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Angelo [IT/IT]; Via della Palazzina, 30, I-40037 Sasso Marconi (IT).

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(74) Agent: **MANZELLA, Giovanni**; Ing. Giovanni Manzella, Via Saragozza, 220, I-40135 Bologna (IT).

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(71) Applicant (*for all designated States except US*):
CORTESE S.P.A. [IT/IT]; Via del Faggiolo, 1, I-40132 Bologna (IT).

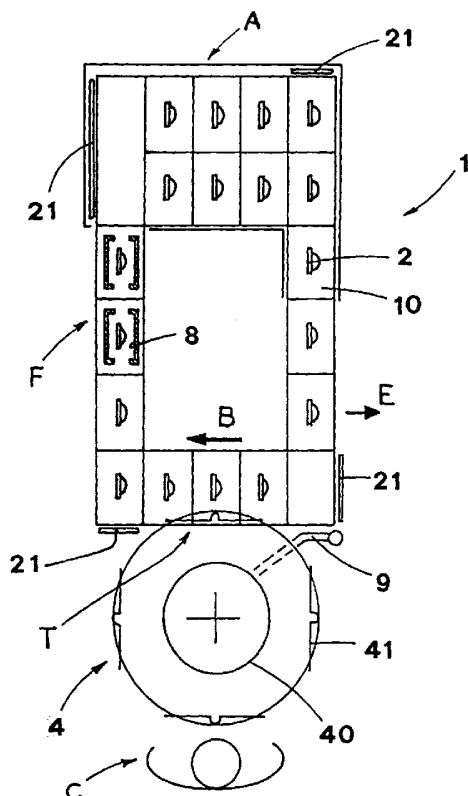
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(72) Inventor; and

(75) Inventor/Applicant (*for US only*): **CORTESE, Carmelo,**

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(54) Title: METHOD AND MACHINE FOR BOARDING TEXTILE ARTICLES



(57) Abstract: The method for boarding textile articles consists in feeding the articles to be treated on to shapes (2) mounted on supports (10) that slide on guides (3) attached to the boarding machine's fixed structure. The supports (10) are conveyed in step along a polygonal pathway defined by said guides (3), by means of engagement with towing devices (21) attached to agent transporters (20) on each linear stretch of the polygonal pathway. A batch of these supports (10) is stacked upstream from multiple boarding station (F), equipped with respective boarding chambers (8), positioned along a stretch of said polygonal pathway. This batch of supports (10) is simultaneously transferred thus introducing the shapes (2) in to the boarding chambers (8), in order for the textile articles to undergo the thermal treatment. On completion of this treatment, said batch of supports (10) is transferred simultaneously on to the subsequent stretch of the polygonal pathway, where the textile articles are subject to the driving phase in a drying chamber (A) inside which said supports (10) of the shapes (2) are stacked side-by-side.

WO 02/084012 A1

DescriptionMETHOD AND MACHINE FOR BOARDING TEXTILE ARTICLESTechnical Field

The following invention regards a method and a machine for the boarding
5 of textile articles, in particular women's stockings and the like.

Background Art

It is known that during production the abovementioned textile products
undergo a boarding treatment in order to give them a permanent form. In
order to perform this boarding process, the articles are fed onto and held
10 taut by special shapes and then subject to a thermal treatment in, for
example, special pressurised steam chambers. This thermal treatment
gives the fabric a permanent form that permits them to adopt the desired
shape.

Automatic machines currently used for the boarding of these textile articles
15 are composed of a turntable bearing such shapes, positioned around the
edge of the turntable itself, which the articles are fed onto and by which
they are held taut. The rotation of the turntable brings the articles fed on
to the shapes inside a boarding chamber, which uses, for example,
pressurised steam, and then inside at least one drying chamber. The
20 articles are then removed from the boarding shapes and sent on to the
subsequent packaging phases.

Boarding shapes are usually solid shapes of a metallic material, most
commonly aluminium.

If the boarding shapes are attached rigidly to the turntable, the machine's
25 function is considerably limited. In particular, this solution somewhat limits

the number of shapes that can be used, in order to maintain the machine's dimensions within acceptable limits.

In such boarding machines, the time spent by the shapes inside the boarding chambers is usually limited. The time spent in the boarding chamber is in particular conditioned by the time required for the stockings
5 to be fed on to the shapes manually, which usually requires approximately 5 seconds. The time required to feed the stockings onto the shapes therefore affects the movement in step of the turntable.

In order to obtain the actual duration of the stocking boarding phase, one
10 must subtract the time necessary for opening the boarding chamber, the subsequent introduction of the steam and the finale opening of the chamber from this interval. Therefore, the actual time that the shapes spend in the boarding chamber, in other words the time available for boarding the stockings is not usually more than 2 seconds.

15 Such a reduced boarding time is sufficient for treating normal quality stockings, however it is not suitable for the boarding of high quality stockings that are manufactured using thicker fibers and therefore require longer treatment times.

On the other hand, it goes without say that an increase in boarding time in
20 the abovementioned machines would result in an unacceptable reduction in productivity.

An alternative solution consists in the stockings to be treated being fed on to detachable supports that are slid, by means of towing devices on to guides attached to the fixed structure of the boarding machine.

25 This permits the availability of a series of shapes bearing stockings to be

treated in a stack area upstream from a boarding station equipped with a large boarding chamber. This series of shapes is then transferred simultaneously from the stack area inside the boarding chamber, in order for the boarding treatment to be performed on the stockings. Once the
5 thermal treatment has been completed, the abovementioned series of shapes is transferred simultaneously inside the drying chamber.

This solution has the advantage of ensuring a longer duration of the shapes inside the boarding chamber, in order to allow perfect boarding. However, it has the disadvantage that the larger dimensions of the
10 boarding chamber require increased steam consumption, with a proportional increase in cost.

The use of a boarding chamber with large dimensions is also subject to the issuance of certain international certificates.

The fact that this kind of boarding machine usually requires more than one
15 operator and therefore has high labor costs should also be considered.

Disclosure of Invention

The aim of the present invention is to resolve the abovementioned drawbacks by devising a method that permits adequate boarding of the textile articles, in particular ensuring an optimal duration of the shapes
20 inside the boarding chamber.

A further aim of the invention is that of supplying a machine for boarding textile articles with a simple design, reliable function and with versatile application.

The abovementioned objectives can be achieved by this present invention,
25 using the method for boarding textile articles, which is characterized by the

fact that it consists in feeding the textile articles to be treated on to shapes mounted on sliding supports on guides attached to the fixed structure of the boarding machine; in transporting these supports in step along a polygonal pathway defined by said guides, using towing devices linked to agent transporters positioned on each linear stretch of said polygonal pathway; of stacking a series of said shape supports, on which the textile articles to be treated are positioned, upstream of a multiple boarding station, equipped with respective boarding chambers along a stretch of said polygonal pathway; of simultaneously transferring said series of supports along said stretch of the polygonal pathway, in such a way as to introduce said shapes into the boarding chambers, in order to subject the said textile articles to the thermal treatment; in simultaneously transferring said series of supports, once the thermal treatment has been completed, onto a subsequent stretch of the said polygonal pathway, in order to perform the drying phase of the said textile articles in a drying chamber inside which said shape supports are positioned side by side; and in removing said textile articles from said shapes.

Brief Description of Drawings

Description details of the invention shall be further evident in the illustrations of a preferred type of machine for boarding textile articles, in the guideline drawings attached and wherein:

Figure 1 illustrates a horizontal view of a machine for boarding textile articles using the method in object;

Figure 2 illustrates a section of a vertical transversal plane;

Figures 3 and 4 show a horizontal view and a vertical section of a shape

support used by this machine;

Figure 5 shows a horizontal view of an alternative layout of the device in object;

Figure 6 illustrates a horizontal view of an alternative layout for the machine in object;

Figure 7 illustrates a perspective view of a support used in this machine.

Modes for Carrying out the Invention

With reference to such figures, 1 refers to the machine for boarding textile articles such as women's stockings and the like. The textile articles are fed on to the relevant shapes 2. The boarding machine transports the shapes 2 along a polygonal pathway, which has a rectangular profile, as shown in figure 1.

Along said polygonal pathway, a series of supports 10 are individually brought into step with at least one shape 2. The supports 10 of the shapes 2 are composed of an elongated metal plate 14, which presents longitudinal sides parallel to the vertical assembly plane of the shape 2 and transversal heads 14a with a circular profile (see figs. 3 and 4). The plate 14 is assembled on an identically shaped base 15, manufactured for example in wood, by means of which the support 10 slides along the device's platform 5. In the case shown the supports 10 take pairs of shapes 2 which the stockings will be fed on to, to the loading station C.

The supports 10 are guided along each stretch of the polygonal pathway by guides 3 composed of special section bars fixed to the platform 5 in pairs, one behind another in order to engage the said longitudinal sides of the plates 14.

Support towing devices operate on each stretch of the polygonal pathway to be covered together with the supports 10 composed of their relative transversal pushers 21 linked to conveyors 20, for example with toothed belts, that are enabled in step, with alternating motions, by special motors.

5 In effect the supports 10 are brought into step, one after another and in reciprocal contact with the said circular profile heads 14a, along the first stretch of the polygonal pathway to be covered, with the shapes 2 positioned parallel to one another on vertical transversal planes to the direction of movement. Loading station C, where the textile articles are fed
10 on to the shapes 2, is positioned along this first stretch of the polygonal pathway. The textile articles can be fed onto the shapes 2 either manually or automatically by a loading robot.

The shapes 2 advance in step, conducted by the sliding supports 10 on the platform 5 and are guided by the guides 3 in the direction shown by arrow
15 B, until the end of the abovementioned first stretch of the polygonal pathway. At the end of this first stretch, the conveyors 10 are transferred onto the second stretch of the polygonal pathway, perpendicular to the first, with the shapes 2 positioned on a vertically parallel plane to the direction of movement. With this configuration, the shapes 2 engage
20 station F in which the thermal treatment required for boarding textile articles takes place, for example inside a pressurized steam boarding chamber.

In particular, this invention features a multiple boarding station F positioned along the second stretch of the polygonal pathway, at a right angle to the
25 first stretch along which the abovementioned loading station C is

positioned. The multiple boarding station F consists of a series of boarding chambers 8, positioned parallel to one another, each of which receives a pair of shapes 2. In the case illustrated for example, boarding station F has three boarding chambers 8.

5 In effect, the movement in step of the supports 10 along the polygonal pathway positions the relative shapes 2, which the stockings to be treated were fed on to in the loading station C, opposite the abovementioned boarding chambers 8, along the first stretch of the polygonal pathway. The supports 10 of the shapes 2 are then moved simultaneously in a
10 transversal direction, on to the second stretch of the polygonal pathway, in order for the shapes 2 to be introduced into the boarding chambers 8.

Once the thermal treatment has been performed, the boarding chambers 8 are opened and the shapes 2 are transferred simultaneously onto the third stretch of the polygonal pathway, parallel to the first stretch. Along the third
15 stretch of the polygonal pathway a drying chamber A, for example the airflow type, is situated, inside which the shapes 2 are transferred in step.

When discharged from drying chamber A, the supports 10 of the shapes 2 are once more transferred in a perpendicular direction, one after another, along the fourth stretch of the polygonal pathway to reach the starting
20 station of the first stretch of the pathway. At this station, indicated by the letter E, the textile articles are removed from the shapes 2 by known removal devices.

Fig. 5 illustrates an alternative machine layout, which permits the conveyors to rotate through a right angle, in order to align the shapes 2 in
25 a longitudinal direction to the preset stretch of the polygonal pathway. This

rotation comes about thanks to a circular swiveling plate 6, level with the machine's platform 5. The swiveling plate 6 bears a pair of slats 7 that guide the supports 10 and form a continuation of the guides 3.

In the solution shown, the supports 10 move along the first stretch of the polygonal pathway, to the loading station C, one behind the other along the longitudinal sides of the plates 14. The supports 10 are then transferred, one behind the other, onto the second stretch of the polygonal pathway, following a perpendicular course to the previous one, with the shapes vertically parallel to the direction of movement.

At the end of the second stretch of the polygonal pathway, the abovementioned 90° rotation of the supports 10 takes place, by means of the swiveling plate 6, in order to align the shapes 2 longitudinally in relation to the direction of the third stretch of the polygonal pathway. The abovementioned multiple boarding station F is positioned along this third stretch of the polygonal pathway and in this case is composed of a series of boarding chambers 8, each of which will receive a pair of shapes 2. In the case shown, the multiple boarding station F has three boarding chambers 8.

A series of supports 10, equal in number to the boarding chambers 8 in the multiple boarding station F, is stacked upstream from the boarding station F, along the abovementioned third stretch of the polygonal pathway. These supports 10 are then transferred simultaneously in a longitudinal direction in order to engage the respective boarding chambers 8, in order to subject the textile articles to the thermal treatment.

Once the thermal treatment is completed, the boarding chambers 8 are

opened and the abovementioned supports 10 bearing the treated textile articles are simultaneously transferred in a longitudinal direction, in such a way that the boarding chambers 8 can receive the next batch of supports 10. The supports 10 bearing the treated textile articles are then
5 simultaneously transferred in a perpendicular direction along a fourth stretch of the polygonal pathway, in order that the textile articles may be subject to the drying phase in drying chamber A.

It is possible to introduce several batches of shapes 2 on supports 10, positioned side by side along the longitudinal sides, into drying chamber A.

10 The supports maintain their previous position, and therefore remain perpendicular to the direction of movement through drying chamber A. This consents the stacking of a large number of shapes inside drying chamber A, with a consequential considerable increase in the time the shapes 2 pass in drying chamber A.

15 Once they have been discharged from drying chamber A, once more the supports 10 are rotated through 90° by a second swiveling plate, in order to align the shapes 2 longitudinally in relation to the direction of movement. The supports 10 are extracted from drying chamber A individually, in a transverse direction to the direction of movement inside chamber A. The
20 supports 10 are then taken back to the first stretch of the polygonal pathway, at the start of which the treated articles are removed from the shapes 2 in the extraction station E.

Fig. 6 shows an alternative layout for the machine in object, consisting of a fixed structure for defining a rectangular pathway, along which the supports
25 10 bearing their respective boarding shapes 2 are guided.

As shown in fig. 7, the supports 10 of the shapes 2 are composed of a rectangular metallic plate 14 mounted on rollers 15 that should preferably be manufactured in a plastic material with a low friction coefficient, positioned on the corners of the plate 14.

- 5 Due to the presence of the rollers 15, each support 10 slides along the machine's platform 5. In the case illustrated, the supports 10 carry the respective pairs of shapes 2 for the stockings to be fed on to, mounted on half-moon shaped connectors 12.

The supports 10 are guided along each stretch of the polygonal pathway
10 by guides 3 composed of special section bars fixed to the platform 5 in pairs, in order to form a type of rail that is engaged by the abovementioned rollers 15 of the plates 14. The rollers 15 consent the supports 10 to slide along two perpendicular directions.

Towing devices for moving the supports 10 are positioned on each stretch
15 of the polygonal pathway to be followed. These towing devices are composed of pushers 21 connected to conveyors 20 by a slider 22, for example, the type with a toothed belt, enabled with an alternating motion by special motors.

For optimal use, the machine should be linked up to an automatic loading
20 device 4 for feeding the stockings on to the shapes 2.

The automatic loading device 4 is composed of a turntable 40 that rotates on a vertical axis and holds a number of loading shapes 41 positioned around its outer edge, which the stockings will be fed on to. If possible, the turntable 40 should be fitted with four pairs of loading shapes 41,
25 positioned at regular intervals. In short, the pairs of loading shapes 41 are

positioned around the edge of the turntable 40 at an angle of 90° from one another.

The loading shapes 41 rotate with relation to one another at a hinge, between a retracted position, in which the shapes 41 protrude considerably
5 on the same vertical plane at the stocking loading and checking station C, and a reciprocal approach on parallel planes in transfer station T of the articles on the shapes 2 of the boarding machine.

The loading device 4 is connected to an oscillating arm 9, by means of which it is possible to rotate the device to a rest position, should manual
10 stocking loading onto the boarding shapes be required.

In actual fact, the supports 10 are moved in step by a first pusher 21 along a first stretch of the polygonal pathway, with the boarding shapes 2 positioned vertically parallel to one another on transverse planes to the direction of movement. Transfer station T, where the stockings are fed on
15 to the shapes, is positioned along the first stretch of the polygonal pathway. Inside transfer station T the stockings are fed on to the shapes 2 automatically by the loading device 4.

The boarding shapes 2 progress in step, carried by the supports 10 that slide on the platform 5 and are guided by the guides 3, in the direction
20 indicated by arrow B, as far as the end of the abovementioned first stretch of the polygonal pathway. At the end of said first stretch the supports 10 are transferred in step by a second pusher 21 in a perpendicular direction to the previous one, along the second stretch of the polygonal pathway, with the shapes 2 positioned on a vertical plane parallel to the direction of
25 movement. In this configuration, the shapes 2 engage the station F in

which the thermal treatment is performed on the textile articles inside the pressurized steam boarding chambers 8.

Where possible, the boarding station F should be composed of two boarding chambers 8, positioned one next to another, each of which
5 receives a pair of shapes 2. The movement of the supports 10 brings two pairs of shapes 2 to a stack in front of the boarding chambers 8. The supports 10 of these shapes 2 simultaneously transfer the shapes 2 inside the boarding chamber 8.

Once the thermal treatment has been completed, the two boarding
10 chambers 8 are opened and the two pairs of boarding shapes 2 are simultaneously transferred inside drying chamber A, at the start of the third stretch of the polygonal pathway. The plates 14 of the supports 10 have an inclined upper surface, between a pair of lateral panels 13, in order to drain the condensation produced during the boarding phase.

15 Inside drying chamber A, the shapes 2 are moved in step on to two rows positioned side by side, by a third pusher 21.

At the end of the third stretch of the polygonal pathway, the supports 10 of the shapes 2 are once more transferred by a fourth pusher 21 in a perpendicular direction, one behind another, along a fourth stretch of the
20 polygonal pathway. On leaving drying chamber A the shapes 2 come to station E in which known extraction devices remove the stockings from the shapes 2.

The method described achieves the desired objective of boarding women's stockings and the like, whilst considerably limiting the device's dimensions.
25 In particular, the method for boarding described ensures an optimal

duration of the shapes in the boarding and drying chambers, thus permitting the production of better quality textile articles.

One advantage of the device is that this result can be achieved using an extremely simply manufactured device that is easy to use and extremely
5 versatile in its application.

Materials adopted for the actual realization of the invention, as well as their shapes and sizes, can be various, depending on the requirements.

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

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Claims

1) A method for boarding textile articles, characterized in that it consists in introducing textile articles on to said shapes (2) mounted on supports (10) that are slid by guides (3) attached to the boarding machine's fixed structure; of transporting these supports (10) in step along the polygonal pathway defined by said guides (3), by means of towing devices (21) attached to agent transporters (20) on each linear stretch of the polygonal pathway; of positioning a batch of said supports (10) of said shapes (2), which the said textile articles are fed on to, in a stack upstream of the multiple boarding station (F), equipped with respective boarding chambers (8), situated along a stretch of said polygonal pathway; of simultaneously transferring said batch of supports (10) along the stretch of the polygonal pathway, in order to bring the said shapes (2) inside the boarding chambers (8) in order for the textile articles to be subject to the thermal treatment; of simultaneously transferring said batch of supports (10), once the thermal treatment has been completed, on to a subsequent stretch of the polygonal pathway, in order for the said textile articles to undergo the drying phase in the drying chamber (A) inside which said supports (10) of the shapes (2) are placed one behind the other; and of removing the said treated textile articles from the shapes (2).

2) Method according to claim 1, characterized in that it consists in positioning said shapes (2) parallel to one another, perpendicular to the direction of movement of said supports (10), along at least a first stretch of the polygonal pathway on which the said textile articles to be treated are fed onto said shapes (2).

3) Machine for boarding textile articles, characterized in that it consists of a loading station (C) in which the textile articles to be treated are fed on to shapes (2) mounted on supports (10) that slide on guides (3) attached to the machine's fixed structure; towing devices (21) attached to agent
5 transporters (20) in step on each linear stretch of a polygonal pathway defined by said guides (3); a multiple boarding station (F) equipped with a series of boarding chambers (8), positioned along a stretch of said polygonal pathway to simultaneously receive a batch of shapes (2) mounted on supports (10); and an extraction station (E) where said textile
10 articles are removed from said shapes (2).

4) Machine according to claim 3, characterized by the fact that it consists of a drying chamber (A) downstream of said multiple boarding station (F), situated along a stretch of said polygonal pathway, inside which the supports (10) of the shapes (2) are stacked side-by side in the direction of
15 movement (B).

5) Machine according to claim 3, characterized by the fact that the towing devices and the transporters of said supports (10) require, on each stretch of said polygonal pathway, respective transversal pushers (21) linked to conveyors (20) kept in step by relative motors.

20 6) Machine for boarding textile articles, characterized in that it consists of a fixed structure (5) for defining a polygonal pathway along which a series of supports (10) are guided and slide bearing boarding shapes which said textile articles to be treated are fed onto in the transfer station (T); towing devices (21) for moving said supports (10) in step, agents corresponding to
25 each linear stretch of said polygonal pathway defined by said fixed

structure (5); a multiple boarding station (F), equipped with a number of boarding chambers (8), positioned along a stretch of the said polygonal pathway for simultaneously receiving a corresponding number of boarding shapes (2) mounted on said supports (10); a drying station (A) in which a number of said boarding shapes (2) are stacked following discharge from the multiple boarding station (F); an extraction station (E) where said treated textile articles are extracted from said boarding shapes (2); an automatic loading device (4) for loading said textile articles on to said boarding shapes (2) composed of a turntable (40) bearing a number of pairs of loading shapes (41) positioned around the edge, and rotate in relation to one another between a retracted position, in which the shapes (41) protrude considerably on the same vertical plane, in a station (C) for loading and checking textile articles, and a position of reciprocal approach on parallel planes in said transfer station (T), said turntable (40) being jog rotating in step equal to the angular distance between said loading shapes (41) in order to carry the same loading shapes (41) in succession to the loading station (C) and said transfer station (T).

7) Machine according to claim 6, characterized in that said supports (10) of the shapes (2) are composed of a metal plate (14) mounted on rollers (15), positioned in the corners of said plate (14) to engage the guides (3) attached to the fixed structure.(5).

8) Machine according to claim 7, characterized in that said guides (3) are composed of section bars attached in pairs to a platform (5) of said fixed structure, in order to create a sort of rail for the rollers (15) of said supports (10).

9) Machine according to claim 7, characterized in that said metal plate (14) has an inclined upper surface, between two lateral panels (13), in order to allow lateral drainage of the condensation produced in the boarding phase.

10) Machine according to claim 6, characterized in that said turntable (40)
5 can be enabled by a 90° rotation, equal to the angular distance between the corresponding pairs of said loading shapes (41) evenly distributed around the outer edge of the same turntable (40).

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FIG. 4

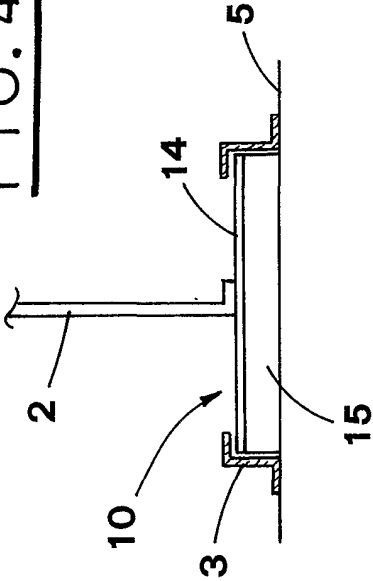


FIG. 3

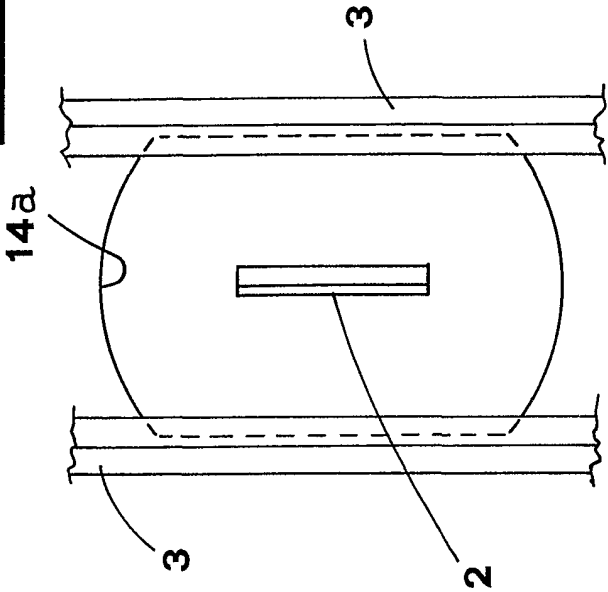
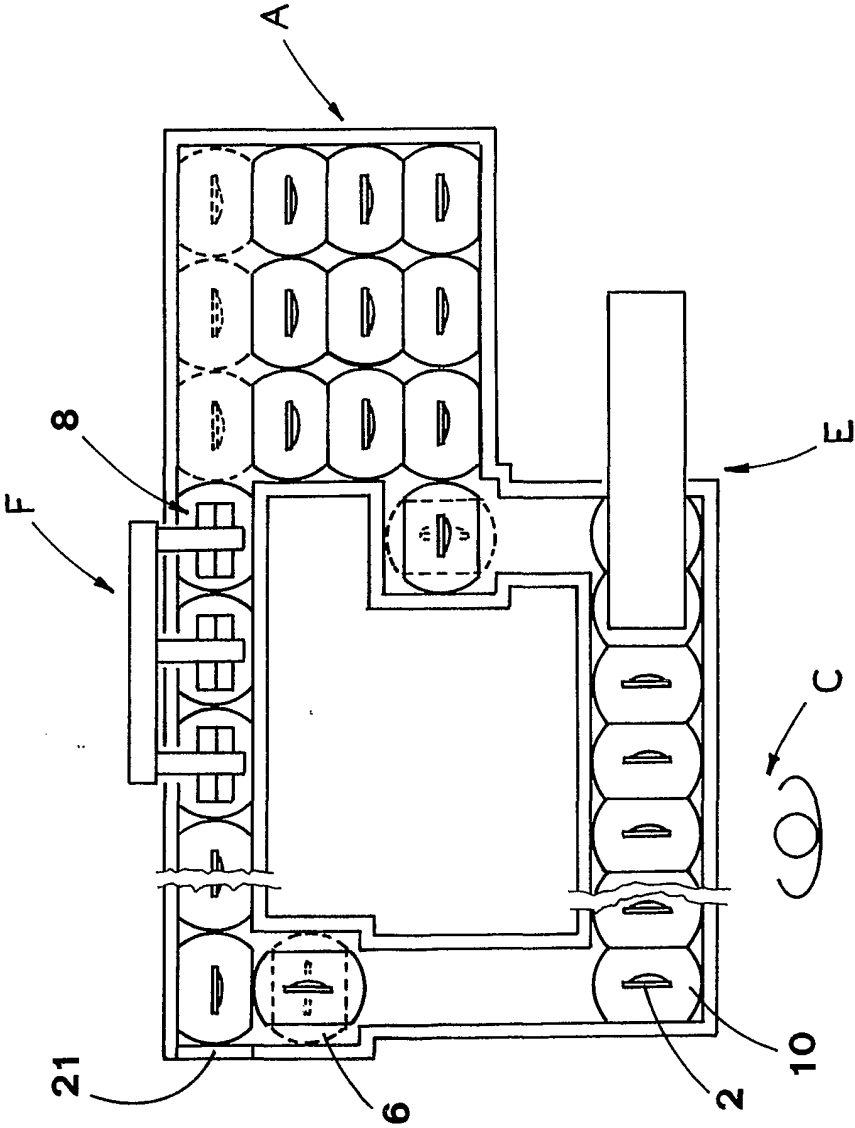
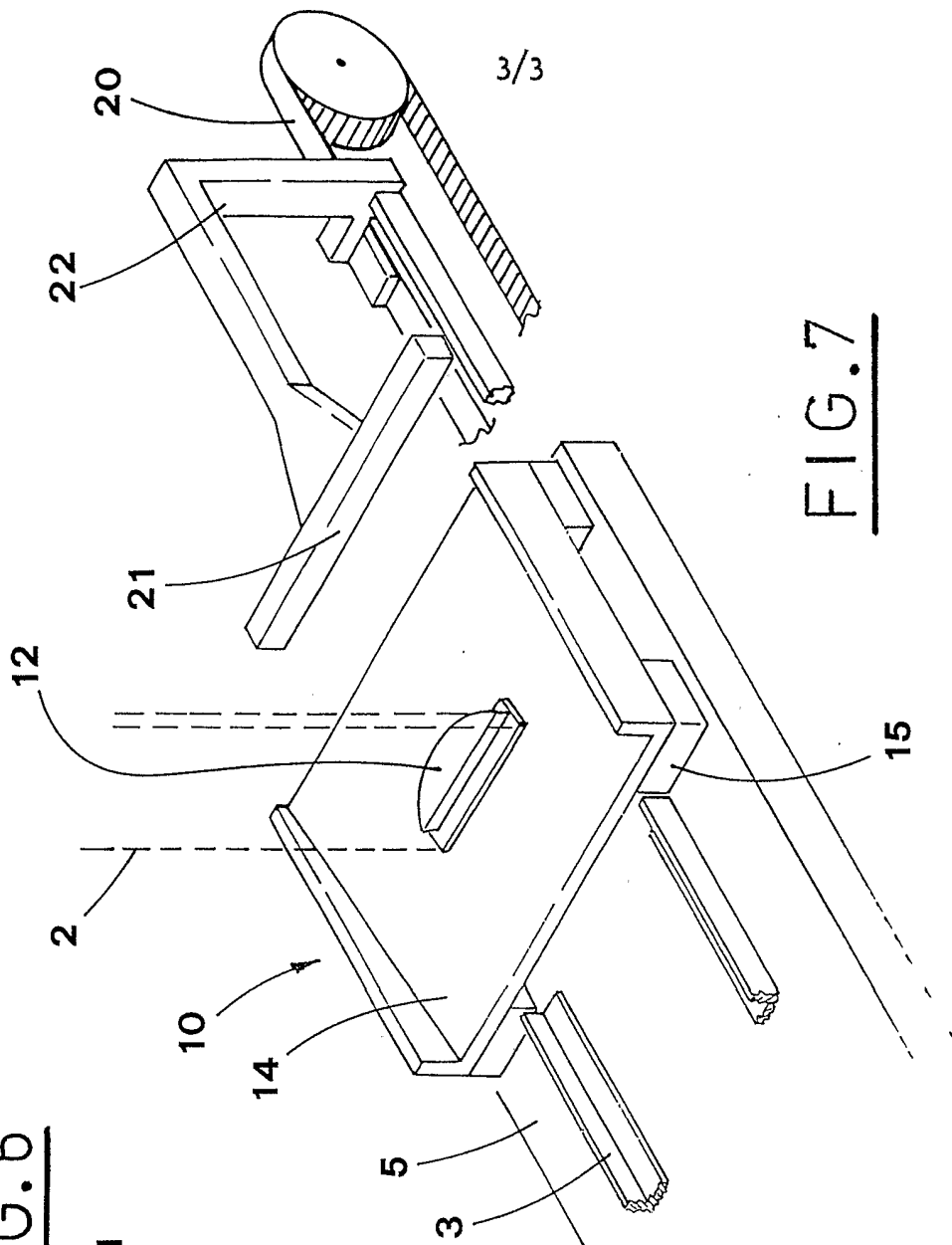
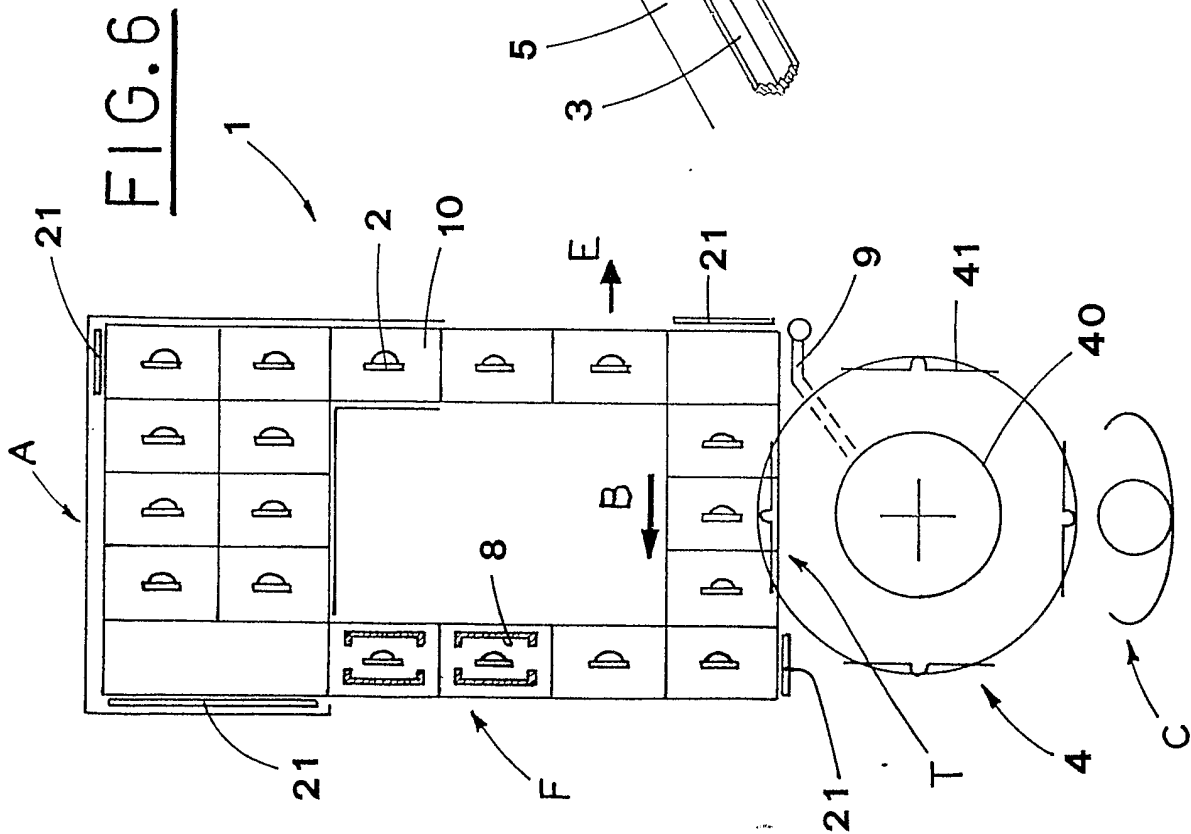


FIG. 5





INTERNATIONAL SEARCH REPORT

International Application No

PCT/IT 02/00227

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 D06C5/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 D06C D06H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 96 19609 A (LAMEC-LAVORAZIONI MECCANICHE DI GUCCINI LUIGI & C. S.N.C.) 27 June 1996 (1996-06-27) page 4, line 30 -page 6, line 27 ----	1,3,6
A	EP 0 652 319 A (C.A. CORTESE) 10 May 1995 (1995-05-10) column 3, line 4 - line 32 -----	1,3,6



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

° Special categories of cited documents :

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Date of the actual completion of the international search

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NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Goodall, C

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
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