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(54) **Handle sealing machine for attachment of plurality of handles to a bag**

(57) The present invention relates to a handle sealing machine (100) for attaching more than two handles on a bag at once, comprising a main unit (110) where handles are attached to a bag, and a supply unit (102) to supply strips (16) in order to form plurality of handles. The ma-

chine and method of the present invention enables to form plurality of handles (104, 105) at least some of which are longer than the other whereby said handles are sealed to a mouth portion of a bag.

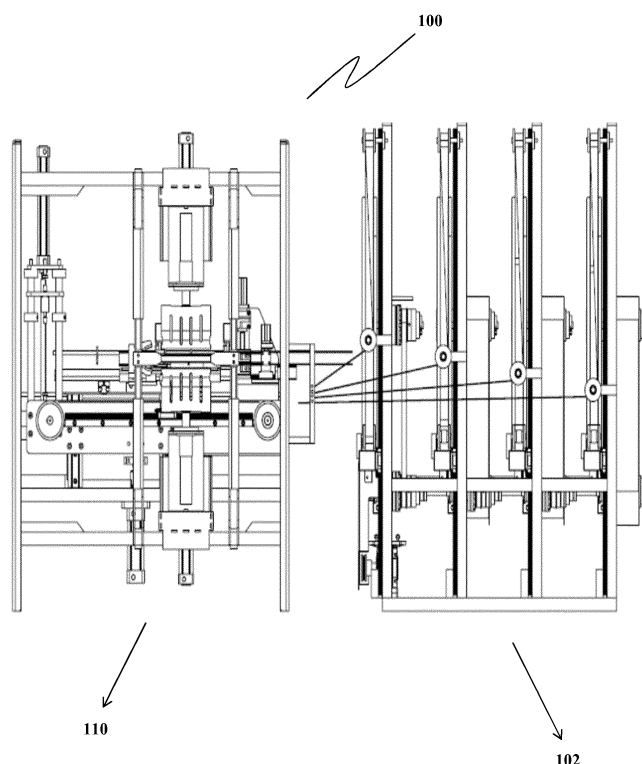
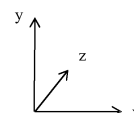


Fig. 1



Description

Field of the Invention

[0001] The present invention generally relates to a machine for attaching handles made of a heat sealable strip on a carrying bag. The present invention particularly relates to an automatic handle sealing machine which is suitable for sealing more than two handles simultaneously on a bag. The handle sealing machine according to the present invention saves labor, time and allows continuity of the production with safer manufacturing process.

Background of the Invention

[0002] Production of carrying bags with multiple components including handles, walls, base and rims is cumbersome in industrial scale because attachment of one component to another requires considerable amount of time and labor. Therefore, heat sealable materials such as non-woven fabrics are facing increasing demand in the market for their easy-to-process nature by means of for instance heat sealing and mostly ultrasonic heat sealing where the operating staff associates practically various pieces of the bag via said methods. Thus, it has been a long felt need to reduce the operational steps in production of a single bag for purposes of increasing amount of production per unit time.

[0003] Heat sealable materials such as non-woven bags are preferred nowadays for producing carrying bags because they are capable of being used many times and also being found environment friendly and resistant. A non-woven fabric is made of polyolefin fibers, and particularly of polyester and rayon without knitting. In the manufacturing process of carrying bags made of heat sealable materials as mentioned above, handles are generally attached to a bag mouth by ultrasonic sealing method. These machines which seal the handles on a bag mouth are well known in prior art. Attaching handles on a bag is the most time wasting step in a production line. Generally, the step involves manual positioning of the handles. An operator put a handle on the mouth of the bag where the handle is associated with said mouth portion by sealing or any other appropriate method.

[0004] In the prior art documents, there are various assemblies capable of attaching one or two handles on a bag at one time. An example of these kinds of machines is disclosed in US 3,706,625 wherein the machine illustrated in this patent document heat-seals looped plastic handles to strips of plastic material or plastic coated material to form either bag handles directly or a handle unit. This handle unit can later be heat-sealed to the mouth of a plastic carrying bag. The machine illustrated in this patent document is capable of fabricating two handle units simultaneously using plastic coated tape as the tape to which the loop handles are sealed.

[0005] Although the mechanisms of the above type are

capable of associating two handles from four points on a bag mouth, there is the increasing demand in the market for the bags having four handles for instance. In this type of arrangement, two handles are generally longer than the other two for enabling on-shoulder-use while the shorter handles are used for in-hand-use as usual. In these four handled arrangements, each end of the longer and shorter handle strips are welded in a superpositioned manner in each side of the bag mouth portion. The prior art arrangements, however are non-responsive to the technical requirements for production of the bags of having more than two handles, e.g. four handles, as mentioned above.

[0006] These and other problems of prior art are solved with the present invention by providing an improved method and assembly for attachment of more than two handles on a bag with a single operation which is cost, time and labor saving as compared to the conventional methods and equipment.

Brief Description of the Figures

[0007]

Figure 1 shows the handle sealing machine, comprising a main and supply unit according to the present invention.

Figure 2 shows the main unit of the handle sealing machine according to the present invention, from a front angle view.

Figure 3 shows a plan view of the main unit as shown in Fig. 2.

Figure 4 shows a perspective view of the main unit as shown in Fig. 2.

Figure 5 shows another perspective view of the main unit as shown in Fig. 2.

Figure 6A shows an elevated view of the operation unit housed in the main unit whereby four strips are held by the first and second strip holders in a retracted position.

Figure 6B shows an elevated view of the operation unit as shown in Fig. 6A whereby two of the strips are brought in a looser form while two others are held in tightened position in shorter form such that looser strips would be longer in between the strip holders.

Figure 6C shows a perspective view of the strip cutting station which is activated after arrangement of the strips' lengths as shown in Fig. 6B.

Figure 7A shows an elevated view of the operation unit whereby the ends of the four handles are brought

into a ready to seal position outwardly by means of swiveled rotating arms.

Figure 7B shows an elevated section of the horns in a position pressing and sealing the ends of the handles to a bag (not shown).

Figure 8 shows the supply unit of the handle sealing machine according to the present invention.

Figure 9 shows a perspective view of the supply unit as shown in Fig. 8.

Figure 10 shows the reels employed in the supply unit according to preferred embodiments of the present invention.

Figure 11 shows a bag with the longer handles and shorter handles attached according to the present invention.

Summary of the Invention

[0008] The present invention is concerned with a handle sealing machine (100) for attaching more than two handles, more particularly four handles on a bag at one time, comprising a main unit (110) where handles are attached to a bag, and a supply unit (102) to continuously provide strips (16) in rectilinear form in order to form the handles (104, 105). The sealing machine according to an embodiment of the present invention is shown as a whole in Fig. 1. The supply unit (102) according to an embodiment of the present invention is shown for instance in Figures 8 and 9 where the said strip (16) is wound on reels (27) employed therein. There may be plurality of reels (27), i.e. more than two, depending on the number of handles to be attached onto a particular bag. The machine of the present invention further comprises a sealing mechanism (39) having two horns (22) to press and seal the handles on a bag mouth. Said supply unit (102), on the other hand has a plurality of rollers (1) on a corresponding supporting bar (36) for guiding and positioning the strips (16) through the main unit (110). Required tightness is adjusted by tensioning means (2) associated with the strip (16), and said tensioning means (2) moves on an elevator unit (29) moving along vertical direction (y) provided on each supporting bar (36) of the supply unit (102). Strips (16) are cut in required length in the strip cutting station (103) of the main unit (110). When longer handles (104) are required to be sealed on a bag together with the shorter handles (105), a strip stopping means (17) runs to immobilize at least two strips (16) so that these immobilized strips constitute the longer handles (104) while the moving strips by way of retraction of the tensioning means (2) will constitute shorter handles (105). After cutting of the strips (16), rotating arms (21) swiveled axially make the handles (104, 105) ready to be sealed on a bag mouth in U shaped form by turning

and then the ends of the handles (104, 105) are drawn between the horns (22) which will press the handles (104, 105) on a bag mouth. Finally, the operator of the machine (100) holds a bag in a proper position and presses the button to seal the handles (104, 105) and then the process is completed.

[0009] The main unit (110) comprises a claw element (33) for holding and delivering the strips (16) to the strip holders (25, 44). When the claw element (33) moves up by means of an elevator mechanism (34), the strip holders (25, 44) move forth in direction (z) and the first strip holder (25) holds the strips (16). The claw element (33) releases the ends of the strips (16), and the first strip holder (25) pulls the strips back (16) in direction (x) so as to move away from the claw element (33). Before the first strip holder (25) moves the strips (16) back, because the strip stopping means (17) immobilizes at least two strips (16), the length of the remaining strips (e.g. two longer strips) stay constant (104), while the other two (105) are shortened. Fixed length strips (104) thereby remain in a loose form as shown in Fig. 6B. After the length of the handles (104, 105) are adjusted by this way, the second strip holder (44) holds all of the strips (16), and the strips (16) are cut in required dimensions in a strip cutting station (103). The strips (16) are made ready to be sealed on a bag mouth by turning of the strip holders (25, 44), and a carrier unit (23) moves the strip holders (25, 44) forth in axis (z). When the ends of the strips (16) are brought in between the horns (22) of the sealing mechanism (39), an operator of the machine (100) puts a bag mouth between the horns (22) in a proper position, and thereby the ultrasonic sealing mechanism (39) runs to seal the ends of the strips (16) on the bag mouth.

Detailed Description of the Invention

[0010] The present invention is disclosed in more detail with reference to different embodiments hereinbelow. As noted in the foregoing explanations, the present invention aims at providing an advantageous assembly for sealing of more than two handles in situ as opposed to the prior art arrangements, although the assembly of the present invention is perfectly suited for attachment of four handles at once, two of which are longer than the remaining two such that two handles are formed for shoulder use, and the remaining shorter handles are designed for hand carriage. Therefore, in the most preferred embodiment of the present invention the handle sealing machine disclosed herein is designed for attachment of four handles at once to a bag, and in the following, this embodiment will be disclosed in detail with reference to the drawings.

[0011] In a handle sealing machine (100) according to the present invention, which is used for attaching handles on a bag mouth, particularly four handles, two of which being short and the remaining two being longer, the said handles can be attached to a bag simultaneously in a machine (100) comprising basically a main unit (110) and a supply unit (102) as shown in Fig. 1. The handle and

the bag can be of any heat sealable material such as non-woven fabric and various plastics whereas the sealing method may involve heat and/or ultrasonic welding methods, all of which shall be referred to as a "sealing method" in the following explanations.

[0012] The main unit (110) of the machine (100) according to the present invention stands for operationally attaching of the handles onto a bag, and the supply unit (102) is configured to supply continuously a strip material (16) of the handles to be attached on the bags.

[0013] Referring now to Fig. 2 the main unit (110) of the present invention, comprises a machine frame (101) for housing the inner mechanisms. Within the main unit (110) provided is also a sealing mechanism (39), preferably of ultrasonic type, having horns (22) facing each other where the strips (16) are pressed on a bag mouth. Said sealing mechanism (39) is affixed preferably on a lower arm (19) and an upper arm (26) of the machine frame (101). The horns (22) of the sealing mechanism (39) are arranged in a face to face arrangement oppositely in order to be able to reciprocate to seal the strips (16) on mouth portion of a bag as can be seen in Figures 4 and 5. There is provided a strip sealing plate (112) lying longitudinally between the first vertical column (113) and the second vertical column (114) as shown in Fig. 2 and 7B. Said plate (112) is thereby arranged so as to be between the horns (22).

[0014] Referring to Fig. 2 together with Fig 6A, the main unit (110) comprises an elevator mechanism (34) where a claw element (33) moves up and down in axis (y). Said elevator mechanism (34) lies along width of the machine frame (101). There is provided a strip holder driving rail (111) on said elevator mechanism (34) which lies between two camshaft gears (43). Said strip holder driving rail (111) is adapted so as to allow said claw element (33) move on it in direction (x). In addition, a strip holder mobile piston (35) is provided to direct the motion of the claw element (33) in vertical direction (y). Referring to Fig. 2 together with Fig. 6C, a strip cutting station (103) is provided in the main unit (110). Said station (103) is preferably located between the second vertical column (114) and the machine frame (101) where the strips (16) are first received and comprises a strip cutting mobile blade (14) above the stationary blades (15). Said blades (14, 15) are connected to a table (30) so as to be one above the other. One of the stationary blades (15) is reserved for the upper line of strip (16) while the other is reserved for the lower line of strip (16'). Also, a strip cutting piston (13) is placed on top of the table (30) to direct the movement of the mobile blade (14). There is also a strip stopping means (17) which is located so as to be able to hold at least one strip (16) of upper line and at least one strip (16) of lower line (16'). Thereby, at least one of the strips in each line stays stationary with a fixed length (loose/longer form) while the other is left free in order to be stayed in tightened form to form shorter strips in the operation unit (18) (Fig. 6B). In a preferred embodiment as shown in Fig. 6A, 6B and 6C, at least two driving rails

(107) are mounted on the operation unit (18) correspondingly to provide the movement of the carrier unit (23) in axis (z). There is a rail (48) on the carrier unit (23) so as to allow at least two plates (40) to move on it in axis (x). Said plates (40) are placed correspondingly and lead to the movement of the rotating arms (21) in axis (x), and each plate (40) has at least one rotating arm (21) mounted on its front section. A rod (41) lies above the carrier unit (23) bearing a number of strip length adjustment protrusions (24), two of which are for short handles (105) and the others are for long handles (104). The distance between these protrusions (24) may be adjusted by the operator.

[0015] The claw element (33), which moves on the strip holder driving rail (111) located on the elevator mechanism (34), delivers the strips (16) to the strip holders (25, 44), and when the first strip holder (25) holds the strips (16), the claw element (33) releases the ends of said strips (16), and then the first strip holder (25) pulls the strips (16) away from the claw element (33). Before the first strip holder (25) pulls back the strips (16) in direction (x), the strip stopping means (17) immobilizes the strips (16) that are envisaged to have a longer length.

[0016] Therefore, while the length of two strips (16) remains constant, which will constitute the long handle (104), the other two strips' length is arranged as shorter to form the shorter handles (105). The strips (104), whose length is constant, will be loose and longer. After being adjusted the length of the strips (16), second strip holder (44) is activated to hold the four strips (16), and then the strips (16) are cut by running of the strip cutting station (103).

[0017] After cutting the strips (16), the rotating arms (21) set the strips (16) in suitable position to be sealed on a bag mouth by turning and moving them through said bag mouth as shown in Fig. 7A. After that, the plates (40) move forward until the ends of the strips (16) are placed inbetween the horns (22) as shown in Fig. 7B. Lastly, the operator of the machine (100) sets a bag in a suitable position to seal the handles (104, 105) and presses the switch bottom to run the sealing mechanism (39), and thereby the process is completed. The final view of the bag with the attached longer and shorter handles is shown in Fig. 11.

[0018] Referring to Fig. 8 together with Fig. 9, the machine (100) structure also comprises a supply unit (102) that has a plurality of reels (27) for accommodating the strips (16) in winded form. The strip (16) is passed on rollers (1) which help to draw the strip (16) in required tightness. Required tightness is adjusted by a tensioning means (2) preferably embodied as a mass hanged on the strip (16). Preferably each supporting bar (36) has its own elevator unit (29) where the tensioning means (2) drives on. A tension bracket (4) may be provided at the bottom region of the supporting bar (36) and it determines the limits of movement of the tensioning means (2).

[0019] The supply unit (102) may also comprise an actuating means such as an electric motor (3) for actuating

rotation of the reels (27) Therefore, a motor activation sensor (not shown) may be located on upper region of in one or more of the supporting bars (36) and also a motor stop sensor (not shown) can be located on lower region of a corresponding supporting bar (36). Said sensors may advantageously adapted to operate according to the movement of the tensioning means (2) which move up and down along the supporting bars (36).

[0020] In a further aspect of the present invention, there is provided a method for attachment of more than two handles on a bag, comprising the steps of:

- providing more than two lines of strips (16) from a supply unit (102) to a main unit (110) of a handle sealing machine (100),
- receiving the end portions of the strips (16) by means of a claw element (33) that is operable at least in horizontal and vertical directions (x, y), and delivering the said end portions to an operation unit (18) of the machine,
- operating a first strip holder (25) to receive said end portions of the strips (16) and operating a second strip holder (44) to hold a further portion of the strips (16) to define lengths of the handles (104, 105) to be formed inbetween thereof,
- applying a tensioning force on the strips (16),
- immobilizing at least one strip of the lines of strips (16) and moving said first strip holder (25) in horizontal axis (x) such that the immobilized strip(s) has a loose form with a longer length as compared to rest of the strips in between the first and second strip holders (25, 44) whereby the longer strip constitutes a longer handle (104) and the rest of the strips constitute shorter handles (105),
- cutting of the strips (16) after arrangement of lengths thereof as in the previous step, and sealing end portions of the so formed handles (104, 105) onto the mouth of a bag.

[0021] Further advantages and aspects of the invention shall be apparent from the explanations above and exemplary drawings appended to the present description.

Claims

1. A handle sealing machine (100) for attachment of more than two handles (104, 105) made of heat sealable strips (16) onto a bag simultaneously, the machine (100) comprising a main unit (110) for sealing the strips (16) to form carrying handles (104, 105) and a supply unit (102) for continuously supplying

lines of strips (16) corresponding to each of the handles (104, 105); said main unit (110) comprising a sealing mechanism (39) equipped with lower and upper horns (22) to press and seal the handles (104, 105) on a bag mouth, a strip cutting station (103) for cutting the strips (16), and an operation unit (18) preparing the line of strips (16) into a ready to seal position **characterized in that** the operation unit (18) comprises first and second strip holders (25, 44) defining the length of the handles (104, 105) and a claw element (33) operable at least in horizontal and vertical directions (x, y) by means of an elevator system (34), said claw element (33) receiving the end portions of the lines of strips (16) from the cutting station (103) and carrying the same to the operation unit (18) where the first and second holders (25, 44) receive the strips (16) from two definite points defining the length of the handles (104, 105) and being axially rotatable such that end portions of the resulting handles (104, 105) are turned to a ready to seal position in between the lower and upper horns (22) whereby at least one of the second strip holder (44) and the cutting station (103) is adapted to fixedly hold at least one of the strips (16) and to leave the rest to be moved and tightened by a tightening force such that the fixedly held strip (16) has a length more than the other strips (16) in between the first and second strip holders (25, 44), and thereby forming the longer handle (104) as compared to the other handles (105).

2. A handle sealing machine according to claim 1 wherein the machine (100) further comprises a tensioning means (2) associated with the strips (16).
3. A handle sealing machine according to claim 2 wherein said tensioning means (2) is arranged as a mass operating with gravity on an elevator (29) of the supply unit (102).
4. A handle sealing machine according to claim 1 wherein the supply unit (102) is adapted to supply four lines of strips (16) whereby at least one of the second strip holder (44) and the cutting station (103) is adapted to fixedly hold two of the strips (16) and to leave the other two to be moved and tightened by a tightening force such that two of the strips (16) have a length more than the other two strips (16) in between the first and second strip holders (25, 44), to form two handles (104) longer than the other two handles (105).
5. A handle sealing machine according to claim 1 or 4 wherein the cutting station (103) comprises stopping means (17) adapted to fixedly hold one or more of the strips (16) to form the longer handles (104).
6. A handle sealing machine according to claim 1 wherein said operation unit (18) comprises a carrier

unit (23) adapted to move said strip holders (25, 44) in axis (z) for receiving the strips (16) in alignment with the claw element (33) and delivering the same to a sealing position.

7. A handle sealing machine according to claim 1 wherein said first strip holder (25) is adapted to move in horizontal axis (x) after receiving the strips (16) from the claw element (33) such that at least one of the said strips (16) is brought into a loose position to form the longer handle(s) (104).
8. A handle sealing machine according to claim 1 wherein strip holders (25, 44) are adapted axially to turn in order to form U shaped handles (104, 105) after cutting of the strips (16).
9. A handle sealing machine according to claim 1 wherein said operation unit (18) comprises at least two strip length adjustment protrusions (24) defining the limits of strip holders' (25, 44) movement in horizontal axis (x) in order to adjust the length of the longer and shorter handles (104, 105).
10. A method of attaching more than two handles made of heat sealable strips (16) onto a bag mouth simultaneously comprising the steps of;

- providing more than two lines of strips (16) from a supply unit (102) to a main unit (110) of a handle sealing machine (100),
- receiving the end portions of the strips (16) by means of a claw element (33) that is operable at least in horizontal and vertical directions (x, y), and delivering the said end portions to an operation unit (18) of the machine,
- operating a first strip holder (25) to receive said end portions of the strips (16) and operating a second strip holder (44) to hold a further portion of the strips (16) to define lengths of the handles (104, 105) to be formed inbetween thereof,
- applying a tensioning force on the strips (16),
- immobilizing at least one strip of the lines of strips (16) and moving said first strip holder (25) in horizontal axis (x) such that the immobilized strip(s) has a loose form with a longer length as compared to rest of the strips in between the first and second strip holders (25, 44) whereby the longer strip constitutes a longer handle (104) and the rest of the strips constitute shorter handles (105),
- cutting of the strips (16) after arrangement of lengths thereof as in the previous step, and sealing end portions of the so formed handles (104, 105) onto the mouth of a bag.

11. A method according to claim 10 wherein the step of applying a tensioning force is provided by a tension-

ing means (2) that is arranged as a mass operating with gravity on an elevator (29) of the supply unit (102).

12. A method according to claim 10 wherein the method comprises supplying of four lines of strips (16) to the main unit (110) of the machine (100), whereby two of the strip lines are immobilized such that these immobilized strips constitute two longer handles (104) and the rest constitute two shorter handles (105).
13. A method according to claim 10 wherein the method further comprises provision of a cutting station (103) comprising cutting blades (14, 15) and strip stopping means (17).
14. A method according to claim 10 wherein the method further comprises the step of axially turning of the strip holders (25, 44) in order to form U shaped handles (104, 105) after cutting of the strips (16).
15. A method according to claim 10 wherein said method comprises provision of at least two strip length adjustment protrusions (24) defining the limits of strip holders' (25, 44) movement in horizontal axis (x) in order to adjust the length of the longer and shorter handles (104, 105).

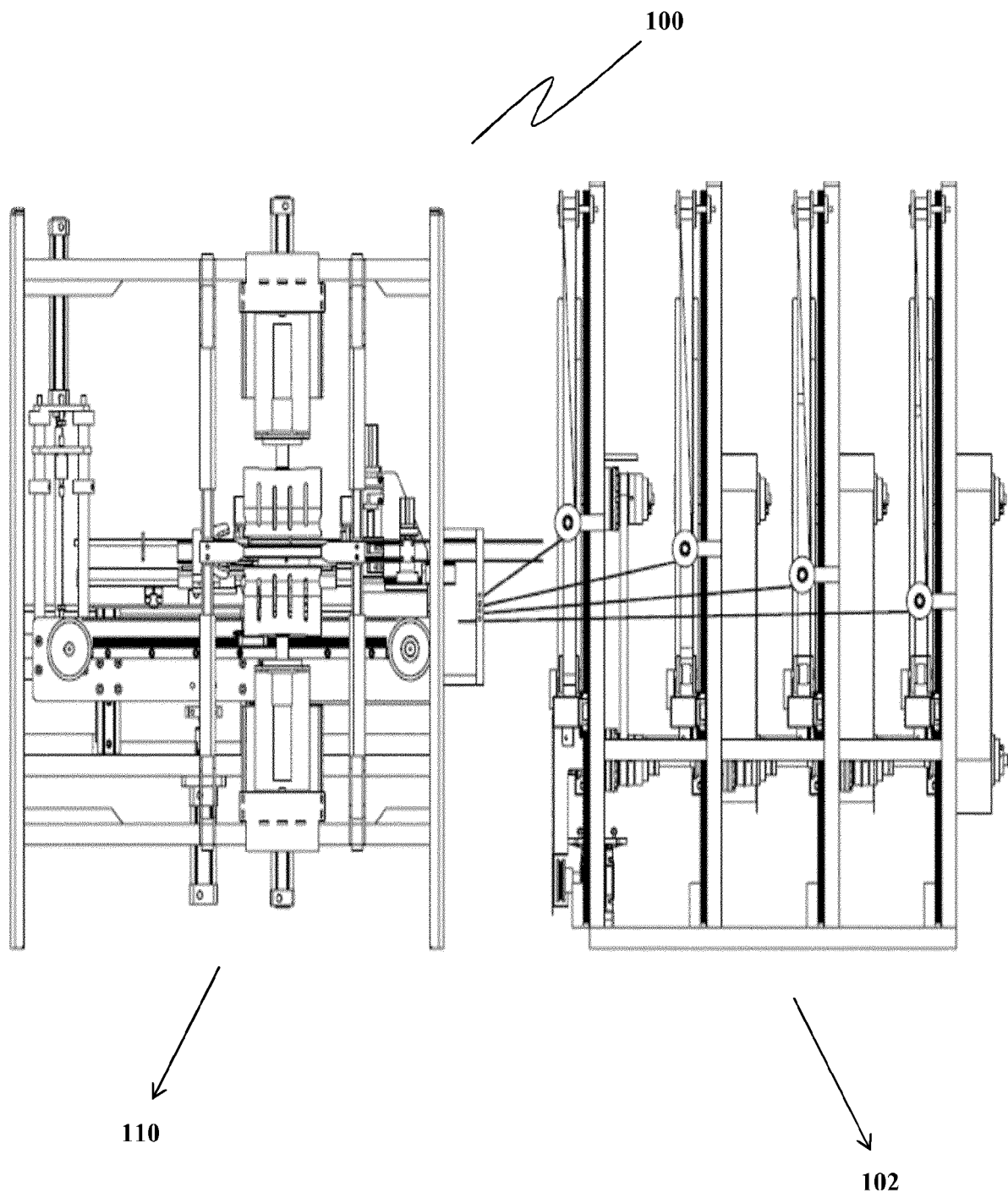


Fig. 1

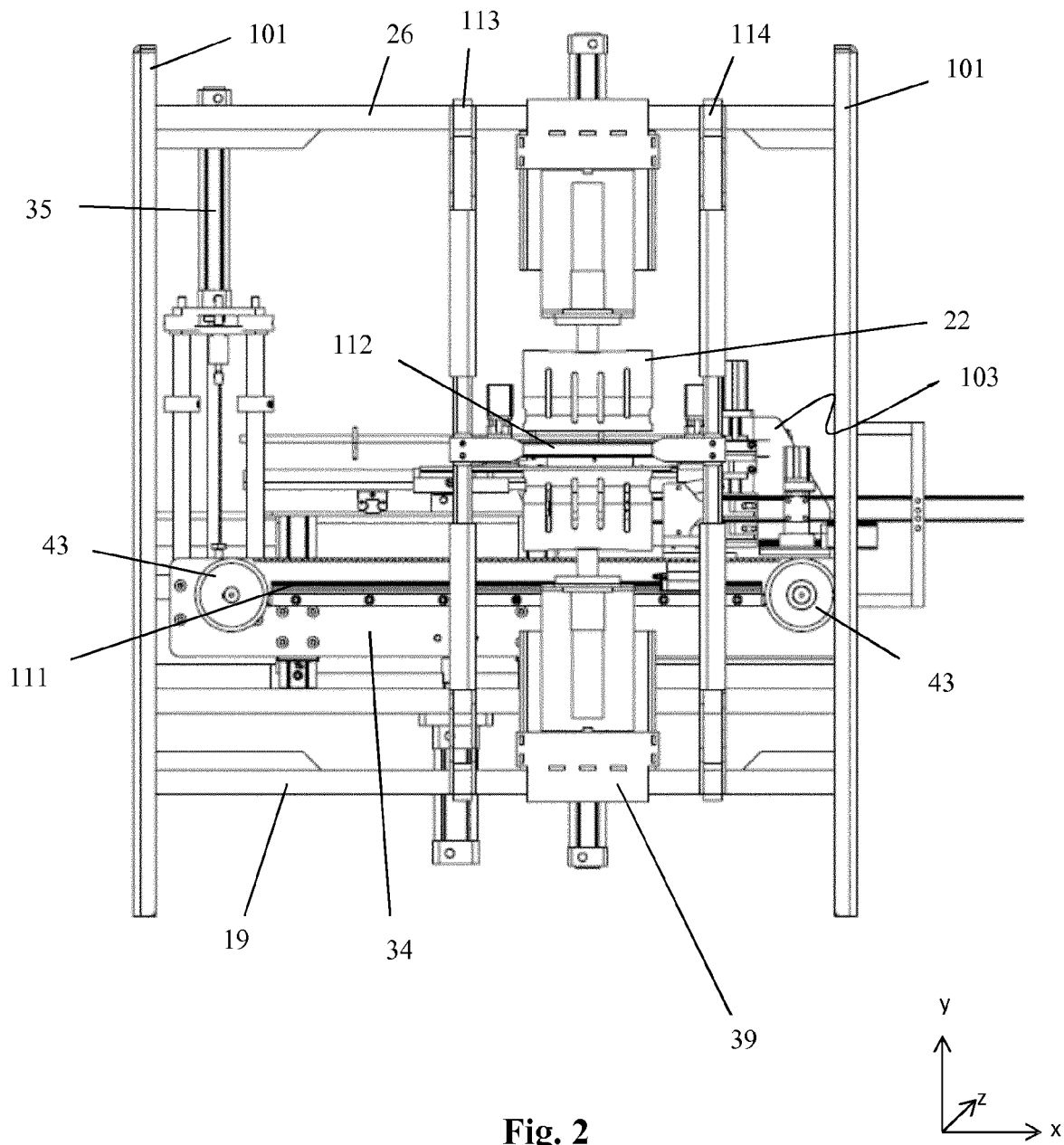


Fig. 2

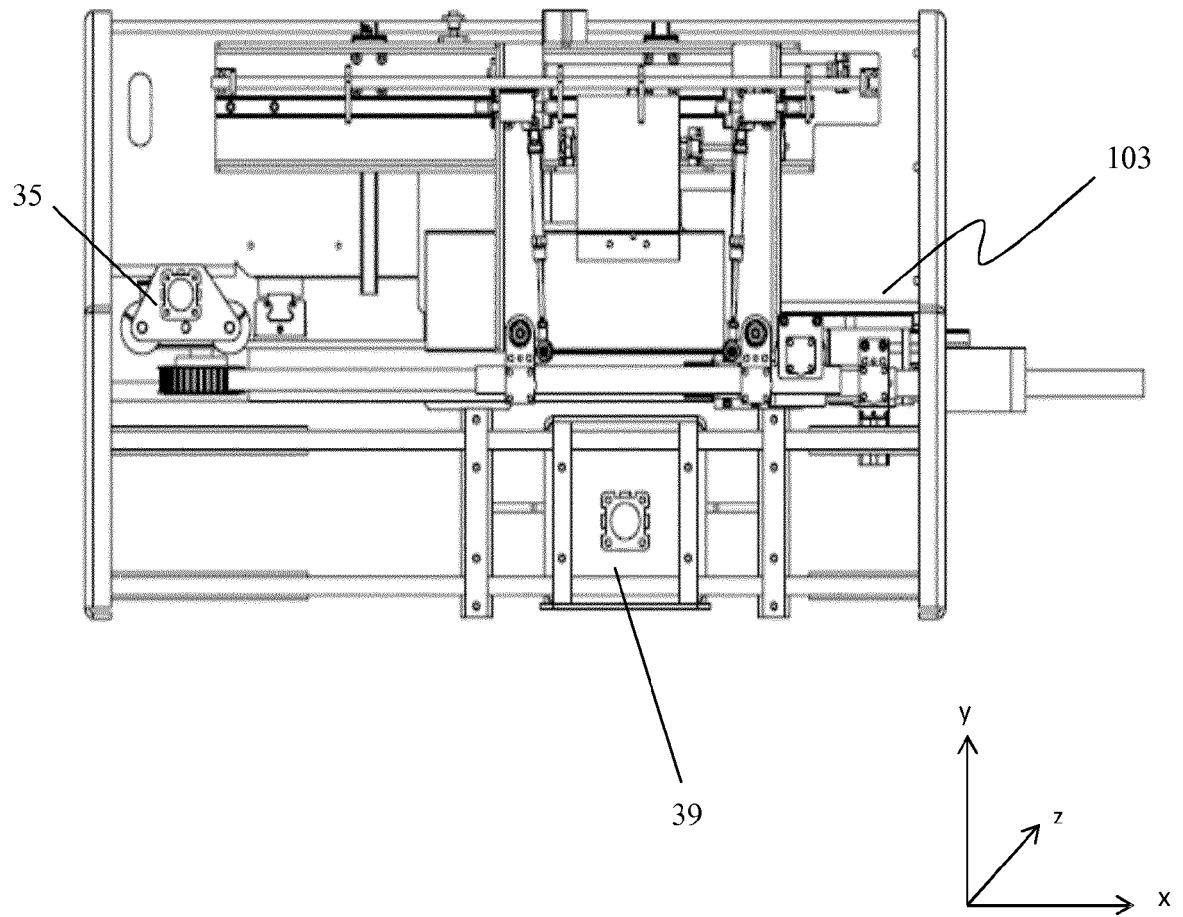


Fig. 3

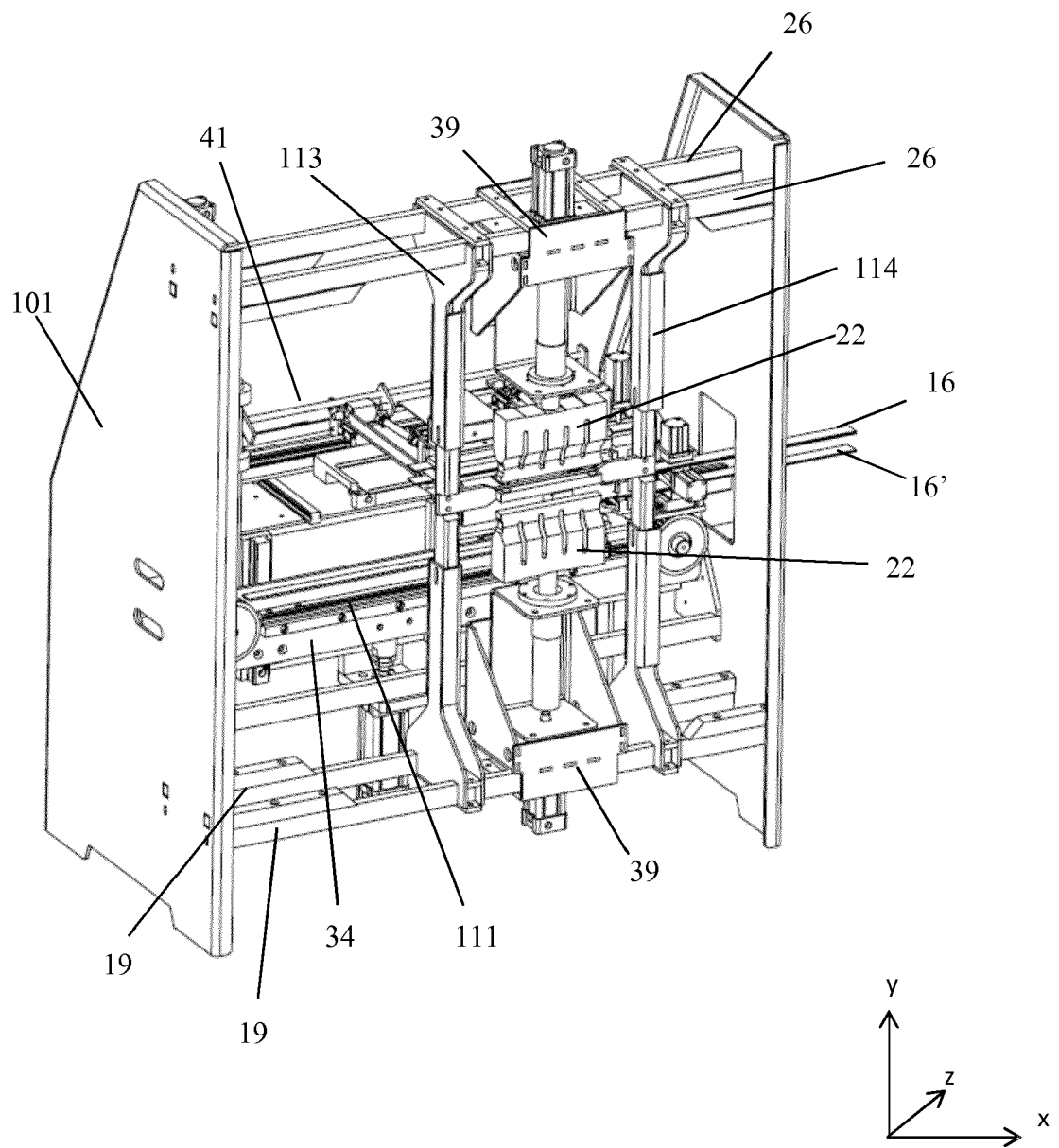


Fig. 4

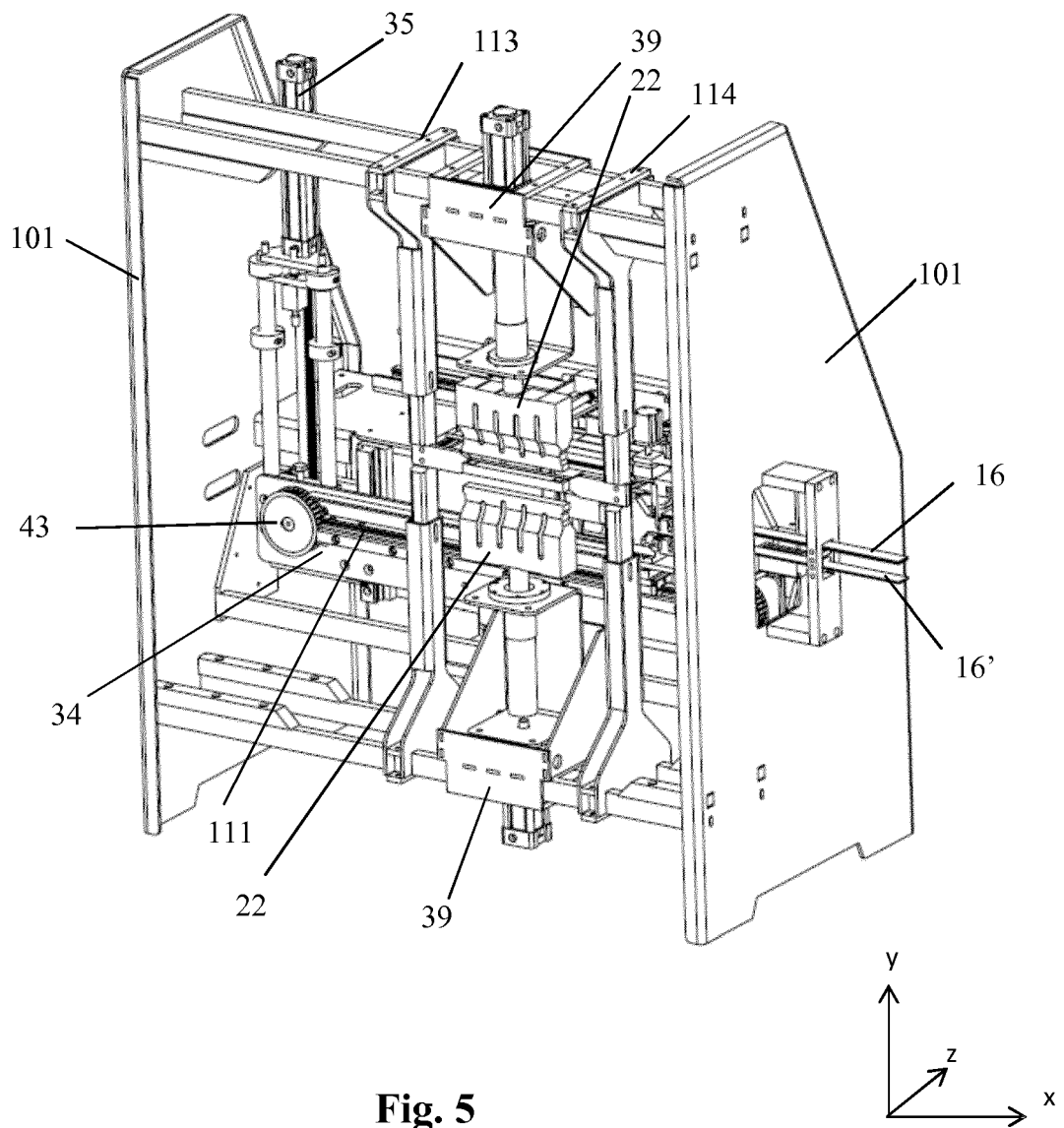


Fig. 5

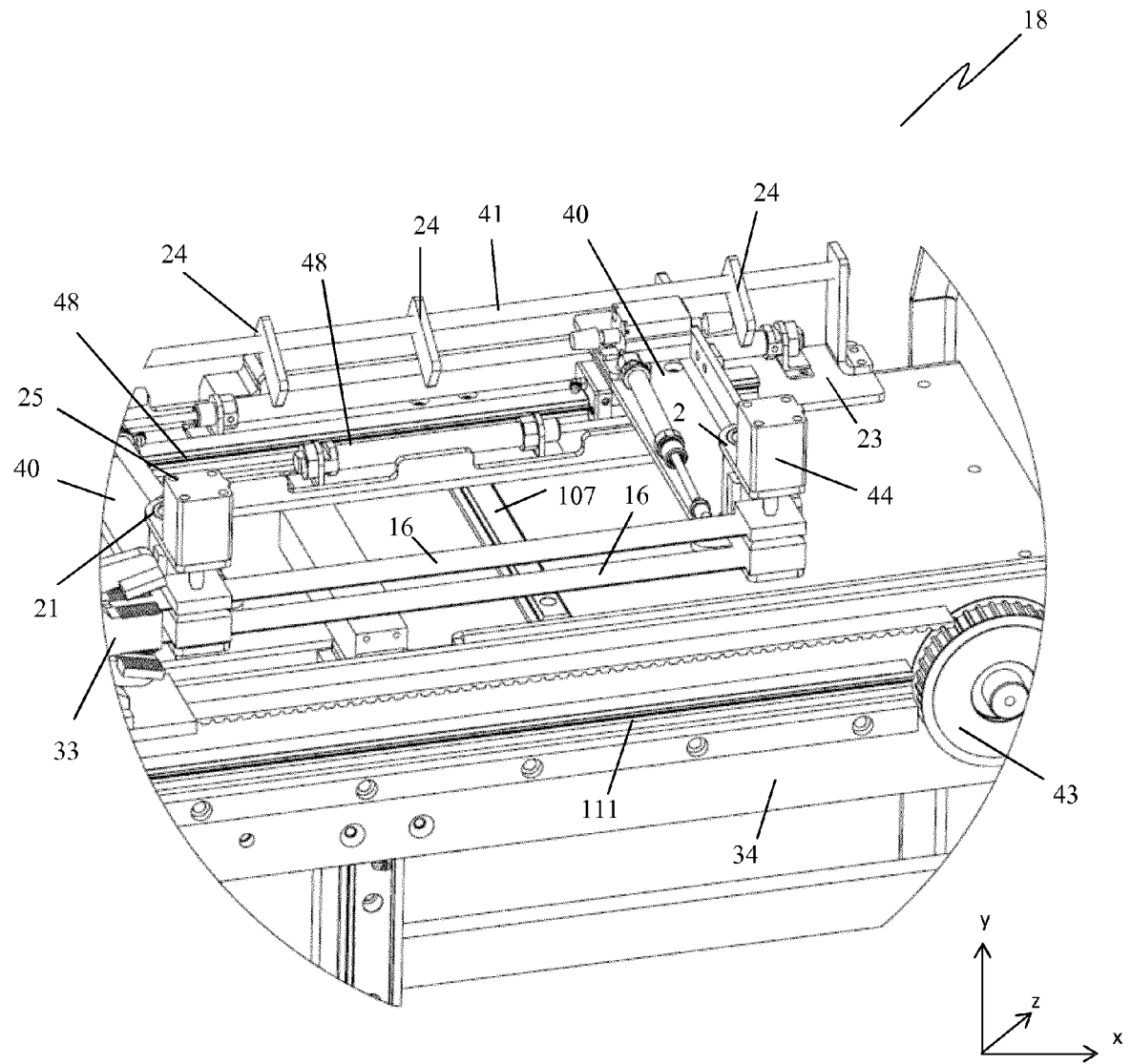


Fig. 6A

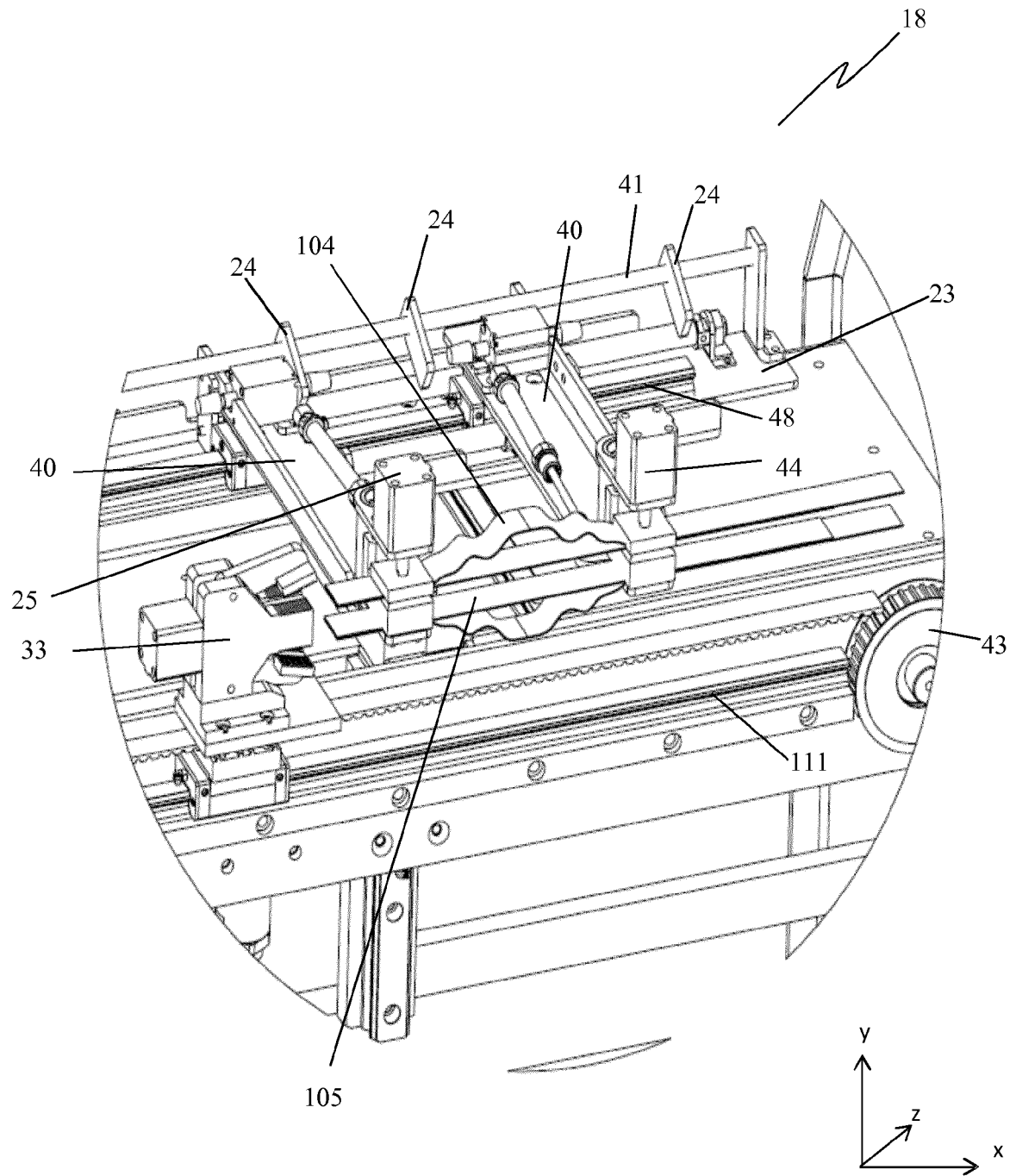


Fig. 6B

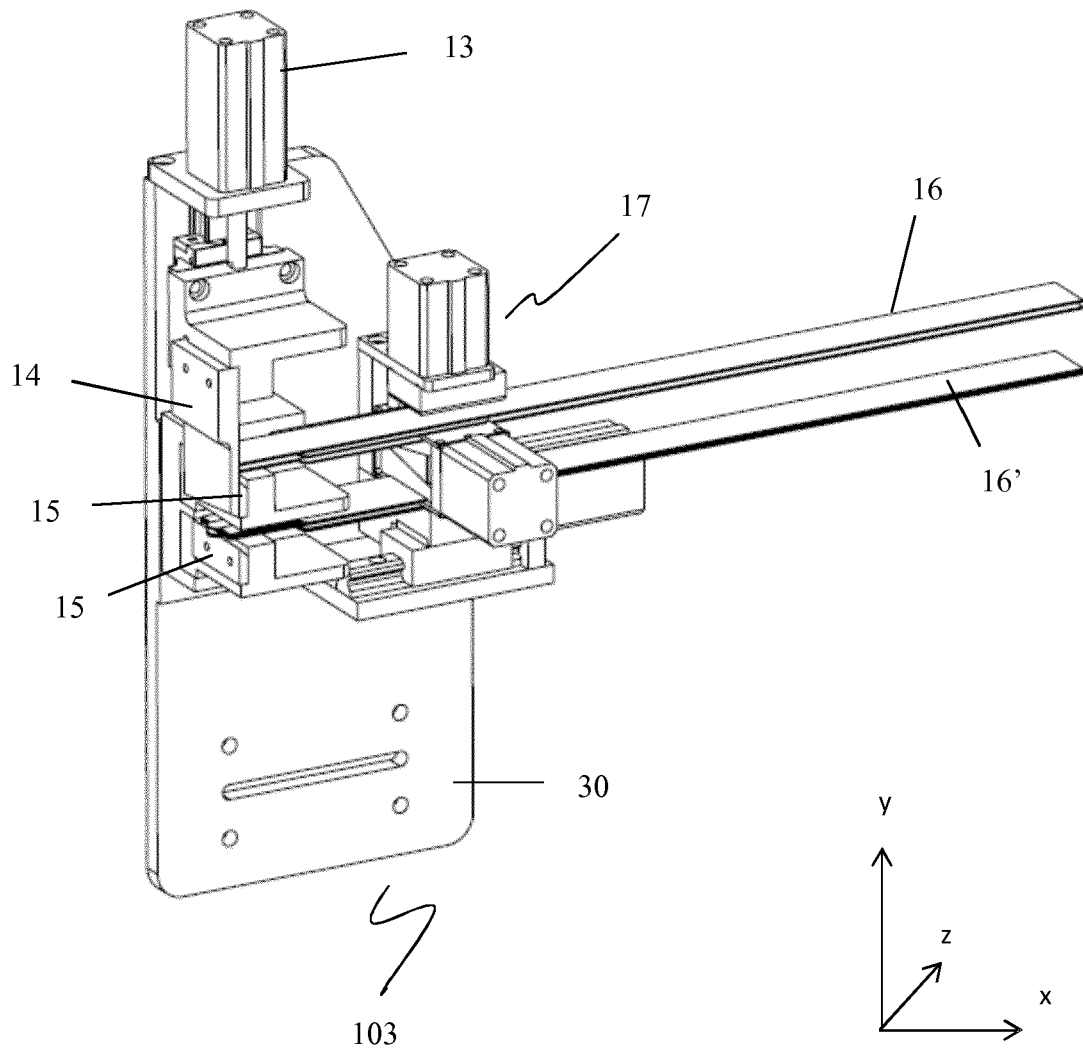


Fig. 6C

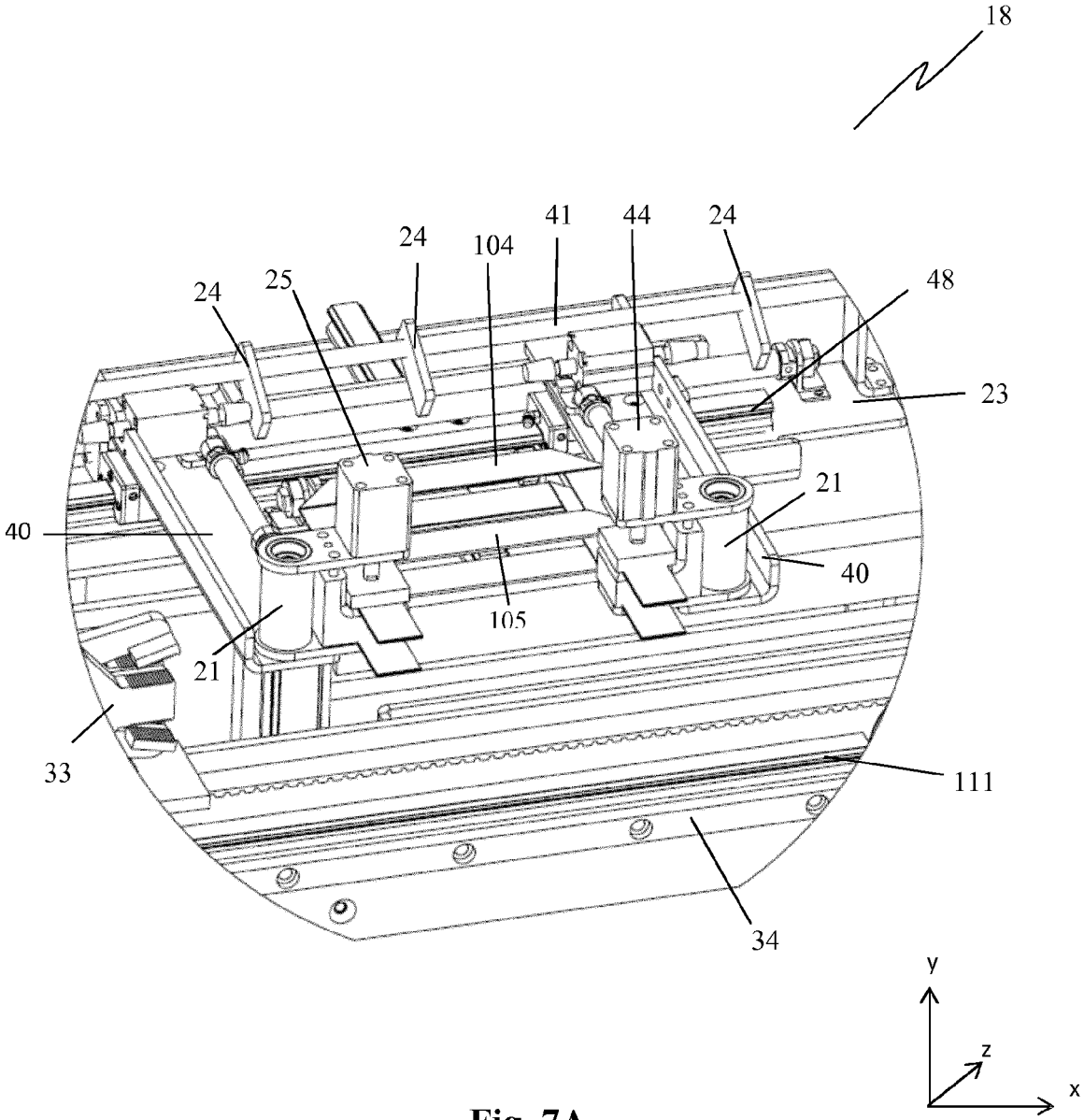


Fig. 7A

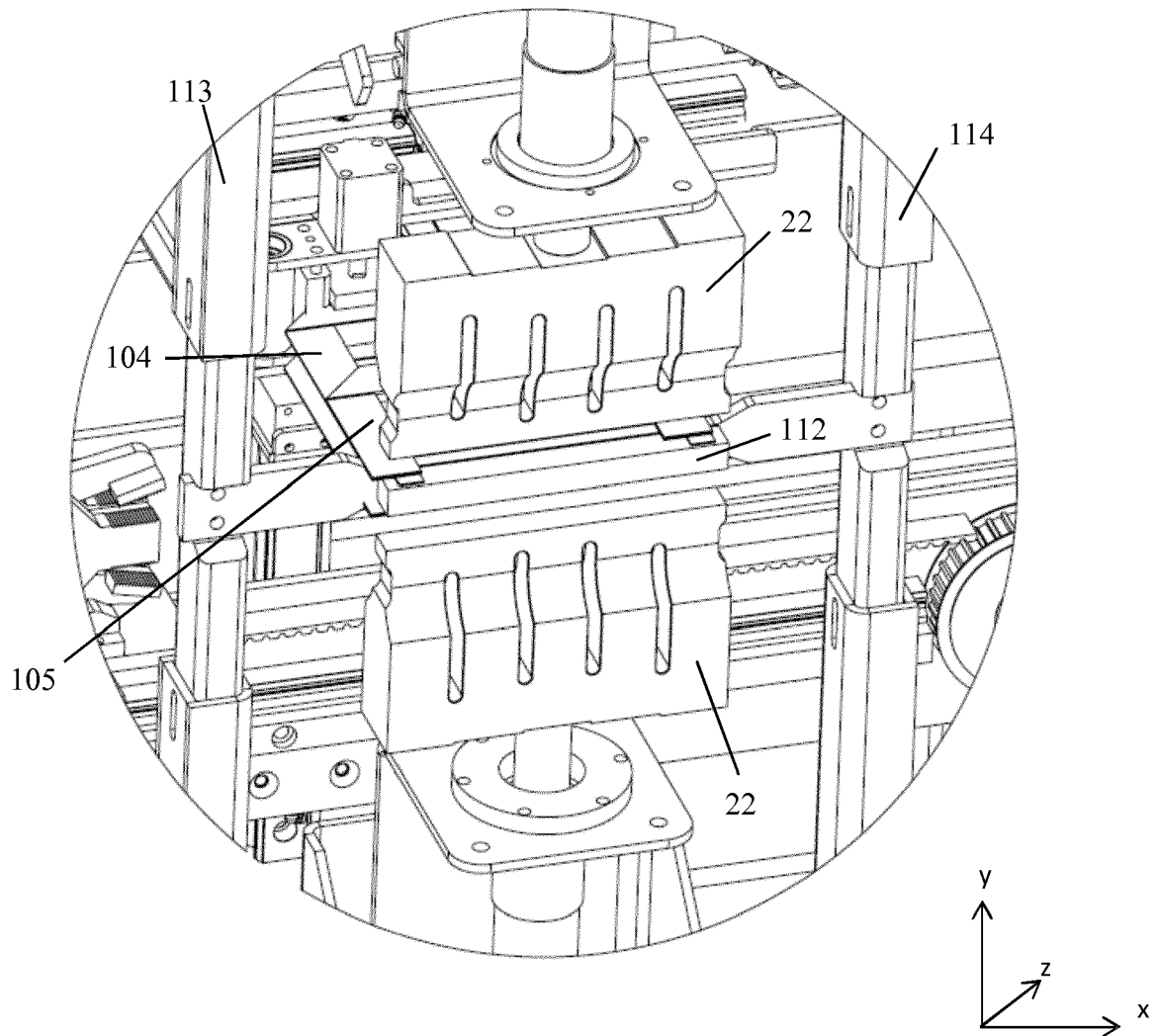


Fig. 7B

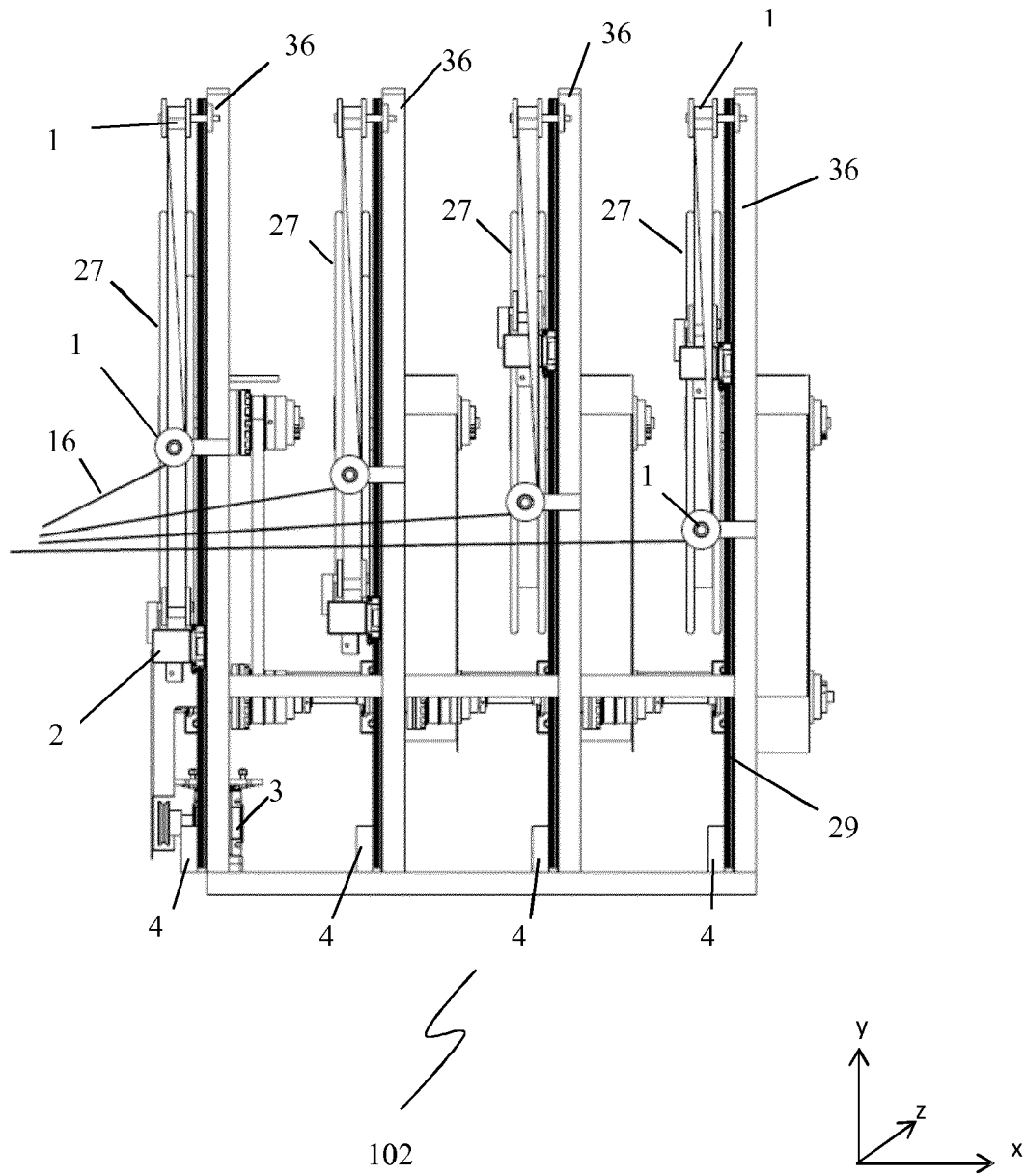


Fig. 8

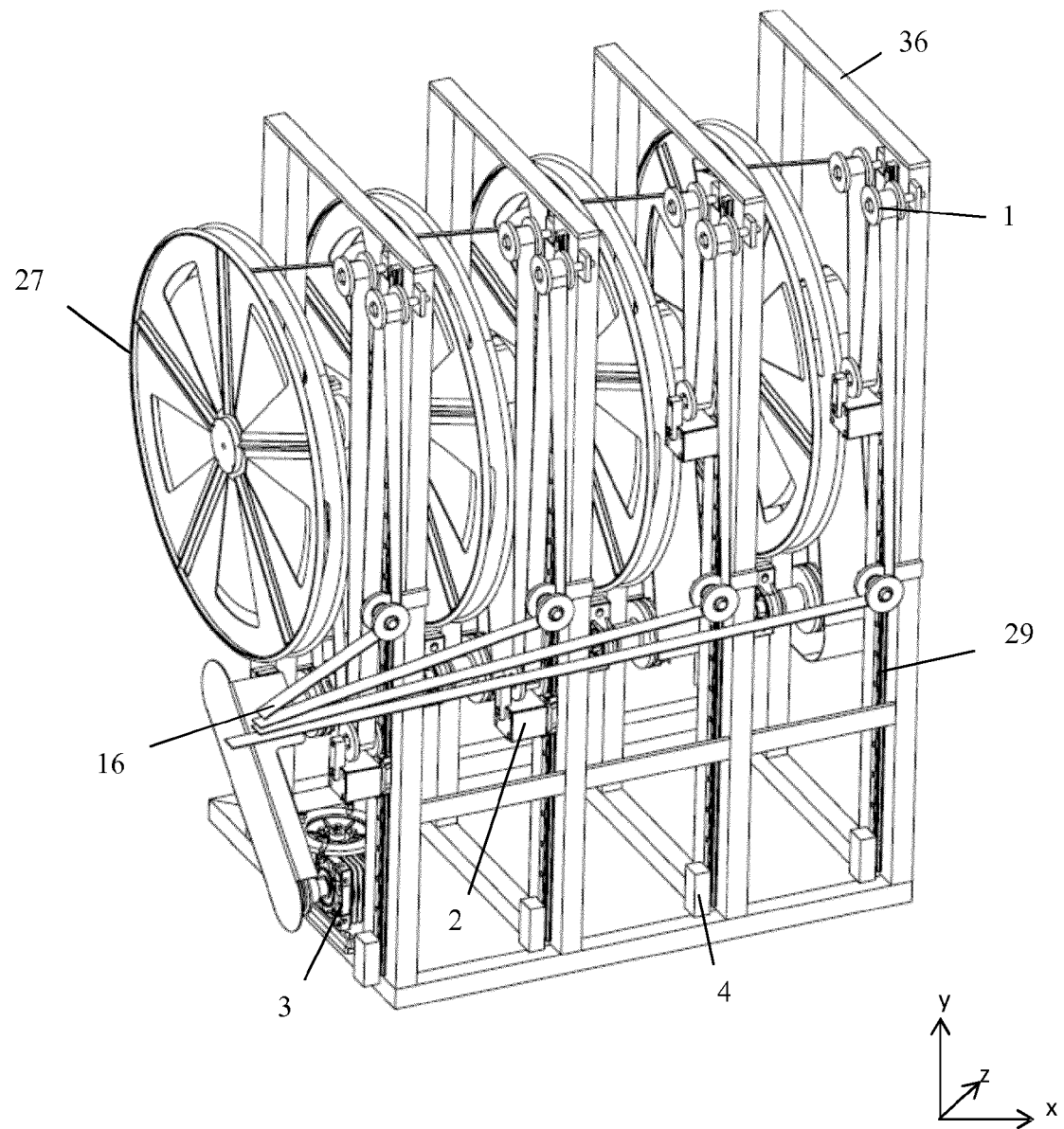


Fig. 9

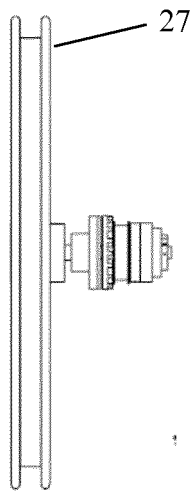


Fig. 10

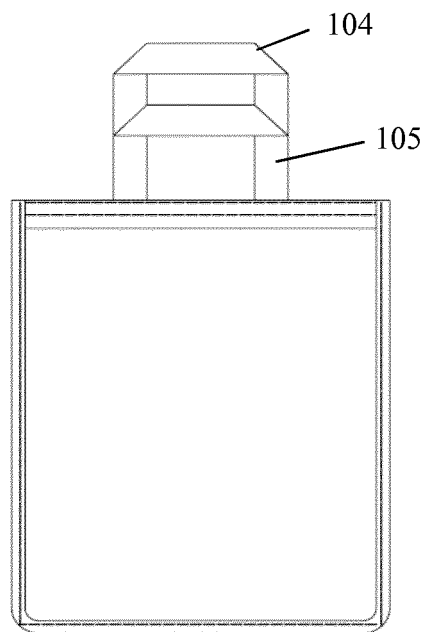


Fig. 11



EUROPEAN SEARCH REPORT

Application Number
EP 14 17 5464

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	US 3 706 625 A (JONES ELWYN DAVID ET AL) 19 December 1972 (1972-12-19) * the whole document *	1-15	INV. B31B19/86 B31D1/06
A	US 4 745 727 A (CINOTTI ANDREA [IT]) 24 May 1988 (1988-05-24) * the whole document *	1-15	
A	DE 11 81 035 B (WINDMOELLER & HOELSCHER) 5 November 1964 (1964-11-05) * the whole document *	1-15	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			B31B B31D
Place of search		Date of completion of the search	Examiner
Munich		7 January 2015	Schelle, Joseph
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.**

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5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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