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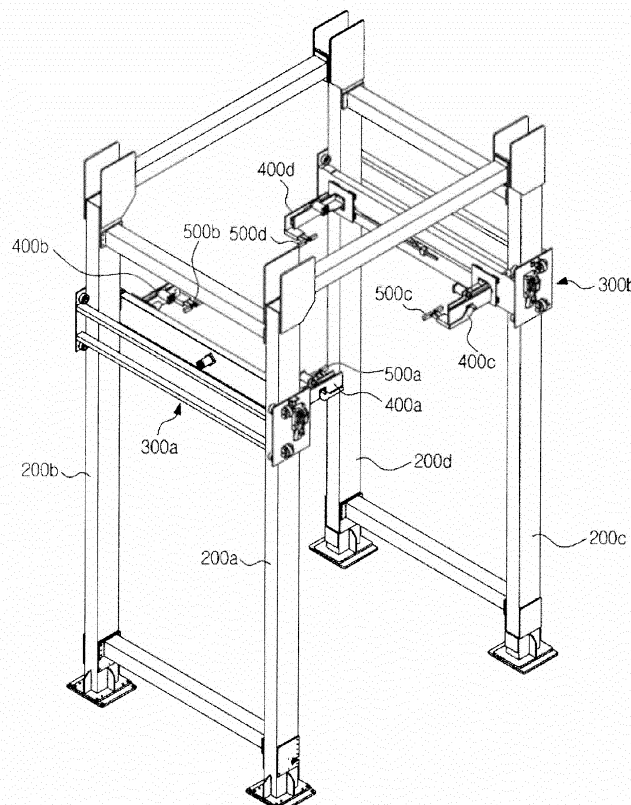
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(54) **Shrink packing system**

(57) A packing unit of a shrink packing system which shortens time required for a packing process. For this purpose, the packing unit includes four supporters arranged at both sides of a transfer conveyer, two elevators

combined with the four supporters so as to be upwardly and downwardly movable, and four telescopic arms combined with the two elevators so as to be movable in the moving direction of the transfer conveyer and to be extensible and retractable in the lengthwise direction.

FIG. 3



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Description

BACKGROUND

1. Field

[0001] Example embodiments of the following disclosure relate to a shrink packing system in which electric home appliances, such as refrigerators and washing machines, are packaged with a shrink film.

2. Description of the Related Art

[0002] In general, shrink packing is a method of packing a product by covering the product with a shrink film, and then shrinking the shrink film by supplying hot air to the product. Recently, such shrink packing methods have used a low-density polyethylene (LDPE) film, which has few harmful substances and is recyclable. Thus, the LDPE film has been highlighted as an environmentally friendly packing method, which substitutes conventional methods of packing a product with a paper box.

[0003] Such shrink packing methods may be divided into a method of covering products with a shrink film in the sideward direction and a method of covering products with a shrink film in the downward direction according to packing directions.

[0004] Generally, a packing unit using the downward covering method includes one supporter provided at one side of the moving direction of a transfer conveyer transferring products, one elevator combined with the supporter so as to move upwards and downwards, two cantilevers combined with the elevator so as to move forwards and backwards in the moving direction of the transfer conveyer, four arms combined with the two cantilevers so as to move forwards and backwards in the direction perpendicular to the moving direction of the transfer conveyer, and four clamping fingers provided at the ends of the four arms so as to grip the shrink film.

[0005] Therefore, only when the elevator moves downwards so that a product is covered with the shrink film and then moves upwards again, the product covered with the shrink film may be to a hot air shrinking unit through the transfer conveyer. Further, since only one end of each of the cantilevers is fixed to the elevator, when the elevator moves upwards and downwards at a high speed, the cantilevers may vibrate and may cause a limit in upward and downward movement of the elevator, when operating at the high speed, thereby reducing the effectiveness of shrink film methods.

SUMMARY

[0006] Therefore, it is an aspect of the present disclosure to provide a shrink packing system which shortens time required for a process of covering a product with a shrink film and transferring the product covered with the shrink film to a hot air shrinking unit through a transfer

conveyer in a method of covering products with the shrink film in the downward direction.

[0007] Additional aspects of the disclosure will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the disclosure.

[0008] In accordance with one aspect of the present disclosure, a shrink packing system includes a transfer conveyer transferring products, a feeding unit continuously feeding a shrink film in the shape of an envelope wound on a roll, an opening unit receiving the shrink film fed from the feeding unit and spreading the shrink film, a packing unit covering a product with the shrink film by moving in the downward direction of the product while gripping the spread shrink film, and a shrinking unit shrinking the shrink film covering the product using hot air, wherein the packing unit includes four supporters arranged at both sides of the transfer conveyer, two elevators supported by the four supporters and provided so as to be upwardly and downwardly movable, four telescopic arms combined with the two elevators so as to be slidable in the leftward and rightward directions, and provided so as to be extensible and retractable in the forward and backward directions, and four clamping fingers provided at the front ends of the four telescopic arms.

[0009] The two elevators may move upwards or downwards together.

[0010] The four telescopic arms may be extended or retracted together.

[0011] When the opening unit spreads the shrink film, the telescopic arms may be extended in the forward direction so that the clamping fingers may grip the shrink film.

[0012] After the elevators have moved downwards under the condition that the clamping fingers grip the shrink film and then covered the product with the shrink film, the telescopic arms may be retracted in the backward direction.

[0013] When the elevators move upwards under the condition that the telescopic arms are retracted in the backward direction, the transfer conveyer may move to transfer the product covered with the shrink film to the shrinking unit and to transfer the next product not covered with the shrink film to the packing unit.

[0014] Each of the elevators may include sliding rails provided in the leftward and rightward directions, and each of the telescopic arms may include a sliding block combined with the sliding rails so as to slide.

[0015] Each of the elevators may further include a pinion gear and a drive motor driving the pinion gear, and each of the telescopic arms may further include a rack gear engaged with the pinion gear so as to receive driving force.

[0016] Each of the telescopic arms may include a first arm member combined with the elevator, a slide member combined with the first arm member so as to be movable in the forward and backward directions with respect to the first arm member, and a second arm member com-

bined with the slide member so as to be movable in the forward and backward directions with respect to the slide member.

[0017] In accordance with another aspect of the present disclosure, a shrink packing system includes a transfer conveyer transferring products, a feeding unit continuously feeding a shrink film in the shape of an envelope wound on a roll, an opening unit receiving the shrink film fed from the feeding unit and spreading the shrink film, a packing unit including two elevators provided so as to be upwardly and downwardly movable, and four telescopic arms combined with the two elevators so as to be slidable in the leftward and rightward directions and provided so as to be extensible and retractable in the forward and backward directions, and a shrinking unit shrinking the shrink film covering the product using hot air.

[0018] When the opening unit spreads the shrink film, the packing unit may move downwards while gripping the shrink film under the condition that a product is stationary, and thus cover the product with the shrink film.

[0019] When the product is covered with the shrink film, the packing unit moves upwards and simultaneously, the product covered with the shrink film may be transferred to the shrinking unit and another product not covered with the shrink film may be transferred to the packing unit.

[0020] In accordance with a further aspect of the present disclosure, a packing unit includes four supporters arranged at both sides of a transfer conveyer transferring products, two elevators supported by the four supporters and provided so as to be upwardly and downwardly movable, four telescopic arms combined with the two elevators so as to be slidable in the leftward and rightward directions, and provided so as to be extensible and retractable in the forward and backward directions, and four clamping fingers provided at the front ends of the four telescopic arms.

[0021] In accordance with a further aspect of the present disclosure, a shrink packing system to shorten a time of a packing process is provided, including: a packing unit to cover a product with shrink film by moving in a direction of the product while gripping the shrink film; and a shrinking unit to shrink the shrink film covering the product using hot air, wherein when the product is covered with the shrink film, the packing unit moves upwards and simultaneously, the product covered with the shrink film is transferred to the shrinking unit and another product not covered with the shrink film is transferred to the packing unit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] These and/or other aspects of the disclosure will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings of which:

FIG. 1 is a schematic view of a shrink packing sys-

tem, according to an example embodiment of the present disclosure;

FIG. 2 is a front view illustrating a feeding unit, an opening unit and a packing unit of FIG. 1;

FIG. 3 is a perspective view of the packing unit of FIG. 1;

FIG. 4 is an exploded perspective view illustrating a connection structure between an elevator and telescopic arms of the packing unit of FIG. 1;

FIG. 5 is an assembled perspective view illustrating the elevator and the telescopic arms of the packing unit of FIG. 1;

FIG. 6 is an exploded perspective view illustrating the structure of the telescopic arm of the packing unit of FIG. 1;

FIG. 7 is an assembled perspective view illustrating the structure of the telescopic arm of the packing unit of FIG. 1; and

FIGS. 8 to 12 are exemplary views illustrating a process of covering a product with a shrink film through the packing unit of FIG. 1, according to example embodiments of the present disclosure,

DETAILED DESCRIPTION

[0023] Reference will now be made in detail to the exemplary embodiments of the present disclosure, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout.

[0024] FIG. 1 is a schematic view of a shrink packing system, according to an example embodiment of the present disclosure, FIG. 2 is a front view illustrating a feeding unit, an opening unit and a packing unit of FIG. 1, and FIG. 3 is a perspective view of the packing unit of FIG. 1,

[0025] With reference to FIGS. 1 to 3, a shrink packing system 1, according to an example embodiment of the present disclosure may include a transfer conveyer 20 transferring a product 10, an alignment unit 21 aligning the product 10, a feeding unit 30 feeding a shrink film 60, an opening unit 40 spreading the shrink film 60 fed by the feeding unit 30, a packing unit 100 moving downwards while gripping the shrink film 60 spread through the opening unit 40 so as to cover the product 10 with the shrink film 60, and a shrinking unit 50 shrinking the shrink film 60 of the product 10 covered with the shrink film 60 through the packing unit 100 using hot air.

[0026] Depending on embodiments, the transfer conveyer 20 may transfer the product 10 so that the product 10 may sequentially pass through the alignment unit 21,

the packing unit 100, and the shrinking unit 50.

[0027] The product 10 may be an electric home appliance, such as a refrigerator or a washing machine, for example. Further, design specifications of the respective constituent equipments of the shrink packing system 1 in accordance with an example embodiment of the present disclosure, such as, the packing unit 100, the shrinking unit 50, etc., may be properly modified according to the size of the product 10, and may thus be applied regardless of the size of the product 10.

[0028] The product 10 may enter the shrink packing system 1 in accordance with an example embodiment of the present disclosure under the condition that the upper, lower and side edges of the product 10 are respectively covered with a cushioning material (not shown).

[0029] When the product 10 enters the alignment unit 21, the alignment unit 21 may align the product 10 at the central region, however, the present disclosure is not limited thereto. That is, the alignment unit 21 may align the product 10 at regions of the transfer conveyer 20, other than the central region. The product 10 having passed through the alignment unit 21 may reach the packing unit 100, and stop in the packing unit 100 for a short time while the packing unit 100 covers the product 10 with the shrink film 60.

[0030] The feeding unit 30 may be arranged at one side of the packing unit 100, and the shrink film 60 may be wound on a roll and then fed to the opening unit 40 through the feeding unit 30. The feeding unit 30 may include a film feed roller (not shown) moving the shrink film 60 and a film feed motor (not shown) driving the film feed roller (not shown), and the shrink film 60 moving through the film feed roller (not shown) may be fed to the opening unit 40 through at least one buffer 33.

[0031] The shrink film 60 in accordance with an example embodiment of the present disclosure may have the shape of an envelope, such that an end portion is open, and the other portion of which may be closed to cover a product in a wrapping way (referring to FIGS. 10 & 11, for example) and may be cut after the shrink film 60 covers a product by a cutter (not shown) or by a partial pre-cutting method. Further, the shrink film may be wound on the roll in a state in which the shrink film 60 is folded flat. Depending on embodiments, the shrink film 60 may be in other shapes or be wound in other ways, and thus, the present disclosure is not limited to the above. The schematic cross-sectional shape of the shrink film 60 is illustrated in a portion shown by an alternate long and two short dashes line in FIG. 2. Further, the shrink film 60 may be a low-density polyethylene (LDPE) film, which has few harmful substances and is recyclable.

[0032] The opening unit 40 may include a horizontal frame 41, and a plurality of opening blades 42 and 43 hinged on to the horizontal frame 41 so as to be rotatable and to cause the shrink film 60 to be adhered thereto using hot air. After the shrink film 60 is adhered to the plurality of opening blades 42 and 43, the plurality of opening blades 42 and 43 may be rotated to opposite

sides to open the shrink film 60. Such an opening unit 40 may be disposed above the packing unit 100, and be supported by supporters 200a, 200b, 200c and 200d (with reference to FIG. 3).

[0033] The packing unit 100 may move downwards while gripping the shrink film 60 opened by the opening unit 40, thereby covering the product 10 with the shrink film 60. The packing unit 100 in accordance with an example embodiment of the present disclosure may include four supporters 200a, 200b, 200c and 200d arranged at both sides of the transfer conveyer 20, two elevators 300a and 300b supported by the supporters 200a, 200b, 200c and 200d and provided so as to be upwardly and downwardly movable, and four telescopic arms 400a, 400b, 400c and 400d combined with the two elevators 300a and 300b and protruding toward the transfer conveyer 20.

[0034] The supporters 200a, 200b, 200c and 200d may be formed in the shape of a column supported by the ground surface, however, the present disclosure is not limited thereto. That is, the supporters 200a, 200b, 200c, and 200d may be formed in shapes other than the shape of a column. Further, the elevators 300a and 300b may be provided so as to be upwardly and downwardly movable along the supporters 200a, 200b, 200c and 200d. The upward and downward movement of the elevators 300a and 300b may be implemented through various configurations, and, for example, may be implemented through weights and chains which are not shown in the drawings.

[0035] For example, the two elevators 300a and 300b may move downwards together when the product 10 is covered with the shrink film 60, and may move upwards together after the product 10 has been covered with the shrink film 60. However, the above is exemplary, and thus, the present disclosure is not limited thereto.

[0036] Two of the four telescopic arms 400a, 400b, 400c and 400d may be combined with each of the two elevators 300a and 300b, and the telescopic arms 400a, 400b, 400c and 400d may be combined with the two elevators 300a and 300b so as to be forwardly and backwardly movable in the moving direction of the transfer conveyer 20. That is, the respective telescopic arms 400a, 400b, 400c and 400d may be combined with the elevators 300a and 300b so as to be slidable in the leftward and rightward directions.

[0037] The telescopic arms 400a, 400b, 400c and 400d may be provided so as to be extended or retracted in the lengthwise direction, i.e., forwards or backwards, and clamping fingers 500a, 500b, 500c and 500d (as shown in FIG. 4) which may grip the shrink film 60 may be provided at the front ends of the telescopic arms 400a, 400b, 400c and 400d.

[0038] The four telescopic arms 400a, 400b, 400c and 400d may be extended together when the telescopic arms 400a, 400b, 400c and 400d grip the shrink film 60 and then cover the product 10 with the shrink film 60, and be retracted together after the telescopic arms 400a, 400b, 400c and 400d have covered the product 10 with

the shrink film 60. However, the above is exemplary, and thus, the present disclosure is not limited thereto.

[0039] In the packing unit 100 having the above configuration in accordance with an example embodiment of the present disclosure (referring, for example, to FIG. 4), the elevators 300a and 300b move upwards and downwards, and the telescopic arms 400a, 400b, 400c and 400d slide in the leftward and rightward directions and are extended and retracted in the forward and backward directions. Therefore, the clamping fingers 500a, 500b, 500c and 500d provided at the front ends of the telescopic arms 400a, 400b, 400c and 400d may have 3 degrees of freedom.

[0040] Further, when the telescopic arms 400a, 400b, 400c and 400d are retracted, the length of the telescopic arms 400a, 400b, 400c and 400d is shortened, and thus, vibration of the telescopic arms 400a, 400b, 400c and 400d when the telescopic arms 400a, 400b, 400c and 400d move upwards and downwards may be reduced.

[0041] Hereinafter, the connection structures between the elevators 300a and 300b and the telescopic arms 400a, 400b, 400c and 400d and the extension and retraction structures of the telescopic arms 400a, 400b, 400c and 400d will be described in detail with reference to the accompanying drawings.

[0042] FIG. 4 is an exploded perspective view illustrating the connection structure between the elevator and the telescopic arms of the packing unit of FIG. 1, FIG. 5 is an assembled perspective view illustrating the elevator and the telescopic arms of the packing unit of FIG. 1, FIG. 6 is an exploded perspective view illustrating the structure of the telescopic arm of the packing unit of FIG. 1, and FIG. 7 is an assembled perspective view illustrating the structure of the telescopic arm of the packing unit of FIG. 1.

[0043] Since the connection structures between the two elevators 300a and 300b and the four telescopic arms 400a, 400b, 400c and 400d of the packing unit 100 in accordance with an example embodiment of the present disclosure are the same, only the connection structure between the elevator 300b and the telescopic arms 400c and 400d will be described and a description of the other connection structure, i.e., between 300a and the telescopic arms 400a and 400b, will be omitted.

[0044] As shown in FIGS. 4 and 5, sliding rails 310 and 311 may be provided on the elevator 300b in the lengthwise direction of the transfer conveyer 20 so as to support the telescopic arms 400c and 400d and to guide sliding of the telescopic arms 400c and 400d, and the telescopic arms 400c and 400d may include sliding blocks 410 and 411 combined with the sliding rails 310 and 311.

[0045] Rack gears 20 and 21 provided in the lengthwise direction of the sliding rails 310 and 311 may be fixed to the sliding blocks 410 and 411. A pinion gear 320 engaged with the rack gears 20 and 21 to transmit driving force, a drive motor 330 driving the pinion gear 320, and rack gear claspers 340 and 341 supporting the rack gears 20 and 21 may be provided on the elevator 300b.

[0046] The two rack gears 20 and 21 may be engaged with the upper and lower parts of the one pinion gear 320 so as to receive driving force from the one pinion gear 320. Therefore, when the pinion gear 320 is rotated in one direction, the telescopic arms 400c and 400d may move close to each other, and when the pinion gear 320 is rotated in the other direction, the telescopic arms 400c and 400d may move away from each other.

[0047] Through the above-described configuration, the telescopic arms 400c and 400d may be supported by the elevator 300b and slide in the leftward and rightward directions.

[0048] Next, the extension and retraction structures of the telescopic arms 400a, 400b, 400c and 400d will be described with reference to FIGS. 6 and 7. Since the extension and retraction structures of the four telescopic arms 400a, 400b, 400c and 400d are the same, only the extension and retraction structure of the telescopic arm 400c will be described and a description of other retraction and retraction structures, i.e., for 400a, 400b, and 400d, will be omitted.

[0049] The telescopic arm 400c may include a first arm member 430 fixed to the sliding block 410 (with reference to FIG. 4), a slide member 440 combined with the first arm member 430 so as to be movable in the lengthwise direction, and a second arm member 450 combined with the slide member 440 so as to be movable in the lengthwise direction.

[0050] Support rails 443 and 444 may be provided on both side surfaces of the slide member 440 in the lengthwise direction, and holding blocks 434 and 454 slidably combined with the support rails 443 and 444 may be provided on the first arm member 430 and the second arm member 450. Therefore, the second arm member 450 may be slidably supported by the slide member 440, and the slide member 440 may be slidably supported by the first arm member 430.

[0051] A first pinion gear 431 to transmit driving force to the slide member 440 and a first drive motor 432 driving the first pinion gear 431 may be provided on the first arm member 430.

[0052] A second rack gear 441, engaged with the first pinion gear 431 so as to receive driving force transmitted from the first pinion gear 431, and a second pinion gear 442 to transmit driving force to the second arm member 450 may be provided on the slide member 440. The second pinion gear 442 is engaged with a first rack gear 433 fixed to the first arm member 430 and is rotated, when the slide member 440 moves in the lengthwise direction.

[0053] A third rack gear 451, engaged with the second pinion gear 442 so as to receive driving force transmitted from the second pinion gear 442, may be provided on the second arm member 450. As described above, both the first rack gear 433 and the third rack gear 451 may be engaged with the second pinion gear 442.

[0054] Through the above-described configuration, the second arm member 450 moves in the lengthwise direction with respect to the first arm member 430, and

thus, the telescopic arm 400c may be extended or retracted in the forward or backward direction.

[0055] FIGS. 8 to 12 are views illustrating a process of covering a product with a shrink film through the packing unit of FIG. 1. Hereinafter, the process of covering the product with the shrink film through the packing unit in accordance with an example embodiment of the present disclosure will be described with reference to FIGS. 8 to 12.

[0056] FIG. 8 illustrates a state in which the telescopic arms 400a, 400b, 400c and 400d of the packing unit 100 are maximally extended forwards before the product 10 is covered with the shrink film 60. As shown in FIG. 8, when the opening unit 40 spreads the shrink film 60, the telescopic arms 400a, 400b, 400c and 400d are maximally extended so as to grip the shrink film 60.

[0057] In this state, when the clamping fingers of the telescopic arms 400a, 400b, 400c and 400d grip the shrink film 60, the telescopic arms 400a, 400b, 400c and 400d are slightly retracted in the backward direction from the maximal extension position, and may thus tightly spread the shrink film 60, as shown in FIG. 9.

[0058] Thereafter, when the elevators 300a and 300b move downwards in the state in which the clamping fingers of the telescopic arms 400a, 400b, 400c and 400d grip the shrink film 60, as shown in FIG. 10, for example, the product 10 may be covered with the shrink film 60.

[0059] When the product 10 has been covered with the shrink film 60, the telescopic arms 400a, 400b, 400c and 400d are retracted in the backward direction, as shown in FIG. 11. Therefore, as shown in FIG. 12, the elevators 300a and 300b move upwards in a state in which the telescopic arms 400a, 400b, 400c and 400d are retracted, and, at this time, the transfer conveyer 20 moves, and thus, the product 10 covered with the shrink film 60 may be transferred to the shrinking unit 50 (with reference to FIG. 1), and the next product 10 not covered with the shrink film 60 may be transferred to a region under the packing unit 100.

[0060] Therefore, while in a shrink packing system, a transfer conveyer moves to transfer a product after an elevator has completely moved upwards, in the shrink packing system 1 in accordance with an example embodiment of the present disclosure, a product may be transferred simultaneously with the upward movement of the elevators 300a and 300b, and thus, a packing cycle time may be shortened.

[0061] As is apparent from the above description, in a shrink packing system in accordance with an example embodiment of the present disclosure, a product covered with a shrink film may be transferred to a hot air shrinking unit through a transfer conveyer while a packing unit moves upwards after the packing unit has moved downwards and covered the product with the shrink film, and thus, the time required for a product packing process may be shortened.

[0062] Further, since the packing unit of the shrink packing system in accordance with an example embod-

iment of the present disclosure may include two elevators supported by four supporters and two telescopic arms, the length of which may be retracted, are combined with each of the two elevators, vibration of the two arms when the elevators move upwards and downwards may be reduced.

[0063] Although a few embodiments of the present disclosure have been shown and described, it would be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the disclosure, the scope of which is defined in the claims and their equivalents.

Claims

1. A shrink packing system, comprising:

a transfer conveyer transferring a product;
a feeding unit continuously feeding a shrink film in the shape of an envelope wound on a roll;
an opening unit receiving the shrink film fed from the feeding unit and spreading the shrink film;
a packing unit covering the product with the shrink film by moving in the downward direction of the product while gripping the spread shrink film; and
a shrinking unit shrinking the shrink film covering the product using hot air,
wherein the packing unit includes:

four supporters arranged at both sides of the transfer conveyer;
two elevators supported by the four supporters and provided so as to be upwardly and downwardly movable;
four telescopic arms combined with the two elevators so as to be slidable in the leftward and rightward directions, and provided so as to be extensible and retractable in the forward and backward directions; and
four clamping fingers provided at the front ends of the four telescopic arms.

2. The shrink packing system according to claim 1, wherein the two elevators move upwards or downwards together.

3. The shrink packing system according to claim 1, wherein the four telescopic arms are extended or retracted together.

4. The shrink packing system according to claim 1, wherein, when the opening unit spreads the shrink film, the telescopic arms are extended in the forward direction so that the clamping fingers grip the shrink film.

5. The shrink packing system according to claim 4, wherein, after the elevators have moved downwards under the condition that the clamping fingers grip the shrink film and then cover the product with the shrink film, the telescopic arms are retracted in the backward direction. 5
6. The shrink packing system according to claim 5, wherein, when the elevators move upwards under the condition that the telescopic arms are retracted in the backward direction, the transfer conveyer moves to transfer the product covered with the shrink film to the shrinking unit and to transfer the next product not covered with the shrink film to the packing unit. 10
7. The shrink packing system according to claim 1, wherein:
- each of the elevators includes sliding rails provided in the leftward and rightward directions; and 20
- each of the telescopic arms includes a sliding block combined with the sliding rails so as to slide. 25
8. The shrink packing system according to claim 7, wherein:
- each of the elevators further includes a pinion gear and a drive motor driving the pinion gear; and 30
- each of the telescopic arms further includes a rack gear engaged with the pinion gear so as to receive driving force. 35
9. The shrink packing system according to claim 1, wherein each of the telescopic arms includes a first arm member combined with the elevator, a slide member combined with the first arm member so as to be movable in the forward and backward directions with respect to the first arm member, and a second arm member combined with the slide member so as to be movable in the forward and backward directions with respect to the slide member. 40 45
10. A shrink packing system comprising:
- a transfer conveyer transferring a product; 50
- a feeding unit continuously feeding a shrink film in the shape of an envelope wound on a roll; 55
- an opening unit receiving the shrink film fed from the feeding unit and spreading the shrink film;
- a packing unit including two elevators provided so as to be upwardly and downwardly movable, and four telescopic arms combined with the two elevators so as to be slidable in the leftward and rightward directions and provided so as to be
- extensible and retractable in the forward and backward directions; and
- a shrinking unit shrinking the shrink film covering the product using hot air.
11. The shrink packing system according to claim 10, wherein, when the opening unit spreads the shrink film, the packing unit moves downwards while gripping the shrink film under the condition that a product is stationary, thereby covering the product with the shrink film.
12. The shrink packing system according to claim 11, wherein, when the product is covered with the shrink film, the packing unit moves upwards and simultaneously, the product covered with the shrink film is transferred to the shrinking unit and another product not covered with the shrink film is transferred to the packing unit.

FIG. 1

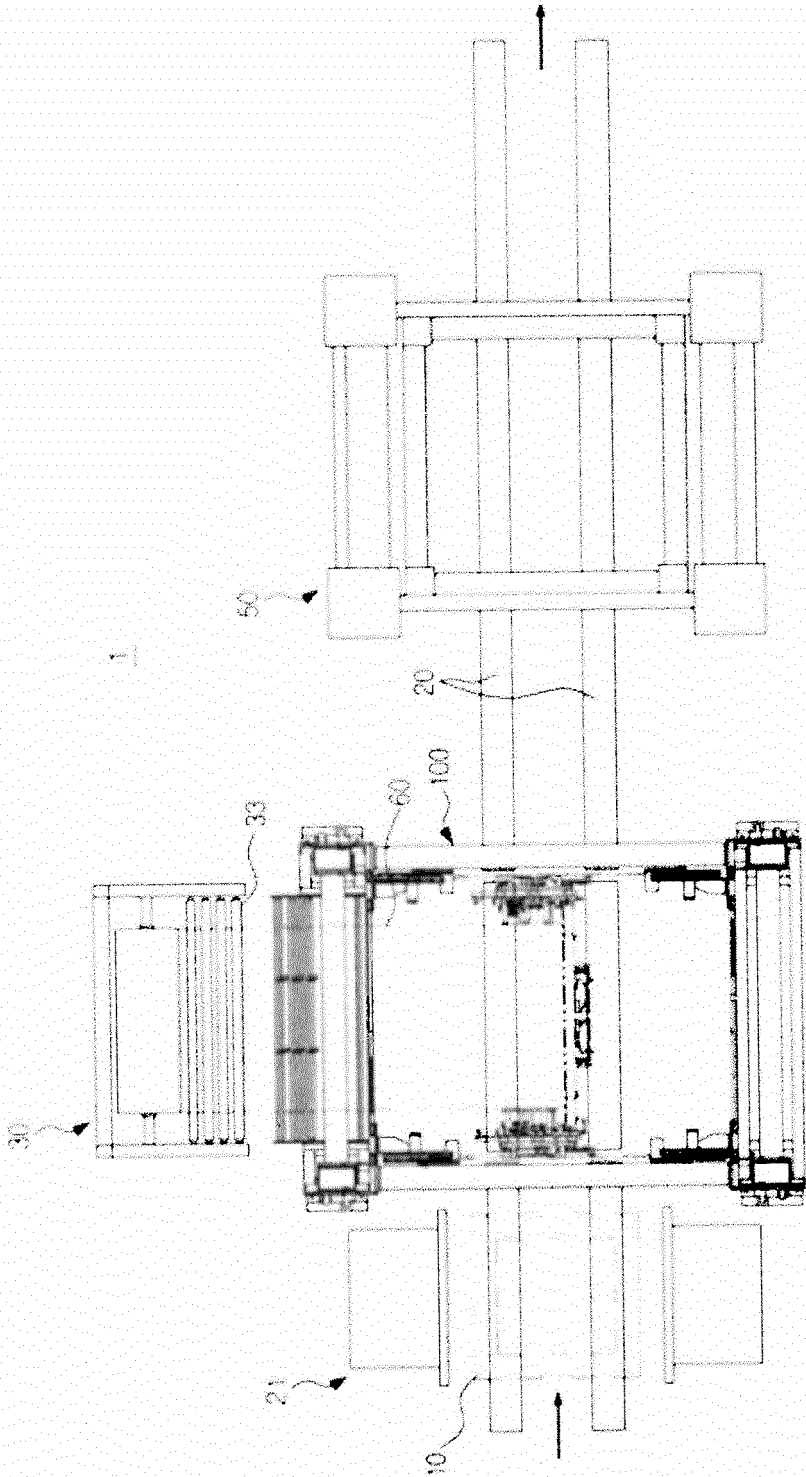


FIG. 2

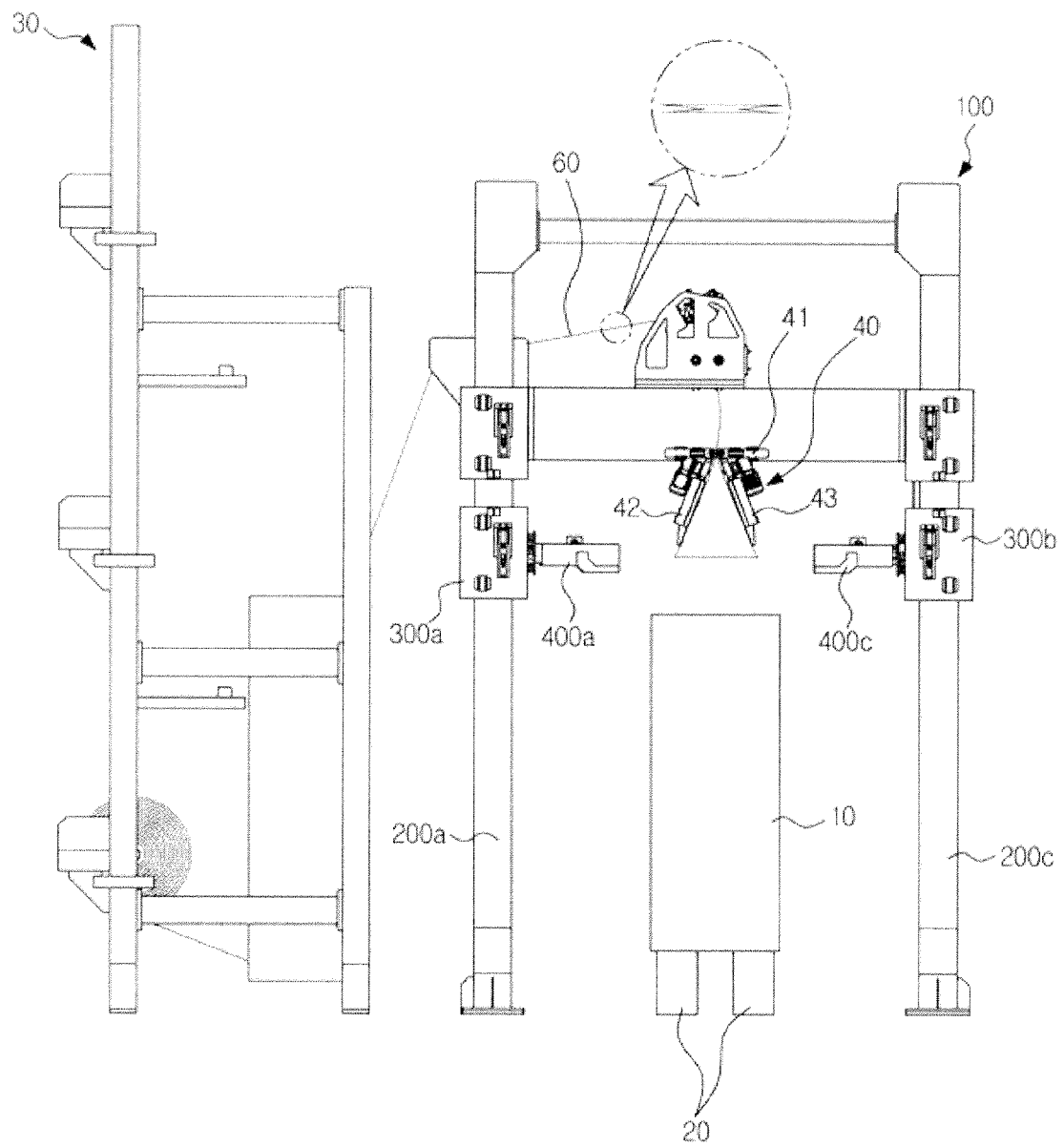


FIG. 3

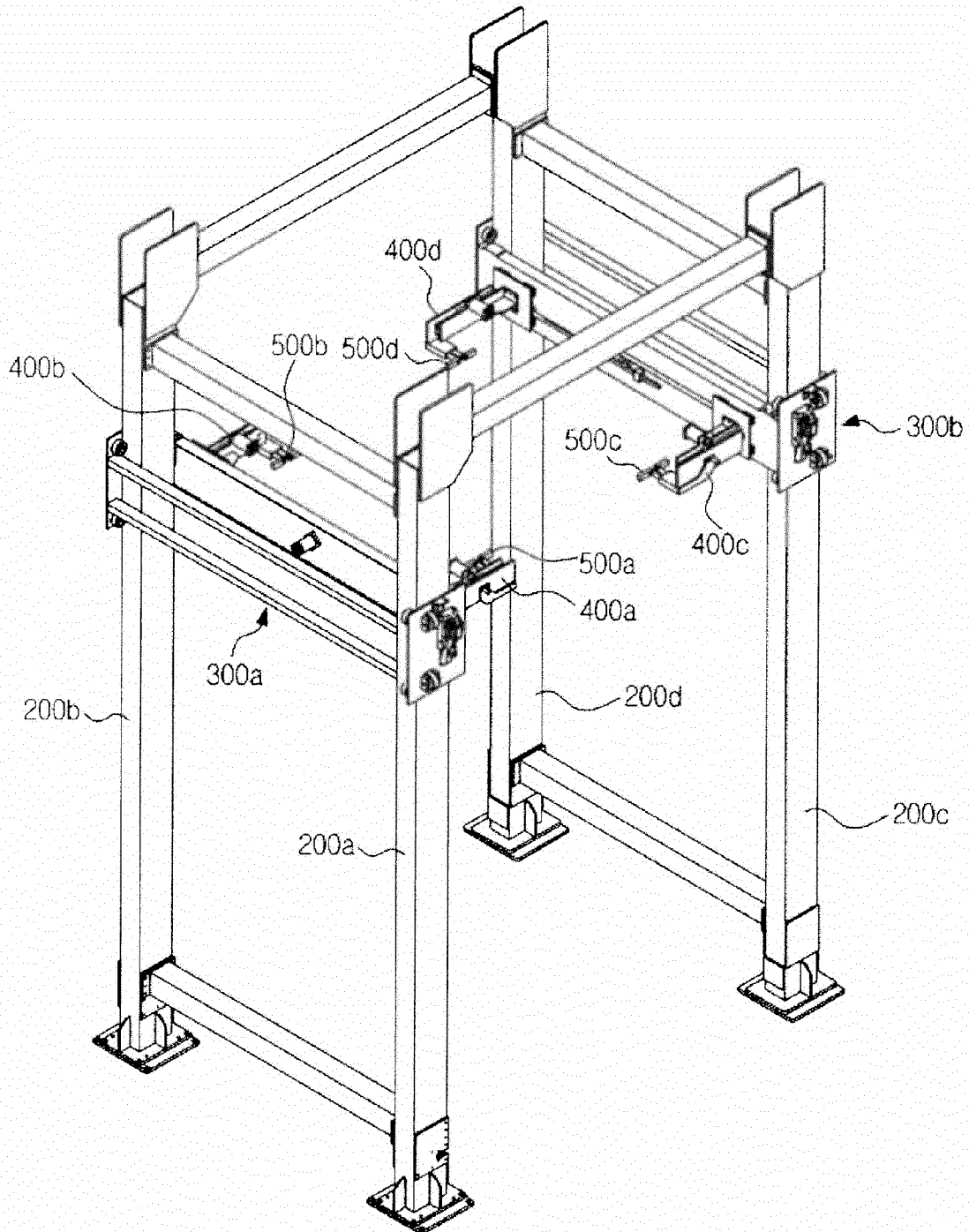


FIG. 4

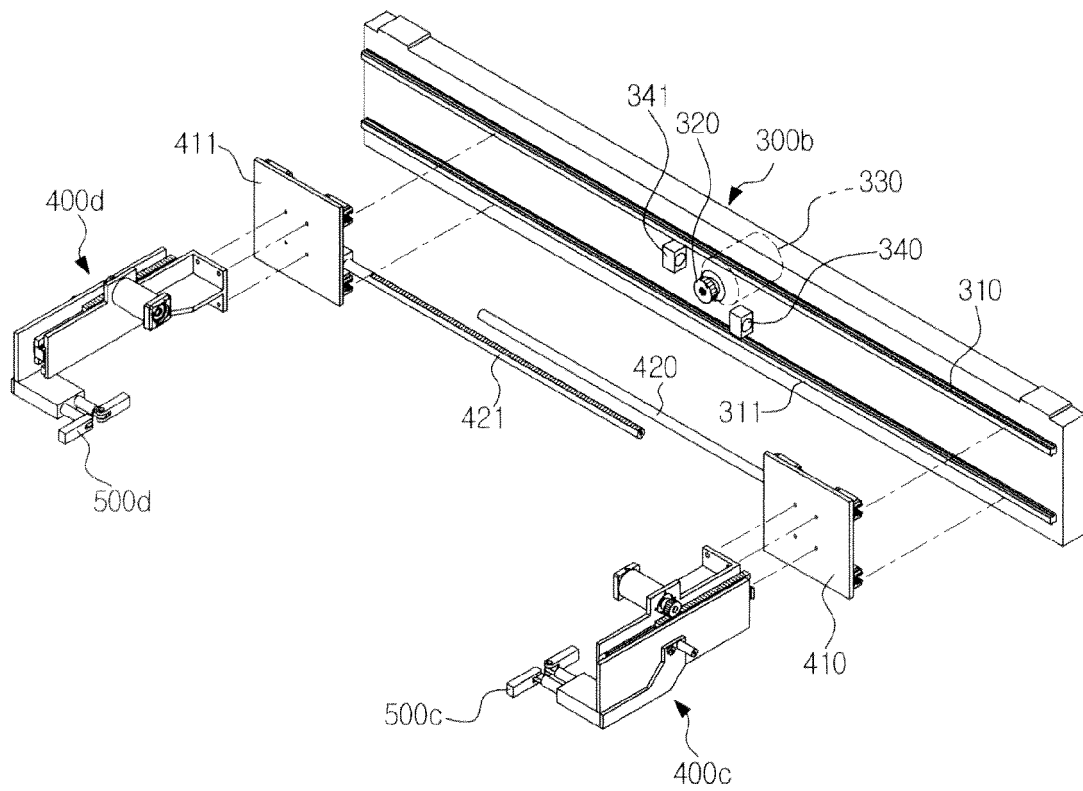


FIG. 5

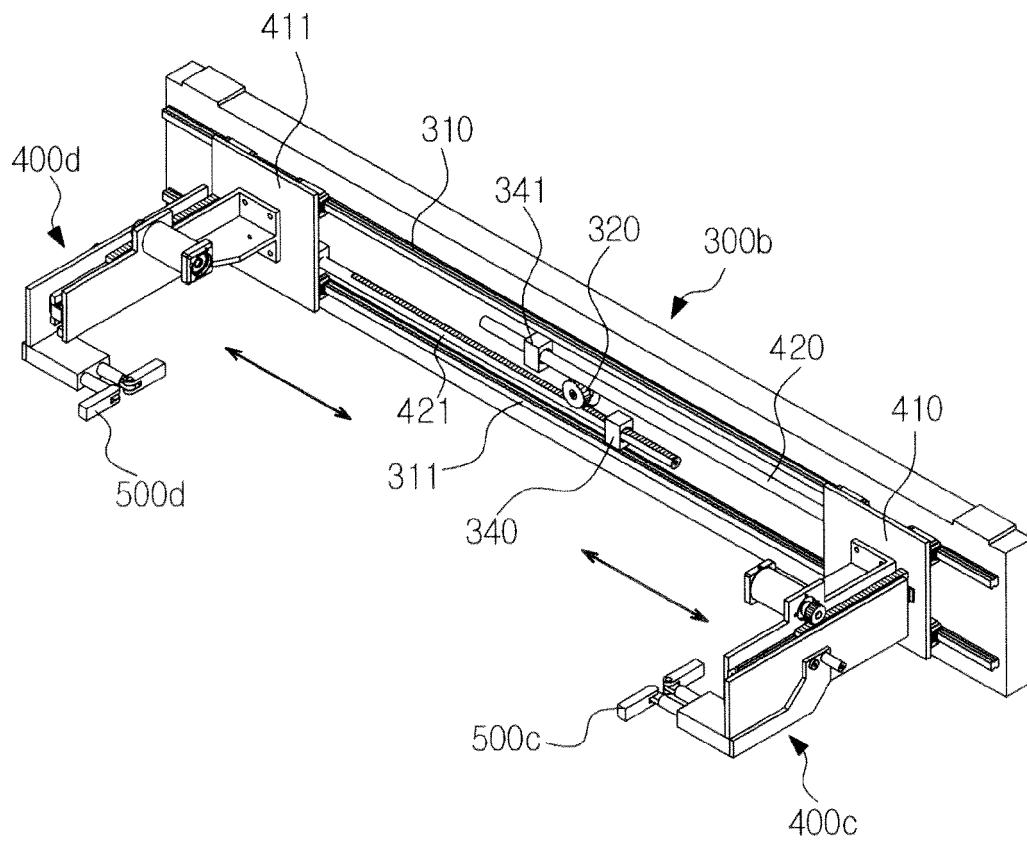


FIG. 6

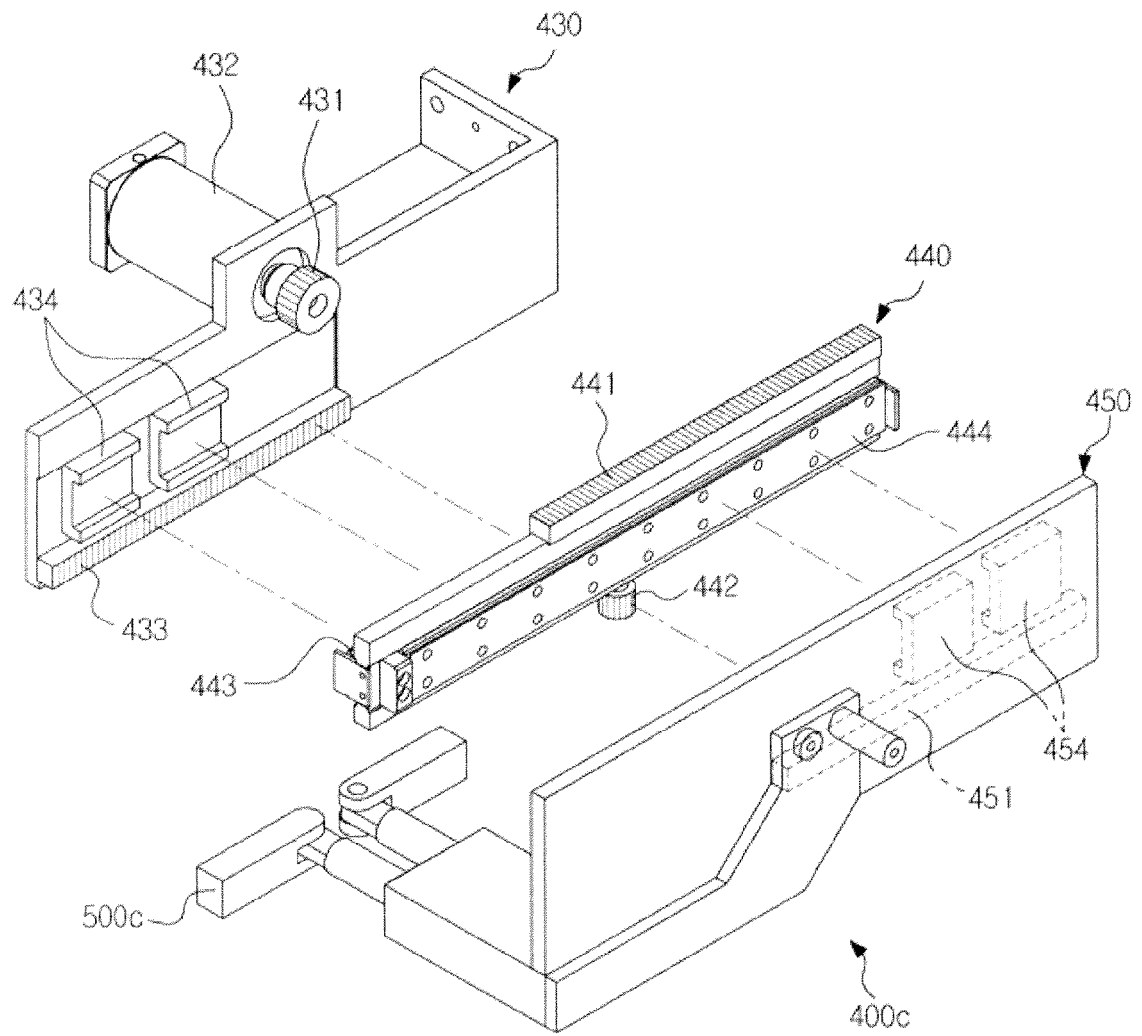


FIG. 7

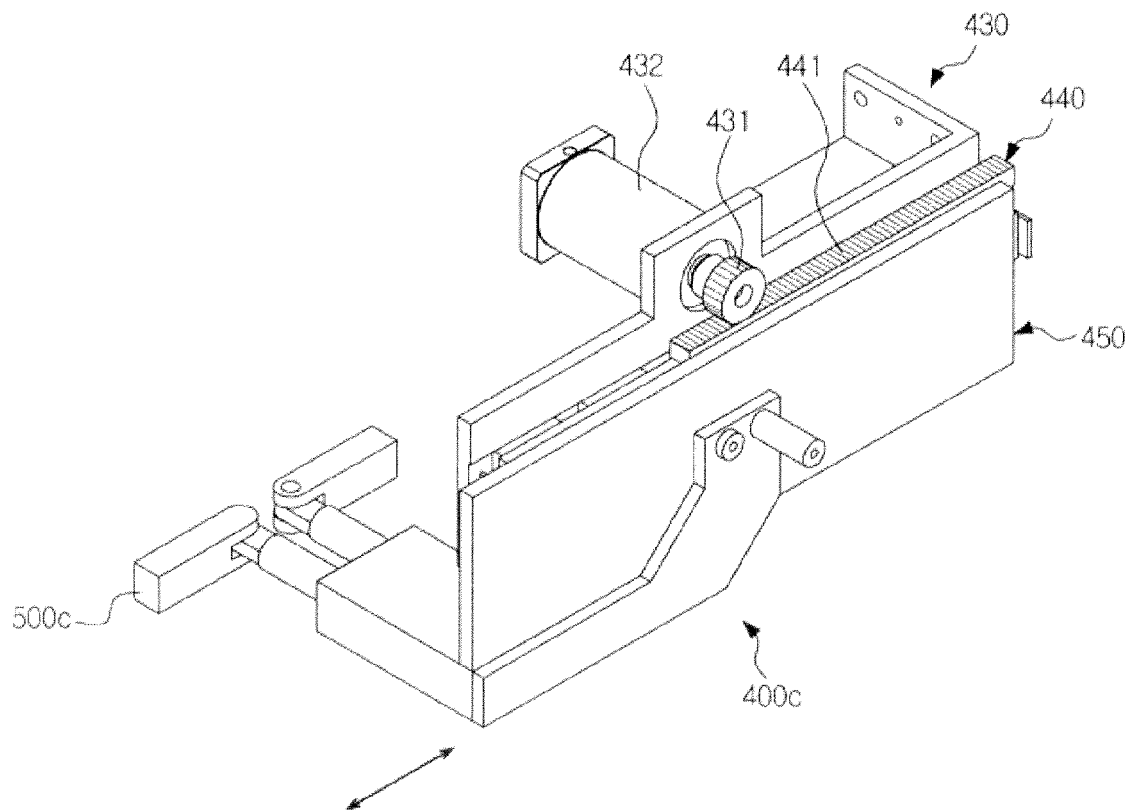


FIG. 8

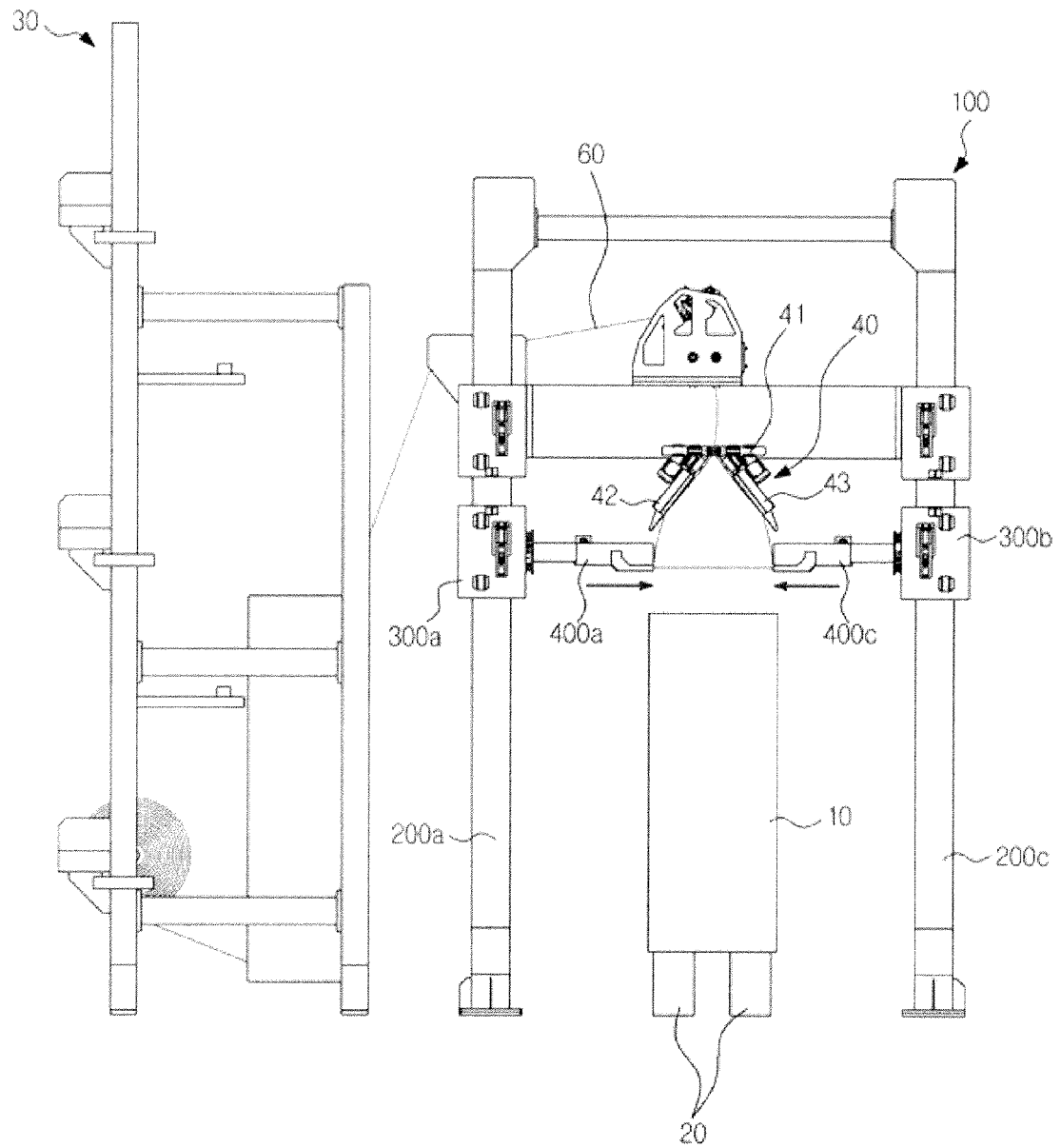


FIG. 9

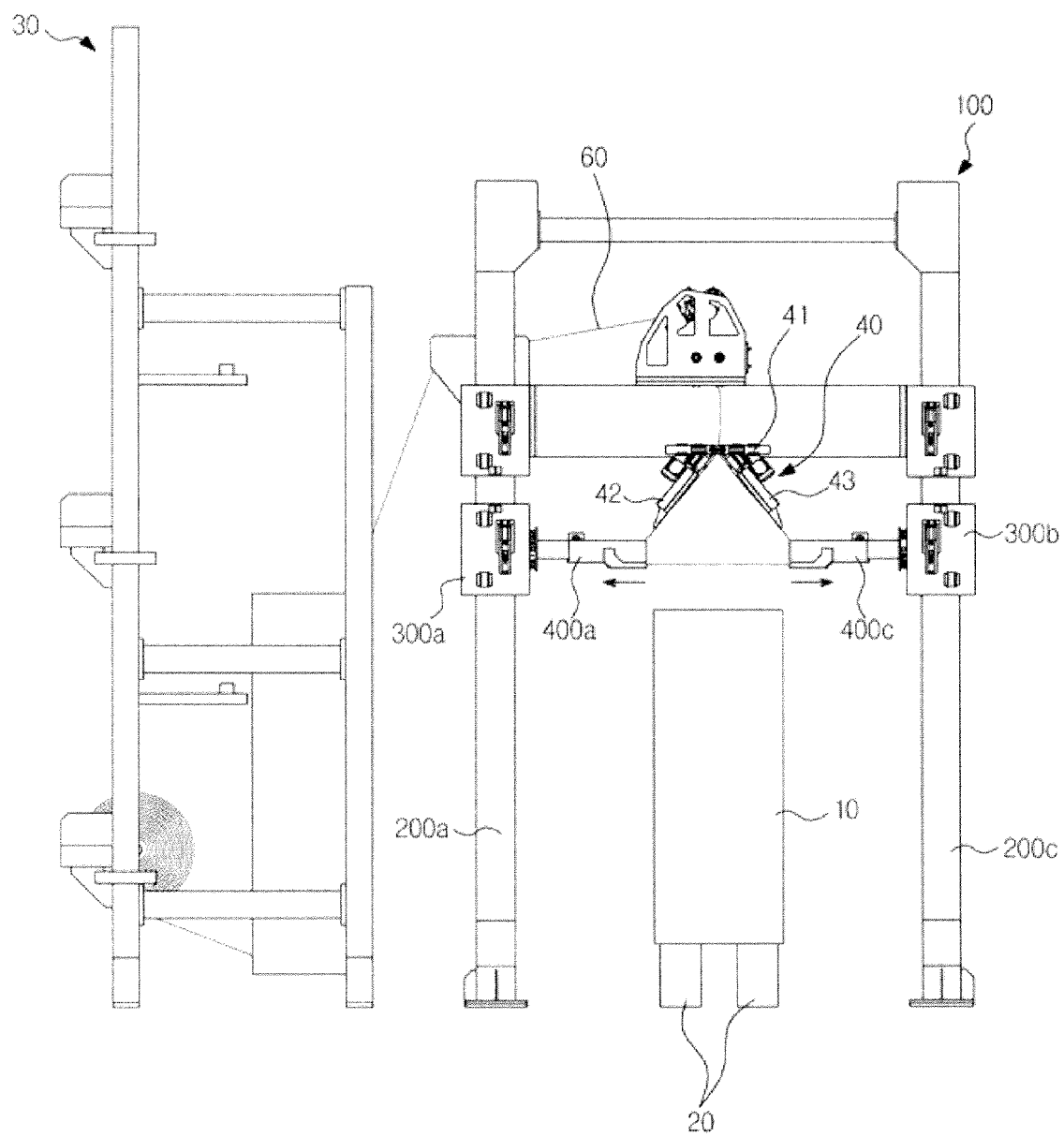


FIG. 10

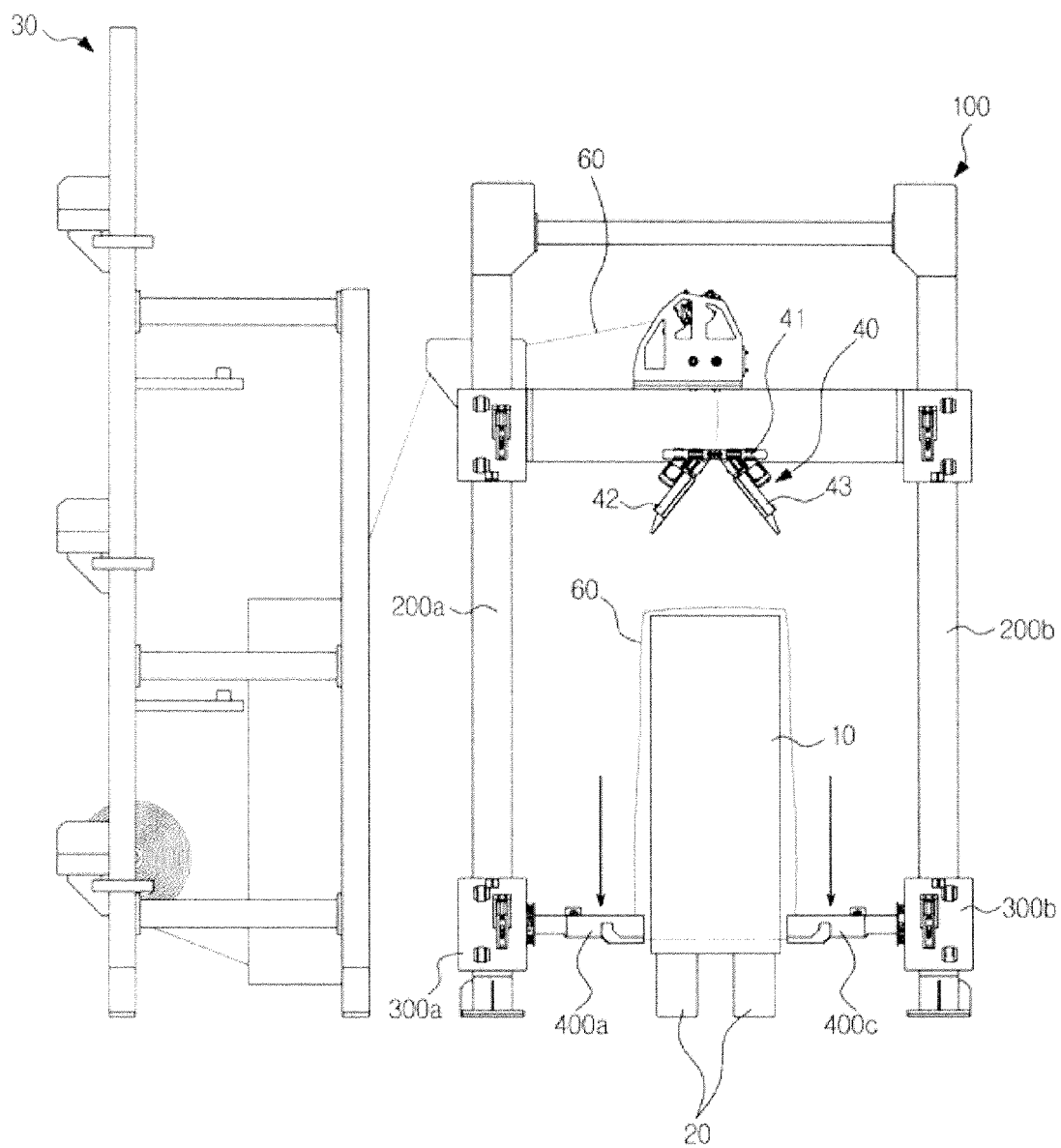


FIG. 11

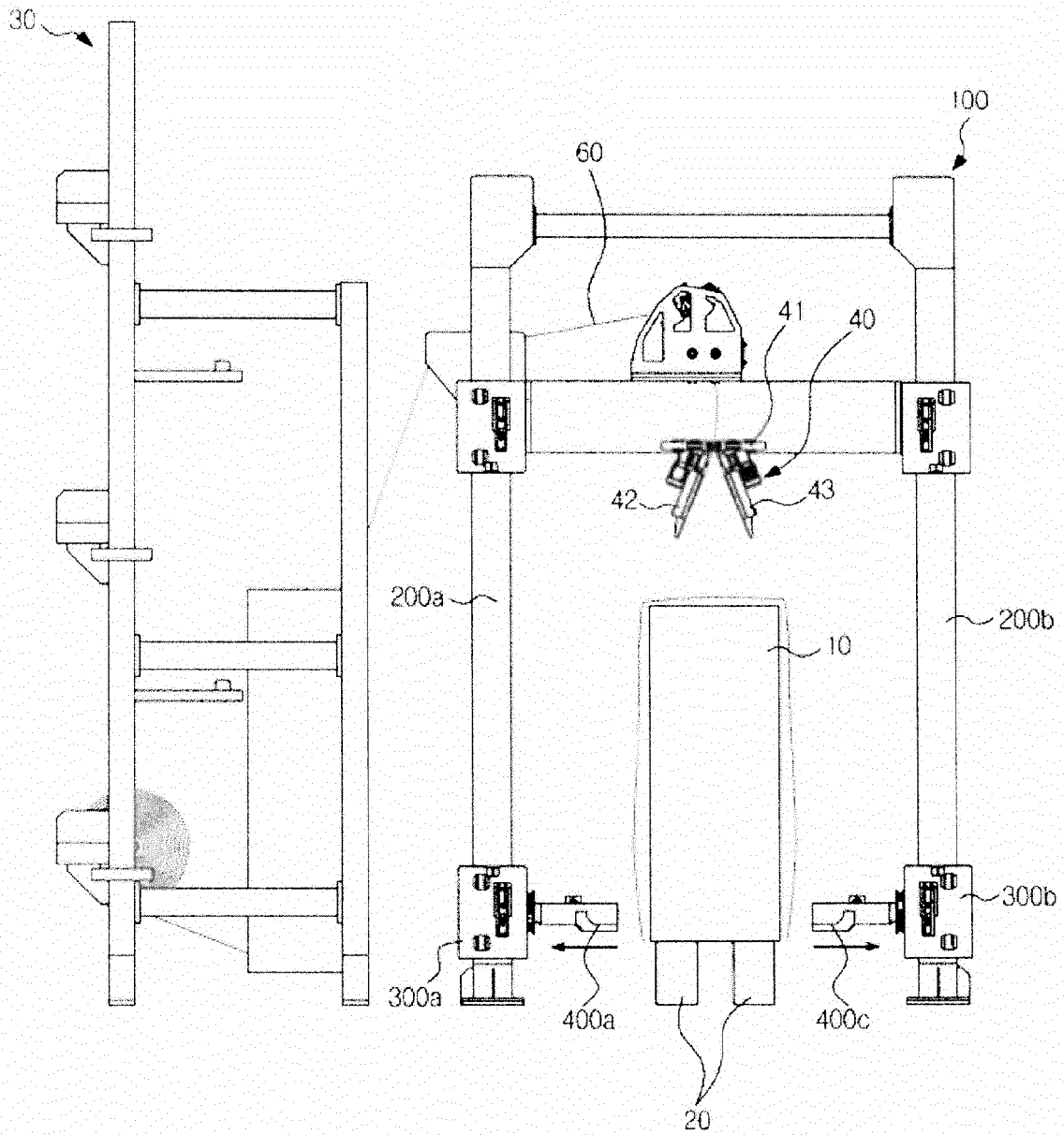
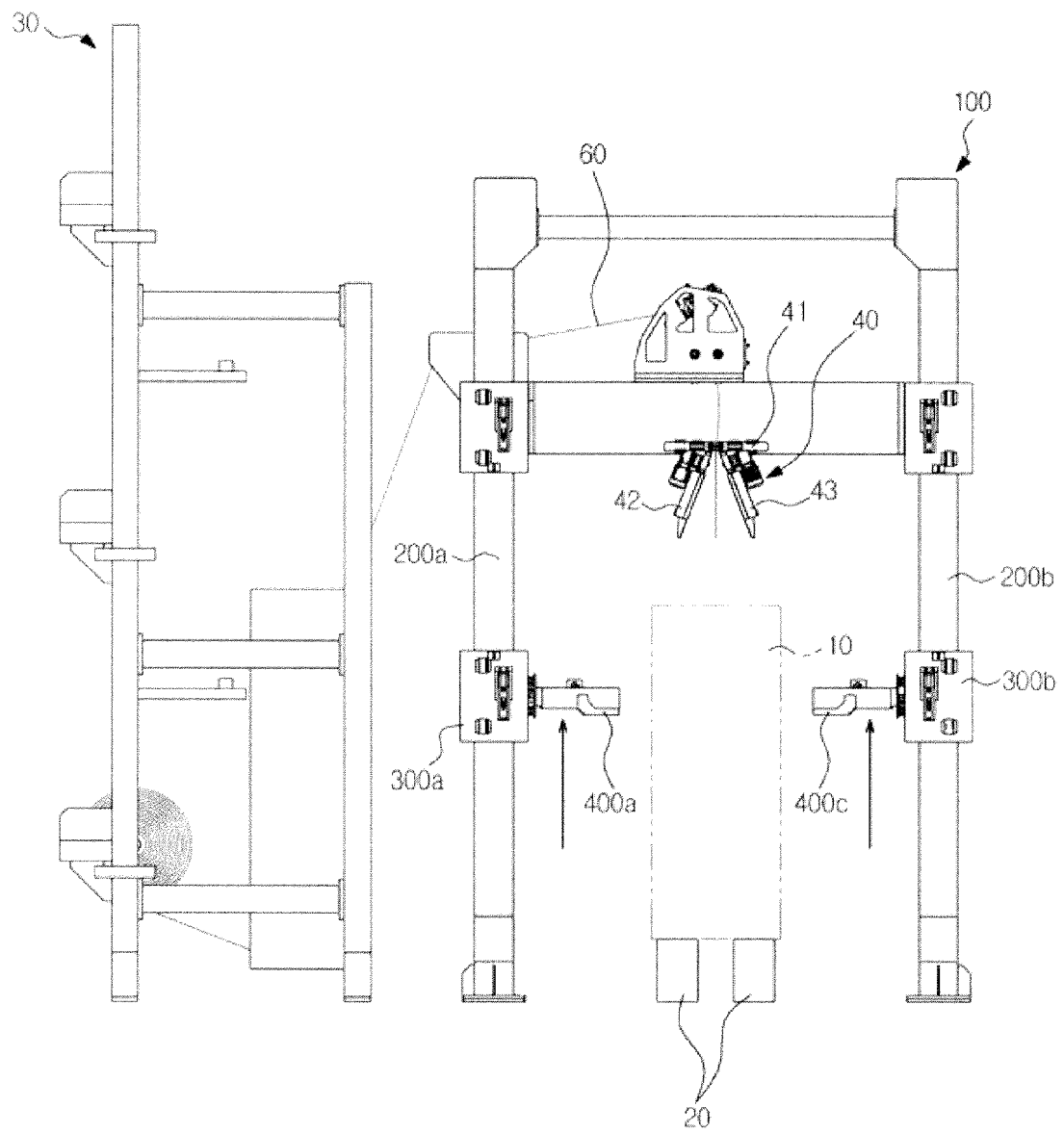


FIG. 12





EUROPEAN SEARCH REPORT

Application Number
EP 13 15 3238

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 4 063 401 A (HIGGINS DAVID M) 20 December 1977 (1977-12-20)	1-7,9-12	INV. B65B53/02
A	* column 2, line 26 - column 4, line 57 * * column 9, lines 5-17; figures 1,3-7,13 * -----	8	B65B9/13
Y	EP 1 580 128 A1 (AETNA GROUP SPA [IT]) 28 September 2005 (2005-09-28) * paragraph [0051]; figures 1,2 * -----	1-7,9-12	
Y	EP 0 564 971 A2 (MOELLERS MASCHF GMBH [DE]) MOELLERS MASCHF GMBH [JP]) 13 October 1993 (1993-10-13) * column 6, line 2 - column 8, line 9; figures 1,2,6-11 * -----	1-7,9-12	
A	US 3 707 064 A (MUCKA JOHN R ET AL) 26 December 1972 (1972-12-26) * column 3, line 47 - column 4, line 48 * * column 6, line 47 - column 8, line 10; figures 1-3,9-11 * -----	1-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 16 May 2013	Examiner Kulhanek, Peter
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 13 15 3238

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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16-05-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4063401	A	20-12-1977	NONE
EP 1580128	A1	28-09-2005	NONE
EP 0564971	A2	13-10-1993	AT 152682 T 15-05-1997 DE 4211297 A1 14-10-1993 EP 0564971 A2 13-10-1993
US 3707064	A	26-12-1972	NONE