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(54) **BAG MAKING/PACKING MACHINE**

(57) It is an object of the present invention to improve the workability of attaching or detaching a former unit on a bag making and packaging apparatus. A supporting member which is configured and arranged to support a former unit (10) on a main body (2) comprises a sliding member (20) supported on a fixed member (7) on the main body (2) so as to be capable of sliding forward and backward, and a rotational member (30) having a lower end part joined to a forward end part of the sliding member (20) so as to be capable of rotating, which allows an upper part of the rotational member to rotate forward to be in a prescribed forwardly inclined orientation. Since the former unit (10) is removably attached to the rotational member (30), when the former unit (10) is to be attached or detached, the sliding member (20) is allowed to slide forward, and the rotational member (30) is allowed to set in the forwardly inclined orientation. The position in which the operation for attaching or detaching the former unit (10) is performed can thereby be set to the front of the main body (2) at a comparatively low position.

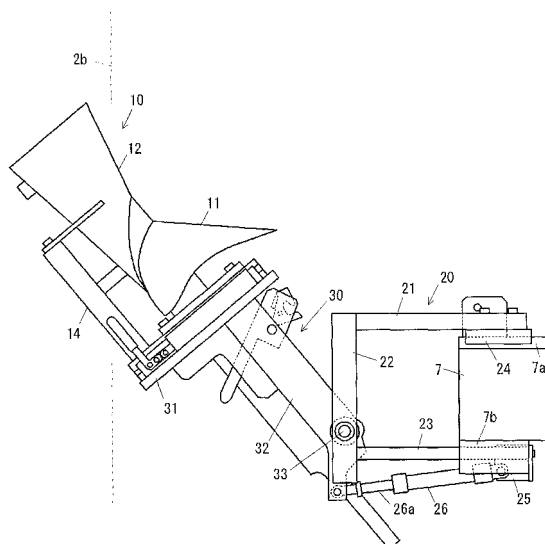


FIG. 6

Description

TECHNICAL FIELD

[0001] The present invention relates to a bag making and packaging apparatus for packaging an article which is introduced while forming a packaging bag from a strip of packaging material, and pertains to the technical field of packaging machines.

BACKGROUND ART

[0002] A bag making and packaging apparatus is used for enclosing an article such as potato chips or the like in a packaging bag, and for sealing the bag to produce a product. The bag making and packaging apparatus is configured to bend a strip of packaging material dispensed from a roll into a tubular shape by a former, and to introduce and package an article in the bent packaging material while the material is sealed in the vertical and horizontal directions and formed into a packaging bag.

[0003] The former integrally comprises a shoulder part and a chute part. The shoulder part is configured to fold a strip of packaging material so that both side parts of the strip of packaging material are brought together and to bend the strip of packaging material into a tubular shape. The chute part is configured to introduce an article into the tubular packaging material whose bottom end part has been sealed. The size of the shoulder part, the dimensions of the chute part and the like must correspond to those of the bag to be produced. Therefore, the former need to be replaced whenever the product size changes. In such a case, replacing the former is a complicated task which requires time and labor, because the former has the integrated configuration having the shoulder part and the chute part, as described above and the former is heavy.

[0004] In order to address this problem, Patent Document 1 discloses a supporting mechanism (support) comprising a first portion mounted on the former, and a second portion affixed to the main body of the bag making and packaging apparatus, as a supporting structure for a former (forming machine) in a bag making and packaging apparatus. The supporting mechanism is configured to allow the first portion to move in relation to the second portion. The former mounted on the first portion can thereby move from a first position, in which the packaging operation is performed, to a second position, which is readily accessed by an operator. With this configuration, in attaching or detaching the former, it is expected that moving the former to the second position, where it is readily accessed by an operator, improves the workability of attaching or detaching.

[0005] The supporting structure of the former described in Patent Document 1 will now be described in more detail. In a first embodiment shown in FIGS. 1 to 4 of Patent Document 1, a forming machine support 20 comprises a pair of support beams 22 extending from an

enclosure (case) 17, a pair of guides 23 mounted on the beams 22, and a pair of rods 24 slidably supported on each of the guides 23. The rods 24 form the abovementioned first portion of the forming machine support 20, and the guides 23 form the abovementioned second portion of the support 20 (see paragraph 0030 and FIG. 2).

[0006] The rods 24 can slide in the guides 23, which thereby causes a forming machine 14 to move from a first position to a horizontally displaced second position (see paragraph 0033). The forming machine 14 comprises a base 28, and a forming machine shoulder member 29. The base 28 is removably mounted on the leading end part of the rods 24 (see paragraphs 0031 and 0037).

[0007] In a second embodiment shown in FIGS. 5 and 6, a forming machine support 47 comprises a pair of arms 42, a rotation assembly 44, and a rotation assembly 46. The pair of arms 42 extend horizontally from the enclosure 17. The rotation assembly 44 has the arm 42 and a vertical shaft extending through the base 28 of the forming machine 14. The rotation assembly 46 has a vertical shaft extending between the arm 42 and the enclosure 17. The rotation assembly 44 on the forming machine 14 forms a first portion 43 of the forming machine support 47, and the rotation assembly 46 on the enclosure 17 forms a second portion 45 of the forming machine support 47 (see paragraph 0042).

[0008] In a third embodiment shown in FIG. 7, a forming machine support 50 comprises a pair of arms 52. The pair of arms 52 is disposed so as to narrow the space between the pair of arms 52 toward a rotation assembly 53. The rotation assembly 53 allows the forming machine 14 to rotate around the vertical shaft 54 (see paragraph 0047). The first and second portions constituting the forming machine support 50 are not very clearly described for this embodiment; however, a comparison with the similarly constructed second embodiment suggests that the rotation assembly 53 corresponds to the second portion, and an end part of the arm 52 or the forming machine 14 corresponds to the first portion.

[0009] In all of these embodiments, the second portion is secured to the main body of the forming machine (exterior structure), and the forming machine is removably mounted on the first portion, which is capable of moving in relation to the second portion. As a result, the forming machine can be moved from the first position to the second position, and can also be detached from or attached to the support in the second position. Therefore, it can be expected to improve the workability of attaching and detaching the forming machine.

Patent Document 1: JP-A 2005-41576

DISCLOSURE OF THE INVENTION

(Problems the Invention is Intended to Solve)

[0010] However, the support structure of the former as disclosed in Patent Document 1 is configured so that the

first portion constituting the support is pulled forward or turned laterally within the horizontal plane in relation to the second portion. Therefore, the movement of the former which is mounted on the first portion is also limited to the horizontal plane when it is moved from the first position to the second position. It is not necessarily satisfactory in terms of improving the workability of attaching and detaching the former.

[0011] In this type of bag making and packaging apparatus, components such as a horizontal seal device for sealing the tubular packaging material in the width direction are disposed below the former. The former is thereby attached in a comparatively high position. Therefore, in the structure described in Patent Document 1, even if the operator moves the former to the second position for readily access, he/she needs to handle a heavy object in a high position for attaching or detaching the former, which is just a little improvements in terms of workability.

[0012] It is an object of the present invention to further improve the workability of attaching and detaching the former in this type of a bag making and packaging apparatus.

(Means for Solving the Problem)

[0013] In order to solve the abovementioned problem, the present invention is characterized in being configured in the following manner.

[0014] A bag making and packaging apparatus according to the present invention is a bag making and packaging apparatus which is configured and arranged to bend a strip of film and form a packaging bag. The bag making and packaging apparatus comprises a former and a supporting member. The former bends the strip of film into a tubular shape. The supporting member removably supports the former. Furthermore, the supporting member is configured to support the former for allowing to move from a first position, in which a packaging operation is performed, to a second position, which is lower than the first position.

[0015] Preferably, the supporting member comprises a sliding member and a rotational member. The sliding member slides horizontally, which allows the former to move horizontally. The rotational member rotates about a prescribed part as a fulcrum, and allows the former to move up and down. The supporting member is configured so that the sliding action of the sliding member and the rotation of the rotational member cause the former to move from the first position to the second position.

(Effect of the Invention)

[0016] As a result of the abovedescribed configuration, according to the present invention, the former is supported on the supporting member so as to be capable of moving from the first position, in which the packaging operation is performed, to the second position, which is

lower than the first position; and the former is removably attached to the supporting member. Therefore, when the heavy former is replaced or other procedure is performed, the attaching or detaching operation can be performed at a comparatively low position, and the operation is improved in terms of workability.

[0017] The supporting member comprises a sliding member and a rotational member, which allows the former to move in the horizontal and/or vertical directions. For example, the former can be slid from the first position, in which the packaging operation is performed, and rotated at a pulled-forward position; or the former can be pulled forward with the rotated orientation. Accordingly, the second position, in which the former is attached or detached, can be set at the front of the main body of the forming machine and at a comparatively low position, which thereby improves the workability of attaching or detaching the former compared to when the attaching or detaching the former is performed inside or inner part of the main body.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

FIG. 1 is a side view of the entirety of a bag making and packaging apparatus according to an embodiment of the present invention;

FIG. 2 is an enlarged side view of a main part of the form/fill/seal machine shown in FIG. 1;

FIG. 3 is a front view of the part shown in FIG. 2;

FIG. 4 is a cross-sectional view along line I-I in FIG. 2;

FIG. 5 is a side view of a main part of the invention, showing a state in which the former unit has been pulled forward;

FIG. 6 is a side view of a main part of the invention, showing a state in which the former unit has also been rotated forward; and

FIG. 7 is a side view of a main part of the invention, showing a state in which the former unit has been removed.

EXPLANATION OF THE REFERENCE NUMERALS

[0019]

- 1 BAG MAKING AND PACKAGING APPARATUS
- 2 MAIN BODY
- 10 FORMER UNIT
- 20 SLIDING MEMBER (SUPPORTING MEMBER)
- 30 ROTATIONAL MEMBER (SUPPORTING MEMBER)

BEST MODE FOR CARRYING OUT THE INVENTION

[0020] A preferred embodiment of the present invention is described below.

[0021] As shown in FIG. 1, a bag making and packag-

ing apparatus 1 according to the present embodiment has a main body 2. The main body 2 has a support part 3 and a former unit 10. The support part 3 is provided above the rear part of the main body 2. The support part 3 supports a film roll *a*. The former unit 10 is arranged above the front part of the main body 2. The former unit 10 has a vertical seal device 4 and a horizontal seal device 5. The vertical seal device 4 is disposed in front of a lower part of the former unit 10. The horizontal seal device 5 is disposed underneath the former unit 10.

[0022] The former unit 10 comprises a shoulder part 11 and a chute portion 12. The shoulder part 11 is configured to hold a strip of film *b* with guiding the strip of film *b* downward and to bring edge parts of either sides of the strip of film *b* together. The strip of film *b* is dispensed forward from the roll *a* on the support part 3. The edge parts brought together are welded together by the vertical seal device 4 to form a tubular shaped film. The tubular shaped film is then sealed in the width direction by the horizontal seal device 5 to form a bag *c*.

[0023] As shown enlarged in FIGS. 2 and 3, the upper part of the chute part 12 of the former unit 10 is a substantially conical article-introducing part 12a, and the lower part of the chute part 12 is a cylindrical article-guiding part 12b inserted into the bag *c* formed by the shoulder part 11. An article introduced via an opening of the upper end of the article-introducing part 12a is guided downward by the article-guiding part 12b, and directed into the bag *c*. The horizontal seal device 5 then seals and cuts the bag *c* above the portion where the article was introduced. A finished product that the article is hermetically sealed in the bag *c* is thereby produced.

[0024] The former unit 10 has a base plate 13, and left and right supporting pillars 14, 14. The left and right supporting pillars 14, 14 are provided vertically to the base plate 13. The base plate 13 and the supporting pillars 14, 14 support the shoulder part 11 and the chute part 12, so that all of these components are integrated into a single unit.

[0025] The structure for supporting the former unit 10 on the main body 2 will now be described.

[0026] As shown in FIGS. 2 to 4, the main body 2 has a substrate 6 attached between left and right frames 2a, 2a. The substrate 6 has a pair of left and right fixed members 7, 7 in a forward extending manner. The left and right fixed members 7, 7 have a shape of a vertical wall. The fixed members 7, 7 have rails 7a, 7a. The rails 7a, 7a are disposed on the upper surface of the fixed members 7, 7, and extend in the transverse direction. The fixed members 7, 7 have guide blocks 7b, 7b, respectively. The guide blocks 7b, 7b are attached to the lower surface of the front end part of the fixed members 7, 7.

[0027] As supporting members for supporting the former unit 10, a pair of left and right sliding members 20, 20 and a rotational member 30 are provided. Each of the left and right sliding members 20, 20 is supported on the respective fixed member 7, 7 of the main body 2 so as to be capable of sliding forward and backward. A

lower end part of the rotational member 30 pivots on front end parts of the sliding members 20, 20, and which allows the upper part of the rotational member 30 to rotate forward. The former unit 10 is removably attached to the rotational member 30.

[0028] The left and the right of the sliding member 20, 20 have the same configuration. The sliding members 20, 20 comprise upper edge members 21, 21, front part members 22, 22, and guide rods 23, 23. The upper edge members 21, 21 extend in the transverse direction. The front part members 22, 22 extend downward. The upper end parts of the front part members 22, 22 are joined to the front end parts of the upper edge members 21, 21. The guide rods 23, 23 extend rearward. The front end parts of the guide rods 23, 23 are joined to the lower parts of the front part members 22, 22. As a result, the sliding members 20, 20 have the shape of a three-sided square when viewed from the side.

[0029] The upper edge members 21, 21 have engaging members 24, 24. The engaging members 24, 24 are attached to lower surfaces of the rear end parts of the upper edge members 21, 21. The engaging members 24, 24 are engaged with the rails 7a, 7a on the upper surfaces of the fixed members 7, 7 so as to be capable of sliding forward and backward. The guide rods 23, 23 are inserted in through-holes 7b', 7b'. The through-holes 7b', 7b' are provided to the guide blocks 7b, 7b on the lower surfaces of the front end parts of the fixed members 7, 7. As a result, the left and right sliding members 20, 20 are supported on the left and right fixed members 7, 7, so as to be capable of sliding forward and backward between a rearward position shown in FIG. 2 and a forward position shown in FIG. 5.

[0030] The rotational member 30 comprises a platform 31 and a pair of left and right leg members 32, 32. The pair of left and right leg members 32, 32 extend downward from either end part of a lower surface of the platform 31. Lower end parts of the leg members 32, 32 are rotatably joined to lower parts of the front part members 22, 22 of the sliding members 20 via fulcrum pins 33, 33. As a result, the rotational member 30 can pivot forward about a lower end part of the rotational member 30, from the upright orientation shown in FIG. 2 to the forwardly inclined orientation shown in FIG. 6.

[0031] One leg member 32 of the rotational member 30 has a locking mechanism 34. The locking mechanism 34 is configured to keep the rotational member 30 in the upright orientation at the rearward position. A locking member 34a of the locking mechanism 34 is engaged with a locking pin 34b, which keeps the sliding members 20, 20 in the rearward position and keeps the rotational member 30 in the upright orientation. The locking pin 34b is provided to one fixed member 7 of the main body 2. When a lever 34c of the locking mechanism 34 is operated and the locking member 34a is disengaged from the locking pin 34b, the sliding members 20, 20 can slide to the forward position and the rotational member 30 can be rotated to be in the forwardly inclined orientation.

[0032] The left and right leg members 32, 32 of the rotational member 30 have extension parts 32a, 32a. The extension parts 32a, 32a extend lower than the fulcrum pins 33, 33. Between the extension parts 32a, 32a and brackets 25, 25, air cylinders 26, 26 are mounted. The brackets 25, 25 are attached to the rear end parts of the guide rods 23, 23 on the sliding members 20, 20.

[0033] When the rotational member 30 rotates forward from the upright orientation shown in FIG. 2, the air cylinders 26, 26 control any abrupt rotation of the rotational member 30 through resistance due to contraction of piston rods 26a, 26a. And the air cylinders 26, 26 are configured to restrict the forward rotation of the rotational member 30 at a stroke end of the piston rods function with a prescribed forwardly inclined orientation.

[0034] The base member 13 of the former unit 10 is disposed on the platform 31 of the rotational member 30. The platform 31 has left and right pressing members 35, 35 for securing the former unit 10. The pressing members 35, 35 press pressed members 15, 15 on the platform 31, which is configured that the entirety of the base plate 13 and the former unit 10 are secured on the platform 31. The pressed members 15, 15 are provided to the side parts of a lower surface of the base plate 13 of the former unit 10.

[0035] One pressing member 35 is configured to detach from the pressed member 15 through the operation of a lever 36 so that the former unit 10 could be removed from the platform 31.

[0036] Next, the function of attaching of detaching the former unit 10 will be described.

[0037] During an ordinary packaging operation, the sliding members 20, 20 are positioned relatively rearward of the fixed members 7, 7 of the main body 2, as shown in FIG. 1 and 2. The rotational member 30 is in the upright orientation, in which state the locking member 34a of the locking mechanism 34 is engaged with the locking pin 34b provided to one fixed member 7. Accordingly, the forward-sliding action of the sliding members 20, 20 and the forward rotation of the rotational member 30 are restricted, and the former unit 10 supported on the rotational member 30 is secured in an upright orientation in the rearward position in which the packaging operation is performed ("first position" in the claims).

[0038] In this state, the packaging operation is performed as follows. The strip of film *b* dispensed from the roll *a* supported on the roll support part 3 is bent into a tubular shape using the shoulder 11 of the former unit 10, and the vertical seal device 4 and the horizontal seal device 5 are used to form a bag *c*. An article introduced into the chute part 12 is directed into the bag *c*. The horizontal seal device 5 then seals and cuts an upper portion of the bag *c* into which the article was introduced. The product that the article is hermetically sealed in the bag *c* is thereby produced.

[0039] In a case where the former unit 10 is removed from the main body 2 of the bag making and packaging apparatus 1 for replacement, cleaning, inspection, or the

like, the lever 34c of the locking mechanism 34 is operated first. The sliding members 20, 20 are thereby released from the rearward position and the rotational member 30 are thereby released from the upright orientation.

[0040] Next, if the former unit 10 is pulled forward using the supporting pillars 14, 14 or the like of the former unit 10 as handles, the sliding members 20, 20 slide forward along the rails 7a, 7a of the fixed members 7, 7. Also, the rotational member 30 and the former unit 10 accordingly move forward to the forward position shown in FIG. 5. In this case, the sliding to the forward position is regulated by the touching of the bracket 25 to the guide block 7b which is attached to the fixed member 7 on the main body 2. The bracket 25 is attached to the rear end of the guide rod 23 on the sliding member 20.

[0041] In this forward position, if the supporting pillars 14, 14 of the former unit 10 are grasped and the upper part of the former unit 10 is rotated forward, the rotational member 30 will rotate forward about the fulcrum pins 33, 33 in the lower parts of the leg members 32, 32. As a result, the rotational member 30 and the former unit 10 are held in a forwardly inclined orientation, as shown in FIG. 6 ("second position" in the claims), and the former unit 10 is positioned lower as a whole than the former unit 10 shown in FIG. 5.

[0042] When the rotational member 30 rotates forward, the air cylinders 26, 26 regulate any abrupt rotation of the rotational member 30 to which the former unit 10 is attached, and the rotational member 30 and the former unit 10 are held in the prescribed forwardly inclined orientation. The air cylinders 26, 26 are mounted between the leg members 32, 32 of the rotational member 30 and the brackets 25, 25 on the sliding members 20, 20.

[0043] If, in the forwardly inclined orientation, one of the left and right pressing members 35, 35 securing the former unit 10 onto the platform 31 of the rotational member 30 is retracted by the operation of the lever 36 to disengage the pressing members 35, 35 from the pressed members 15, 15 which is provided to the base plate 13 of the former unit 10, the former unit 10 can be removed from the platform 31 of the rotational member 30.

[0044] In this case, as shown in FIGS. 6 and 7, the sliding action of the sliding members 20, 20 toward the forward position and the rotation of the rotational member 30 toward the forwardly inclined orientation cause the upper part of the former unit 10 to which the supporting pillars 14, 14 are provided to be positioned lower. At the same time, the upper part of the former unit 10 is projected forward over a front surface 2b of the main body 2. Therefore, the operation of removing the heavy former unit 10 can be performed at a comparatively low position, at the front of the main body 2, without entering inside or inner part of the main body 2. The same can be said for attaching the former unit 10 after replacing, cleaning, inspecting, or the like. That will improve the workability of attaching and detaching the former unit 10.

[0045] In the above description, the former unit 10 is slid to the forward position before being rotated to the forwardly inclined orientation. However, the former unit 10 can be slid after being rotated to the forwardly inclined orientation, and the former unit 10 further can be rotated with being slid.

[0046] Other embodiments of the present invention will now be described.

[0047] According to the previous embodiment, the sliding action of the sliding members 20, 20 and the rotation of the rotational member 30 allow the former unit 10 to move from the first position, in which the packaging operation is performed, to the second position, in which the former unit 10 is attached or detached, the second position being lower than the first position. However, according to another embodiment, a supporting member of the former unit is supported by a linear guiding mechanism such as a linear bearing, which allows the supporting member to move vertically relative to the member on the main body which corresponds to the fixed member 7 of the previous embodiment. The former unit is thereby configured to move from the first position to the second position, which is lower than the first position.

[0048] In other embodiment, a member for supporting the former unit is supported in a vertically moveable manner relative to a member corresponding to the sliding members 20, 20 of the previous embodiment. The member corresponding to the sliding members 20, 20 are supported slidably forward and backward on the fixed member 7. The former unit is thereby moved from a first position to a second position, which is further forward and lower than the first position.

[0049] In the above embodiments, configurations such as a rack-and-pinion mechanism in which the pinion is rotated with a handle or a motor; a ball screw mechanism in which the screw shaft is rotated with a handle or motor; and a configuration in which a cylinder moves up-and-down are employed as means of moving the supporting member of the former unit up and down.

[0050] As shown in the above description, according to any of these other embodiments, the second position, in which the former unit is attached or detached, is lower than the first position, in which the packaging operation is performed; which thereby improves the workability of attaching and detaching the forming machine.

INDUSTRIAL APPLICABILITY

[0051] As has been described in the foregoing, the bag making and packaging apparatus according to the present invention improves the workability of attaching or detaching the former unit, and is accordingly used advantageously in industrial fields in which packaging machines of this type are used.

Claims

1. A bag making and packaging apparatus which is configured and arranged to bend a strip of film and to form a packaging bag, the bag making and packaging apparatus comprising:

a former which is configured and arranged to bend the strip of film into a tubular shape; and a supporting member which is configured and arranged to support the former removably; the supporting member being configured and arranged to support the former so as to allow movement from a first position, in which a packaging operation is performed, to a second position, which is lower than the first position.

2. The bag making and packaging apparatus according to claim 1, wherein the supporting member includes a sliding member that slides horizontally and allows the former to move horizontally; and a rotational member that rotates about a prescribed part as a fulcrum and allows the former to move up and down; and the former is configured or arranged to move from the first position to the second position by the sliding action of the sliding member and the rotation of the rotational member.

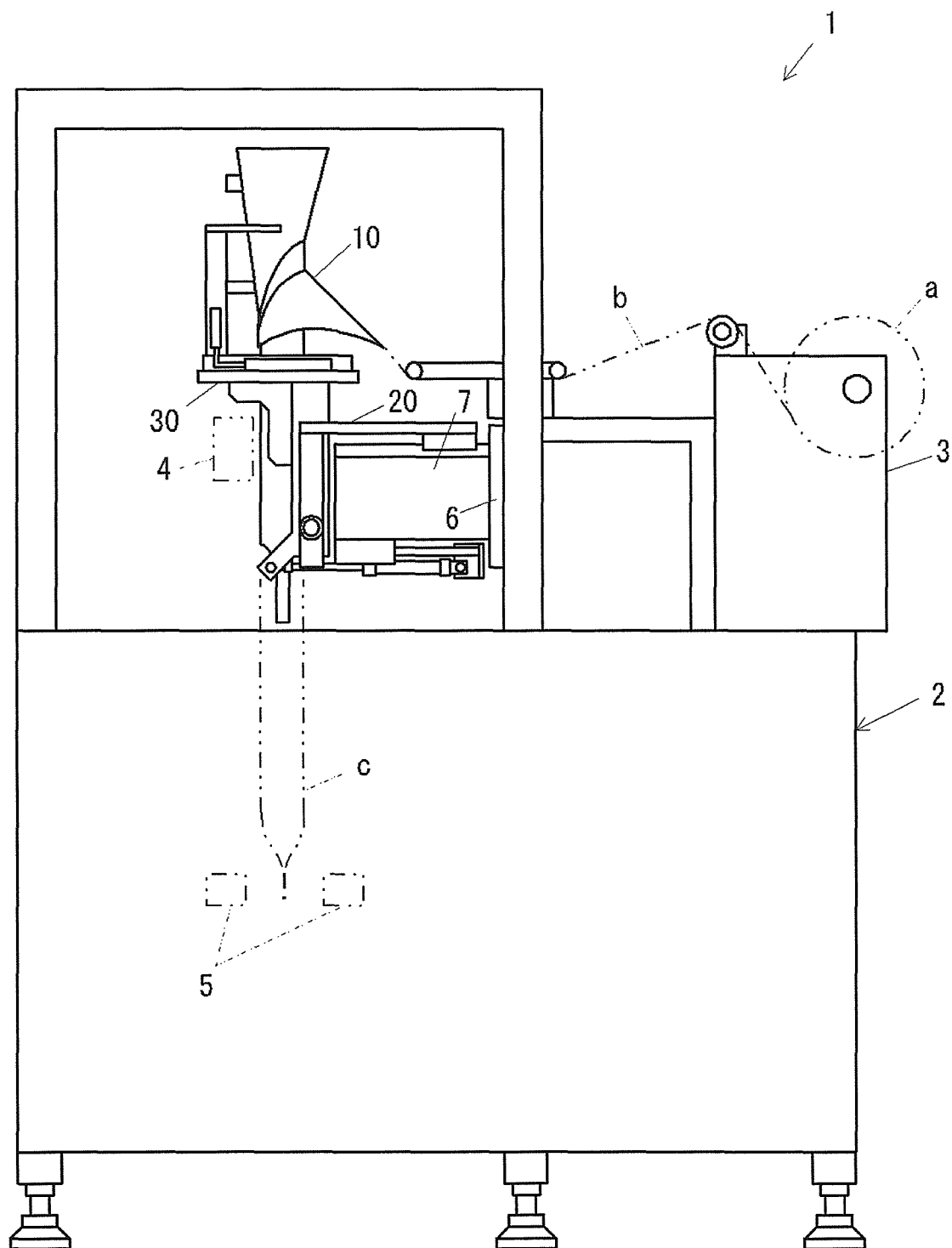


FIG. 1

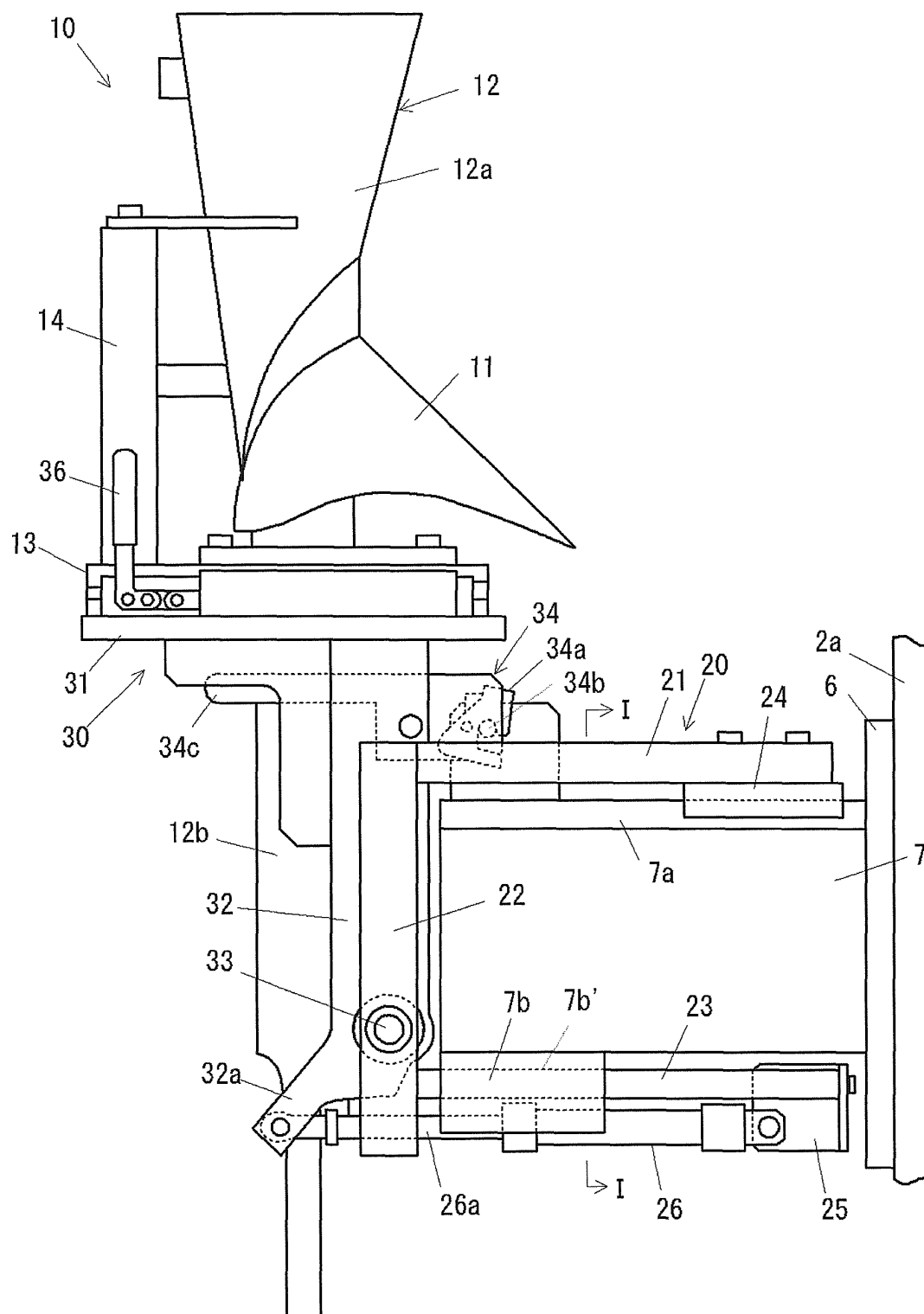


FIG. 2

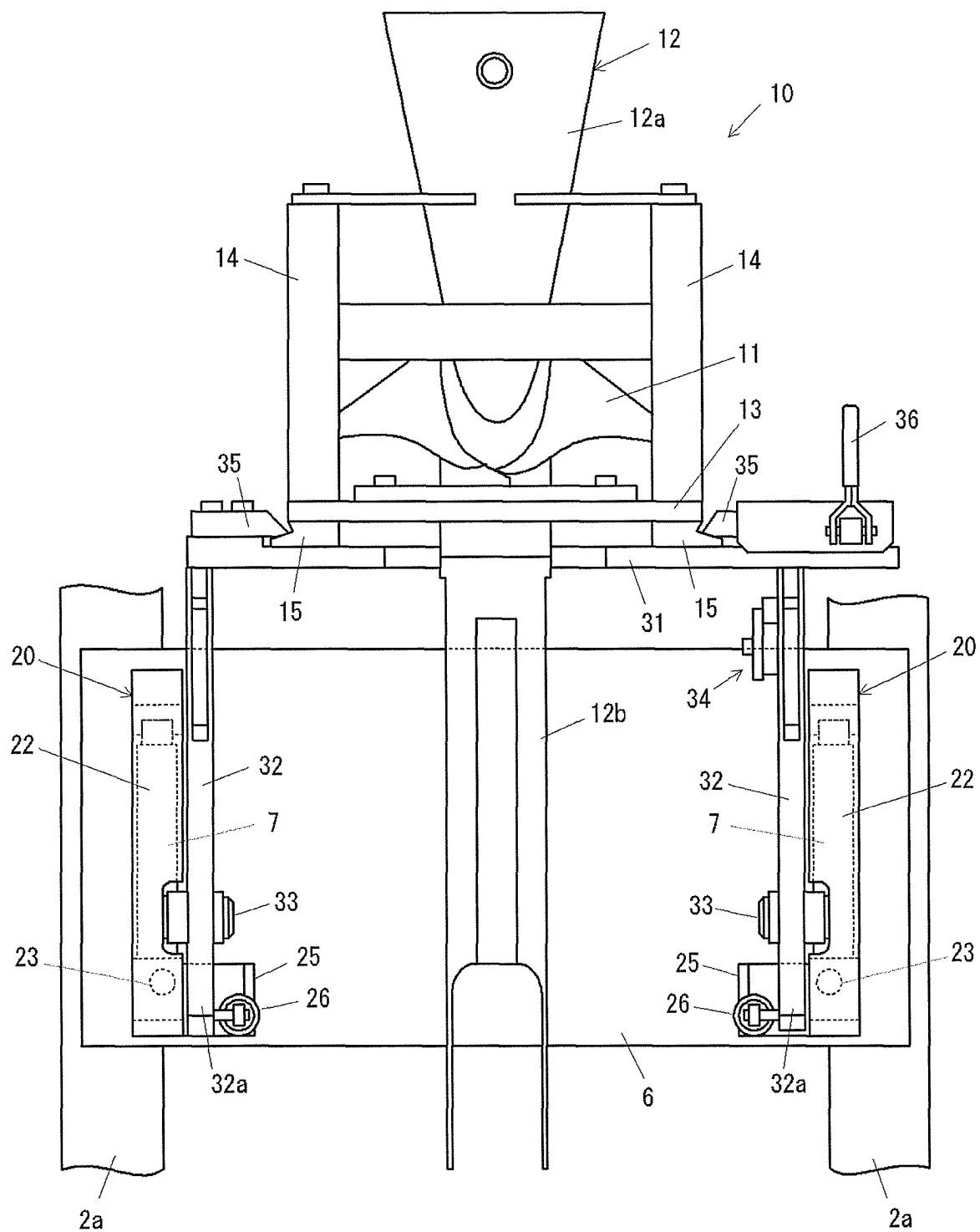


FIG. 3

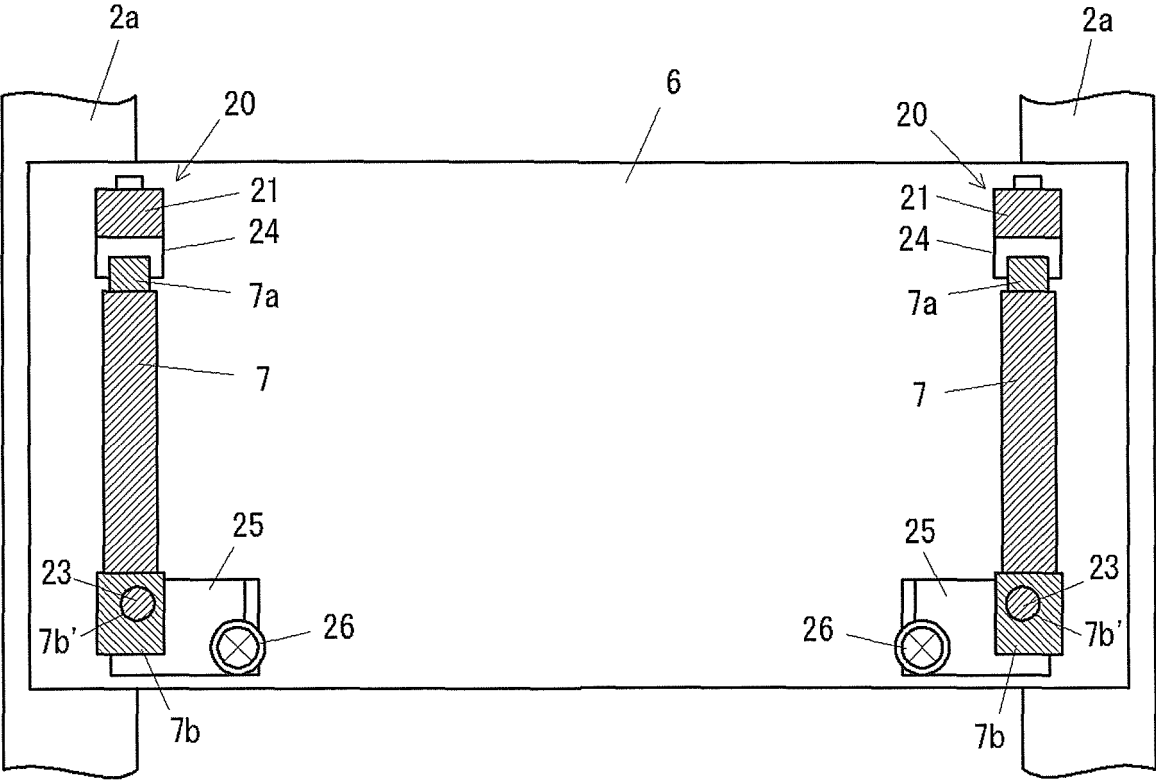


FIG. 4

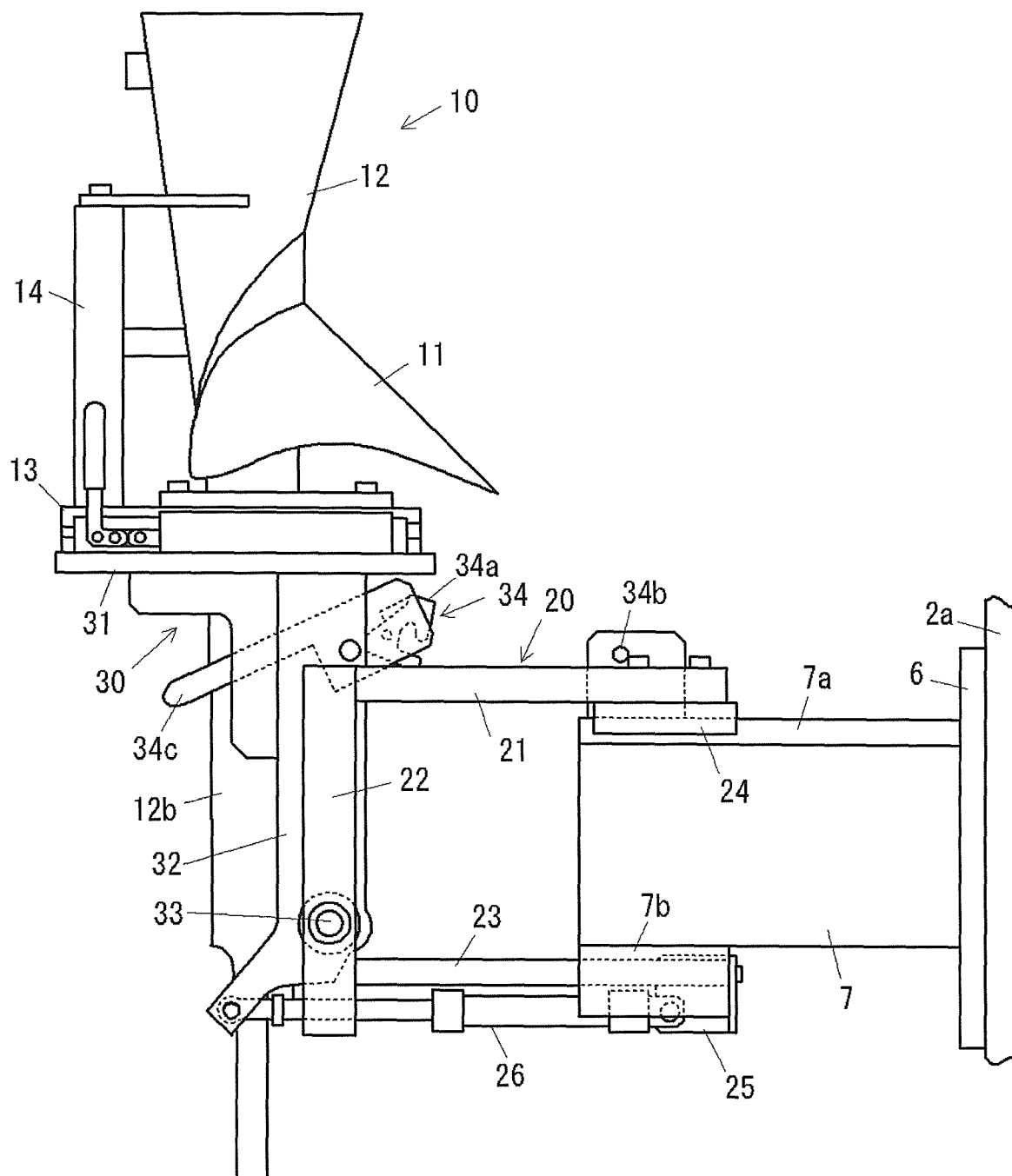


FIG. 5

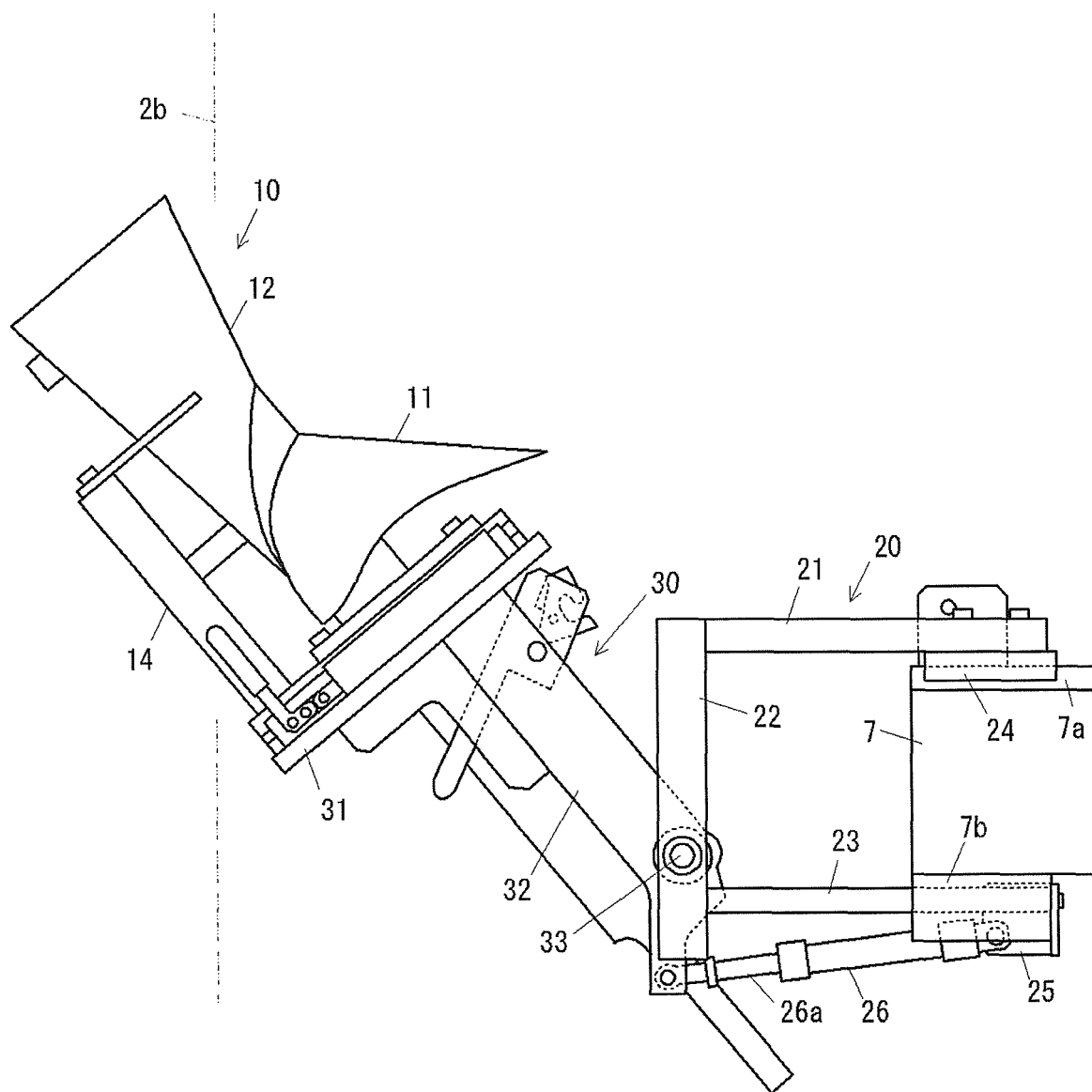


FIG. 6

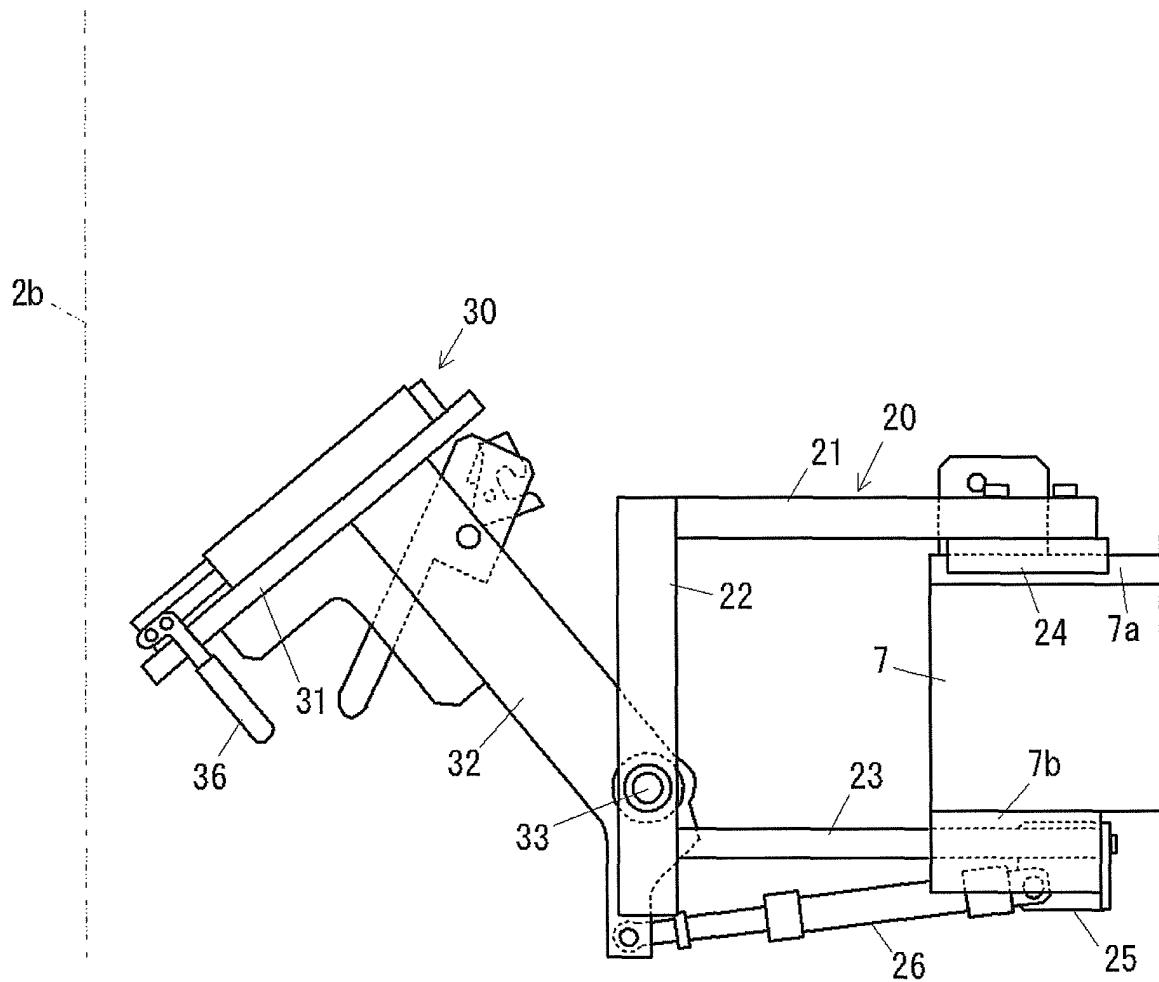


FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2008/056556

A. CLASSIFICATION OF SUBJECT MATTER

B65B9/10 (2006.01) i, B65B59/04 (2006.01) i

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)

B65B9/10, B65B59/04

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

Jitsuyo Shinan Koho	1922-1996	Jitsuyo Shinan Toroku Koho	1996-2008
Kokai Jitsuyo Shinan Koho	1971-2008	Toroku Jitsuyo Shinan Koho	1994-2008

Electronic data base consulted during the international search (name of data base and, where practicable, 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	JP 2005-041576 A (TNA Australia Pty Ltd.), 17 February, 2005 (17.02.05), Full text; all drawings & EP 1495967 A1 & US 2005/0066629 A1	1, 2
A	JP 06-239318 A (Ishida Co., Ltd.), 30 August, 1994 (30.08.94), Par. No. [0016]; all drawings & US 5463850 A & EP 611697 A2	1, 2

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

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Date of the actual completion of the international search
09 June, 2008 (09.06.08)Date of mailing of the international search report
17 June, 2008 (17.06.08)Name and mailing address of the ISA/
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Patent documents cited in the description

- JP 2005041576 A [0009]