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(54) **Sorting line for ceramic products particularly tiles, with modular packaging station**

Sortieranlage für keramische Gegenstände, insbesondere Ziegel, mit modulärer Verpackungsstation

Ligne de triage pour produits céramiques, spécialement des tuiles, avec station d'emballage modulaire

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Description

[0001] The present invention relates to a sorting line for ceramic products, particularly tiles, with modular packaging station.

[0002] Sorting lines are used mainly in the ceramics industry to sort the quality of the finished products, constituted by tiles in the specific case, and to then route them to packaging.

[0003] Conventional lines essentially consist of an elongated frame along which a tile conveyance line runs, specifically in the upper part; said tiles arrive from a sorting table, where one or more operators apply coded markings to the surfaces of the passing tiles with writing means whose strokes can be detected by adapted readers arranged along the conveyance line.

[0004] Proximate to the readers there are provided stations for stacking the tiles, which are separated one another according to the classification produced by the sorting performed upstream.

[0005] Each station is capable of forming a stack which, once it has been completed with a preset number of tiles, is deposited on a second conveyor arranged in the lower part of said frame and conveys said tiles to the final station for so-called wraparound packaging.

[0006] In conventional lines, the final station is an integral part of the lines and is rigidly supported by the same frame that constitutes the main framework of the line.

[0007] This means that each line can be used for packaging only one type of product, so that when it is necessary to change the packaging it is necessary to either purchase a second line built specifically for the new requirement or to provide a sort of parallel line which merges into a second twin station which has different packaging characteristics.

[0008] In the first case, the costs to be sustained double, while in the second case they increase significantly, besides requiring a considerable availability of space at the site where the line is used.

[0009] Another problem of conventional lines is the fact that maintenance on the packaging machine is highly troublesome, owing to difficulty in accessing the elements that compose it, and that it is necessary to stop the entire line during the maintenance. Since one of the lines is capable of producing a turnover equal to a few million lire/hour, it is necessary to minimize any stoppage.

[0010] The aim of the present invention is to solve the above mentioned problems of the conventional art, providing a sorting line for ceramic products, particularly tiles, with modular packaging station which allows to have multiple types of packaging available for a single line.

[0011] Within this aim, an object of the present invention is to provide a sorting line for ceramic products, particularly tiles, with modular packaging station which allows to avoid interrupting the operation of said line for maintenance, facilitates the maintenance and furthermore does not require more space than required for simple conventional lines.

[0012] This aim and object and others which will become apparent hereinafter are achieved by a sorting line for ceramic products, particularly tiles, with modular packaging station, composed of a main frame which supports a plurality of stacking stations served by a tile feeder line which cooperates with a plurality of means for extracting said tiles from said conveyance line, and for depositing the formed stacks on a second lower conveyor to send them to a final packaging station, characterized in that said final packaging station is mounted on an independent modular frame which is rotatably/detachably articulated, by articulation means, to the end of said main frame, to which it is connected without discontinuities by means of adapted elements.

[0013] Further characteristics and advantages of the present invention will become apparent from the description of a preferred embodiment of a sorting line for ceramic products, particularly tiles, with modular packaging station, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a reduced-scale side view of a sorting line for ceramic products, particularly tiles, with modular packaging station, according to the present invention;

Figure 2 is a schematic top view of the region for the connection between the modular packaging station and the end portion of the sorting line;

Figure 3 is another enlarged-scale top view of the elements for mutually coupling the modular packaging station and the end portion of the sorting line in a possible embodiment of the invention;

Figure 4 is an enlarged-scale side view of the region for joining said end portion of the sorting line and the modular packaging station.

[0014] With particular reference to the above figures, the reference numeral 1 generally designates a sorting line for ceramic products, particularly tiles.

[0015] The line 1 is composed of a main frame 2 which supports a plurality of stacking stations, designated by the reference numerals 3, 4, 5, and 6 in the drawings, which are served by a tile feeder line 7. The line 7 cooperates with a plurality of means 8 for extracting the tiles from the line 7 for conveying and depositing the formed stacks onto a second conveyor 9 which is lower than, and parallel to, the conveyor 7 and is provided in order to send the formed stacks to a final packaging station 10.

[0016] The packaging station is mounted on an independent modular frame 11 which is rotatably and, if necessary, detachably articulated, by articulation means 12, to the end of the main frame 2, to which it can be locked without discontinuities by means of corresponding elements 13.

[0017] In the preferred embodiment, the independent frame 11 is articulated to the main frame 2 so as to rotate on a horizontal plane about a vertical axis designated by A; however, as an alternative, it may also be articulated so as to swing with respect to the main frame 2, i. e., rotate about a horizontal axis which lies transversely to the advancement direction of the stacks of tiles.

[0018] The articulation means 12 are composed of at least one vertical pivot 14 which coincides with the axis A and is mounted on a vertical side 2a of the main frame 2.

[0019] The elements 13 for coupling the independent frame 11 to the main frame 2 are constituted by a hook 15 for latch coupling which can be set manually or automatically and is arranged on the side 2b of the frame 2 which lies opposite to the vertical pivot 14 with respect to the longitudinal axis B.

[0020] The hook 15 is articulated, so that it can rotate, to the main frame 2 in contrast with elastic return means 16 and engages a corresponding tooth 17 correspondingly associated with the independent frame 11, which is also provided with a set of flanges 18 for the universal coupling of packaging machines of different kinds and, if necessary, of wheels to allow its movement on the supporting surface.

[0021] The operation of the invention is immediately apparent from the above description. The independent frame 11 is normally coupled to the end of the main frame 2, is essentially monolithic therewith and is retained axially by means of the pivot 14 on one side and by means of the hook 15, which engages the tooth 17, on the other side.

[0022] In this configuration, there is no discontinuity between the modular station 11 and the main frame 2, and the stacks of tiles formed in the stations 3, 4, 5 and 6 arrive, by means of the lower conveyor 9, at the packaging station 10, where they are packaged, already divided by grade.

[0023] The station 10 is provided with flanges 18 for the universal coupling of different kinds of packaging machine: this allows in practice to replace said packaging machines with others which have different characteristics. Such replacement is performed by releasing the hook 15 from the tooth 17 and by rotating the independent frame 11 about one edge, as shown in thin lines in figure 2, easily accessing the inside of the station 10.

[0024] In order to work even better, it is also possible to fully separate the independent frame 11 from the main frame 2, disengaging the pivot 14 from the corresponding rotation seat. This further allows to optionally provide both a plurality of independent frames 11, each of which is already provided with a different packaging machine, in order to have available a range which is ready for use according to the product to be packaged, and, more simply, one or more reserve packaging machines in case of maintenance, in any case reducing, in both cases, the expensive downtimes of the sorting line strictly to the minimum required for the replacements.

[0025] It has thus been found that the described invention achieves the intended aim and objects.

[0026] The invention thus conceived is susceptible of modifications and variations, all of which are within the scope of the inventive concept.

[0027] Moreover, all the details may be replaced with other technically equivalent elements.

[0028] In the practical execution of the invention, the materials used, as well as the shapes and the dimensions, may be any according to the requirements without thereby abandoning the protective scope of the claims that follow.

[0029] 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 sorting line (1) for ceramic products, particularly tiles, with modular packaging station, composed of a main frame (2) which supports a plurality of stacking stations (3,4,5,6) which are served by a tile feeder line (7) which cooperates with a plurality of means (8) for extracting said tiles from said feeder line, and for depositing the formed stacks on a second lower conveyor (9) to send them to a final packaging station (10), **characterized in that** said final packaging station is mounted on an independent modular frame (11) which is rotatably/detachably articulated, by articulation means (12), to the end of said main frame, to which it is connected without discontinuities by means of corresponding elements (13).

2. A sorting line for ceramic products, particularly tiles, with modular packaging station according to claim 1, **characterized in that** said independent frame (11) is articulated to said main frame and rotates on a horizontal plane about a vertical axis (A).

3. A sorting line for ceramic products, particularly tiles, with modular packaging station according to claim 1, **characterized in that** said independent frame (11) is articulated to said main frame so as to be able to swing and rotates about a vertical axis (A) which lies transversely to the direction of advancement of the stacks of tiles.

4. A sorting line for ceramic products, particularly tiles, with modular packaging station according to claim 2, **characterized in that** said articulation means (12) are composed of at least one vertical pivot (14) which coincides with said axis (A) and is eccentri-

cally associated on a vertical side of said main frame (2), said independent frame (11) being adapted to rotate about a vertical axis (A) with respect to said main frame.

5. A sorting line for ceramic products, particularly tiles, with modular packaging station according to claim 4, **characterized in that** said elements (13) for coupling the independent frame to the main frame are constituted by a latch-type closure element (15,17) which can be set manually/automatically and is arranged on the opposite side with respect to said vertical pivot (14).

6. A sorting line for ceramic products, particularly tiles, with modular packaging station according to claim 5, **characterized in that** said latch element is composed of a hook (15) which is rotatably articulated to said main frame (2) in contrast with elastic return means and engages a corresponding tooth (17) which is correspondingly associated with said independent frame (11).

7. A sorting line for ceramic products, particularly tiles, with modular packaging station according to claim 6, **characterized in that** said independent frame (11) is provided with flanges (18) for the universal coupling of packaging machines of different kinds.

8. A sorting line for ceramic products, particularly tiles, with modular packaging station, according to claim 6, **characterized in that** said independent frame (11) can be equipped with wheeled means for translatory motion on the ground.

9. A sorting line for ceramic products, particularly tiles, with modular packaging station according to claim 6, **characterized in that** said independent frame (11) is fully detachable from said main frame.

Patentansprüche

1. Sortieranlage (1) für keramische Gegenstände, insbesondere Ziegel, mit modularer Packstation, die aus einem Hauptrahmen (2) besteht, der eine Vielzahl von Stapelstationen (3, 4, 5, 6) trägt, die von einer Zuführungsleitung (7) für Ziegel bedient wird, die mit einer Vielzahl von Mitteln (8) zum Herausholen der Ziegel aus der Zuführungsleitung (7) und zum Ablegen der gebildeten Stapel auf einem zweiten unteren Fördermittel (9) zusammenarbeitet, um sie an eine finale Packstation (10) zu schicken, **dadurch gekennzeichnet, dass** die finale Packstation an einem unabhängigen modularen Rahmen (11) angebracht ist, der drehbar/lösbar mittels Gelenkmitteln (12) am Ende des Hauptrahmens, mit dem er ohne Unterbrechungen mittels entsprechender Elemente (13) verbunden ist, gelenkig gelagert ist.

2. Sortieranlage für keramische Gegenstände, insbesondere Ziegel, mit modularer Packstation gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der unabhängige Rahmen (11) gelenkig zu dem Hauptrahmen gelagert ist und in einer horizontalen Ebene um eine vertikale Achse (A) rotiert.

3. Sortieranlage für keramische Gegenstände, insbesondere Ziegel, mit modularer Packstation gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der unabhängige Rahmen (11) gelenkig zu dem Hauptrahmen gelagert ist, um so um eine vertikale Achse (A) schwenkbar und rotierbar zu sein, die quer zur Beförderungsrichtung der Ziegelstapel liegt.

4. Sortieranlage für keramische Gegenstände, insbesondere Ziegel, mit modularer Packstation gemäß Anspruch 2, **dadurch gekennzeichnet, dass** die Gelenkmittel (12) zumindest aus einem vertikalen Zapfenlager (14) bestehen, das mit der Achse (A) zusammenfällt und exzentrisch an einer vertikalen Seite des Hauptrahmens (2) verbunden ist, wobei der unabhängige Rahmen (11) angepasst ist, um um die vertikale Achse (A) hinsichtlich des Hauptrahmens zu rotieren.

5. Sortieranlage für keramische Gegenstände, insbesondere Ziegel, mit modularer Packstation gemäß Anspruch 4, **dadurch gekennzeichnet, dass** die Elemente (13) zum Koppeln des unabhängigen Rahmens an den Hauptrahmen aus einem Schließelement (15, 17) eines Verriegelungstyps bestehen, das manuell/automatisch eingestellt werden kann und auf der gegenüberliegenden Seite hinsichtlich des vertikalen Zapfenlagers (14) angeordnet ist.

6. Sortieranlage für keramische Gegenstände, insbesondere Ziegel, mit modularer Packstation gemäß Anspruch 5, **dadurch gekennzeichnet, dass** das Verriegelungselement aus einem Haken (15) besteht, der drehbar gelenkig zum Hauptrahmen (2) im Vergleich mit elastischen Rückführungsmitteln gelagert ist und in einen entsprechenden Zahn (17) eingreift, der dementsprechend dem unabhängigen Rahmen (11) zugeordnet ist.

7. Sortieranlage für keramische Gegenstände, insbesondere Ziegel, mit modularer Packstation gemäß Anspruch 6, **dadurch gekennzeichnet, dass** der unabhängige Rahmen (11) mit Flanschen (18) für das universelle Koppeln unterschiedlicher Packmaschinen vorgesehen ist.

8. Sortieranlage für keramische Gegenstände, insbe-

sondere Ziegel, mit modularer Packstation gemäß Anspruch 6, **dadurch gekennzeichnet, dass** der unabhängige Rahmen (11) mit Radmitteln für eine translatorische Bewegung auf dem Grund ausgerüstet ist.

9. Sortieranlage für keramische Gegenstände, insbesondere Ziegel, mit modularer Packstation gemäß Anspruch 6, **dadurch gekennzeichnet, dass** der unabhängige Rahmen (11) vollständig lösbar vom Hauptrahmen ist.

Revendications

1. Chaîne de tri (1) pour produits en céramique, en particulier des carrelages, avec poste d'emballage modulaire, composée d'un bâti principal (2) qui supporte une pluralité de postes d'empilage (3, 4, 5, 6) qui sont approvisionnés par une ligne (7) d'alimentation en carrelages qui coopère avec une pluralité de moyens (8) pour extraire lesdits carrelages de ladite ligne d'alimentation, et pour déposer les piles formées sur un second transporteur inférieur (9) afin de les envoyer jusqu'à un poste d'emballage final (10), ***caractérisée en ce que*** ledit poste d'emballage final est monté sur un bâti modulaire indépendant (11) qui est articulé de manière rotative/amovible, par des moyens d'articulation (12), avec l'extrémité dudit bâti principal, auquel il est raccordé sans discontinuité au moyen d'éléments correspondants (13).

2. Chaîne de tri poux produits en céramique, en particulier des carrelages, avec poste d'emballage modulaire selon la Revendication 1, ***caractérisé en ce que*** ledit bâti indépendant (11) est articulé avec ledit bâti principal et tourne sur un plan horizontal autour d'un axe vertical (A).

3. Chaîne de tri pour produits en céramique, en particulier des carrelages, avec poste d'emballage modulaire selon la Revendication 1, ***caractérisé en ce que*** ledit bâti indépendant (11) est articulé avec ledit bâti principal de manière à pouvoir basculer et tourner autour d'un axe vertical (A) qui est placé transversalement à la direction de progression des piles de carrelages.

4. Chaîne de tri pour produits en céramique, en particulier des carrelages, avec poste d'emballage modulaire selon la Revendication 2, ***caractérisé en ce que*** lesdits moyens d'articulation (12) sont composés d'au moins un pivot vertical (14) qui coïncide avec ledit axe (A) et est associé de manière excentrique sur un côté vertical dudit bâti principal (2), ledit bâti indépendant (11) étant apte à tourner autour d'un axe vertical (A) par rapport audit bâti principal.

5. Chaîne de tri pour produits en céramique, en particulier des carrelages, avec poste d'emballage modulaire selon la Revendication 4, ***caractérisé en ce que*** lesdits éléments (13) pour coupler le bâti indépendant au bâti principal sont constitués par un élément (15, 17) de fermeture du type loquet qui peut être bloqué manuellement/automatiquement et est disposé sur le côté opposé par rapport audit pivot vertical (14).

6. Chaîne de tri pour produits en céramique, en particulier des carrelages, avec poste d'emballage modulaire selon la Revendication 5, ***caractérisé en ce que*** ledit élément de loquet se compose d'un crochet (15) qui est articulé de maniére rotative sur ledit bâti principal (2), en opposition avec des moyens de retour élastiques, et s'accouple avec une dent correspondante (17) qui est assodée de manière correspondante audit bâti principal (11).

7. Chaîne de tri pour produits en céramique, en particulier des carrelages, avec poste d'emballage modulaire selon la Revendication 6, ***caractérisé en ce que*** ledit bâti indépendant (11) est muni de brides (18) pour le couplage universel de machines d'emballage de types différents.

8. Chaîne de tri pour produits en céramique, en particulier des carrelages, avec poste d'emballage modulaire selon la Revendication 6, ***caractérisé en ce que*** ledit bâti indépendant (11) peut être équipé de moyens à roues pour un déplacement en translation sur le sol.

9. Chaîne de tri pour produits en céramique, en particulier des carrelages, avec poste d'emballage modulaire selon la Revendication 6, ***caractérisé en ce que*** ledit bâti indépendant (11) est complètement séparable dudit bâti principal.

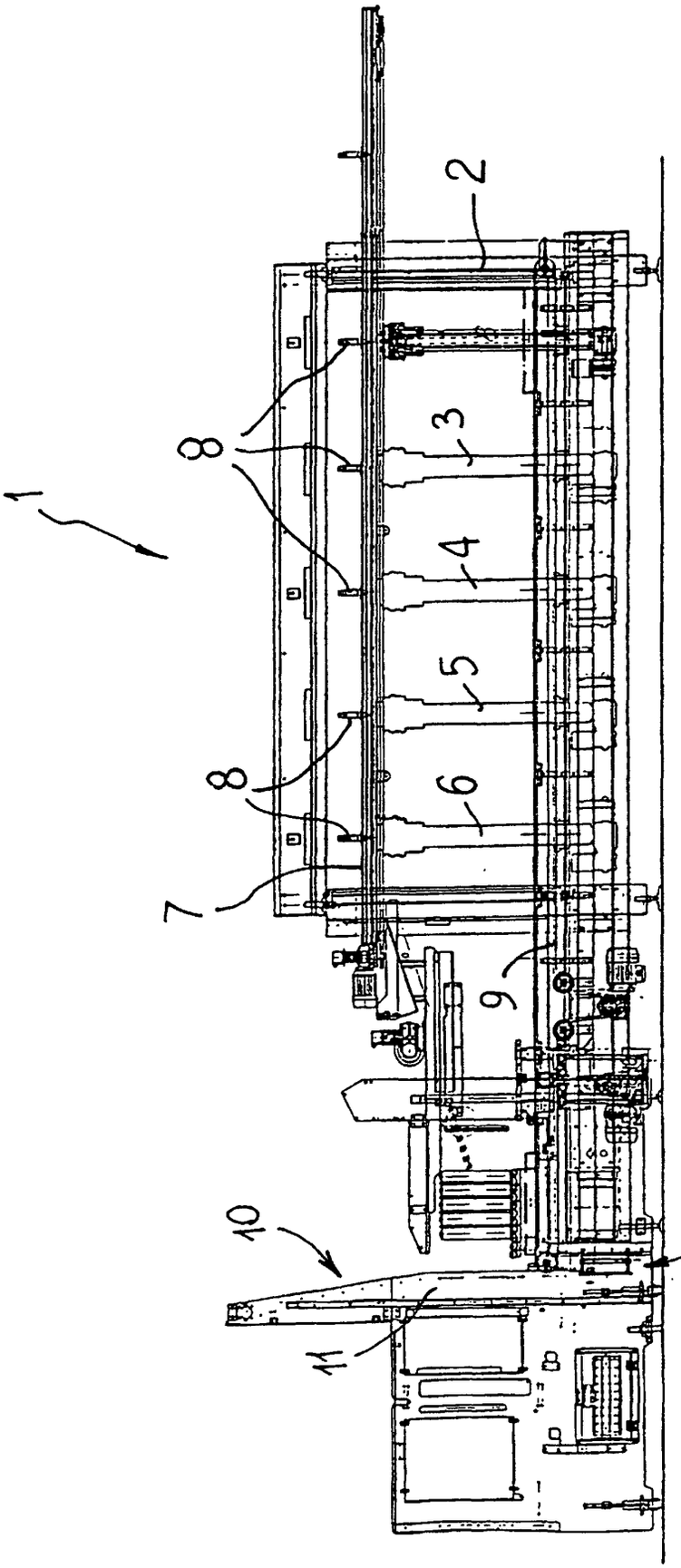


FIG. 1

FIG. 3

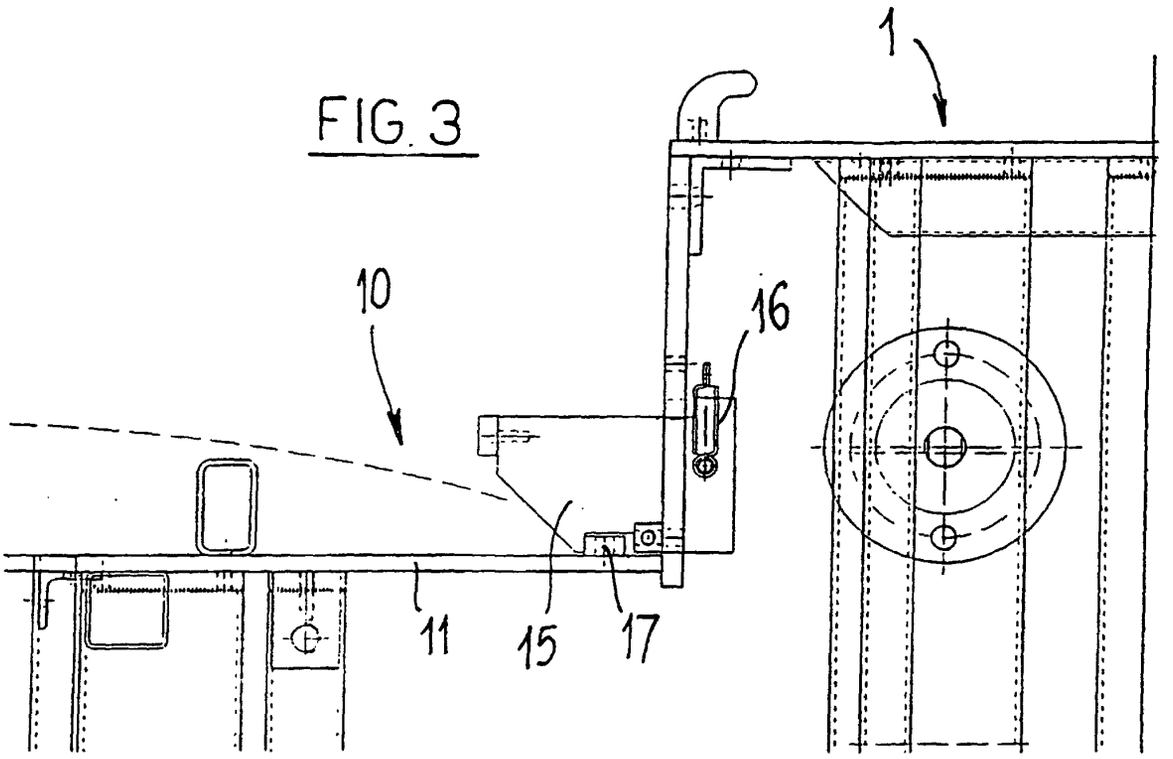
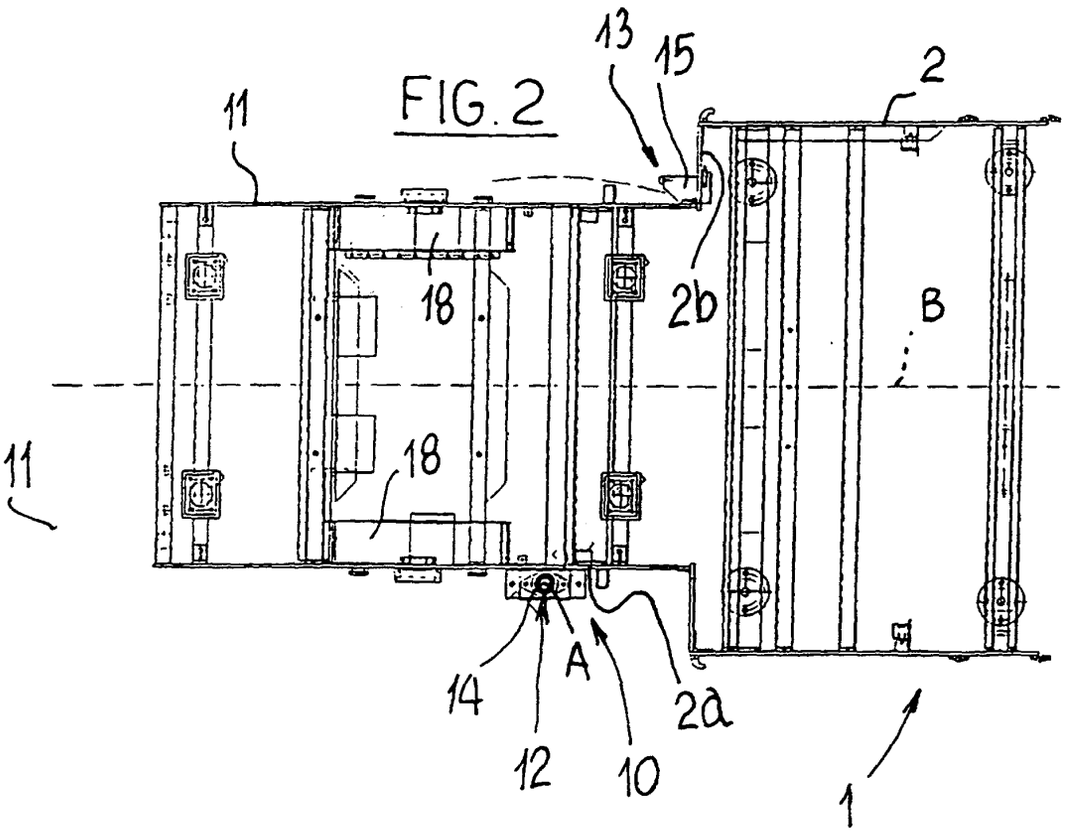


FIG. 2



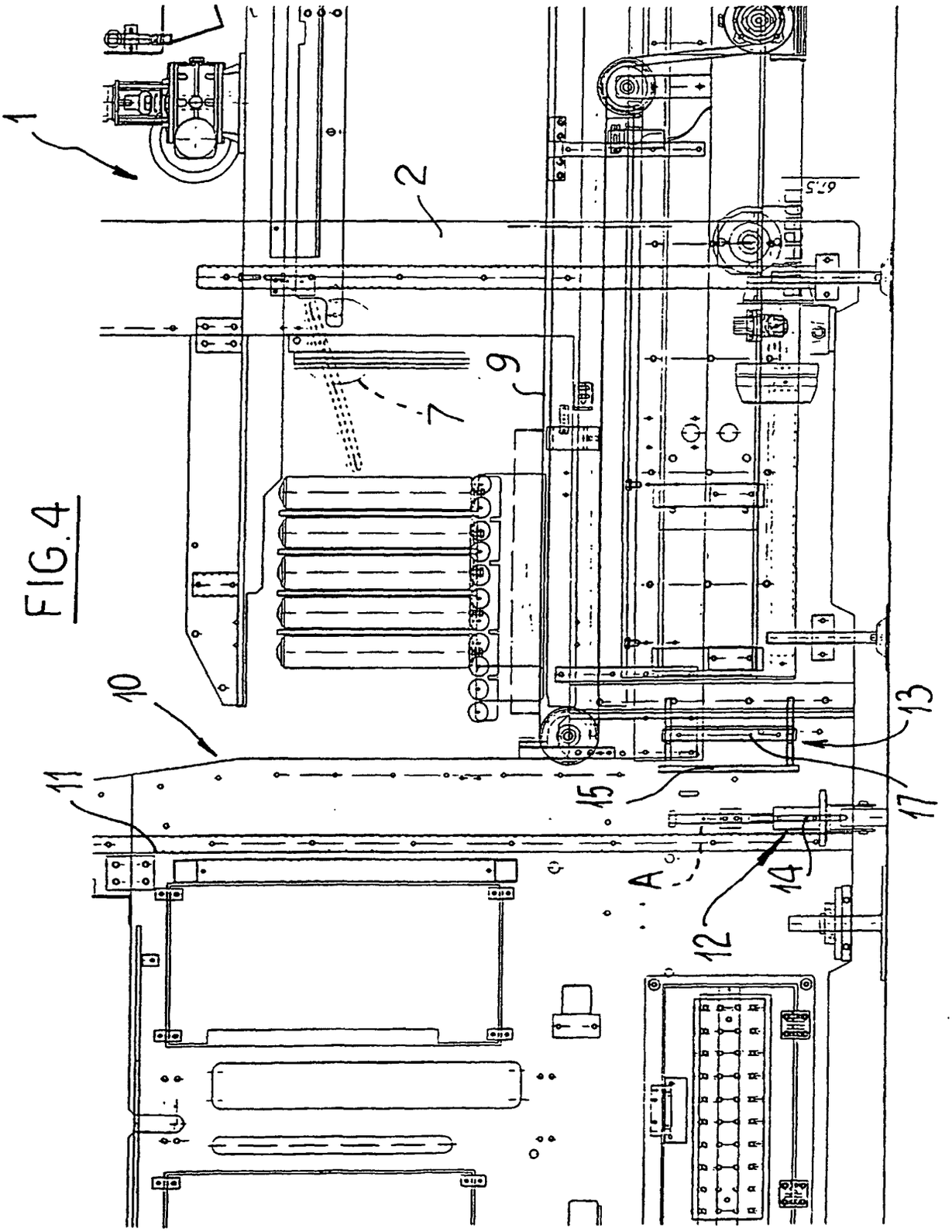


FIG.4