by means of said robot (8), providing for the positioning of said support (5) in said area according to said coordinates.

7. Method according to claim 5 o 6, **characterized in** comprising, before the step of fixing said support (5) to said product (3) by means of said device for fixing of said robot (8), a step of positioning said product (3) in a work area (2) having a preset position with respect to said robot (8).

8. Method according to claim 7, **characterized in** comprising, after the step of fixing said support (5) on said product (3) by means of said device for fixing of said robot (8), the following steps:

- freeing up said work area (2),
- positioning a new product (3) in said work area (2),
- repeating the step of fixing said support (5) to said new product (3) by means of said device for fixing of said robot (8).

9. Method according to one of claims 6-8, **characterized in that** said area of said surface of said product (3) is positioned frontally to said product (3).

10. Method according to one of claims 6-8, **characterized in that** said area of said surface of said product (3) is positioned above said product (3), so as said support (5) which has been welded in said area protrudes frontally from said product (3).

11. Method according to claim 10, **characterized in** comprising, after the step of fixing said support (5) to said product (3) by means of said device for fixing of said robot (8), the following step:

- bending said support (5) in correspondence of an edge of said product (3), so that said support (5) covers a front portion of said surface of said product (3).

Fig.1 -Labels on bonding lace

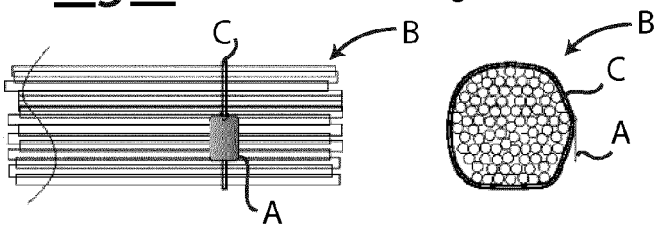


Fig.2 -Manual welding of the nail

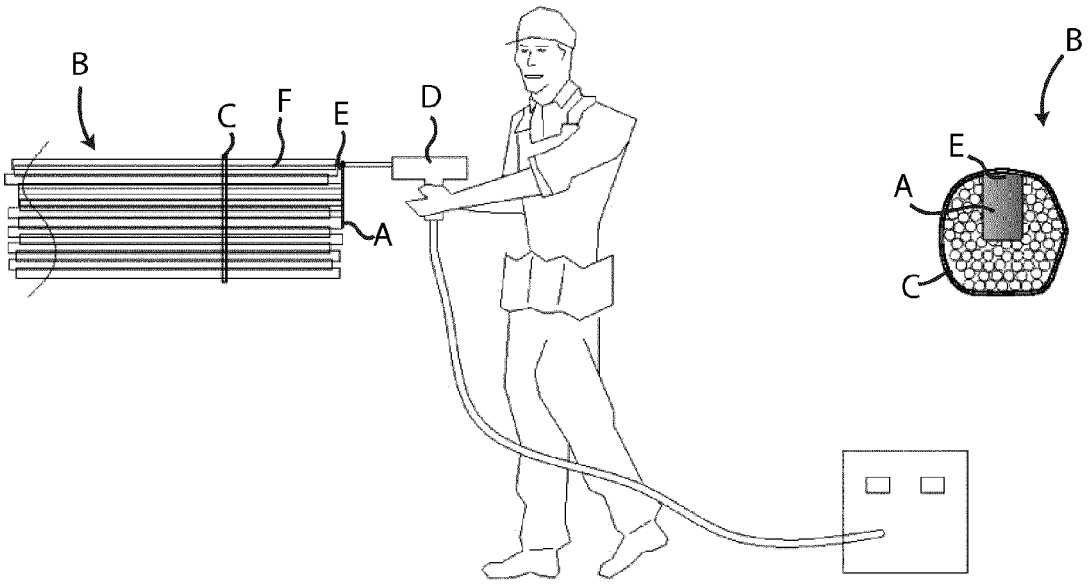


Fig.3 -Automatic applying of the labels to the billets

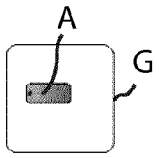


Fig. 4 - FRONTAL FEEDING

Fig. 4a *Picking up*

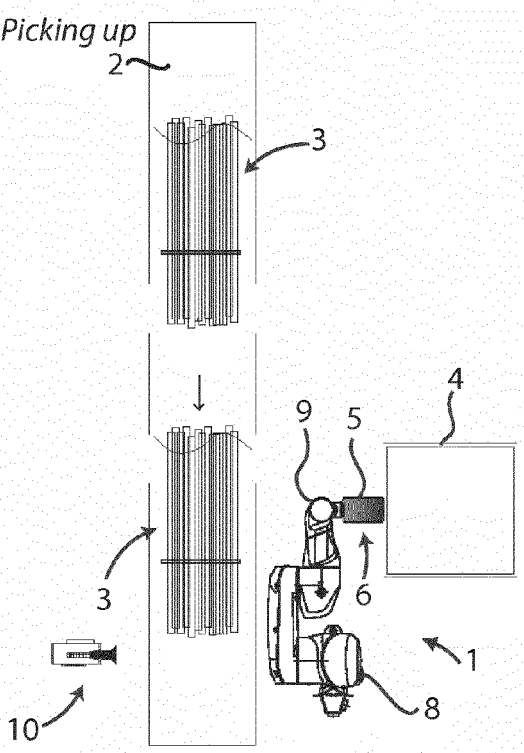
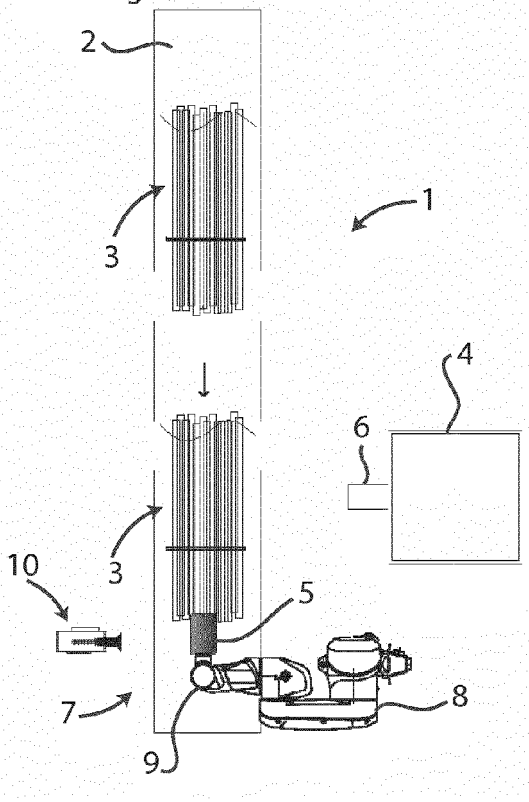


Fig. 4b *2 welding*



LATERAL FEEDING

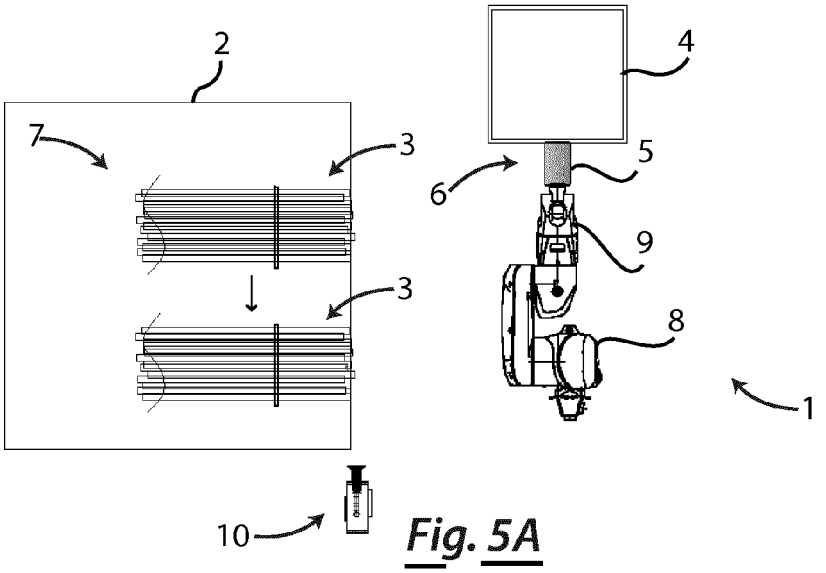


Fig. 5A

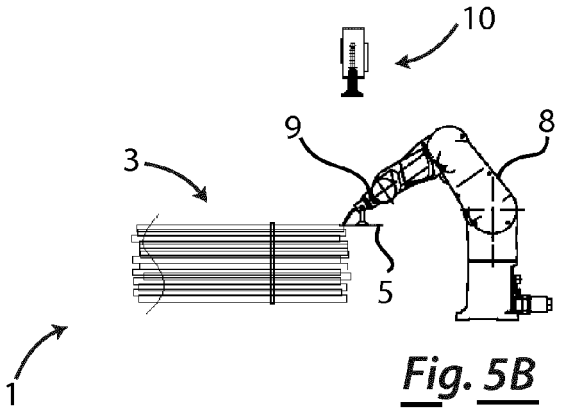


Fig. 5B

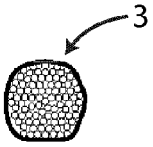


Fig. 5C

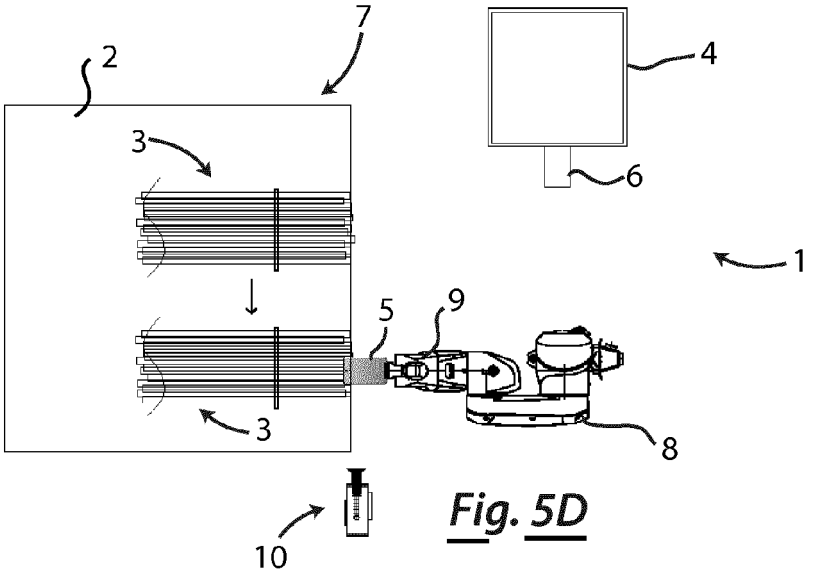


Fig. 5D

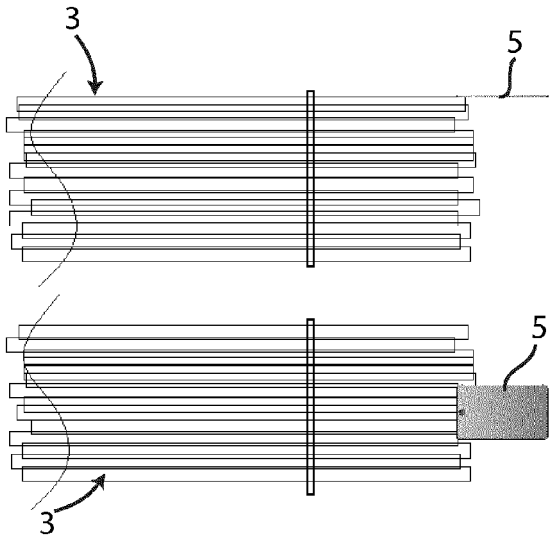


Fig. 6A

Fig. 6C

Fig. 6B

Fig. 7A

Fig. 7C

Fig. 7B

Fig. 8A

Fig. 8C

Fig. 8B

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EUROPEAN SEARCH REPORT

Application Number
EP 13 42 5053

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			TECHNICAL FIELDS SEARCHED (IPC) B65C G09F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	24 July 2013	Pardo, Ignacio

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