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(54) **Machine for spreading out and loading flat clothing articles**

Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel

Machine pour étendre et charger des articles d'habillement plat

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Description

Technical Field

[0001] The present invention relates to a machine for spreading out and loading flat clothing articles to a laundry processing unit, such as an ironing machine, a dryer or the like. The machine of the present invention includes two or three loading stations served by respective operators for spreading and loading large flat clothing articles, such as sheets or tablecloths, in a semiautomatic loading mode, and alternatively allows spreading and loading small flat clothing articles, such as napkins, pillowcases, cloths or tablecloths in a manual loading mode.

Background of the Invention

[0002] Machines for spreading and loading flat clothing articles comprising a frame supporting a conveyor belt and two or more loading stations served by respective operators in a semiautomatic loading mode are known. Each loading station comprises a pair of loading and spreading clamps in which the corresponding operator secures two contiguous corners of a large flat clothing article, for example a sheet. These loading and spreading clamps are moved in a direction transverse to the forward direction of the conveyor belt such that they unfold the flat clothing article, position it facing a loading end of the conveyor belt and smoothen it. Deposition means then deposit an upper end of the flat clothing article on the conveyor belt and the movement of the conveyor belt loads the flat clothing article thereon and transfers it to the laundry processing unit.

[0003] Optionally, in the loading stations there are several pairs of loading clamps receiving the corners of the flat clothing article loaded by the corresponding operator and transfer them to a pair of spreading clamps which unfold, position and smoothen the flat clothing article, so that the deposition means can deposit it on the conveyor belt.

[0004] Some machines such as those described above which further include an alternative manual loading mode by means of which one or more operators can load small flat clothing articles such as napkins, pillowcases, cloths or tablecloths directly on the conveyor belt, are also known.

[0005] Document EP-A-1683908 describes an example of one of such machines of the prior art. Other known machines are described in EP-A-0554205 and JP-A-2002326000.

[0006] Finally, document US-A1-0345087 discloses a machine for spreading and loading flat clothing articles, comprising all the features belonging to the preamble of independent claim 1.

[0007] These machines for spreading and loading flat clothing articles of the state of the art have in general one or more of the following drawbacks:

- Risk for the operators due to the movements of the clamps which are necessarily fast if wanting to achieve a high productivity.
- Productivity relatively limited by the time taken by the conveyor belt to load a flat clothing article, since the spreading clamps cannot spread and position a flat clothing article until the loading end of the conveyor belt is free to receive it and to not hinder the preceding flat clothing article.
- Bad quality in depositing the flat clothing articles on the conveyor belt, for example the presence of folds and wrinkles due to the bad conditions in which the deposition is performed in machines of high productivity.
- Large sizes of the machine, for example in those cases in which the transferring means are located at a height sufficient to keep certain movable elements away from the operators and thus reducing their risk.
- Poor visibility of the small flat clothing articles deposited on the conveyor belt in the manual loading mode due to the concealment caused by protection elements partially removed for accessing the conveyor belt.

Disclosure of the Invention

[0008] The present invention aims to solve the aforementioned and other drawbacks by providing a machine for spreading out and loading flat clothing articles, comprising a frame in which there is supported at least one conveyor belt moving in a loading direction and having a loading end frontally covered by a protective cover. The machine comprises first and second loading stations located adjacent to first and second side ends of the protective cover, respectively, and first and second pairs of spreading clamps movable along a guide rail transverse to said loading direction of the conveyor belt.

- [0009]** Driving means independently move the first spreading clamps along the guide rail between a receiving position, in which the first spreading clamps are adjacent to one another in said first loading station and arranged for catching respective contiguous corners of a first flat clothing article manually loaded by a first operator, and a spread out position, in which the first spreading clamps are separated from one another holding said first flat clothing article hanging by gravity and spread out with respect to said loading end of the conveyor belt with its upper edge taut. Similarly, the driving means independently move the second spreading clamps along the guide rail between a receiving position, in which said second spreading clamps are adjacent to one another in said second loading station for catching respective contiguous corners of a second flat clothing article manually loaded by a second operator, and a spread out position, in which the second spreading clamps are separated from one another holding said second flat clothing article hanging by gravity and spread out with respect to said

loading end of the conveyor belt with its upper edge taut.

[0010] The machine further comprises deposition means for depositing an upper end of said first and second flat clothing articles on the conveyor belt from the position in which they are supported by the first and second spreading clamps when they are in the mentioned spread out position.

[0011] The mentioned protective cover is movable and has a pressing edge at a lower end. The driving means move the protective cover between a free passage position, in which said pressing edge is at a distance from the frame sufficient to allow the passage of the first and second flat clothing articles held and moved by the first or second spreading clamps between their receiving and spread out positions, and a retaining position, in which the pressing edge is applied against the frame catching therebetween the first or second flat clothing article spread out and held by the first or second spreading clamps in the spread out position. When the spreading clamps release the corners of the first or second flat clothing article, the latter is supported between the pressing edge of the protective cover and the frame while said deposition means act.

[0012] Throughout this description, the term "first flat clothing article" is used to designate any flat clothing article loaded by the first operator in the first loading station and the term "second flat clothing article" is used to designate any flat clothing article loaded by the second operator in the second loading station.

[0013] The deposition means comprise, in an embodiment, at least one blowing nozzle fixed to the protective cover and arranged for blowing an airflow on an upper part of the flat clothing article which is being supported by the pressing edge of the protective cover once the pair of first or second spreading clamps have released the contiguous corners of the flat clothing article for depositing the upper part of the flat clothing article on the loading end of the conveyor belt. Additionally, the flat clothing article is pressed against the upper surface of the conveyor belt by press wheels installed at the ends of press arms or is attracted by suction against the upper surface of the conveyor belt by means of a suction chamber through openings existing in the conveyor belt.

[0014] The movable protective cover provided with the mentioned pressing edge acts as a safety element against risks for the operators and furthermore, in cooperation with the deposition means, assures that the flat clothing articles are deposited in a regular and reliable manner on the conveyor belt, without folds or wrinkles.

[0015] In an embodiment, the machine comprises a separator element moved by driving means between a separating position and a retracted position in coordination with the movements of the protective cover between their free passage position and retaining position, respectively. In the separating position, a separating edge of said separator element is at a distance from the protective cover sufficient to allow the passage of the first and second flat clothing articles held and moved by the first or

second spreading clamps between their receiving and spread out positions when the protective cover is in the free passage position, at the same time that said separating edge of the separator element keeps the first or second flat clothing article sufficiently separated from the loading end of the conveyor belt to not interfere with a first or second flat clothing article previously deposited and which is being moved by the conveyor belt. In the retracted position which corresponds to the retaining position of the protective cover, the separator element is not in contact with the first or second flat clothing article and leaves the loading end of the conveyor belt free to allow the upper part of the first or second flat clothing article caught between the pressing edge of the protective cover and the frame to be deposited on the conveyor belt by the deposition means.

[0016] This separator element contributes to increase the productivity of the machine since it allows spreading and positioning a flat clothing article with respect to the loading end of the conveyor belt by the spreading clamps while another preceding flat clothing article, which is still being transported by the conveyor belt, is partially arranged on the conveyor belt and with one part thereof hanging by gravity from the loading end.

[0017] Another safety element against risks for the operators in an embodiment of the machine of the present invention consists of safety screens preventing the operators from being able to be harmed by the spreading clamps while the same are moved at high speed between their receiving and spread out positions. Thus, the first and second loading stations comprise respective first and second access protection screens moved by driving means between an open position and a closed position. In the open position, the first and second access protection screens allow the access of the first or second operator to the corresponding pair of first or second spreading clamps when the same is in the receiving position, and in the closed position the first and second access protection screens prevent the access of the first or second operator to the corresponding pair of first or second spreading clamps.

[0018] The first and second loading stations further comprise respective first and second inner protection screens moved by driving means between an open position and a closed position. In the open position, said first and second inner protection screens allow the movements of the corresponding pair of first or second spreading clamps between their receiving and spread out positions, and in the closed position the first and second inner protection screens prevent the access of the first or second operator to the corresponding pair of first or second spreading clamps when the same are not in the first or second loading station.

[0019] The driving means of the first and second access protection screens and of the first and second inner protection screens are controlled by control means such that when one of the loading stations has its access protection screen in its open position, then the inner protec-

tion screen of the same loading station is in its closed position, whereas the access protection screen of the other loading station is in its closed position, and the corresponding inner protection screen is in its open position, and vice versa.

[0020] In an embodiment, the machine comprises a third loading station configured to be used by a third operator. This third loading station is located between the first and second loading stations facing the conveyor belt and in communication with an opening formed in the protective cover. In this case, the first, second and third loading stations include respective pairs of first, second and third loading clamps moved by driving means in a direction parallel to the loading direction between a loading position and a transferring position. In the loading position, the pairs of first, second and third loading clamps are in a position suitable for receiving contiguous corners of the first, second and third flat clothing articles manually loaded by the first, second and third operators. In the transferring position, the pairs of first, second and third loading clamps are adjacent to one of the pairs of first and second spreading clamps and transfer said contiguous corners of the first, second and third flat clothing articles to the pairs of first and second spreading clamps.

[0021] Throughout this description, the term "third flat clothing article" is used to designate any flat clothing article loaded by the third operator in the third loading station.

[0022] In this embodiment of the machine with three loading stations, the aforementioned first and second access protection screens of the first and second loading stations, when they are in their closed positions, prevent the access of the first or second operator to the respective first and second pairs of loading clamps when the same are in the loading position, and the third loading station comprises a third access protection screen moved by driving means between an open position and a closed position. In the open position, said third access protection screen allows the access of the third operator to the corresponding pair of third loading clamps when the same is in the loading position, and in the closed position the third access protection screen prevents the access of the third operator to the corresponding pair of third loading clamps.

[0023] The three loading stations include respective first, second and third intermediate screens moved by driving means between a closed position and an open position. In the closed position, the first, second and third intermediate screens are interposed between the pairs of first, second and third loading clamps and the pairs of first and second spreading clamps when the latter are in the receiving position, such that they prevent the access of the corresponding first, second or third operator to the first and second spreading clamps when the corresponding first, second and third access protection screens are in their open position. In the open position, the first, second and third intermediate screens allow the movements of the pairs of first, second and third loading clamps be-

tween their loading and transferring positions.

[0024] In an embodiment, the movements of the loading clamps between their loading positions and their delivery positions are driven by driving means controlled by control means configured for stopping said driving means in the event that the loading clamps encounter a resistance above a predetermined threshold during their movements between the loading positions and the delivery positions. This eliminates or reduces to the minimum the risk of injury for the operator in the event that he/she puts his/her hands between the loading clamps and the spreading clamps. With this control system for controlling the movements of the loading clamps, the function of the access protection screens may be unnecessary, therefore the access protection screens can be omitted.

[0025] The first, second and third loading stations described above allow the machine of the present invention to function in a semiautomatic loading mode in which the corresponding operators manually load two contiguous corners of the flat clothing article to the clamps and the machine automatically performs the subsequent operations of spreading, positioning and depositing and transporting the flat clothing article. However, the machine of the present invention is prepared to function in a manual loading mode, in which one or more, generally up to three, operators can load small flat clothing articles directly on the loading end of the conveyor belt.

[0026] To that end, the protective cover is installed in a casing portion, which is in turn connected to the frame of the machine by a casing hinge. In the embodiment with two loading stations, the casing portion together with the protective cover can pivot with respect to the frame between a semiautomatic loading position and a manual loading position. In said semiautomatic loading position the protective cover frontally covers the loading end of the conveyor belt such that the large flat clothing articles can be loaded through the loading stations in the semiautomatic loading mode as has been described above. Contrarily, in said manual loading position the protective cover is lifted up and exposes the loading end of the conveyor belt such that it allows one or more operators to manually load small flat clothing articles directly on the loading end of the conveyor belt in the manual loading mode. In this manual loading position the protective cover is lifted up sufficiently to provide the operators with good visibility of the clothing articles deposited.

[0027] In the embodiment with three loading stations, the protective cover is also installed in the mentioned casing portion similarly to the embodiment with two loading stations, and the third loading station is directly connected to the casing portion. Thus, the casing portion pivots together with the protective cover and the third loading station between the semiautomatic loading position and the manual loading position. In the semiautomatic loading position, the protective cover and the third loading station are in an operative condition. In the manual loading position, the protective cover and the third loading station are in inoperative positions and are lifted

up sufficiently to provide the operators with good visibility of the clothing articles deposited.

[0028] Both in the embodiment with two loading stations and in the embodiment with three loading stations, the protective cover is connected to the casing portion by a cover hinge, such that the protective cover can pivot about said cover hinge between the free passage position and retaining position. The driving means are operatively connected to the protective cover and to the casing portion to drive the movements of the protective cover between the free passage position and retaining position with respect to the casing portion, which is performed when the casing portion is in the semiautomatic loading position.

Brief Description of the Drawings

[0029] The foregoing and other features and advantages will be better understood from the following detailed description of exemplary embodiments with reference to the attached drawings, in which:

Fig. 1 is a schematic plan view of a machine for spreading out and loading flat clothing articles according to a first embodiment of the present invention with two loading stations in a semiautomatic loading mode and with protection screens in a first position;

Fig. 2 is a schematic plan view of the machine of Fig. 1 in the semiautomatic loading mode and with the protection screens in a second position;

Fig. 3 is a side view of the machine of Fig. 1 in the semiautomatic loading mode with a protective cover in a free passage position;

Fig. 4 is a side view of the machine of Fig. 1 in the semiautomatic loading mode with the protective cover in a retaining position;

Fig. 5 is a side view of the machine of Fig. 1 showing a first loading station in the semiautomatic loading mode;

Fig. 6 is a side view of the machine of Fig. 1 in a manual loading mode;

Fig. 7 is a plan view of the machine of Fig. 1 in the manual loading mode;

Fig. 8 is a schematic plan view of a machine for spreading out and loading flat clothing articles according to a second embodiment of the present invention with three loading stations in a semiautomatic loading mode;

Fig. 9 is a side view of the machine of Fig. 8 in the semiautomatic loading mode with a protective cover in a free passage position;

Fig. 10 is a side view of the machine of Fig. 8 in the semiautomatic loading mode with the protective cover in a retaining position;

Fig. 11 is a side view of the machine of Fig. 8 showing a third loading station in the semiautomatic loading mode; and

Fig. 12 is a side view of the machine of Fig. 8 in a

manual loading mode.

Detailed Description of Exemplary Embodiments

[0030] First referring to Figs. 1 to 7, there is shown a machine for spreading out and loading flat clothing articles according to a first embodiment of the present invention, which comprises a frame 10 supporting a conveyor belt 30 having a considerably horizontal or slightly inclined upper section moving in a loading direction D. The conveyor belt 30 has a loading end 30a on which there is deposited a duly spread out and positioned upper part of flat clothing articles A1, A2, and an unloading end 30b, from which the spread out flat clothing articles A1, A2 are transferred to a laundry processing unit 33, such as an ironing unit or a folding unit, schematically depicted by means of dashed lines. Flat clothing articles are understood as linen elements and other clothing for use in the home, hospitals, hotels, restaurants, etc., such as tablecloths, napkins, sheets, pillowcases, and cloths, among others.

[0031] The mentioned loading end 30a of the conveyor belt 30 is covered frontally by a protective cover 11, and the machine of this first embodiment includes first and second loading stations 1, 2 adjacent to first and second side ends of said protective cover 11, beyond corresponding first and second side ends 30c, 30d of the conveyor belt 30. The first and second loading stations 1, 2 are used by respective first and second operators P1, P2 in a semiautomatic loading mode.

[0032] Along the width of the conveyor belt 30 and of the first and second loading stations 1, 2 there is extended a guide rail 8 arranged in a direction transverse to said loading direction D of the conveyor belt 30. A pair of first spreading clamps 4a, 4b are installed on corresponding first carriages 6a, 6b which are independently moved by driving means along said guide rail 8 between a receiving position, in which said first spreading clamps 4a, 4b are adjacent to one another in said first loading station 1 (Fig. 1), and a spread out position, in which the first spreading clamps 4a, 4b are separated from one another and positioned facing the loading end of the conveyor belt 30 (Fig. 2).

[0033] Similarly, a pair of second spreading clamps 5a, 5b are installed on corresponding second carriages 7a, 7b which are moved independently by driving means along the guide rail 8 between a receiving position, in which said second spreading clamps 5a, 5b are adjacent to one another in said second loading station 2 (Fig. 2), and a spread out position, in which the second spreading clamps 5a, 5b are separated from one another and positioned facing the loading end of the conveyor belt 30 (Fig. 1).

[0034] When the pair of first spreading clamps 4a, 4b is in its receiving position in the first loading station 1 (Fig. 1), the first operator P1 searches for contiguous corners of a first flat clothing article A1 and catches them manually to the first pair of spreading clamps 4a, 4b. Once the

corners are caught, a swift movement of the first spreading clamps 4a, 4b towards their spread out position (Fig. 2) spreads the first flat clothing article A1 until its upper edge is taut and positions it facing the conveyor belt 30. At the same time that first spreading clamps 4a, 4b position the first flat clothing article A1 in the spread out position, the pair of second spreading clamps 5a, 5b is in its receiving position in the second loading station 2 (Fig. 2), and the second operator P2 searches for contiguous corners of a second flat clothing article A2 so as to catch them manually to the second pair of spreading clamps 5a, 5b. Next, a swift movement of the second spreading clamps 5a, 5b towards their spread out position (Fig. 1) spreads the second flat clothing article A2 until its upper edge is taut and positions it facing the conveyor belt 30, while the pair of first spreading clamps 4a, 4b have swiftly returned to their receiving position in the first loading station 1 (Fig. 1), and the loading cycle will thus be repeated.

[0035] In the spread out position, the first and second spreading clamps 4a, 4b; 5a, 5b hold the corresponding first or second flat clothing article A1, A2 hanging by gravity inside a narrow pit (not shown) adjacent to the loading end 30a of the conveyor belt 30. From this spread out position, an upper part of the first and second flat clothing articles A1, A2 is deposited on the loading end 30a of the conveyor belt 30 by deposition means which will be explained in detail below, and the first and second flat clothing articles A1, A2 are transported in the loading direction D by the conveyor belt 30 and transferred to the laundry processing unit 33.

[0036] The first and second loading stations 1, 2 define respective enclosures in which there are positioned the pairs of first and second spreading clamps 4a, 4b; 5a, 5b when they are in their receiving positions, and said enclosures have respective windows through which the first and second operators P1, P2 access the enclosures. The first and second loading stations 1, 2 comprise respective first and second access protection screens 13, 14 located in said windows and are moved vertically by driving means between an open position (indicated by means of dashed lines in Figs. 1 and 2) and a closed position (indicated by means of solid lines in Figs. 1 and 2). The first and second loading stations 1, 2 also comprise respective first and second inner protection screens 15, 16 moved vertically by driving means between an open position (indicated by means of dashed lines in Figs. 1 and 2) and a closed position (indicated by means of solid lines in Figs. 1 and 2).

[0037] Thus, the first and second access protection screens 13, 14 are in positions approximately parallel to the protective cover 11 and substantially aligned therewith, whereas the first and second inner protection screens 15, 16 are in positions substantially perpendicular to the first and second access protection screens 13, 14. The driving means of the first and second access protection screens 13, 14 and of the first and second inner protection screens 15, 16 can be, for example, lin-

ear actuators 34 (Fig. 5) driven by fluid-dynamic or electric energy.

[0038] In the open position, the first and second access protection screens 13, 14 allow the access of the first or second operator P1, P2 to the corresponding enclosure of the first or second loading station 1, 2 where the pair of first or second spreading clamps 4a, 4b; 5a, 5b is located when the same is in the receiving position, and in the closed position, the first and second access protection screens 13, 14 close the mentioned windows and prevent the access of the first or second operator P1, P2 to the corresponding pair of first or second spreading clamps 4a, 4b; 5a, 5b.

[0039] When the first and second inner protection screens 15, 16 are in the open position, they allow the movements of the corresponding pair of first or second spreading clamps 4a, 4b; 5a, 5b between their receiving positions inside the corresponding enclosure of the first or second loading station 1, 2 and their spread out positions facing the loading end 30a of the conveyor belt 30. When the first and second inner protection screens 15, 16 are in the closed position, they prevent the access of the first or second operator P1, P2 to the corresponding pair of first or second spreading clamps 4a, 4b; 5a, 5b when the same are not in the first or second loading station 1, 2, i.e., when they are in their spread out positions or being moved at high speed towards or from their spread out positions facing the loading end 30a of the conveyor belt 30.

[0040] The machine comprises control means which control the driving means moving the first and second access protection screens 13, 14 and the first and second inner protection screens 15, 16 such that when the first access protection screen 13 is in its open position (Fig. 1), then the first inner protection screen 15 is in its closed position, the second access protection screen 14 is in its closed position, and the second inner protection screen 16 is in its open position, and when the first access protection screen 13 is in its closed position (Fig. 2), then the first inner protection screen 15 is in its open position, the second access protection screen 14 is in its open position, and the second inner protection screen 16 is in its closed position.

[0041] This alternating movement of the protection screens provides a very high level of safety for the first and second operators P1, P2 against the risk of being harmed by the first and second spreading clamps 4a, 4b; 5a, 5b being moved at high speed. The opening of the access protection screens informs the first and second operators P1, P2 when a flat clothing article A1, A2 can be introduced and establishes the cycle rate.

[0042] Referring especially to Figs. 3 and 4, the mentioned protective cover 11 frontally covering the loading end 30a of the conveyor belt 30 is movable and has a pressing edge 12 at a lower end facing the frame 10. The protective cover 11 is connected to a casing portion 17 by means of a cover hinge 18, and driving means 20, such as fluid-dynamic cylinders or the like, are operative-

ly connected to the protective cover 11 and to the casing portion 17 to drive pivoting movements of the protective cover 11 about the cover hinge 18 between a free passage position (Fig. 3), in which said pressing edge 12 is at a distance from the frame 10 sufficient to allow the passage of the first and second flat clothing articles A1, A2 when they are held and moved by the pair of first or second spreading clamps 4a, 4b; 5a, 5b between their receiving and spread out positions and insufficient to allow the access of the hands of the operator to dangerous areas of the machine where the spreading clamps 4a, 4b; 5a, 5b move at high speed, and a retaining position (Fig. 4), in which the pressing edge 12 is applied against the frame 10 catching therebetween the first or second flat clothing article A1, A2 while the same is spread out and held by the first or second spreading clamps 4a, 4b; 5a, 5b in their spread out position.

[0043] Once the protective cover 11 has reached its retaining position (Fig. 4), the pair of first or second spreading clamps 4a, 4b; 5a, 5b releases the contiguous corners of the first or second flat clothing article A1, A2, such that the latter is caught and supported by the pressing edge 12 against the frame 10. Then the mentioned deposition means act, which in the illustrated example comprise an blowing nozzle 21 fixed to the protective cover 11 and arranged to blow an airflow on an upper part of the first or second flat clothing article A1, A2 comprised between the pressing edge 12 and the pair of first or second spreading clamps 4a, 4b; 5a, 5b. When the airflow contacts the first or second flat clothing article A1, A2 it deposits the upper part thereof on the loading end 30a of the conveyor belt 30.

[0044] Above the conveyor belt 30, the deposition means further comprise a plurality of press wheels 22 installed at the ends of corresponding movable press arms 23 driven to press the upper part of the first or second flat clothing article A1, A2 against the loading end 30a of the conveyor belt 30. In the embodiment illustrated, the blowing nozzle 21 has the shape of a longitudinal slot formed in a hollow profile extending along the protective cover, although alternatively there could be a plurality of individual blowing nozzles. Likewise, the press wheels 22 could be replaced with a suction chamber (such as the suction chamber 32 shown in Figs. 9-12) connected to a vacuum source and arranged below an upper section of the conveyor belt to attract by suction the first or second flat clothing article A1, A2 through openings existing in the conveyor belt.

[0045] The protective cover 11 is installed in a casing portion 17, which is in turn connected to the frame 10 by a casing hinge 19 about which said casing portion 17 together with the protective cover 11 can pivot with respect to the frame 10 between a semiautomatic loading position (Figs. 3, 4 and 5) and a manual loading position (Fig. 6). In said semiautomatic loading position, the protective cover 11 frontally covers the loading end 30a of the conveyor belt 30 and its pressing edge 12 is in an operative condition, as has been described above. In said

manual loading position, the casing portion 17 and the protective cover 11 are lifted upwards exposing the loading end 30a of the conveyor belt 30 to allow one or more operators to load small flat clothing articles Ap1, Ap2, Ap3 directly on the loading end 30a of the conveyor belt 30 in a manual loading mode.

[0046] As shown in Fig. 7, in the manual loading mode, each operator deposits the small flat clothing articles Ap1, Ap2, Ap3 in a sector of the conveyor belt 30.

[0047] Figs. 8 to 12 describe a machine for spreading out and loading flat clothing articles according to a second embodiment of the present invention, which comprises a third loading station 3 added to the basic configuration with two loading stations 1, 2 of the first embodiment.

[0048] As shown in Fig. 8, in this second embodiment, the mentioned third loading station 3 is located in a central area of the machine, between said first and second loading stations 1, 2 and facing the conveyor belt 30. The protective cover 11 has an opening (not shown) in register with the third loading station 3, and a third operator P3 is in charge of serving the third loading station 3 in the semiautomatic loading mode. The enclosures defined by the first, second and third loading stations 1, 2, 3 protrude outwards in relation with the protective cover 11, and have associated therewith respective pairs of first, second and third loading clamps 24a, 24b; 25a, 25b; 26a, 26b moved by driving means in a direction substantially perpendicular to the guide rail 8 between a loading position and a transferring position. The pairs of first and second spreading clamps 4a, 4b; 5a, 5b maintain the same configuration as in the first embodiment, and the pairs of first, second and third loading clamps 24a, 24b; 25a, 25b; 26a, 26b provide a significant increase of productivity and allow keeping the hands of the operators away from the first and second spreading clamps 4a, 4b; 5a, 5b, which move at high speed.

[0049] In said loading position, the pairs of first, second and third loading clamps 24a, 24b; 25a, 25b; 26a, 26b are adjacent to the windows of the enclosures defined by the first, second and third loading stations 1, 2, 3, such that they can receive contiguous corners of the first, second and third flat clothing articles A1, A2, A3 manually loaded by the corresponding first, second and third operators P1, P2, P3. In said transferring position, the pairs of first, second and third loading clamps 24a, 24b; 25a, 25b; 26a, 26b transfer the contiguous corners of the first, second and third flat clothing articles A1, A2, A3 to one of said pairs of first and second spreading clamps 4a, 4b; 5a, 5b.

[0050] The machine of this second embodiment comprises a separator element 9 in the shape of a plate located above the conveyor belt 30. This separator element is moved by driving means in coordination with the movements of the protective cover 11 between a separating position (Fig. 9) corresponding with the free passage position of the protective cover 11, and a retracted position (Fig. 10) corresponding with the retaining position of the protective cover 11. The mentioned driving means of the

separator element 9 comprise, for example, a linear actuator 35 driven by fluid-dynamic or electric energy. The protective cover 11 maintains the same configuration as in the first embodiment, although in this second embodiment with three loading stations (Fig. 9), when the protective cover 11 is in its free passage position, it is further separated from the frame 10 in comparison with the first embodiment with two loading stations (Fig. 3).

[0051] In the mentioned separating position (Fig. 9), a separating edge 9a of said separator element 9 is at a distance from the protective cover 11, which is located in its free passage position. This distance is sufficient to allow the passage of the first, second and third flat clothing articles A1, A2, A3 (A1 in Fig. 9) held and moved by the first or second spreading clamps 4a, 4b; 5a, 5b between their receiving and spread out positions but insufficient to allow the access of the hands of an operator to dangerous areas of the machine where the spreading clamps 4a, 4b; 5a, 5b move at high speed. Furthermore, in this separating position, the separating edge 9a of the separator element 9 keeps the first, second or third flat clothing article A1, A2, A3 (A1 in Fig. 9) separated from the loading end 30a of the conveyor belt 30, which allows transporting a preceding flat clothing article A1, A2, A3 (A2 in Fig. 9) by the conveyor belt without hindering one another nor creating interferences.

[0052] The protective cover 11 allows a movement towards the operator P1, P2, P3 if the latter pulls the protective cover 11 outwards, in a direction opposite the frame 10, for example in the event that the operator P1, P2, P3 got his/her hands caught between the pressing edge 12 of the protective cover 11 and the frame 10, and control means are configured for stopping the operation of the machine in the event that one of the operators P1, P2, P3 pulls the protective cover 11 outwards. This feature is common for the embodiments with two and three loading stations.

[0053] In said retracted position (Fig. 10), the separator element 9 is retracted towards the inside of the machine and leaves the loading end 30a of the conveyor belt 30 free to allow depositing the first, second and third flat clothing articles A1, A2, A3. Thus, in this retracted position, the separator element 9 allows moving the protective cover 11 to its retaining position and the deposition means to deposit the upper part of the first, second or third flat clothing article A1, A2, A3 on the loading end 30a of the conveyor belt 30. The plate forming the separator element 9 is preferably round in shape to facilitate sliding the first, second and third flat clothing articles A1, A2, A3 thereon.

[0054] It must be pointed out that although this separator element 9 is essential for the second embodiment of the machine with three loading stations 1, 2, 3, it can also be applied to the first embodiment of the machine with two loading stations 1, 2, in which case it allows increasing the cycle speed without the risk of interference between the first and second flat clothing articles A1, A2.

[0055] Due to the presence of the separator element

9, in the second embodiment the deposition means comprise a suction chamber 32 (Figs. 9 to 12) instead of the press wheels 22 described above in relation with the embodiment with two loading stations. The suction chamber 32 is arranged below an upper section of the conveyor belt 30 and connected to a vacuum source (not shown). The conveyor belt 30 has openings, for example formed by separations between parallel bands forming the conveyor belt 30, and the suction chamber 32 acts to attract by suction the first, second or third flat clothing article A1, A2, A3 against the loading end 30a of the conveyor belt 30 through said openings of the conveyor belt 30. The suction chamber is also applicable to the first embodiment with two loading stations when the same incorporates the separator element 9.

[0056] In the second embodiment with three loading stations 1, 2, 3, when the first and second access protection screens 13, 14 of the first and second loading stations 1, 2 are in the closed position, they prevent the access of the first and second operators P1, P2 to the respective pairs of first and second loading clamps 24a, 24b; 25a, 25b, and the third loading station 3 comprises a third access protection screen 31 moved by driving means between an open position, in which said third access protection screen 31 allows the access of the third operator P3 to the corresponding pair of third loading clamps 26a, 26b when the same is in the loading position, and a closed position, in which said third access protection screen 31 prevent the access of the third operator P3 to the corresponding pair of third loading clamps 26a, 26b.

[0057] Furthermore, the first, second and third loading stations 1, 2, 3 include respective first, second and third intermediate screens 27, 28, 29 moved by driving means between a closed position and an open position. In the closed position, said first, second and third intermediate screens 27, 28, 29 are interposed between the pairs of first, second and third loading clamps 24a, 24b; 25a, 25b; 26a, 26b and the pairs of first and second spreading clamps 4a, 4b; 5a, 5b when the latter are in the receiving position, which occurs when the corresponding first, second and third access protection screens 13, 14, 31 are in their open position. In the open position, the first, second and third intermediate screens 27, 28, 29 are lifted up and allow the movements of the pairs of first, second and third loading clamps 24a, 24b; 25a, 25b; 26a, 26b between their loading and transferring positions.

[0058] The driving means moving the third access protection screen 31 between its open and closed positions comprise for example a linear actuator 34 driven by fluid-dynamic or electric energy, and the driving means moving the first, second and third intermediate screens 27, 28, 29 between their open and closed positions comprise for example respective linear actuators 36 driven by fluid-dynamic or electric energy.

[0059] In this second embodiment with three loading stations 1, 2, 3, the protective cover 11 is installed in the casing portion 17 in a manner similar to that described

above in relation with the first embodiment with two loading stations, and the third loading station 3 is fixed to the same casing portion 17. The casing portion 17 herein is also connected to the frame 10 by a casing hinge 19 about which said casing portion 17 together with the protective cover 11 and the third loading station 3 can pivot with respect to the frame 10 between a semiautomatic loading position (Fig. 11) and a manual loading position (Fig. 12).

[0060] In the semiautomatic loading position (Fig. 11), the protective cover 11 is in an operative condition frontally covering the loading end 30a of the conveyor belt 30 and the third loading station 3 is also in an operative condition. In the manual loading position (Fig. 12), the protective cover 11 and the third loading station 3 are lifted in an inoperative condition such that they expose the loading end 30a of the conveyor belt 30 to allow one or more operators P1, P2, P3 to load small flat clothing articles Ap1, Ap2, Ap3 directly on the loading end 30a of the conveyor belt 30 in a manner similar to that described above in relation with the first embodiment with two loading stations (Fig. 7).

[0061] Modifications, variations and combinations will occur to a person skilled in the art from the embodiments shown and described without departing from the scope of the present invention as defined in the attached claims.

Claims

1. A machine for spreading out and loading flat clothing articles, comprising:

a frame (10) supporting at least one conveyor belt (30) moving in a loading direction (D), and having a loading end (30a);

a protective cover (11) frontally covering said loading end (30a) of the conveyor belt (30);

driving means for moving said protective cover (11);

first and second loading stations (1, 2) adjacent to first and second side ends of said protective cover (11);

a pair of first spreading clamps (4a, 4b) moved independently by driving means along a guide rail (8) transverse to said loading direction (D) of the conveyor belt (30) between a receiving position, in which said first spreading clamps (4a, 4b) are adjacent to one another in said first loading station (1) for catching respective contiguous corners of a first flat clothing article (A1) manually loaded by a first operator (P1), and a spread out position, in which the first spreading clamps (4a, 4b) are separated from one another holding said first flat clothing article (A1) spread out with respect to said loading end (30a) of the conveyor belt (30);

a pair of second spreading clamps (5a, 5b)

moved independently by driving means along said guide rail (8) between a receiving position, in which said second spreading clamps (5a, 5b) are adjacent to one another in said second loading station (2) for catching respective contiguous corners of a second flat clothing article (A2) manually loaded by a second operator (P2), and a spread out position, in which the second spreading clamps (5a, 5b) are separated from one another holding said second flat clothing article (A2) spread out with respect to said loading end (30a) of the conveyor belt (30); and deposition means for depositing an upper end of said first and second flat clothing articles (A1, A2) on the conveyor belt (30) from said spread out position of the first and second spreading clamps (4a, 4b; 5a, 5b);

characterized in that said protective cover (11) is movable and has a pressing edge (12) at a lower end, and **in that** said driving means are suitable for moving the protective cover (11) between a free passage position, in which said pressing edge (12) is at a distance from the frame (10) sufficient to allow the passage of the first and second flat clothing articles (A1, A2) held and moved by the first or second spreading clamps (4a, 4b; 5a, 5b) between their receiving and spread out positions and insufficient to allow the access of the hands of the operator (P1, P2) to dangerous areas, and a retaining position, in which the pressing edge (12) is applied against the frame (10) catching therebetween the first or second flat clothing article (A1, A2) spread out and held by the first or second spreading clamps (4a, 4b; 5a, 5b) in their spread out position and supporting the first or second flat clothing article (A1, A2) while said deposition means act.

2. The machine for spreading out and loading flat clothing articles according to claim 1, **characterized in that** the machine comprises a separator element (9) moved by driving means in coordination with the movements of the protective cover (11) between a separating position, in which a separating edge (9a) of said separator element (9) is at a distance from the protective cover (11) sufficient to allow the passage of the first and second flat clothing articles (A1, A2) held and moved by the first or second spreading clamps (4a, 4b; 5a, 5b) between their receiving and spread out positions and insufficient to allow the access of the hands of the operator (P1, P2) to dangerous areas when the protective cover (11) is in the free passage position, and in which said separating edge (9a) keeps the first or second flat clothing article (A1, A2) separated from the loading end (30a) of the conveyor belt (30), and a retracted position, in which the separator element (9) leaves the loading end

(30a) of the conveyor belt (30) free to allow depositing the first and second flat clothing articles (A1, A2) when the protective cover (11) is in the retaining position.

3. The machine for spreading out and loading flat clothing articles according to claim 1 or 2, **characterized in that** the first and second loading stations (1, 2) comprise respective first and second access protection screens (13, 14) moved by driving means between an open position, in which said first and second access protection screens (13, 14) allow the access of said first or second operator (P1, P2) to the corresponding pair of first or second spreading clamps (4a, 4b; 5a, 5b) when the same is in the receiving position, and a closed position, in which said first and second access protection screens (13, 14) prevent the access to the corresponding pair of first or second spreading clamps (4a, 4b; 5a, 5b).
4. The machine for spreading out and loading flat clothing articles according to claim 3, **characterized in that** the first and second loading stations (1, 2) comprise respective first and second inner protection screens (15, 16) moved by driving means between an open position, in which said first and second inner protection screens (15, 16) allow the movements of the corresponding pair of first or second spreading clamps (4a, 4b; 5a, 5b) between their receiving and spread out positions, and a closed position, in which said first and second inner protection screens (15, 16) prevent the access of the first or second operator (P1, P2) to the corresponding pair of first or second spreading clamps (4a, 4b; 5a, 5b) when the same are not in the first or second loading station (1, 2).
5. The machine for spreading out and loading flat clothing articles according to claim 4, **characterized in that** control means control said driving means of the first and second access protection screens (13, 14) and the first and second inner protection screens (15, 16) such that when the first access protection screen (13) is in its open position, then the first inner protection screen (15) is in its closed position, the second access protection screen (14) is in its closed position, and the second inner protection screen (16) is in its open position, and when the first access protection screen (13) is in its closed position, then the first inner protection screen (15) is in its open position, the second access protection screen (14) is in its open position, and the second inner protection screen (16) is in its closed position.
6. The machine for spreading out and loading flat clothing articles according to claim 1, **characterized in that** the protective cover (11) when it is in a semiautomatic loading position, allows an outward movement thereof in a direction opposite the frame (10),

and control means are configured for stopping the operation of the machine in the event that one of the first, second and third operators (P1, P2, P3) pulls the protective cover (11) outwards.

7. The machine for spreading out and loading flat clothing articles according to any one of claims 2 to 6, **characterized in that** a third loading station (3) configured to be served by a third operator (P3) is located between said first and second loading stations (1, 2) facing said conveyor belt (30), and said first, second and third loading stations (1, 2, 3) include respective pairs of first, second and third loading clamps (24a, 24b; 25a, 25b; 26a, 26b) moved by driving means between a loading position, in which said pairs of first, second and third loading clamps (24a, 24b; 25a, 25b; 26a, 26b) can receive contiguous corners of the first, second and third flat clothing articles (A1, A2, A3) manually loaded by said first, second and third operators (P1, P2, P3), and a transferring position, in which the pairs of first, second and third loading clamps (24a, 24b; 25a, 25b; 26a, 26b) transfer said contiguous corners of the first, second and third flat clothing articles (A1, A2, A3) to one of said pairs of first and second spreading clamps (4a, 4b; 5a, 5b).
8. The machine for spreading out and loading flat clothing articles according to claim 7, **characterized in that** the movements of each of the pairs of first, second and third loading clamps (24a, 24b; 25a, 25b; 26a, 26b) between their loading positions and their delivery positions are driven by driving means controlled by control means configured for stopping said driving means in the event that the pair of first, second or third loading clamps (24a, 24b; 25a, 25b; 26a, 26b) encounters a resistance above a predetermined threshold during their movements between the loading positions and the delivery positions.
9. The machine for spreading out and loading flat clothing articles according to claim 7 or 8, **characterized in that** the first, second and third loading stations (1, 2, 3) include respective first, second and third intermediate screens (27, 28, 29) moved by driving means between a closed position, in which said first, second and third intermediate screens (27, 28, 29) are interposed between the pairs of first, second and third loading clamps (24a, 24b; 25a, 25b; 26a, 26b) and the pairs of first and second spreading clamps (4a, 4b; 5a, 5b) when the latter are in the receiving position and the corresponding first, second and third access protection screens (13, 14, 31) are in their open position, and an open position.
10. The machine for spreading out and loading flat clothing articles according to claim 9, **characterized in that** said first and second access protection screens (13, 14) of the first and second loading stations (1,

- 2) prevent the access of the first or second operator (P1, P2) to the respective first and second pairs of loading clamps (24a, 24b; 25a, 25b) when they are in the closed position, and said third loading station (3) comprises a third access protection screen (31) moved by driving means between an open position, in which said third access protection screen (31) allows the access of said third operator (P3) to the corresponding pair of third loading clamps (26a, 26b) when the same is in the loading position, and a closed position, in which said third access protection screen (31) prevent the access to the corresponding pair of third loading clamps (26a, 26b).
11. The machine for spreading out and loading flat clothing articles according to claim 1 or 2, **characterized in that** the protective cover (11) is installed in a casing portion (17) and said casing portion (17) is connected to the frame (10) by a casing hinge (19) about which said casing portion (17) together with the protective cover (11) can pivot with respect to the frame (10) between a semiautomatic loading position, in which the protective cover (11) frontally covers the loading end (30a) of the conveyor belt (30), and a manual loading position, in which the protective cover (11) exposes the loading end (30a) of the conveyor belt (30) to allow one or more operators to load small flat clothing articles (Ap1, Ap2, Ap3) directly on the loading end (30a) of the conveyor belt (30).
12. The machine for spreading out and loading flat clothing articles according to any one of claims 8 to 11, **characterized in that** the protective cover (11) and the third loading station (3) are installed in a casing portion (17) and said casing portion (17) is connected to the frame (10) by a casing hinge (19) about which said casing portion (17) together with the protective cover (11) and the third loading station (3) can pivot with respect to the frame (10) between a semiautomatic loading position, in which the protective cover (11) frontally covers the loading end (30a) of the conveyor belt (30) and the third loading station (3) is in an operative condition, and a manual loading position, in which the protective cover (11) exposes the loading end (30a) of the conveyor belt (30) to allow one or more operators to load small flat clothing articles (Ap1, Ap2, Ap3) directly on the loading end (30a) of the conveyor belt (30) and the third loading station (3) is in an inoperative condition.
13. The machine for spreading out and loading flat clothing articles according to claim 11 or 12, **characterized in that** the protective cover (11) is connected to said casing portion (17) by a cover hinge (18) about which the protective cover (11) pivots between said free passage position and retaining position, and driving means (20) are operatively connected to the protective cover (11) and to the casing portion (17) to drive the movements of the protective cover (11) between the free passage position and retaining position with respect to the casing portion (17) when the casing portion (17) is in the semiautomatic loading position.
14. The machine for spreading out and loading flat clothing articles according to any one of the preceding claims, **characterized in that** said deposition means comprise at least one blowing nozzle (21) fixed to the protective cover (11) and arranged for blowing an airflow on an upper part of the first or second flat clothing article (A1, A2) supported by the pressing edge (12) of the protective cover (11) when the pair of first or second spreading clamps (4a, 4b; 5a, 5b) have released said contiguous corners of the first or second flat clothing article (A1, A2) to deposit said upper part of the first or second flat clothing article (A1, A2) on the loading end (30a) of the conveyor belt (30).
15. The machine for spreading out and loading flat clothing articles according to claim 1, **characterized in that** the deposition means comprise a plurality of press wheels (22) installed at the ends of movable press arms (23) to press the upper part of the first or second flat clothing article (A1, A2) against the loading end (30a) of the conveyor belt (30).
16. The machine for spreading out and loading flat clothing articles according to claim 2 or 7, **characterized in that** the deposition means comprise a suction chamber (32) connected to a vacuum source and arranged below an upper section of the conveyor belt (30) to attract by suction the first, second or third flat clothing article (A1, A2, A3) against the loading end (30a) of the conveyor belt (30) through openings of the conveyor belt (30).

Patentansprüche

1. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel, umfassend:
- einen Rahmen (10), welcher mindestens ein Förderband (30) trägt, das sich in eine Beladungsrichtung (D) bewegt, und ein Beladungsende (30a) aufweist;
 - eine Schutzabdeckung (11), welche das genannte Beladungsende (30a) des Förderbands (30) frontal abdeckt;
 - Betätigungsmittel für die Bewegung der genannten Schutzabdeckung (11);
 - eine erste Beladungsstation (1) und eine zweite Beladungsstation (2) angrenzend an ein erstes Seitenende und an ein zweites Seitenende der genannten Schutzabdeckung (11);

ein Paar erster Ausbreithalterungen (4a, 4b), die über Betätigungsmittel entlang einer Führungsschiene (8) quer zur genannten Beladungsrichtung (D) des Förderbands (30) zwischen einer Aufnahmestellung, in welcher die genannten ersten Ausbreithalterungen (4a, 4b) in der genannten ersten Beladungsstation (1) aneinander angrenzen zum Greifen von jeweiligen benachbarten Ecken eines ersten flachen Bekleidungsartikels (A1), welcher von einem ersten Bediener (P1) manuell geladen wird, und einer Ausbreitstellung, in welcher die ersten Ausbreithalterungen (4a, 4b) voneinander getrennt sind und den genannten ersten flachen Bekleidungsartikel (A1) ausgebreitet in Bezug auf das genannte Beladungsende (30a) des Förderbands (30) halten, unabhängig bewegt werden;

ein Paar zweiter Ausbreithalterungen (5a, 5b), die über Betätigungsmittel entlang der genannten Führungsschiene (8) zwischen einer Aufnahmestellung, in welcher die genannten zweiten Ausbreithalterungen (5a, 5b) in der genannten zweiten Beladungsstation (2) aneinander angrenzen zum Greifen von jeweiligen benachbarten Ecken eines zweiten flachen Bekleidungsartikels (A2), welcher von einem zweiten Bediener (P2) manuell geladen wird, und einer Ausbreitstellung, in welcher die zweiten Ausbreithalterungen (5a, 5b) voneinander getrennt sind und den genannten zweiten flachen Bekleidungsartikel (A2) ausgebreitet in Bezug auf das genannte Beladungsende (30a) des Förderbands (30) halten, unabhängig bewegt werden; und

Ablagemittel zum Ablegen eines oberen Endes des genannten ersten Bekleidungsartikel (A1) und des genannten zweiten Bekleidungsartikel (A2) auf das Förderband (30) aus der genannten Ausbreitstellung von den ersten Ausbreithalterungen (4a, 4b) und den zweiten Ausbreithalterungen (5a, 5b);

dadurch gekennzeichnet, dass die genannte Schutzabdeckung (11) bewegbar ist und einen Druckrand (12) an einem unteren Ende aufweist und dass die genannten Betätigungsmittel dazu geeignet sind, die Schutzabdeckung (11) zwischen einer Stellung mit freiem Durchgang, in welcher der genannte Druckrand (12) einen Abstand zu dem Rahmen (10) aufweist, der ausreicht, um den Durchgang des ersten flachen Bekleidungsartikels (A1) und des zweiten flachen Bekleidungsartikels (A2), welche von den ersten Ausbreithalterungen (4a, 4b) oder den zweiten Ausbreithalterungen (5a, 5b) gehalten und zwischen ihren Aufnahme- und Ausbreitstellungen bewegt werden, zu erlauben, und nicht ausreicht, um den Zugang der Hände des Bedieners (P1, P2) auf gefährliche

Bereiche zu erlauben, und einer Zurückhaltestellung, in welcher der Druckrand (12) gegen den Rahmen (10) gesetzt wird, wobei dazwischen der erste flache Bekleidungsartikel (A1) oder der zweite flache Bekleidungsartikel (A2) gegriffen wird, von den ersten Ausbreithalterungen (4a, 4b) oder den zweiten Ausbreithalterungen (5a, 5b) in ihrer Ausbreitstellung ausgebreitet und gehalten, und wobei der erste flache Bekleidungsartikel (A1) oder der zweite flache Bekleidungsartikel (A2) getragen wird, während die genannten Ablagemittel wirken, zu bewegen.

2. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel nach Anspruch 1, **dadurch gekennzeichnet, dass** die Maschine ein Trennelement (9) umfasst, welches über Betätigungsmittel in Zusammenwirkung mit den Bewegungen der Schutzabdeckung (11) zwischen einer Trennstellung, in welcher ein Trennrand (9a) des genannten Trennelements (9) einen Abstand zu der Schutzabdeckung (11) aufweist, der ausreicht, um den Durchgang des ersten flachen Bekleidungsartikels (A1) und des zweiten flachen Bekleidungsartikels (A2), welche von den ersten Ausbreithalterungen (4a, 4b) oder den zweiten Ausbreithalterungen (5a, 5b) gehalten und zwischen ihren Aufnahme- und Ausbreitstellungen bewegt werden, zu erlauben, und nicht ausreicht, um den Zugang der Hände des Bedieners (P1, P2) auf gefährliche Bereiche zu erlauben, wenn sich die Schutzabdeckung (11) in der Stellung mit freiem Durchgang befindet, und in welcher der genannte Trennrand (9a) den ersten flachen Bekleidungsartikel (A1) und den zweiten flachen Bekleidungsartikel (A2) von dem Beladungsende (30a) des Förderbands (30) getrennt hält, und einer eingezogenen Stellung, in welcher das Trennelement (9) das Beladungsende (30a) des Förderbands (30) freilässt, um die Anlage des ersten flachen Bekleidungsartikels (A1) und des zweiten flachen Bekleidungsartikels (A2) zu erlauben, wenn sich die Schutzabdeckung (11) in der Zurückhaltestellung befindet.
3. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die erste Beladungsstation (1) und die zweite Beladungsstation (2) eine jeweilige erste Zugangsschutzscheibe (13) und eine jeweilige zweite Zugangsschutzscheibe (14) umfassen, welche über Betätigungsmittel zwischen einer offenen Stellung, in welcher die genannte erste Zugangsschutzscheibe (13) und die genannte zweite Zugangsschutzscheibe (14) den Zugang des genannten ersten Bedieners (P1) oder des genannten zweiten Bedieners (P2) auf das entsprechende Paar erster Ausbreithalterungen (4a, 4b) oder zweiter

- Ausbreithalterungen (5a, 5b) erlauben, wenn sich diese in der Aufnahme­stellung befinden, und einer geschlossenen Stellung, in welcher die genannte erste Zugangsschutzscheibe (13) und die genannte zweite Zugangsschutzscheibe (14) den Zugang auf das entsprechende Paar erster Ausbreithalterungen (4a, 4b) oder zweiter Ausbreithalterungen (5a, 5b) verhindern, bewegt werden.
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4. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel nach Anspruch 3, **dadurch gekennzeichnet, dass** die erste Beladungsstation (1) und die zweite Beladungsstation (2) eine jeweilige erste innere Schutzscheibe (15) und eine jeweilige zweite innere Schutzscheibe (16) umfassen, welche über Betätigungsmittel zwischen einer offenen Stellung, in welcher die genannte erste innere Schutzscheibe (15) und die genannte zweite innere Schutzscheibe (16) die Bewegungen des entsprechenden Paares erster Ausbreithalterungen (4a, 4b) oder zweiter Ausbreithalterungen (5a, 5b) zwischen ihren Aufnahme- und Ausbreitstellungen erlauben, und einer geschlossenen Stellung, in welcher die genannte erste innere Schutzscheibe (15) und die genannte zweite innere Schutzscheibe (16) den Zugang von dem ersten Bediener (P1) oder dem zweiten Bediener (P2) auf das entsprechende Paar erster Ausbreithalterungen (4a, 4b) oder zweiter Ausbreithalterungen (5a, 5b) verhindern, wenn sich diese nicht in der ersten Beladungsstation (1) oder der zweiten Beladungsstation (2) befinden, bewegt werden.
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5. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel nach Anspruch 4, **dadurch gekennzeichnet, dass** Steuermittel die genannten Betätigungsmittel der ersten Zugangsschutzscheibe (13) und der zweiten Zugangsschutzscheibe (14) und der ersten inneren Schutzscheibe (15) und der zweiten inneren Schutzscheibe (16) steuern, so dass wenn sich die erste Zugangsschutzscheibe (13) in ihrer offenen Stellung befindet, sich dann die erste innere Schutzscheibe (15) in ihrer geschlossenen Stellung, die zweite Zugangsschutzscheibe (14) in ihrer geschlossenen Stellung und die zweite innere Schutzscheibe (16) in ihrer offenen Stellung befinden, und wenn sich die erste Zugangsschutzscheibe (13) in ihrer geschlossenen Stellung befindet, sich dann die erste innere Schutzscheibe (15) in ihrer offenen Stellung, die zweite Zugangsschutzscheibe (14) in ihrer offenen Stellung und die zweite innere Schutzscheibe (16) in ihrer geschlossenen Stellung befinden.
6. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel nach Anspruch 1, **dadurch gekennzeichnet, dass** die Schutzabdeckung (11), wenn sie sich in einer halbautomatischen Beladungsstellung befindet, eine Bewegung nach außen derselben in eine dem Rahmen (10) entgegengesetzte Richtung erlaubt, und Steuermittel dazu ausgebildet sind, den Betrieb der Maschine abzubrechen falls der erste, der zweite oder der dritte Bediener (P1, P2, P3) die Schutzabdeckung (11) nach außen ziehen.
7. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel nach einem der Ansprüche 2 bis 6, **dadurch gekennzeichnet, dass** sich eine dritte Beladungsstation (3), welche dazu ausgebildet ist, von einem dritten Bediener (P3) versorgt zu werden, zwischen der genannten ersten Beladungsstation (1) und der genannten zweiten Beladungsstation (2) zum genannten Förderband (30) gerichtet, befindet, und die genannte erste Beladungsstation (1), die genannte zweite Beladungsstation (2) und die genannte dritte Beladungsstation (3) jeweilige Paare erster Beladungshalterungen (24a, 24b), zweiter Beladungshalterungen (25a, 25b) und dritter Beladungshalterungen (26a, 26b) aufweisen, welche über Betätigungsmittel zwischen einer Beladungsstellung, in welcher die genannten Paare erster Beladungshalterungen (24a, 24b), zweiter Beladungshalterungen (25a, 25b) und dritter Beladungshalterungen (26a, 26b) benachbarten Ecken des ersten flachen Bekleidungsartikels (A1), des zweiten flachen Bekleidungsartikels (A2) und des dritten flachen Bekleidungsartikels (A3), welche von dem genannten ersten Bediener (P1), dem genannten zweiten Bediener (P2) und dem genannten dritten Bediener (P3) manuell geladen werden, aufnehmen, und einer Übertragungsstellung, in welcher die Paare erster Beladungshalterungen (24a, 24b), zweiter Beladungshalterungen (25a, 25b) und dritter Beladungshalterungen (26a, 26b) die genannten benachbarten Ecken des ersten flachen Bekleidungsartikels (A1), des zweiten flachen Bekleidungsartikels (A2) und des dritten flachen Bekleidungsartikels (A3) auf einem der genannten Paare erster Ausbreithalterungen (4a, 4b) und zweiter Ausbreithalterungen (5a, 5b) übertragen, bewegt werden.
8. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel nach Anspruch 7, **dadurch gekennzeichnet, dass** die Bewegungen von jedem der Paare erster Beladungshalterungen (24a, 24b), zweiter Beladungshalterungen (25a, 25b) und dritter Beladungshalterungen (26a, 26b) zwischen ihren Beladungsstellungen und ihren Lieferstellungen über Betätigungsmittel betätigt werden, welche über Steuermittel gesteuert sind, die dazu ausgebildet sind, die genannten Betätigungsmittel zu stoppen falls das Paar erster Beladungshalterungen (24a, 24b), zweiter Beladungshalterungen (25a, 25b) oder dritter Beladungshalterungen (26a, 26b) einen Widerstand über eine vorbestimmte Grenze während

ihrer Bewegungen zwischen den Beladungsstellungen und den Lieferstellungen findet.

9. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel nach Anspruch 7 oder 8, **dadurch gekennzeichnet, dass** die erste Beladungsstation (1), die zweite Beladungsstation (2) und die dritte Beladungsstation (3) eine jeweilige erste Zwischenscheibe (27), eine jeweilige zweite Zwischenscheibe (28) und eine jeweilige dritte Zwischenscheibe (29) aufweisen, welche über Betätigungsmittel zwischen einer geschlossenen Stellung, in welcher die genannte erste Zwischenscheibe (27), die genannte zweite Zwischenscheibe (28) und die genannte dritte Zwischenscheibe (29) zwischen den Paaren erster Beladungshalterungen (24a, 24b), zweiter Beladungshalterungen (25a, 25b) und dritter Beladungshalterungen (26a, 26b) und den Paaren erster Ausbreithalterungen (4a, 4b) und zweiter Ausbreithalterungen (5a, 5b) gestellt werden, wenn sich diese in der Aufnahmestellung befinden und sich die entsprechende erste Zugangsschutzscheibe (13), zweite Zugangsschutzscheibe (14) und dritte Zugangsschutzscheibe (31) in ihrer offenen Stellung befinden, und einer offenen Stellung, bewegt werden.
10. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel nach Anspruch 9, **dadurch gekennzeichnet, dass** die genannte erste Zugangsschutzscheibe (13) und die genannte zweite Zugangsschutzscheibe (14) der ersten Beladungsstation (1) und der zweiten Beladungsstation (2) den Zugang des ersten Bedieners (P1) oder des zweiten Bedieners (P2) auf das jeweilige erste Paar Beladungshalterungen (24a, 24b) und das jeweilige zweite Paar Beladungshalterungen (25a, 25b) verhindern, wenn sie sich in der geschlossenen Stellung befinden, und die genannte dritte Beladungsstation (3) umfasst eine dritte Zugangsschutzscheibe (31), welche über Betätigungsmittel zwischen einer offenen Stellung, in welcher die genannte dritte Zugangsschutzscheibe (31) den Zugang des genannten dritten Bedieners (P3) auf das entsprechende Paar dritter Beladungshalterungen (26a, 26b) erlaubt, wenn sich dieses in der Beladungsstellung befindet, und einer geschlossenen Stellung, in welcher die genannte dritte Zugangsschutzscheibe (31) den Zugang auf das entsprechende Paar dritter Beladungshalterungen (26a, 26b) verhindert, bewegt wird.
11. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Schutzabdeckung (11) in einem Gehäusebereich (17) installiert wird und der genannte Gehäusebereich (17) mit dem Rahmen (10) über ein Gehäusegelenk (19) verbunden wird, um welches der genannte Gehäusebereich (17) zusammen mit der Schutzabdeckung (11) in Bezug auf den Rahmen (10), zwischen einer halbautomatischen Beladungsstellung, in welcher die Schutzabdeckung (11) das Beladungsende (30a) des Förderbands (30) frontal abdeckt, und einer manuellen Beladungsstellung, in welcher die Schutzabdeckung (11) das Beladungsende (30a) des Förderbands (30) freilegt, um einem oder mehreren Bedienern zu erlauben, kleine flache Bekleidungsartikel (Ap1, Ap2, Ap3) direkt auf das Beladungsende (30a) des Förderbands (30) zu laden, schwenken kann.
12. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel nach einem der Ansprüche 8 bis 11, **dadurch gekennzeichnet, dass** die Schutzabdeckung (11) und die dritte Beladungsstation (3) in einem Gehäusebereich (17) installiert werden und der genannte Gehäusebereich (17) mit dem Rahmen (10) über ein Gehäusegelenk (19) verbunden wird, um welches der genannte Gehäusebereich (17) zusammen mit der Schutzabdeckung (11) und der dritten Beladungsstation (3) in Bezug auf den Rahmen (10), zwischen einer halbautomatischen Beladungsstellung, in welcher die Schutzabdeckung (11) das Beladungsende (30a) des Förderbands (30) frontal abdeckt und sich die dritte Beladungsstation (3) in einem operativen Zustand befindet, und einer manuellen Beladungsstellung, in welcher die Schutzabdeckung (11) das Beladungsende (30a) des Förderbands (30) freilegt, um einem oder mehreren Bedienern zu erlauben, kleine flache Bekleidungsartikel (Ap1, Ap2, Ap3) direkt auf das Beladungsende (30a) des Förderbands (30) zu laden, und sich die dritte Beladungsstation (3) in einem nicht operativen Zustand befindet, schwenken kann.
13. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel nach Anspruch 11 oder 12, **dadurch gekennzeichnet, dass** die Schutzabdeckung (11) mit dem genannten Gehäusebereich (17) über ein Abdeckungsgelenk (18) verbunden wird, um welches die Schutzabdeckung (11) zwischen der genannten Stellung mit freiem Durchgang und der Zurückhaltstellung schwenkt, und Betätigungsmittel (20) mit der Schutzabdeckung (11) und dem Gehäusebereich (17) operativ verbunden werden, um die Bewegungen der Schutzabdeckung (11) zwischen der Stellung mit freiem Durchgang und der Zurückhaltstellung in Bezug auf den Gehäusebereich (17) zu betätigen, wenn sich der Gehäusebereich (17) in der halbautomatischen Beladungsstellung befindet.
14. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet,**

dass die genannten Ablagemittel mindestens eine Blasdüse (21) umfassen, welche an der Schutzabdeckung (11) befestigt ist und dazu angeordnet ist, einen Luftstrom auf einen oberen Teil des ersten flachen Bekleidungsartikels (A1) oder des zweiten flachen Bekleidungsartikels (A2), welcher von dem Druckrand (12) der Schutzabdeckung (11) getragen wird, zu blasen, wenn das Paar erster Ausbreithalterungen (4a, 4b) oder zweiter Ausbreithalterungen (5a, 5b) die genannten benachbarten Ecken des ersten flachen Bekleidungsartikels (A1) oder des zweiten flachen Bekleidungsartikels (A2) befreit hat, um den genannten oberen Teil des ersten flachen Bekleidungsartikels (A1) oder des zweiten flachen Bekleidungsartikels (A2) auf das Beladungsende (30a) des Förderbands (30) abzulegen.

15. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel nach Anspruch 1, **dadurch gekennzeichnet, dass** die Ablagemittel eine Vielzahl von Druckrädern (22) umfassen, welche an den Enden von bewegbaren Druckarmen (23) installiert sind, um den oberen Teil des ersten flachen Bekleidungsartikels (A1) oder des zweiten flachen Bekleidungsartikels (A2) gegen das Beladungsende (30a) des Förderbands (30) zu drücken.
16. Maschine zum Ausbreiten von und Beladen mit flachen Bekleidungsartikel nach Anspruch 2 oder 7, **dadurch gekennzeichnet, dass** die Ablagemittel eine Saugkammer (32) umfassen, welche mit einer Vakuumquelle verbunden und unter einem oberen Abschnitt des Förderbands (30) angeordnet ist, um durch Absaugung den ersten flachen Bekleidungsartikel (A1), den zweiten flachen Bekleidungsartikel (A2) oder den dritten flachen Bekleidungsartikel (A3) gegen das Beladungsende (30a) des Förderbands (30) durch Öffnungen des Förderbands (30) anzuziehen.

Revendications

1. Une machine pour étaler et charger des vêtements plats, comportant:
- un châssis (10) supportant au moins une courroie convoyeuse (30) se déplaçant dans un sens de chargement (D) et ayant une extrémité de chargement (30a);
 - un couvercle de protection (11) couvrant de front cette extrémité de chargement (30a) de la courroie convoyeuse (30);
 - des moyens d'entraînement pour entraîner ce couvercle de protection (11);
 - des premier et deuxième postes de chargement (1,2) adjacents aux première et deuxième extrémités latérales de ce couvercle de protection

(11);
 une paire de premières pinces à étaler (4a, 4b) entraînées indépendamment par des moyens d'entraînement le long d'une glissière de guidage (8) transversale à ce sens de chargement (D) de la courroie convoyeuse (30) entre une position de réception, dans laquelle ces premières pinces à étaler (4a, 4b) sont adjacentes les unes des autres dans ce premier poste de chargement (1) pour saisir les coins contigus respectifs d'un premier vêtement plat (A1), chargé manuellement par un opérateur (P1) et une position étalée, dans laquelle les premières pinces à étaler (4a, 4b) sont écartées les unes des autres en retenant ce premier vêtement plat (A1) étalé par rapport à cette extrémité de chargement (30a) de la courroie convoyeuse (30);
 une paire de deuxièmes pinces à étaler (5a, 5b) entraînée indépendamment par des moyens d'entraînement le long de cette glissière de guidage (8) entre une position de réception, dans laquelle ces deuxièmes pinces à étaler (5a, 5b) sont adjacentes les unes des autres dans ce deuxième poste de chargement (2) pour saisir les coins contigus respectifs du deuxième vêtement plat (A2) chargé manuellement par un deuxième opérateur (P2) et une position étalée, dans laquelle les deuxièmes pinces à étaler (5a, 5b) sont écartées les unes des autres en retenant ce deuxième vêtement plat (A2) étalé par rapport à cette extrémité de chargement (30a) de la courroie convoyeuse (30); et
 des moyens de dépôt pour déposer une extrémité supérieure de ces premier et deuxième vêtements plats (A1, A2) sur la courroie convoyeuse (30) de cette position étalée des premières et deuxièmes pinces à étaler (4a, 4b; 5a, 5b);
caractérisée en ce que ce couvercle de protection (11) est mobile et possède un bord de pression (12) à l'extrémité inférieure et **en ce que** ces moyens d'entraînement sont appropriés pour déplacer le couvercle de protection (11) entre une position de passage libre dans lequel ce bord de pression (12) est à une distance du châssis (10) suffisante pour permettre le passage des premier et deuxième vêtements plats (A1, A2) retenus et déplacés par les première et deuxième pinces (4a, 4b; 5a, 5b) entre leurs positions de réception et étalée et insuffisante pour permettre l'accès des mains de l'opérateur (P1, P2) à des régions dangereuses et une position de rétention, dans laquelle le bord de pression (12) est appliqué contre le châssis (10) en emprisonnant entre eux le premier ou le deuxième vêtement plat (A1, A2) étalé et retenu par les première et deuxième pinces (4a, 4b; 5a, 5b) dans leur position étalée et en supportant le premier ou deuxième vêtement plat (A1, A2)

pendant que ces moyens de dépôt agissent.

2. La machine pour étaler et charger des vêtements plats conformément à la revendication 1, **caractérisée en ce que** la machine comporte un élément écarteur (9) entraîné par des moyens d'entraînement en coordination avec les mouvements du couvercle de protection (11) entre une position d'écartement, dans laquelle le bord d'écartement (9a) de cet élément écarteur (9) est à une distance du couvercle de protection (11) suffisante pour permettre le passage des premier et deuxième vêtements plats (A1, A2) retenus et entraînés par la première ou deuxième pince (4a, 4b; 5a, 5b) entre leur positions de réception et étalée et insuffisante pour permettre l'accès des mains de l'opérateur (P1, P2) à des régions dangereuses lorsque le couvercle de protection (11) est en position de passage libre et dans laquelle ce bord écarteur (9a) maintient le premier ou le deuxième vêtement plat (A1, A2) écarté de l'extrémité de chargement (30a) de la courroie convoyeuse (30) et une position en retrait, dans laquelle l'élément écarteur (9) laisse l'extrémité de chargement (30a) de la courroie convoyeuse (30) libre pour permettre de déposer les premier et deuxième articles plats (A1, A2) lorsque le couvercle de protection (11) est en position de rétention.
3. La machine pour étaler et charger des vêtements plats conformément à la revendication 1 ou 2, **caractérisée en ce que** les premier et deuxième postes de chargement (1,2) comportent des premier et deuxième écrans de protection d'accès (13, 14) entraînés par des moyens d'entraînement entre une position ouverte, dans laquelle ces premier et deuxième écrans de protection d'accès (13, 14) permettent l'accès de ce premier ou deuxième opérateur (P1, P2) à la paire correspondante de première ou deuxième pinces à étaler (4a, 4b; 5a, 5b) lorsque celle-ci est dans la position de réception, et une position fermée, dans laquelle ces premier et deuxième écrans de protection d'accès (13, 14) empêchent l'accès à la paire correspondante de première ou deuxième pinces à étaler (4a, 4b; 5a, 5b).
4. La machine pour étaler et charger des vêtements plats conformément à la revendication 3, **caractérisée en ce que** les premier et deuxième postes de chargement (1, 2) comportent des premier et deuxième écrans de protection intérieurs (15, 16) entraînés par des moyens d'entraînement entre une position ouverte, dans laquelle ces premier et deuxième écrans de protection intérieurs (15, 16) permettent les mouvements de la paire correspondante de première ou deuxième pinces (4a, 4b; 5a, 5b) entre leurs positions de réception et étalée et une position fermée, dans laquelle ces premier et deuxième écrans de protection intérieurs (15, 16) empêchent l'accès
- du premier ou deuxième opérateur, (P1, P2) à la paire correspondante de première et deuxième pinces à étaler (4a, 4b; 5a, 5b) lorsque celles-ci ne se trouvent pas dans le premier ou deuxième poste de chargement (1,2).
5. La machine pour étaler et charger des vêtements plats conformément à la revendication 4, **caractérisée en ce que** des moyens de contrôle contrôlent ces moyens d'entraînement des premier et deuxième écrans de protection d'accès (13, 14) et les premier et deuxième écrans de protection intérieurs (15, 16) de sorte que lorsque le premier écran de protection d'accès (13) se trouve dans sa position ouverte, le premier écran de protection intérieur (15) est à la position fermée, le deuxième écran de protection d'accès (14) est à sa position fermée et le deuxième écran de position intérieur (16) est dans sa position ouverte et lorsque le premier écran de protection d'accès (13) se trouve à sa position fermée, le premier écran de protection intérieur (15) se trouve dans sa position ouverte, le deuxième écran de protection d'accès (14) se trouve dans la position ouverte et le deuxième écran de protection intérieur (16) se trouve dans sa position fermée.
6. La machine pour étaler et charger des vêtements plats conformément à la revendication 1, **caractérisée en ce que** le couvercle de protection (11) lorsqu'il se trouve dans une position de chargement semi automatique, permet un déplacement vers son extérieur dans un sens opposé au châssis (10) et des moyens de contrôle sont configurés pour arrêter le fonctionnement de la machine dans le cas où un des premier, deuxième ou troisième opérateurs (P1, P2, P3) tirerait le couvercle de protection (11) vers l'extérieur.
7. La machine pour étaler et charger des vêtements plats conformément à une quelconque des revendications 2 à 6, **caractérisée en ce qu'**un troisième poste de chargement (3) configuré pour être desservi par un troisième opérateur (P3) est situé entre ces premier et deuxième postes (1,2) faisant face à cette courroie convoyeuse (30) et ces premier, deuxième et troisième postes (1,2,3) comprennent des paires respectives de première, deuxième et troisième pinces de chargement (24a, 24b; 25a, 25b; 26a, 26b) entraînées par des moyens d'entraînement entre une position de chargement, dans laquelle ces paires de première, deuxième et troisième pinces de chargement (24a, 24b; 25a, 25b; 26a, 26b) peuvent recevoir coins contigus des premier, deuxième et troisième vêtements plats (A1, A2, A3) chargées manuellement par ces premier, deuxième et troisième opérateurs (P1, P2, P3), et une position de transfert, dans laquelle ces première, deuxième et troisième pinces de chargement (24a, 24b; 25a, 25b; 26a, 26b)

transfèrent ces coins contigus des premier, deuxième et troisième vêtements plats (A1, A2, A3) à une de ces paires de première et deuxième pinces à étaler (4a, 4b; 5a, 5b).

8. La machine pour étaler et charger des vêtements plats conformément à la revendication 7 **caractérisée en ce que** les déplacements de chacune des paires de première, deuxième et troisième pinces de chargement (24a, 24b; 25a, 25b ; 26a, 26b), entre leurs positions de chargement et leurs positions de sortie, sont entraînés par des moyens d'entraînement contrôlés par des moyens de contrôle configurés pour arrêter ces moyens d'entraînement dans le cas où la paire de première, deuxième ou troisième pinces de chargement (24a, 24b; 25a, 25b, 26a, 26b) rencontrerait une résistance au-delà d'un seuil prédéterminé durant leurs déplacements entre les positions de chargement et les positions de sortie.
9. La machine pour étaler et charger des vêtements plats conformément à la revendication 7 ou 8 **caractérisée en ce que** les premier, deuxième et troisième postes de chargement (1,2,3) comprennent des premier, deuxième et troisième écrans intermédiaires (27, 28, 29) entraînés par des moyens d'entraînement entre une position fermée, dans laquelle ces premier, deuxième et troisième écrans intermédiaires (27, 28, 29) sont interposés entre les paires des premier, deuxième et troisième pinces de chargement (24a, 24b ; 25a, 25b ; 26a, 26b) et les paires de première et deuxième pinces à étaler (4a, 4b; 5a, 5b), lorsque ces dernières sont dans la position de réception et les premier, deuxième et troisième écrans de protection d'accès correspondants (13, 14, 31) sont dans leur position ouverte, et une position ouverte.
10. La machine pour étaler et charger des vêtements plats conformément à la revendication 9 **caractérisée en ce que** ces premier et deuxième écrans de protection d'accès (13, 14) des premier et deuxième postes de chargement (1, 2) empêchent l'accès du premier ou deuxième opérateur (P1, P2) aux première et deuxième paires de pinces de chargement respectives (24a, 24b; 25a, 25b) lorsqu'elles se trouvent dans une position fermée et ce troisième poste de chargement (3) comporte un troisième écran de protection d'accès (31) entraîné par des moyens d'entraînement entre une position ouverte, dans laquelle ce troisième écran de protection (31) permet l'accès de ce troisième opérateur (P3) à la paire de troisième pinces de chargement correspondantes (26a, 26b) lorsque celle-ci est dans la position de chargement et une position fermée, dans laquelle ce troisième écran de protection d'accès (31) empêche l'accès à la paire de troisième pinces de chargement correspondantes (26a, 26b).

11. La machine pour étaler et charger des vêtements plats conformément à la revendication 1 ou 2 **caractérisée en ce que** le couvercle de protection (11) est installé dans une portion de carter (17) et cette portion de carter (17) est reliée au châssis (10) par une charnière de carter (19) autour de laquelle cette portion de carter (17) peut pivoter en même temps que le couvercle de protection (11) par rapport au châssis (10) entre une position de chargement semi automatique, dans laquelle le couvercle de protection (11) couvre sur le front l'extrémité de chargement (30a) de la courroie convoyeuse (30) et une position de chargement manuel, dans laquelle le couvercle de protection (11) expose l'extrémité de chargement (30a) de la courroie convoyeuse (30) pour permettre qu'un ou plusieurs opérateurs chargent de petits vêtements plats (Ap1, Ap2, Ap3) directement à l'extrémité de chargement (30a) de la courroie convoyeuse (30).
12. La machine pour étaler et charger des vêtements plats conformément à une quelconque des revendications 8 à 11 **caractérisée en ce que** le couvercle de protection (11) et le troisième poste de chargement (3) sont installés dans une portion de carter (17) et cette portion de carter (17) est reliée au châssis (10) par une charnière de carter (19) autour de laquelle cette portion de carter (17) peut pivoter en même temps que le couvercle de protection (11) et le troisième poste de chargement (3) peut pivoter par rapport au châssis (10) entre une position de chargement semi automatique, dans lequel le couvercle de protection (11) couvre de front l'extrémité de chargement (30a) de la courroie convoyeuse (30) et le troisième poste de chargement (3) est en fonctionnement opérationnel et une position de chargement manuel, dans laquelle le couvercle de protection (11) expose l'extrémité de chargement (30a) de la courroie convoyeuse (30) pour permettre qu'un ou plusieurs opérateurs chargent de petits vêtements plats (Ap1, Ap2, Ap3) directement sur l'extrémité de chargement (30a) de la courroie convoyeuse (30) et le troisième poste de chargement (3) dans une position de fonctionnement non opérationnel.
13. La machine pour étaler et charger des vêtements plats conformément à la revendication 11 ou 12 **caractérisée en ce que** le couvercle de protection (11) est relié à cette portion de carter (17) par une charnière de carter (18) autour de laquelle le couvercle de protection (11) pivote entre cette position de passage libre et la position de rétention et les moyens d'entraînement (20) sont reliés opérationnellement au couvercle de protection (11) et à la portion de carter (17) pour entraîner les mouvements du couvercle de protection (11) entre la position de passage libre et la position de rétention par rapport à la portion de carter (17) lorsque la portion de carter (17) est

dans la position de chargement semi automatique.

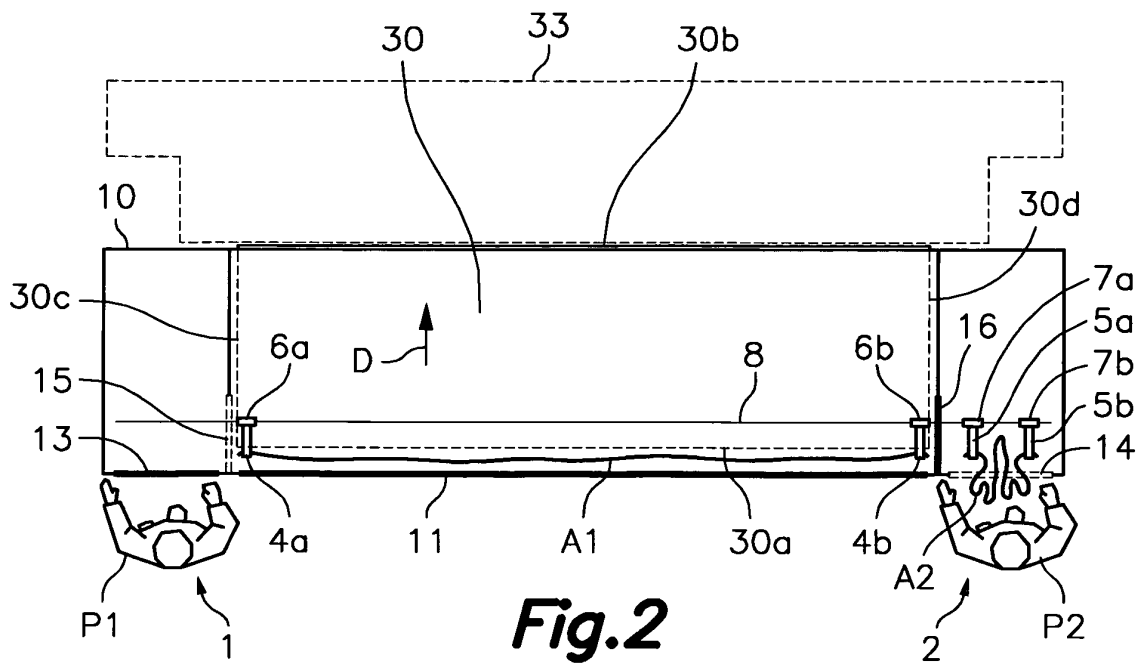
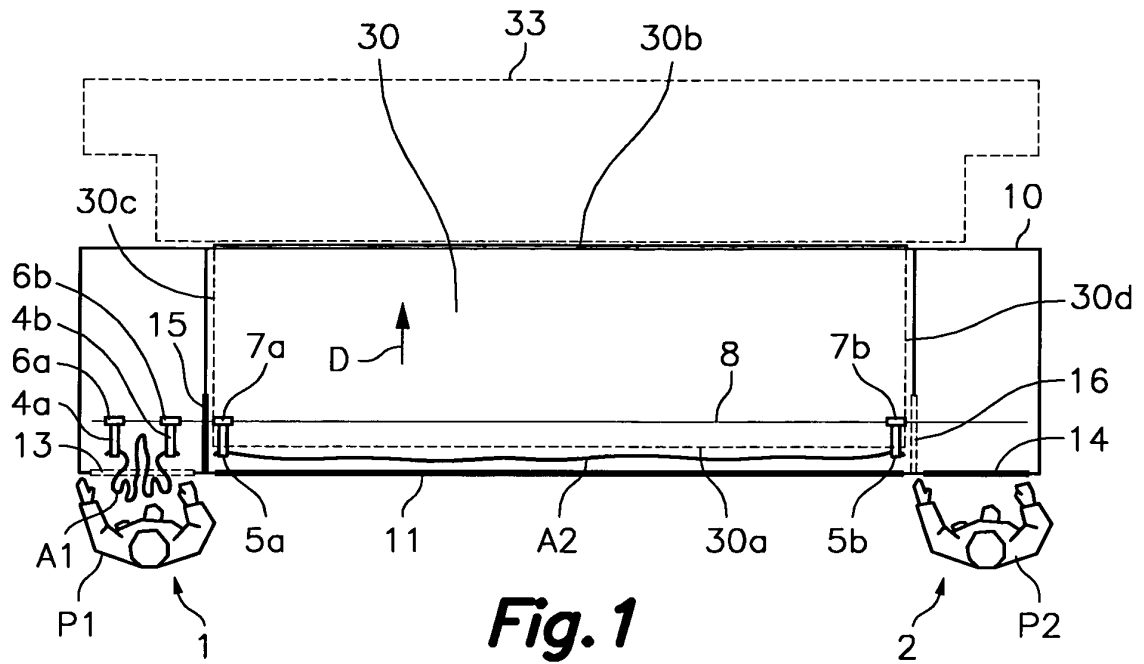
14. La machine pour étaler et charger des vêtements plats conformément à quelconque des revendications précédentes **caractérisée en ce que** ces moyens de dépôt comportent au moins une buse de soufflage (21) fixée sur le couvercle de protection (11) et agencée pour souffler un flux d'air sur une partie supérieure du premier ou deuxième petit vêtement plat (A1, A2) supporté par le bord de pression (12) du couvercle de protection (11) lorsque la paire de première ou deuxième pinces à étaler (4a, 4a; 5a, 5b) ont lâché ces coins contigus du premier ou du deuxième vêtement plat (A1, A2) pour déposer cette partie supérieure du premier et deuxième vêtement plat (A1, A2) à l'extrémité de chargement (30a) de la courroie convoyeuse (30).
15. La machine pour étaler et charger des vêtements plats conformément à la revendication 1 **caractérisée en ce que** les moyens de dépôt comportent une pluralité de roues de pression (22) installées aux extrémités des bras de pression mobiles (23) pour faire pression sur la partie supérieure du premier ou deuxième vêtement plat (A1, A2) contre l'extrémité de chargement (30a) de la courroie convoyeuse (30).
16. La machine pour étaler et charger des vêtements plats conformément à la revendication 2 ou 7 **caractérisée en ce que** les moyens de dépôt comportent une chambre d'aspiration (32) reliée à une source de vide et agencée au-dessous d'une section supérieure de la courroie convoyeuse (30) pour attirer par aspiration le premier, deuxième ou troisième vêtement plat (A1, A2, A3) contre l'extrémité de chargement (30a) de la courroie convoyeuse (30) à travers les ouvertures de la courroie convoyeuse (30).

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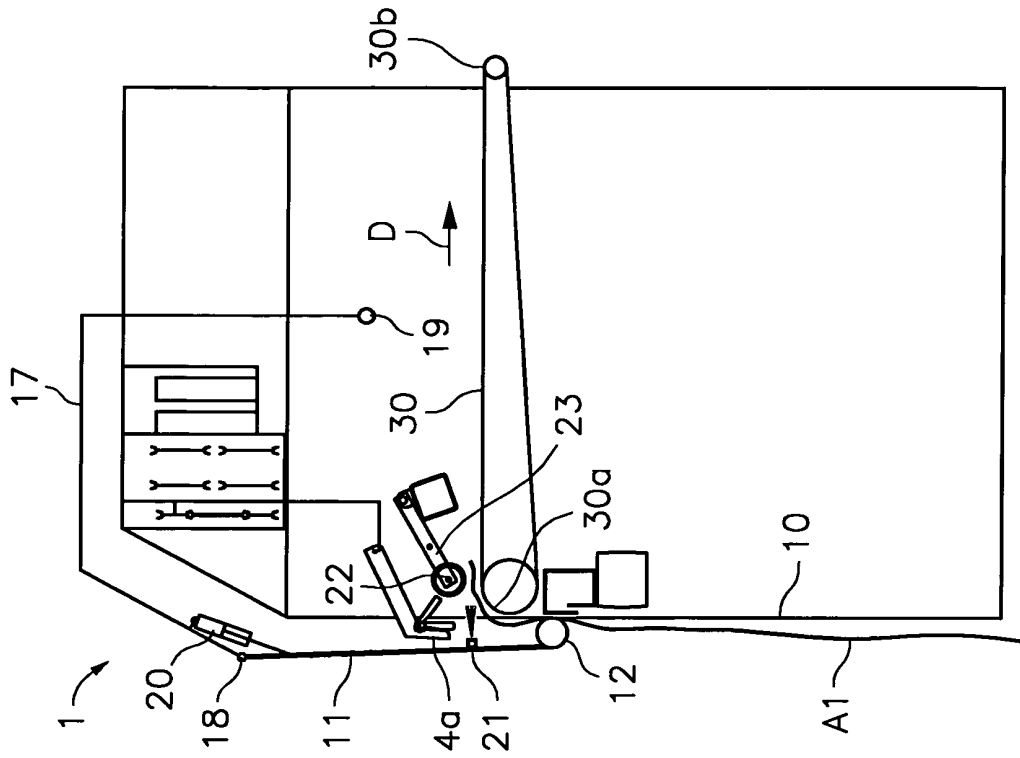


Fig. 4

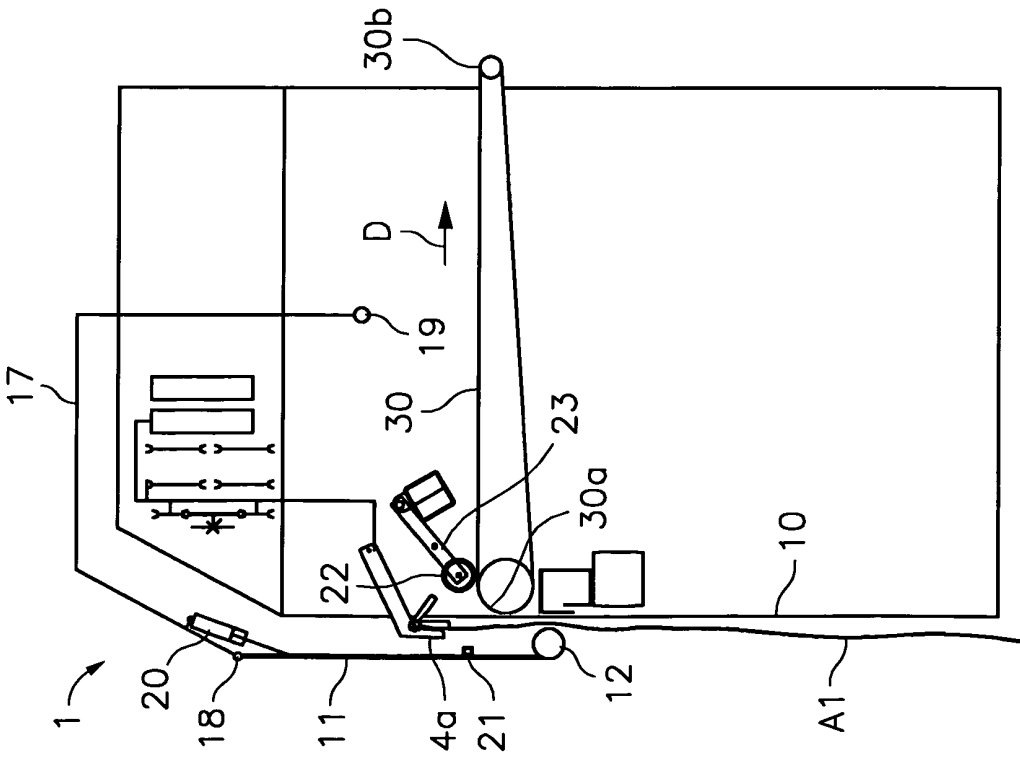


Fig. 3

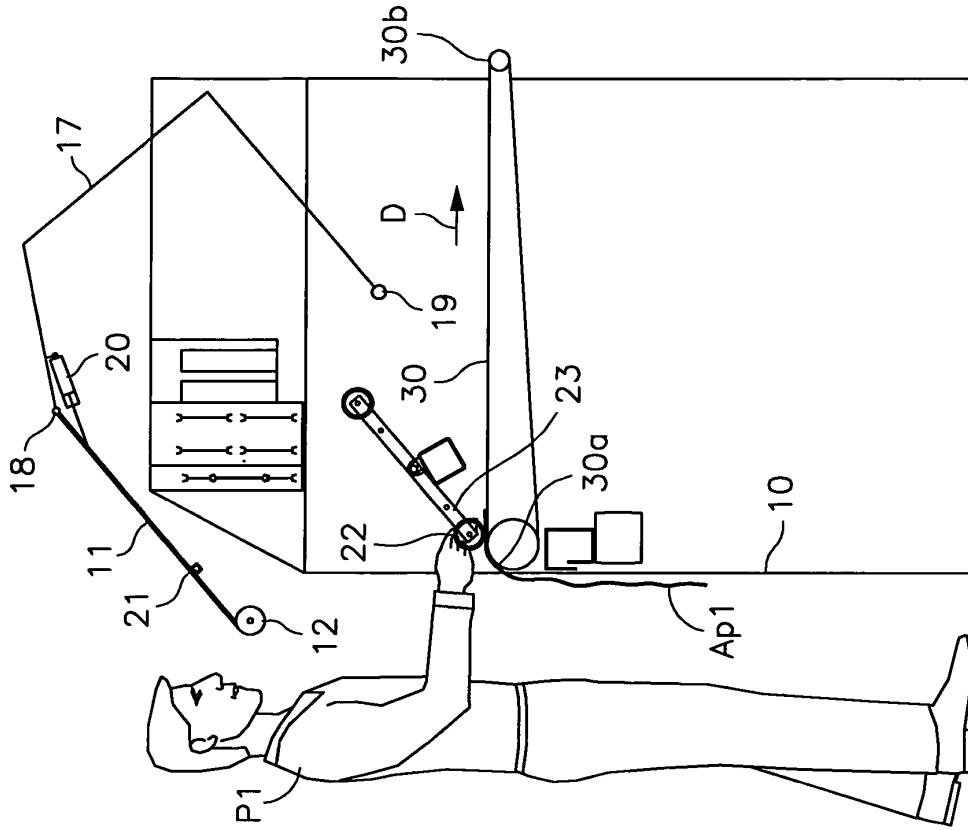


Fig. 6

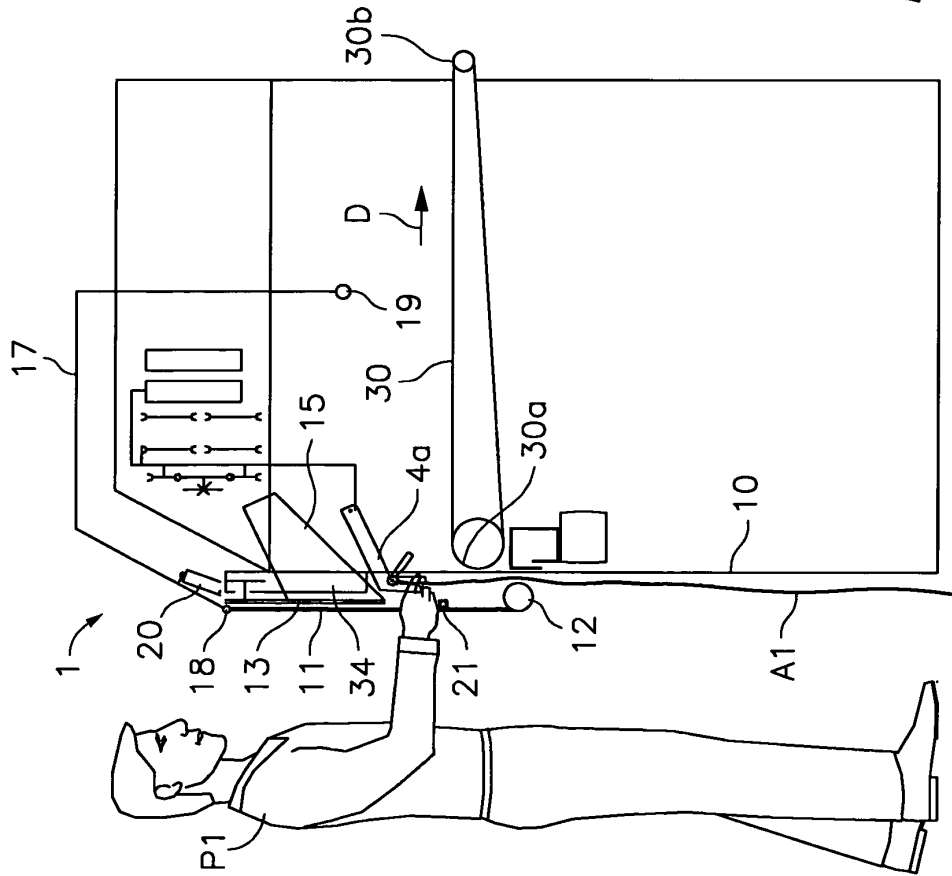


Fig. 5

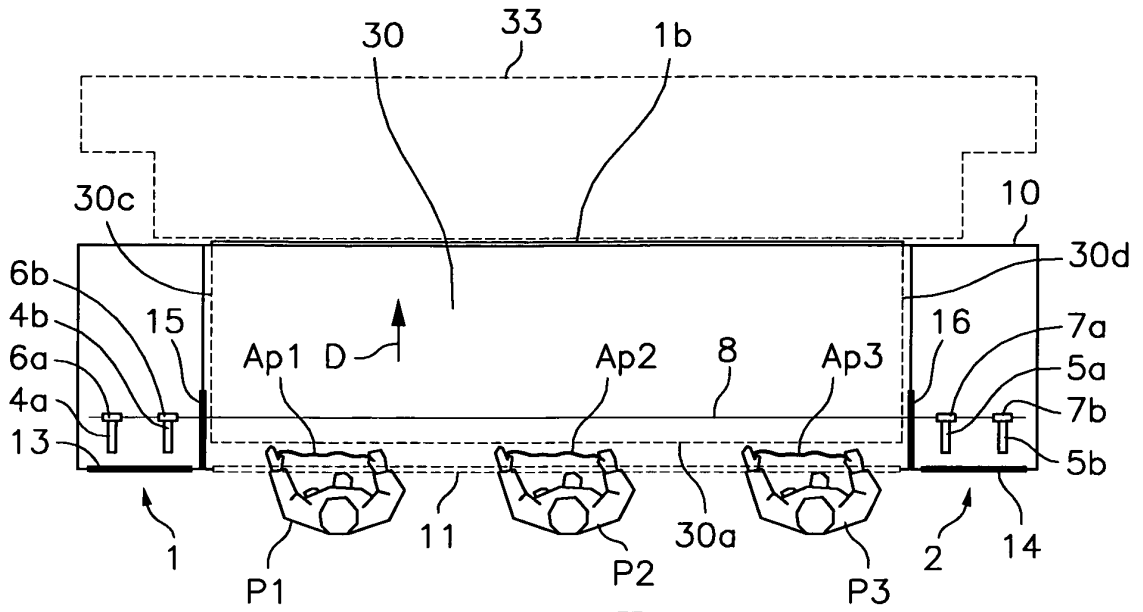


Fig. 7

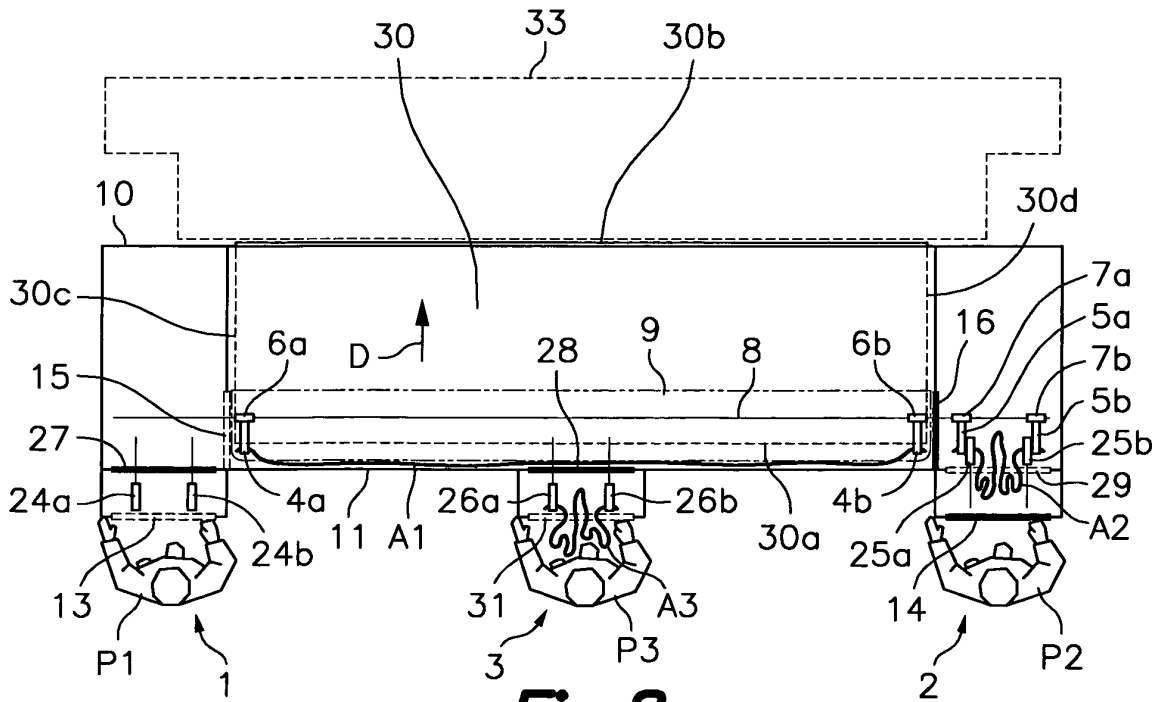


Fig. 8

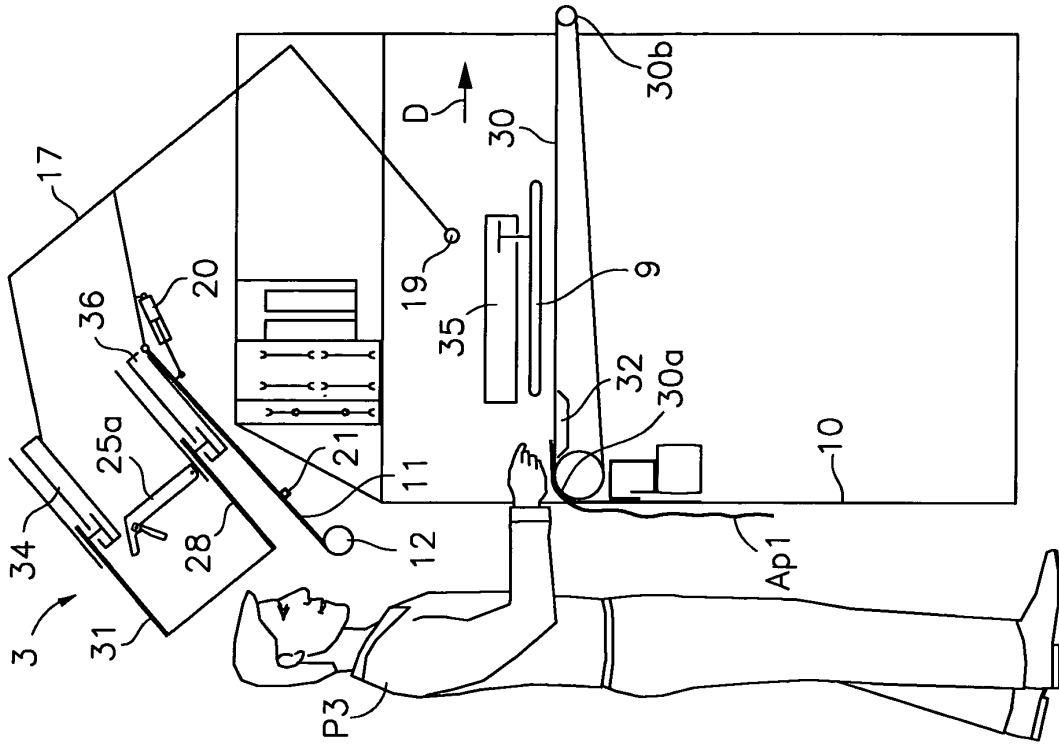


Fig. 12

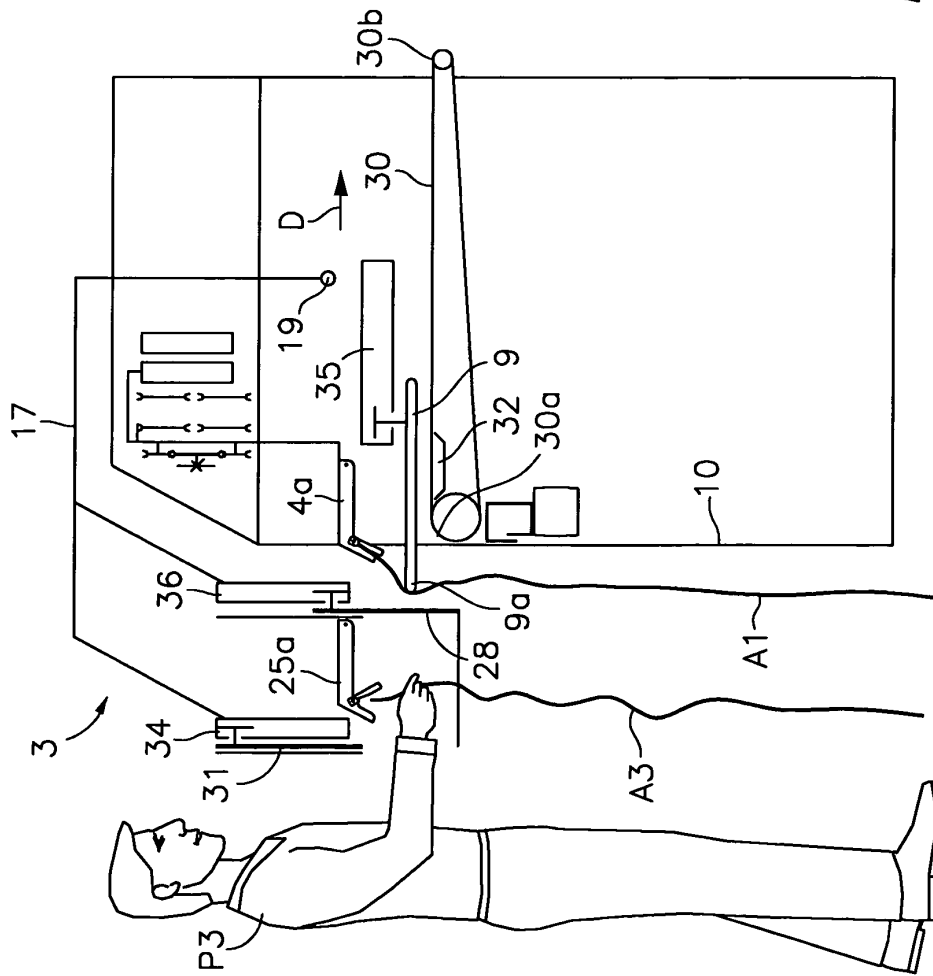


Fig. 11

REFERENCES CITED IN THE DESCRIPTION

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