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(54) Wrapping apparatus presenting a plurality of film rolls

(57) A wrapping apparatus includes a plurality of supporting members (2, 3, 4) mounted on a main frame (1) for supporting a plurality of film rolls (5, 11, 12) respectively, a film drawing section (15) provided in the main frame (1), a guide mechanism (22) provided on the main frame (1) for holding distal ends of films drawn out from the film rolls (5, 11, 12) respectively and guiding one of the distal ends of the respective films to the film drawing section (15), a plurality of return preventing means (31, 32) for preventing the respective films drawn out from the film rolls (5, 11, 12) from returning, and a cutter (17) for cutting the film drawn out from the film drawing section (15).

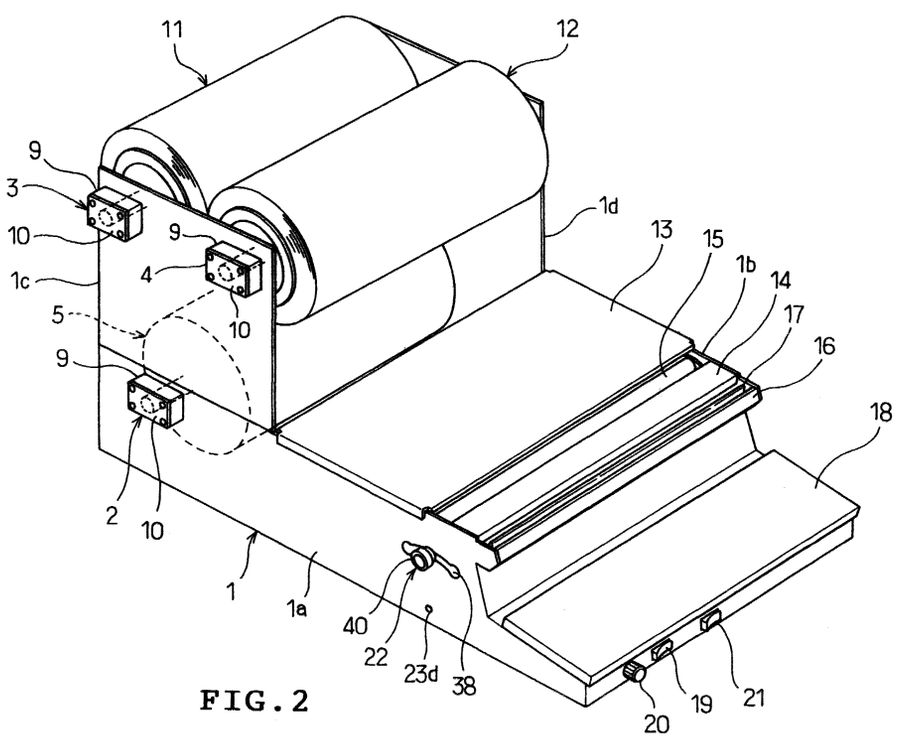

FIG. 2

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Description

[0001] This invention relates to a wrapping apparatus provided with a plurality of film rolls one of which is selectively used.

[0002] FIG. 17 illustrates one of conventional wrapping apparatus of the above-mentioned type. A main frame 100 of the wrapping apparatus includes three pairs of supporting members 104, 105 and 106 for supporting three film rolls 101, 102 and 103 respectively. The main frame 100 further includes three guide rollers 107, 108 and 109, a thermal cutter 110 and a hot plate 111. The film rolls 101, 102 and 103 have different widths respectively. For example, when used, a film 101a of the film roll 101 is caused to pass through guide rollers 107 and 108 in turn, drawn out of a film drawing section 112. In this case, unused films 102a and 103a hang down from the respective film rolls 102 and 103.

[0003] When an article (not shown) is to be wrapped in the film 101a of the film roll 101, the film 101a is drawn out of the film drawing section 112 to be wound on the article. The film 101a is then cut by the thermal cutter 110 and overlapping portions of the film 101a wound on the article is thermally bonded together by the hot plate 111. A distal end of the film 101a is caused to adhere to a receiving plate 113 provided below the film drawing section 112. The distal end is gripped so that the film 101a is drawn out subsequently.

[0004] When the film roll 101 in use is changed to another film roll, for example, the film roll 102, the film roll 101 is turned in a take-up direction or the Z direction so that the distal end thereof is retreated through the film drawing section 112 and guide rollers 107 and 108. The film 102a of the film roll 102 is then drawn out through the guide rollers 107 and 108 from the film drawing section 112. Furthermore, when the film roll 102 is changed to another film roll 103, the film roll 102 is turned in the take-up direction so that the distal end thereof is retreated through the film drawing section 112 and guide rollers 107 and 108. The film 103a of the film roll 103 is then drawn out through the guide rollers 107 and 108 from the film drawing section 112.

[0005] In the above-described construction, however, the currently used film of the film roll is retreated as described above when changed to another film. The film to be subsequently used needs to be drawn out to be guided to the film drawing section. Thus, changing the films from one to another is troublesome and results in inconvenience.

[0006] Therefore, an object of the present invention is to provide a wrapping apparatus which can use a plurality of film rolls and in which the film can easily be changed from one to another and the distal end of each film can reliably be held.

[0007] The present invention provides a wrapping apparatus comprising a plurality of supporting members provided on a main frame for supporting a plurality of film rolls respectively, a film drawing section provided in the main frame, a cutter for cutting the film drawn out from the film drawing section, characterized by a guide mechanism provided on the main frame for holding distal ends of films drawn out from the film rolls respectively and guiding one of the distal ends of the respective films to the film drawing section and a plurality of return preventing means for preventing the respective films drawn out from the film rolls from returning.

[0008] According to the above-described wrapping apparatus, the guide mechanism holds the distal ends of the films drawn out from the respective film rolls. The guide mechanism further guides one of the distal ends of the films to the film drawing section. Accordingly, when changed to another film roll, the currently used film roll need not be retreated and the film roll to be subsequently used need not be drawn out to be guided to the film drawing section. Consequently, the film change can easily be carried out. Furthermore, since the return preventing means are provided for preventing the films drawn out from the film rolls from returning, respectively, each film can be prevented from returning while it is being wrapped on the article and the distal ends of the unused films can reliably be held by the guide mechanism.

[0009] In a preferred form, the guide mechanism includes a rotating member, a plurality of holding members holding the distal ends of the films drawn out from the respective film rolls, and a positioning mechanism for positioning a selected one of the holding members relative to the film drawing section. The guide mechanism positions one of the holding members holding the respective distal ends of the films relative to the film drawing section. Consequently, the distal end of the film can be caused to accurately correspond to the film drawing section.

[0010] In another preferred form, the guide mechanism is provided with the return preventing means. Since the guide mechanism guides the distal end of the film to the film drawing section, the distal end of the film is subjected to a returning force due to the guiding operation of the guide mechanism at an increasing frequency. Accordingly, there is a possibility that the distal end of the film may be detached from the guide mechanism. In the above-described construction, however, the guide mechanism is provided with the return preventing means. Consequently, the distal end of the film can reliably be prevented from being detached from the guide mechanism.

[0011] In further another preferred form, the return preventing means includes a film return preventing roller and a one-way clutch allowing the film return preventing roller to be rotated only in one direction, wherein the film is guided by the film return preventing roller. As the result of the aforesaid construction, the film can reliably be prevented from returning.

[0012] In further another preferred form, the one-way clutch includes a cylindrical member having a circularly cylindrical inner circumferential face and disposed so that a center of the inner circumferential face is eccentric

relative to the film return preventing roller, and a rolling member rotatably mounted between the inner circumferential face of the cylindrical member and an outer circumferential face of the film return preventing roller. The one-way clutch can reliably prevent reverse rotation although having a simple construction. Consequently, the film can reliably be prevented from returning while the manufacturing cost can be reduced.

[0013] In further another preferred form, the cutter thermally cuts the film in a non-contact manner. The film is cut when a melting temperature thereof is reached. Thus, the film is cut without contacting with the cutter. Consequently, the film can be prevented from being subjected to an excessive amount of heat, and chips and shavings of the film and emitting smoke due to welding can be prevented. Additionally, the grounds can be prevented from adhering to the cutter.

[0014] In further another preferred form, the cutter includes two film snubbers provided on both sides of the cutter respectively and the cutter is disposed to be adjacent to but not to project from a line between the film snubbers. The film comes nearer to the cutter when the drawn film is bridged between both film snubbers. As a result, the film is subjected to heat from the cutter to be thermally cut. Consequently, the film can be cut while being reliably spaced away from the cutter.

[0015] The invention will be described, merely by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a partially broken side section of the wrapping apparatus of a first embodiment in accordance with the present invention;
FIG. 2 is a perspective view of the wrapping apparatus;
FIG. 3 is a side view of the wrapping apparatus;
FIG. 4 is a longitudinally sectional front view of the supporting mechanism;
FIG. 5 is a plan view of the guide mechanism;
FIG. 6 is a longitudinally sectional side view of the guide mechanism;
FIG. 7 is a transversely sectional side view of a first return preventing mechanism;
FIG. 8 is a sectional view taken along line 8-8 in FIG. 7;
FIG. 9 is a transversely sectional side view of a second return preventing mechanism;
FIG. 10 is a longitudinally sectional side view of the cutter;
FIG. 11 is a view similar to FIG. 6, showing a different working condition of the guide mechanism;
FIG. 12 is a view similar to FIG. 6, showing a further different working condition of the guide mechanism;
FIG. 13 is a side view of the wrapping apparatus of a second embodiment in accordance with the present invention;
FIG. 14 is a side view of the wrapping apparatus of a third embodiment in accordance with the present invention;
FIG. 15 is a partially broken side view similar to FIG. 1;
FIG. 16 is a partially broken side view of the wrapping apparatus of a fourth embodiment in accordance with the present invention; and
FIG. 17 is a schematic longitudinally sectional side view of a conventional wrapping apparatus.

[0016] A first embodiment of the present invention will be described with reference to FIGS. 1 to 12. Referring to FIGS. 2 and 3, the wrapping apparatus of the first embodiment comprises a main frame 1 including left-hand and right-hand side plates 1a and 1b and left-hand and right-hand rectangular side plates 1c and 1d, all of which are connected together so that the apparatus is formed into a table top type. A first supporting mechanism 2 serving as a supporting member is provided on the rear of the main frame 1. A second supporting mechanism 3 serving as another supporting member is provided over the first supporting mechanism 2. A third supporting mechanism 4 serving as further another supporting member is provided in front of the second supporting mechanism 3. Since the supporting mechanisms 2 to 4 have the same construction, only the first supporting mechanism 2 will be described with reference to FIG. 4. The first supporting mechanism 2 comprises a support shaft 6 inserted through a hollow core 5a of a film roll 5, and two spacers 7 fitted in both ends of the core 5a respectively to hold the shaft 6 concentric with the core. The supporting mechanism 2 further comprises nuts 8 for fixing the spacers 7 to the shaft 6, two bearings 9 rotatably supporting both ends of the shaft 6 respectively, and two check plates 10 provided for preventing the shaft 6 from falling off from the bearings 9.

[0017] The film roll 5 includes an adhesive wrap film 5b wound on the core 5a. The second and third supporting mechanisms 3 and 4 support other film rolls 11 and 12. The film rolls 5, 11 and 12 have different widths. A working table 13 formed of a metal plate is mounted on the frame 1 so as to be located in front of the first supporting mechanism 2. A first film snubber 14 formed of a metal plate is mounted on the frame 1 so as to be located in front of the working table 13 with a space therebetween. The first film snubber 14 has a high level of surface finish so that the film adheres thereto. The space between the working table 13 and the first film snubber 14 constitutes a film drawing section 15. A second film snubber 16 is mounted on the frame 1 so as to be spaced away forward from the first film snubber 14. A cutter 17 is provided between the first and second film snubbers 14 and 16. The cutter 17 thermally cuts the film in a non-contact manner. The cutter 17 has an electrically heating wire (not shown) therein. The cutter 17 is disposed to be adjacent to but not to project from an imaginary line L between distal ends of the film snubbers 14 and 16 as shown in FIG. 10. A hot plate 18 is mounted on the frame 1 so as to be located downwardly in front

of the second film snubber 16. The hot plate 18 includes an electrically heating wire (not shown) provided therein. On the front of the frame 1 in front of the hot plate 18 are provided a switch 19 for turning on and off the cutter 17, a temperature adjusting knob 20 and a switch 21 for turning on and off the hot plate 18.

[0018] A guide mechanism 22 is provided in the frame 1 so as to be located below the film drawing section 15. The guide mechanism 22 will now be described with reference to FIGS. 1 and 5 to 7. A pivoting member 23 formed of a metal plate is provided inside the side plates 1a and 1b so as to be pivoted about shafts 23d and 23e. The shaft 23d is shown in FIG. 1, whereas the shaft 23e is shown in FIG. 6. The pivoting member 23 includes left-hand and right-hand sectorial pivoting plate portions 23a and 23b and a connecting plate portion 23c connecting the pivoting plate portions. The pivoting plate portions 23a and 23b are mounted on the shafts 23d and 23e which are further mounted on the side plates 1a and 1b for rotation respectively. Three pairs of guide rollers 24 and 25, 26 and 27, and 28 and 29 are rotatably mounted on support shafts 24a to 29a which are further mounted on the pivoting plate portions 23a and 23b. Furthermore, a guide roller 30 is mounted on a support shaft 30a which is further mounted on the pivoting plate portions 23a and 23b so as to be located near the shafts 23d and 23e. The guide rollers 24, 26 and 28 serve as holding members for holding distal ends of the films respectively. The guide roller 25 serves as a film return preventing roller in a first return preventing mechanism 31 serving as return preventing means. The guide roller 27 also serves as a film return preventing roller in a second return preventing mechanism 32 serving as return preventing means.

[0019] The first return preventing mechanism 31 will now be described with reference to FIGS. 7 and 8. A support shaft 25a extends through two cylindrical spacers 25b and the guide roller 25 so as to be concentric with the guide roller. Only one of the spacers 25b is shown in FIG. 7. A one-way clutch 33 is provided on one end of the guide roller 25. The construction of the one-way clutch 33 will be described. A fixture 34 is mounted on the pivoting plate portion 23a and includes a horizontally extending cylindrical portion 34a having a cylindrical inner circumferential face. The cylindrical portion 34a has an end plate 34b formed therein. A bearing 34c is formed on the end plate 34b so as to have a center Sp thereof offset from a center Cp of the cylindrical portion 34a, that is, the bearing 34c is eccentric to the guide roller 25. The shaft 25a is rotatably supported on the bearing 34c. A metal ball 35 serving as a rolling member is disposed for rotation between the inner circumferential face of the cylindrical portion 34a and an outer circumferential face of the guide roller 25. The ball 35 may be a roller. Where symbol R designates the difference between an inner diameter of the cylindrical portion 34a and an outer diameter of the guide roller 25 and symbol α designates a distance between the center of Cp of the cylindrical portion 34a and the center Sp of the bearing 34c, a maximum value of the difference R is shown by (R+α) and a minimum value of the difference R is shown by (R-α) as depicted in FIG. 8. The ball 35 has a diameter Kr set so as to be smaller than (R+α) and larger than (R-α). Accordingly, the guide roller 25 is allowed to be rotated only in the direction of arrow A in FIG. 8. A cover plate 36 is provided in the cylindrical portion 34a for preventing the ball 35 from falling off. The cover plate 36 has a ball stopper 37. The shaft 25a has the other end supported on another bearing (not shown) mounted on the right-hand side plate 1b.

[0020] The second return preventing mechanism 32 has the same basic construction as the first return preventing mechanism 31. Only the difference between the first and second mechanisms 31 and 32 will be described. A support shaft 27a has both ends each of which extends through the pivoting plate portion 23a or 23b and a positioning groove 38 formed in the side plate 1a or 1b. A positioning knob 40 is mounted on each extending end of the shaft 27. The knob 40 constitutes a positioning mechanism 39 together with the groove 38. Two such positioning mechanisms 39 are provided on the left-hand and right-hand side plates 1a and 1b respectively. Only the left-hand positioning mechanism 39 will be described with reference to FIGS. 1 and 9. The positioning groove 38 is formed into an arcuate form about the shaft 23d and has three positioning holes 38a, 38b and 38c each of which has a diameter larger than the width of the groove. The holes 38a, 38b and 38c are located at both ends of the groove and in the middle thereof. The knob 40 has a fit portion 40a (see FIG. 9) fitted into the holes 38a-38c. The portion of the groove 38 other than the holes 38a-38c has a width that is set to be smaller than the outer diameter of the fit portion 40a and to allow the shaft 27a to move therethrough.

[0021] Each positioning knob 40 is mounted on the extending end of the shaft 27a to be axially moved. At this time, each knob 40 is urged by a spring 41 in such a direction that the fit portion 40a is fitted into any one of the positioning holes 38a, 38b and 38c, that is, in the direction of arrow B in FIG. 9. The positioning knob 40 is fitted in the hole 38b in FIGS. 1 and 9. When the knob 40 is moved in the direction opposite to arrow B so as to be pulled out of the hole 38b, the pivoting member 23 is allowed to pivot. For example, when the pivoting member 23 is caused to pivot in the direction of arrow C in FIG. 1 so that each positioning knob 40 is fitted into the corresponding hole 38a. As a result, the guide roller 24 is guided into the film drawing section 15 as shown in FIG. 11. Furthermore, when the pivoting member 23 is caused to pivot in the direction of arrow D in FIG. 1 so that each knob 40 is fitted into the corresponding hole 38c, the guide roller 28 is guided into the film drawing section 15 as shown in FIG. 12.

[0022] A guide roller 42 and a third return preventing mechanism 43 serving as further another return preventing means are provided near the aforesaid guide

mechanism 22 so that the guide roller 42 is located over the third return mechanism. The third return preventing mechanism 43 comprises a guide roller 44 serving as a film return preventing roller and a one-way clutch 45. The one-way clutch 45 has the same basic construction as the one-way clutch 33 shown in FIG. 7. The one-way clutch 45 differs from the one-way clutch 33 in that it is mounted on the left-hand side plate 1a and that the guide roller 44 has a larger length than the guide roller 25.

[0023] Three guide rollers 46 to 48 are provided in the frame 1 for guiding the film 11b of the film roll 11 supported by the second supporting mechanism 3 as shown in FIG. 3. Furthermore, a guide roller 49 is provided for guiding the film 12b of the film roll 12 supported by the third supporting mechanism 4. The film 5b of the film roll 5 is drawn through the guide roller 30 and the guide roller 25 of the first return preventing mechanism 31 to the guide roller 24 as shown in FIGS. 1 and 3. The film 5b hangs down from the guide roller 24 in its non-used state. Furthermore, the film 11b of the film roll 11 is drawn through the guide rollers 46 to 48 and the guide roller 27 of the second return preventing mechanism 32 to the guide roller 26. The film 11b hangs down from the guide roller 26 in its non-used state as shown in FIG. 11. Additionally, the film 12b of the film roll 12 is drawn through the guide roller 49, the guide roller 44 of the third return preventing mechanism 43, and the guide rollers 42 and 29 to the guide roller 28. The film 12b hangs down from the guide roller 28 in its non-used state. Each of the guide rollers 25, 27 and 44 serving as the respective film return preventing rollers and the guide rollers 24, 26 and 28 serving as the respective holding members has an outer circumferential surface with a high level of surface finish so that the film readily adheres thereto. As a result, the film can be prevented from sliding from each guide roller. Accordingly, the film can be prevented from sliding back when in contact with the guide rollers 25, 27 and 44 serving as the respective film return preventing rollers.

[0024] The operation of the wrapping apparatus will now be described. The cutter 17 and the hot plate 18 are previously energized. The following describes a case where the film 11b of the film roll 11 supported by the second supporting mechanism 9 is wound on an article to be wrapped or a tray T (see FIG. 3) containing food, for example. FIG. 1 shows the state where the film 11b is adherent to the first film snubber 14. In this state, the film 11b is picked up to be drawn and wound on the tray T on the working table 13 as shown by solid line in FIG. 3. The tray T is then moved toward the cutter 17 as shown by two-dot chain line and then downward. The tray T is then pressed against the first and second film snubbers 14 and 16 so as to bridge them, so that the film 11b is subjected to heat from the cutter 17 to be cut in the non-contact manner. In this case, the distal end of the film 11b adheres to the first film snubber 14 to be caught as shown in FIG. 1. The guide roller 27 of the second return preventing mechanism 32 is not rotated in the direction opposite to arrow A even when the middle portion of the film 11b shown by reference symbol 11bA in FIG. 3 is slackened during the wrapping work such that the distal end of the film is subjected to a returning force. Consequently, the film 11b can be prevented from returning.

[0025] When the tray T is to be wrapped in the film 5b of the film roll 5 supported by the first supporting mechanism 2, a part of the film 11b located ahead of the guide roller 26 is cut so as to have a suitable length (preferably short) and hung down from the guide roller. The positioning knobs 40 are then moved in the direction opposite to arrow B so as to be pulled out of the respective holes 38b. The knobs 40 are further rotated in the direction of arrow C so that the knobs 40 are fitted into the respective holes 38a. As a result, the guide roller 24 is guided to the film drawing section 15 as shown in FIG. 11. Thereafter, the film 11b is drawn out of the film drawing section 15 to wrap the tray T.

[0026] Additionally, when the film 12b of the film roll 12 supported on the third supporting mechanism 4 is used to wrap the tray T, a part of the film 11b located ahead of the guide roller 26 is cut so as to have a suitable length in the state shown in FIG. 1 in the same manner as described above and hung down from the guide roller. The positioning knobs 40 are then moved in the direction opposite to arrow B in FIG. 9 so as to be pulled out of the respective holes 38b. The knobs 40 are further rotated in the direction of arrow C so that the knobs 40 are fitted into the respective holes 38c. As a result, the guide roller 28 is guided to the film drawing section 15 as shown in FIG. 12. Thereafter, the film 12b is drawn out of the film drawing section 15 to wrap the tray T. Thus, when the film to be used is changed from one to another, the film return preventing mechanisms 31, 32 and 43 prevent the respective films 5b, 11b and 12b from returning. The distal ends of the films 5b, 11b and 12b can reliably be held on the guide rollers 24, 26 and 28 of the guide mechanism 22 respectively.

[0027] According to the foregoing embodiment, the distal ends of the films 5b, 11b and 12b drawn out from a plurality of film rolls 5, 11 and 12 respectively are held by the guide mechanism 22. The guide mechanism 22 guides one of the film distal ends to the film drawing section 15. Consequently, the currently used film need not be retreated when the film is changed from one to another. Furthermore, the film to be subsequently used need not be drawn out to be guided to the film drawing section 15. Thus, the change of the film can be simplified. Moreover, since the return preventing mechanisms 31, 32 and 43 prevent the films 5b, 11b and 12b of the film rolls 5, 11 and 12 from returning, respectively, the film can be prevented from returning during the use thereof, and the distal ends of the unused films can reliably held on the guide mechanism 22.

[0028] Particularly in the foregoing embodiment, the guide mechanism 22 includes the guide rollers 24, 26

and 28 holding the distal ends of the films 5b, 11b and 12b respectively. One of these guide rollers selectively positions the corresponding film at the film drawing section 15. Consequently, the distal end of the film can be caused to accurately correspond to the film drawing section.

[0029] Furthermore, the return preventing mechanism 31 comprises the guide roller 25 serving as the film return preventing roller and the one-way clutch 33 allowing the guide roller 25 to rotate only in one direction. Since the film 5b is guided by the guide roller 25, it can reliably be prevented from returning. The same return preventing mechanisms 31 and 43 are provided for the films 11b and 12b of the film rolls 11 and 12 respectively. Consequently, each of the films 11b and 12b can reliably be prevented from returning.

[0030] The one-way clutch 33 comprises the cylindrical portion 34a which has the cylindrical inner circumferential face and is eccentric with the guide roller 25 or 27, and the ball 35 provided between the inner circumferential face of the cylindrical portion 34a and the outer circumferential face of the guide roller 25 or 27 for rotation. Consequently, the one-way clutch 33 can reliably prevent reverse rotation although having a simple construction. Thus, the film can be prevented from returning while the cost of the apparatus can be reduced. The same effect can be achieved with respect to the one-way clutch 45.

[0031] The cutter 17 thermally cuts the film in the non-contact manner. Accordingly, the film is thermally cut when a thermally cutting temperature is reached. The film is not subjected to an excessive heat and accordingly, chips and shavings of the film and emitting smoke due to thermal cutting can be prevented. Additionally, the chips and shavings can be prevented from adhering to the cutter 17. In this case, the first and second film snubbers 14 and 16 are provided on both sides of the cutter 17 respectively, and the cutter is disposed to be adjacent to but not to project from the line between the film snubbers. The drawn film is caused to bridge the film snubbers 14 and 16 such that it is subjected to heat from the cutter 17 to be thermally cut in the non-contact manner. Consequently, the film can reliably be cut while being reliably spaced away from the cutter 17.

[0032] FIG. 13 illustrates a second embodiment of the invention. Only the difference between the first and second embodiments will be described. In the second embodiment, identical or similar parts are labeled by the same reference symbols as in the first embodiment. The wrapping apparatus comprises the main frame 51 generally formed into the shape of a desk lamp. More specifically, the wrapping apparatus comprises left-hand and right-hand leg-like side plates 51a only one of which is shown, left-hand and right-hand frame side plates 51b only one of which is shown, and left-hand and right-hand vertical side plates 51c only one of which is shown, these plates being connected together. The first supporting mechanism 2 is provided on the side plates 51a. The second supporting mechanism 3 is provided on the side plates 51b. The third supporting mechanism 4 is provided on the side plates 51c. The same effect can be achieved from the second embodiment as from the first embodiment.

[0033] FIGS. 14 and 15 illustrate a third embodiment of the invention. Only the difference between the second and third embodiments will be described. The main frame 61 of the wrapping apparatus comprises left-hand and right-hand frame side plates 61a only one of which is shown, and left-hand and right-hand vertical side plates 61b only one of which is shown, these plates being connected together into a table top type wrapping apparatus. The left-hand and right-hand leg-like side plates 51a are eliminated in the wrapping apparatus of the third embodiment. Two supporting mechanisms 62 and 63 are provided in the wrapping apparatus. The supporting mechanism 62 is provided on the frame side plates 61a, and the supporting mechanism 63 is provided on the vertical side plates 61b.

[0034] The guide mechanism 64 holds two film rolls 11 and 12 and guides the films 11b and 12b to the film drawing section 15. The guide mechanism 64 includes the pivoting member 65 having the same construction as shown in FIG. 1. The other identical or similar parts in the third embodiment are labeled by the same reference symbols as in the first embodiment. Each positioning mechanism 39 includes the positioning groove 66 having two positioning holes 66a and 66b formed at both ends thereof respectively. In the third embodiment, the film can be changed between two film rolls.

[0035] FIG. 16 illustrates a fourth embodiment of the invention. The fourth embodiment differs from the first embodiment in that the guide mechanism 22 includes not only the first and second return preventing mechanisms 31 and 32 but also a third return preventing mechanism 43. Thus, the guide mechanism 22 has three return preventing mechanisms 31, 32 and 43 corresponding to the film rolls 5, 11 and 12 respectively. Consequently, the distal ends of the films can effectively be held by the guide mechanism 22.

[0036] The locations of the return preventing mechanism 31 and the guide roller 24 serving as the holding member may be changed to each other. In this case, the film return preventing roller of the return preventing mechanism 31 serves as the holding member. More specifically, the final stage roller prevents the film from returning while holding the film. The construction may be applied to the return preventing mechanism 32 and the guide roller 26, and the return preventing mechanism 43 and the guide roller 44. Furthermore, the cutter may be brought into contact with the film. The guide mechanism may be constructed to perform the linear movement instead of rotation or may employ linkage. Although the films have different widths in the foregoing embodiments, the films may have the same width and the unused films may serve as spares.

[0037] The foregoing description and drawings are

merely illustrative of the principles of the present invention and are not to be construed in a limiting sense. Various changes and modifications will become apparent to those of ordinary skill in the art. All such changes and modifications are seen to fall within the scope of the invention as defined by the appended claims.

Claims

1. A wrapping apparatus comprising a plurality of supporting members (2, 3 and 4) provided on a main frame (1) for supporting a plurality of film rolls (5, 11 and 12) respectively, a film drawing section (15) provided in the main frame (1), a cutter (17) for cutting the film drawn out from the film drawing section (15), **characterized by**:

   a guide mechanism (22) provided on the main frame (1) for holding distal ends of films drawn out from the film rolls (5, 11 and 12) respectively and guiding one of the distal ends of the respective films to the film drawing section (15); and
   a plurality of return preventing means (31 and 32) for preventing the respective films drawn out from the film rolls (5, 11 and 12) from returning.

2. The wrapping apparatus according to claim 1, **characterized in that** the guide mechanism (22) includes a pivoting member (23), a plurality of holding members (24, 26 and 28) holding the distal ends of the films drawn out from the respective film rolls (5, 11 and 12), and a positioning mechanism (39) for positioning a selected one of the holding members (24, 26 and 28) relative to the film drawing section (15).

3. The wrapping apparatus according to claim 1, **characterized in that** the guide mechanism (22) is provided with the return preventing means (31, 32).

4. The wrapping apparatus according to claim 1, **characterized in that** the return preventing means (31, 32) includes a film return preventing roller (25, 27) and a one-way clutch (33) allowing the film return preventing roller (25, 27) to be rotated only in one direction, wherein the film is guided by the film return preventing roller (25, 27).

5. The wrapping apparatus according to claim 4, **characterized in that** the one-way clutch (33) includes a cylindrical member (34a) having a circularly cylindrical inner circumferential face and disposed so that a center of the inner circumferential face is eccentric relative to the film return preventing roller (25, 27), and a rolling member (35) rotatably mounted between the inner circumferential face of the cylindrical member (34a) and an outer circumferential face of the film return preventing roller (25, 27).

6. The wrapping apparatus according to claim 1, **characterized in that** the cutter (17) thermally cuts the film in a non-contact manner.

7. The wrapping apparatus according to claim 6, **characterized in that** the cutter (17) includes two film snubbers (14, 16) provided on both sides of the cutter (17) respectively and the cutter (17) is disposed to be adjacent to but not to project from an imaginary line between the film snubbers (14, 16).

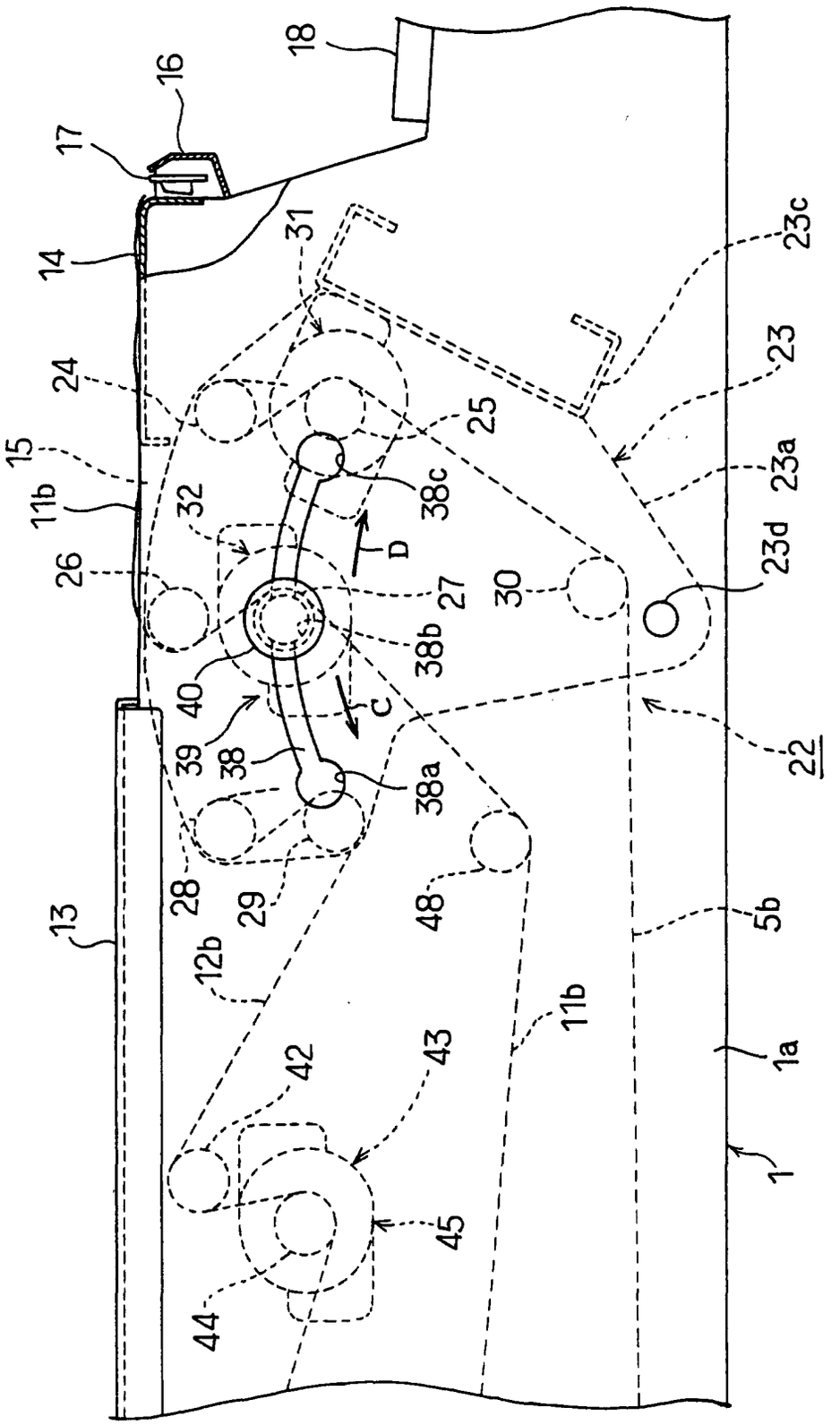
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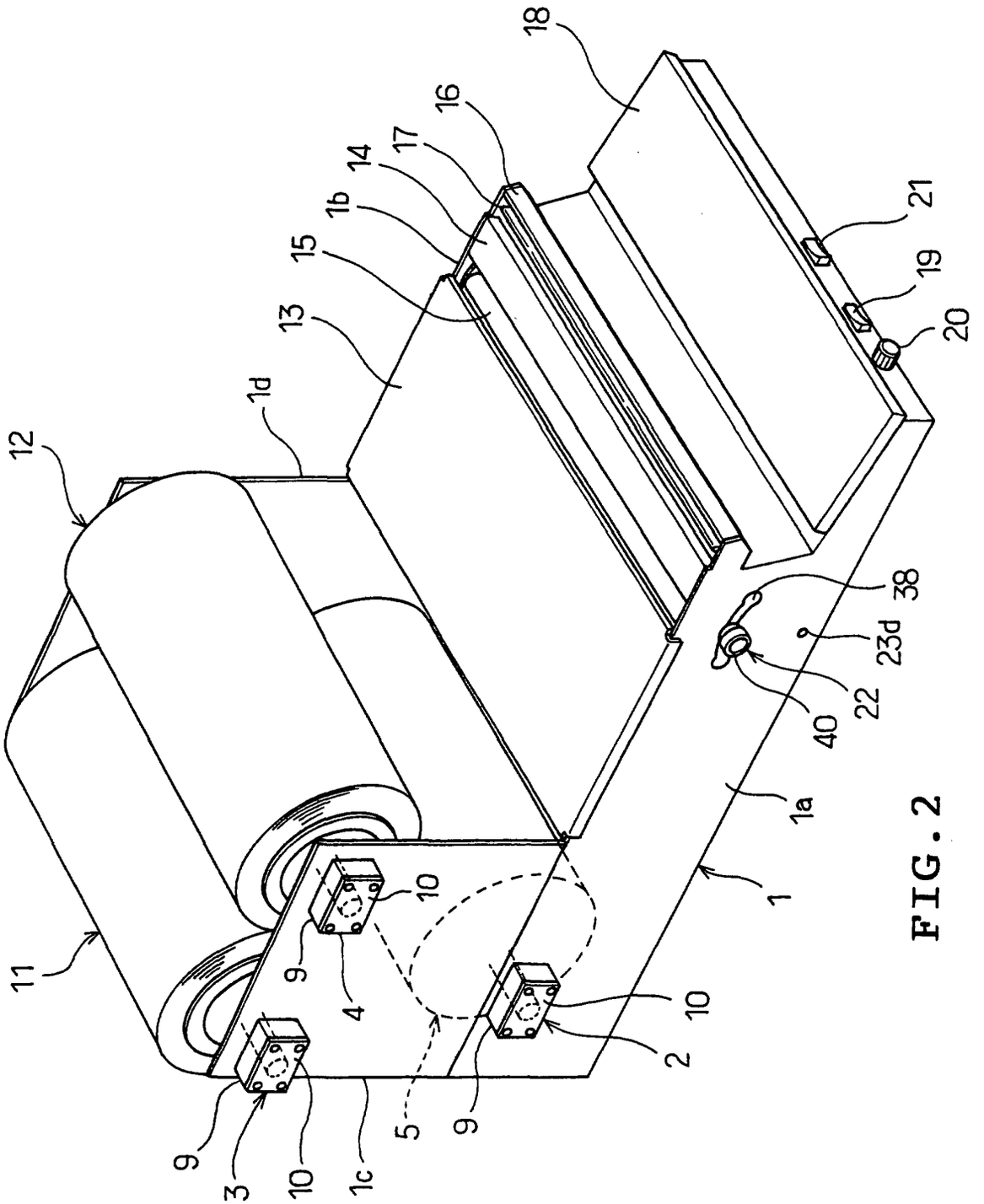
FIG. 1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16
17
14
1b
15
13
1d
12
21
19
20
38
23d
22
40
1a
1
11
10
9
4
10
2
5
9
9
3
10
1c

FIG. 2

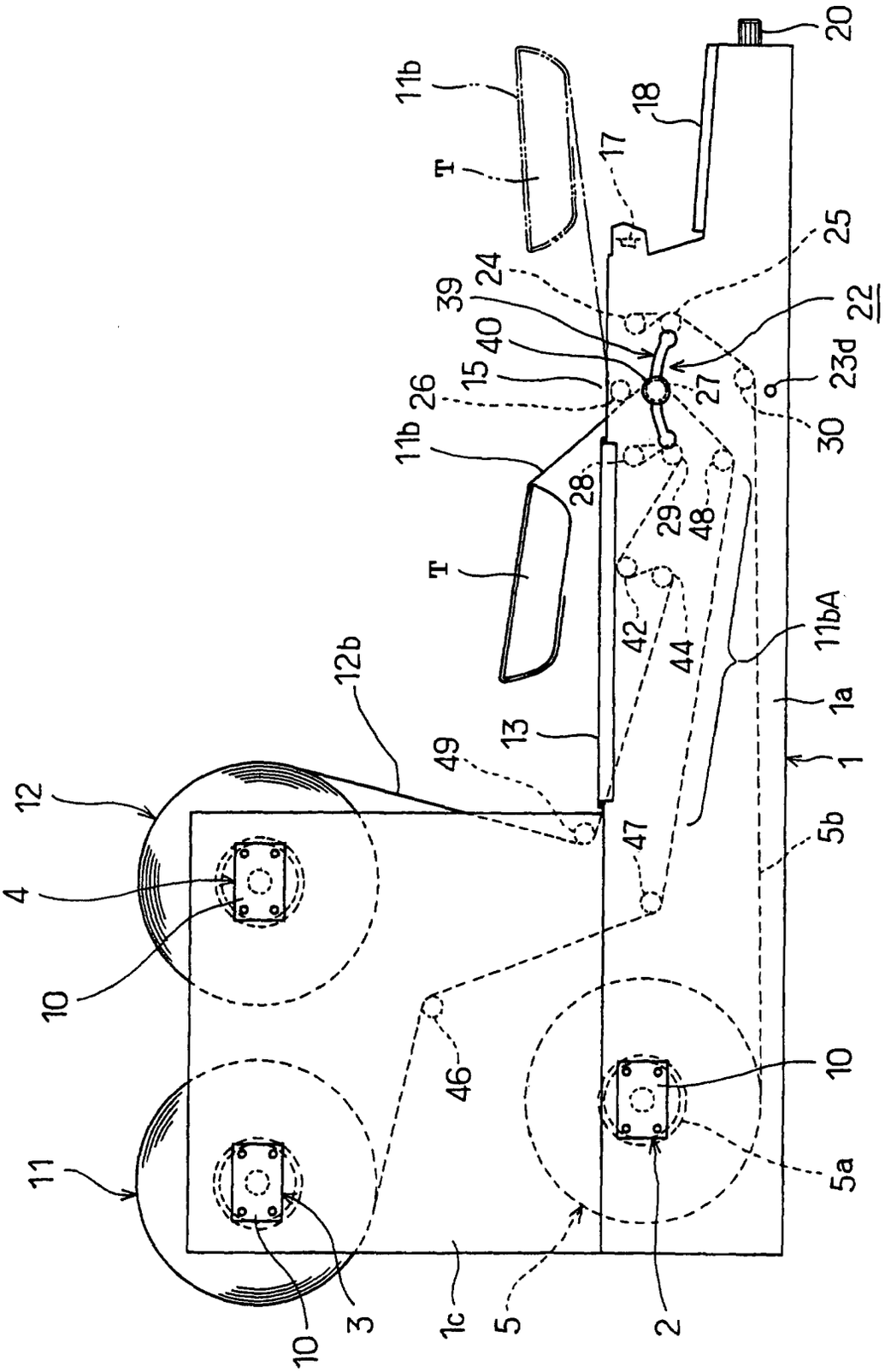
11b
T
17
18
20
25
24
39
40
15
26
22
23d
27
30
11b
28
29
48
T
42
44
11bA
12b
1a
1
49
13
12
47
5b
4
10
46
10
11
5a
10
3
1c
5
2

FIG. 3

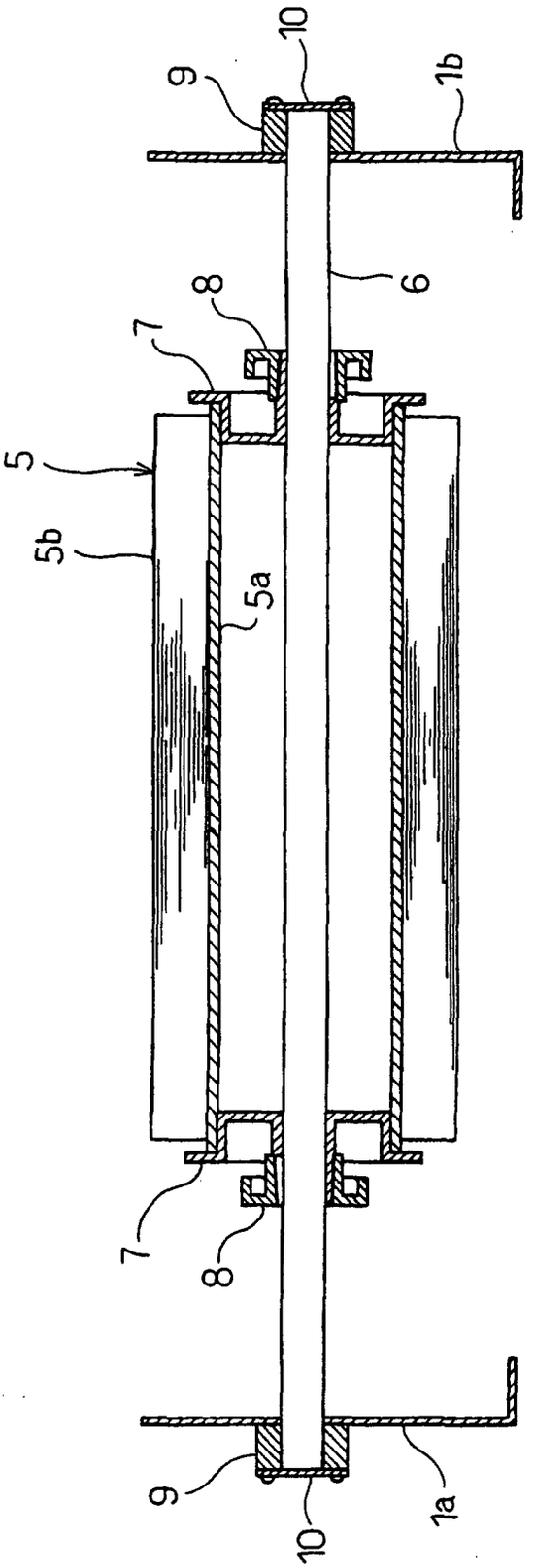

FIG. 4

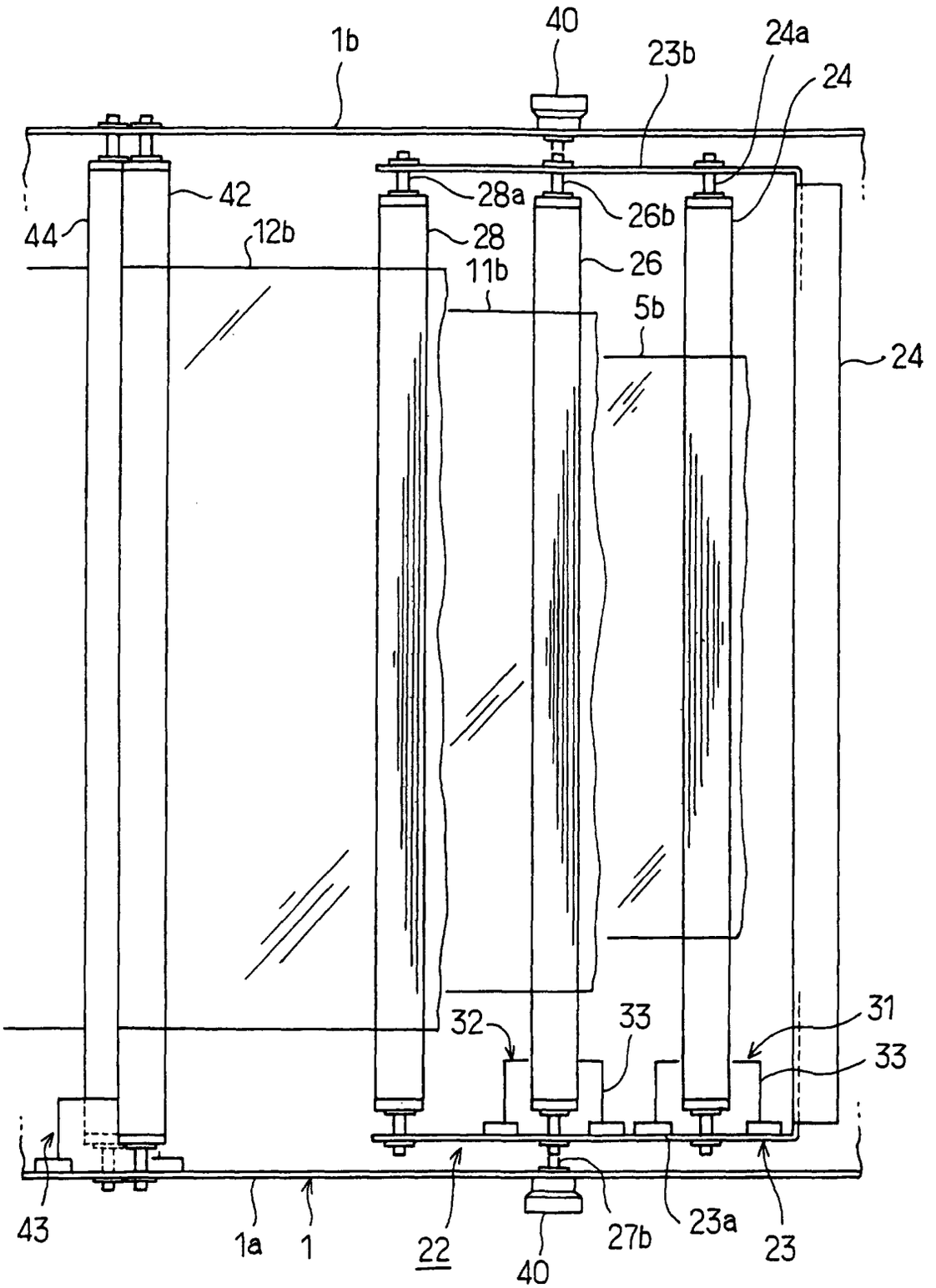
1b
40
23b
24a
24
42
28a
26b
44
12b
28
26
11b
5b
24
32
33
31
33
43
1a
1
22
40
27b
23a
23

FIG.5

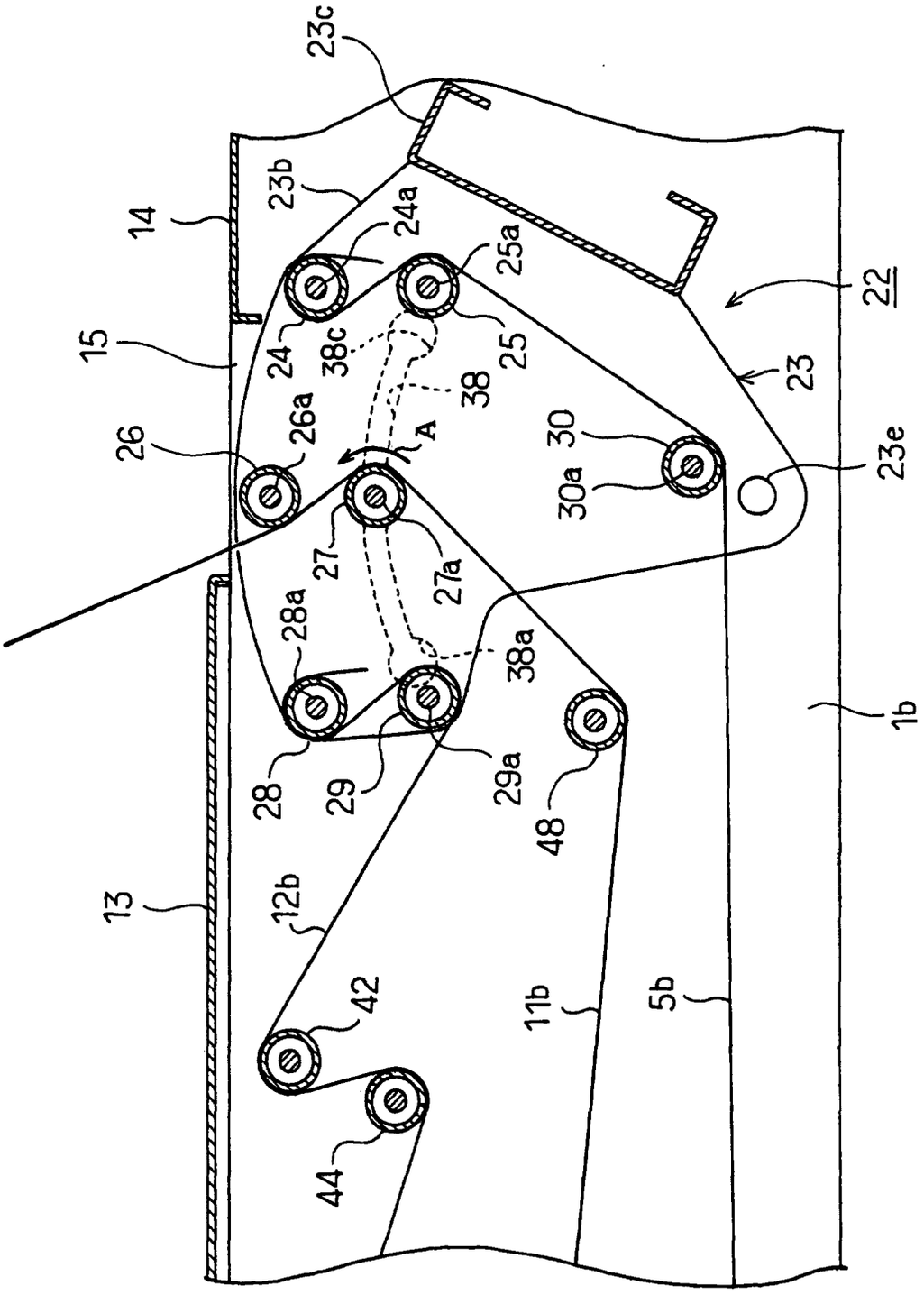
23c
23b
14
24a
25a
22
15
24
38c
25
23
38
26a
A
26
30
23e
30a
27
27a
28a
38a
1b
28
29
29a
48
13
12b
42
11b
5b
44

FIG. 6

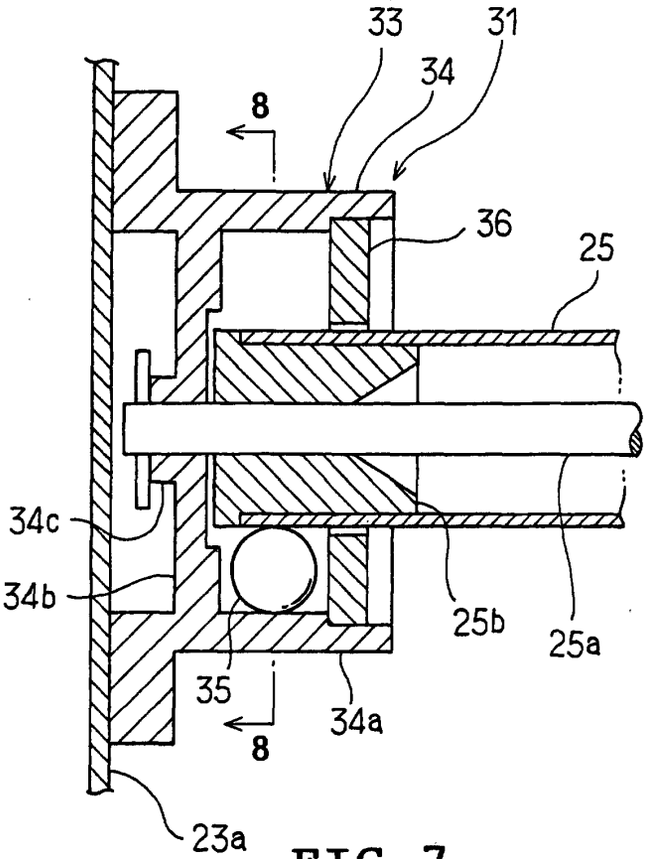
33
31
34
8
36
25
34c
34b
25b
25a
35
34a
8
23a

FIG.7

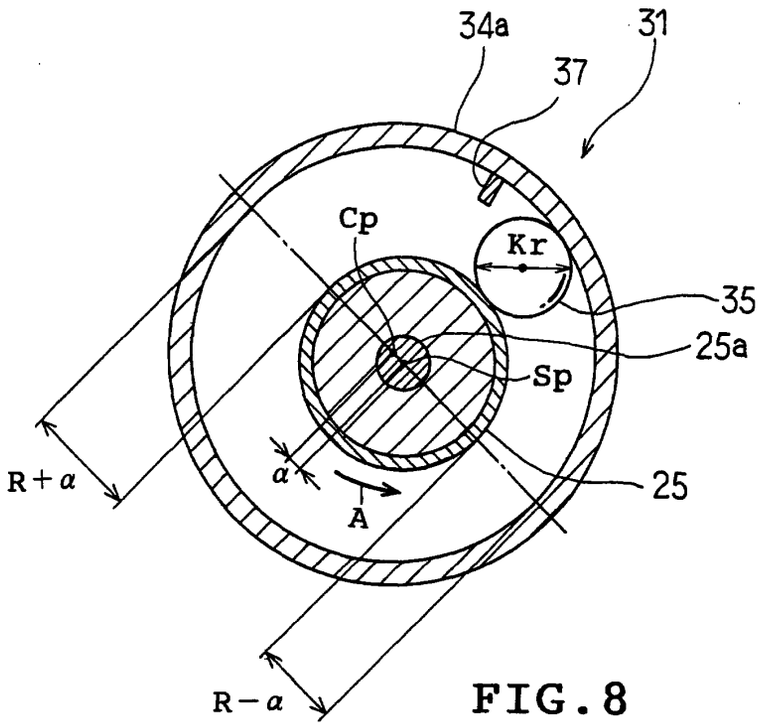
34a
31
37
Cp
Kr
35
25a
Sp
25
R+α
α
A
R−α

FIG.8

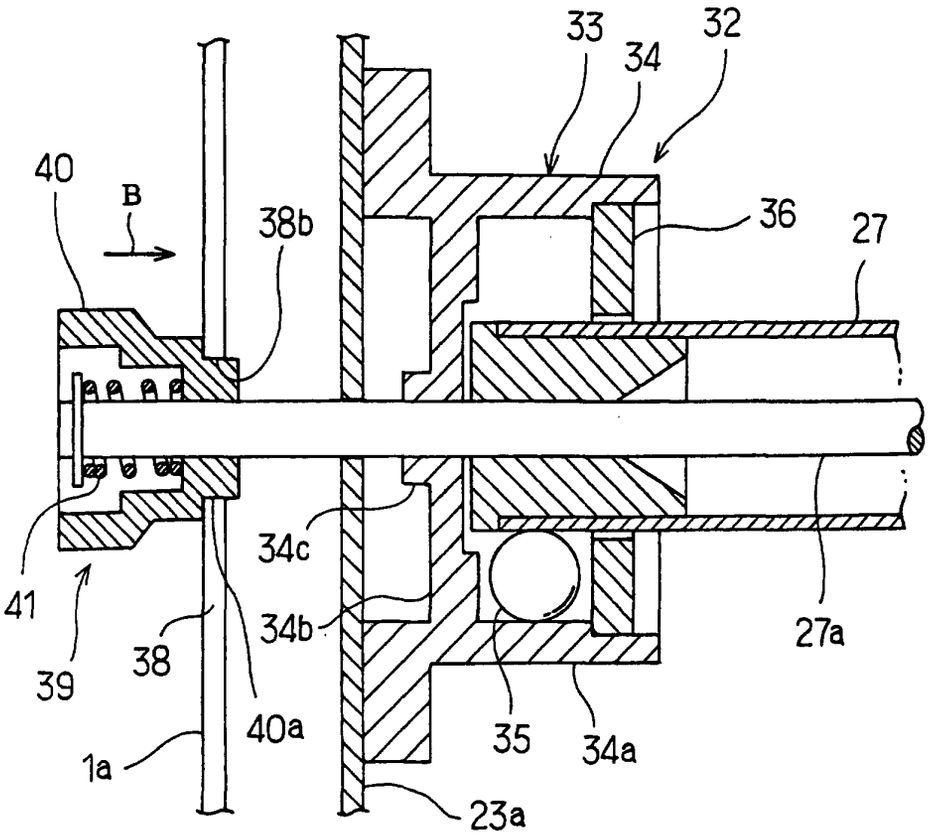
33
34
32
40
B
38b
36
27
41
34c
34b
38
39
40a
1a
35
34a
27a
23a

FIG.9

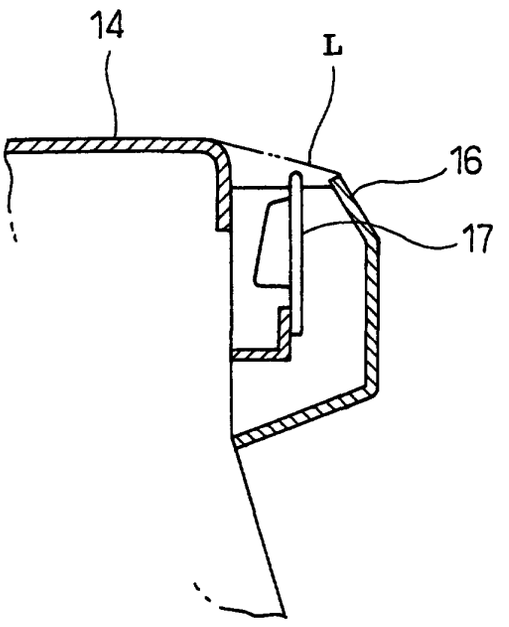
14
L
16
17

FIG.10

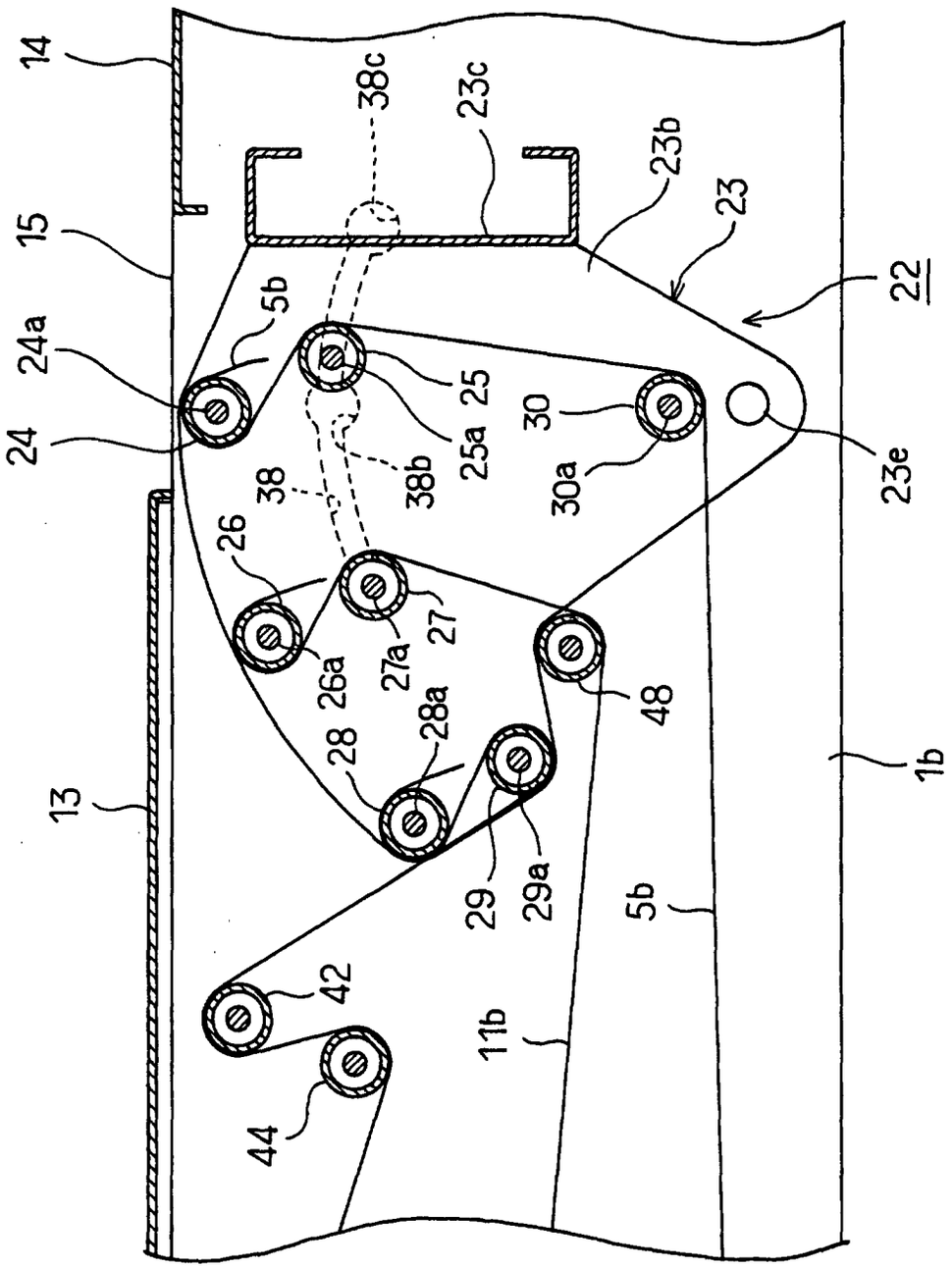
14
38c
23c
23b
23
15
22
5b
24a
25
30
24
25a
38
38b
30a
23e
26
27
26a
27a
48
28a
28
13
1b
29
29a
5b
42
11b
44

FIG. 11

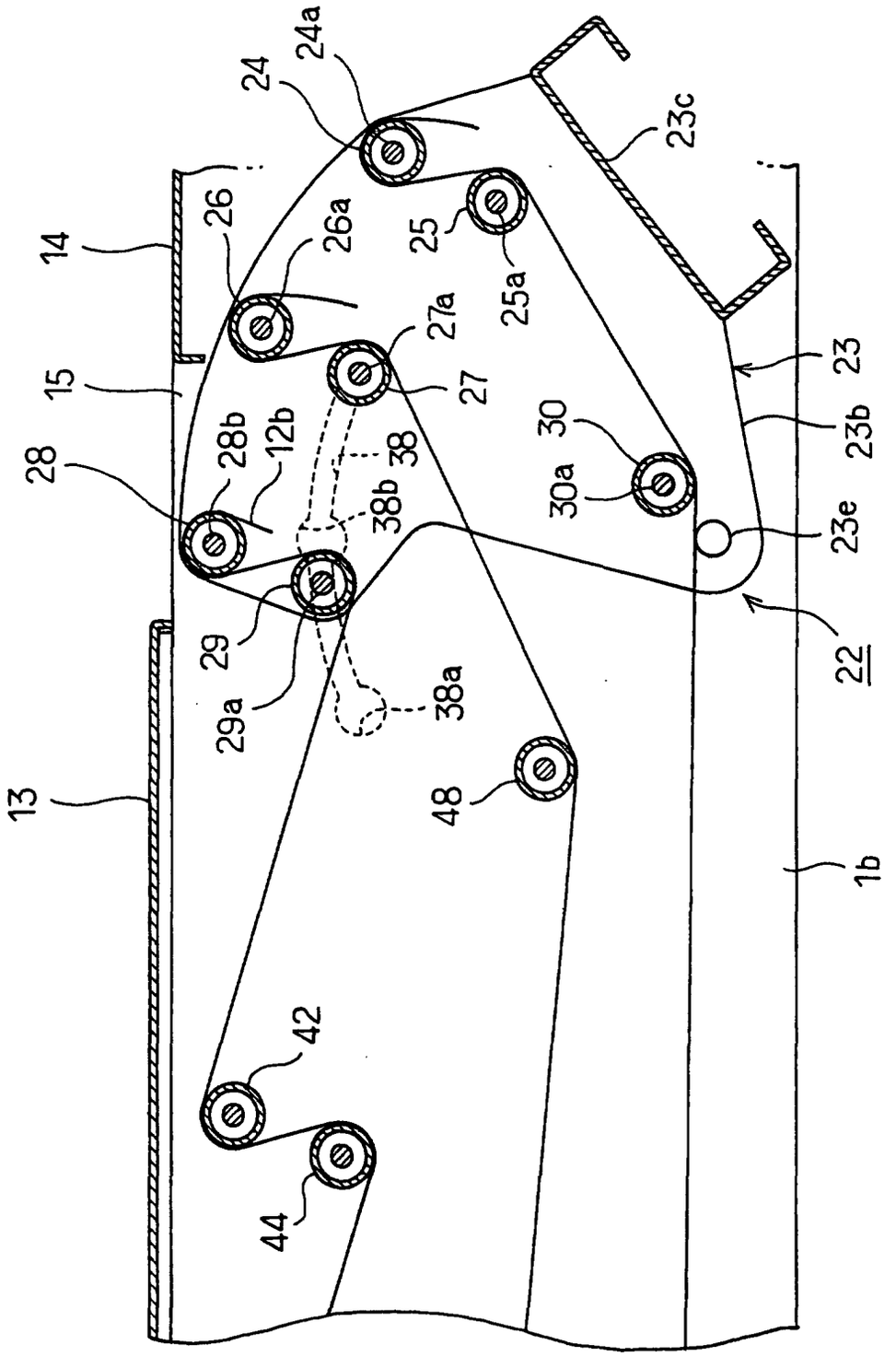
24a
24
23c
26
26a
25
25a
14
27a
27
23
15
28b
12b
38
30
28
38b
30a
23b
23e
29
29a
38a
22
48
13
1b
42
44

FIG. 12

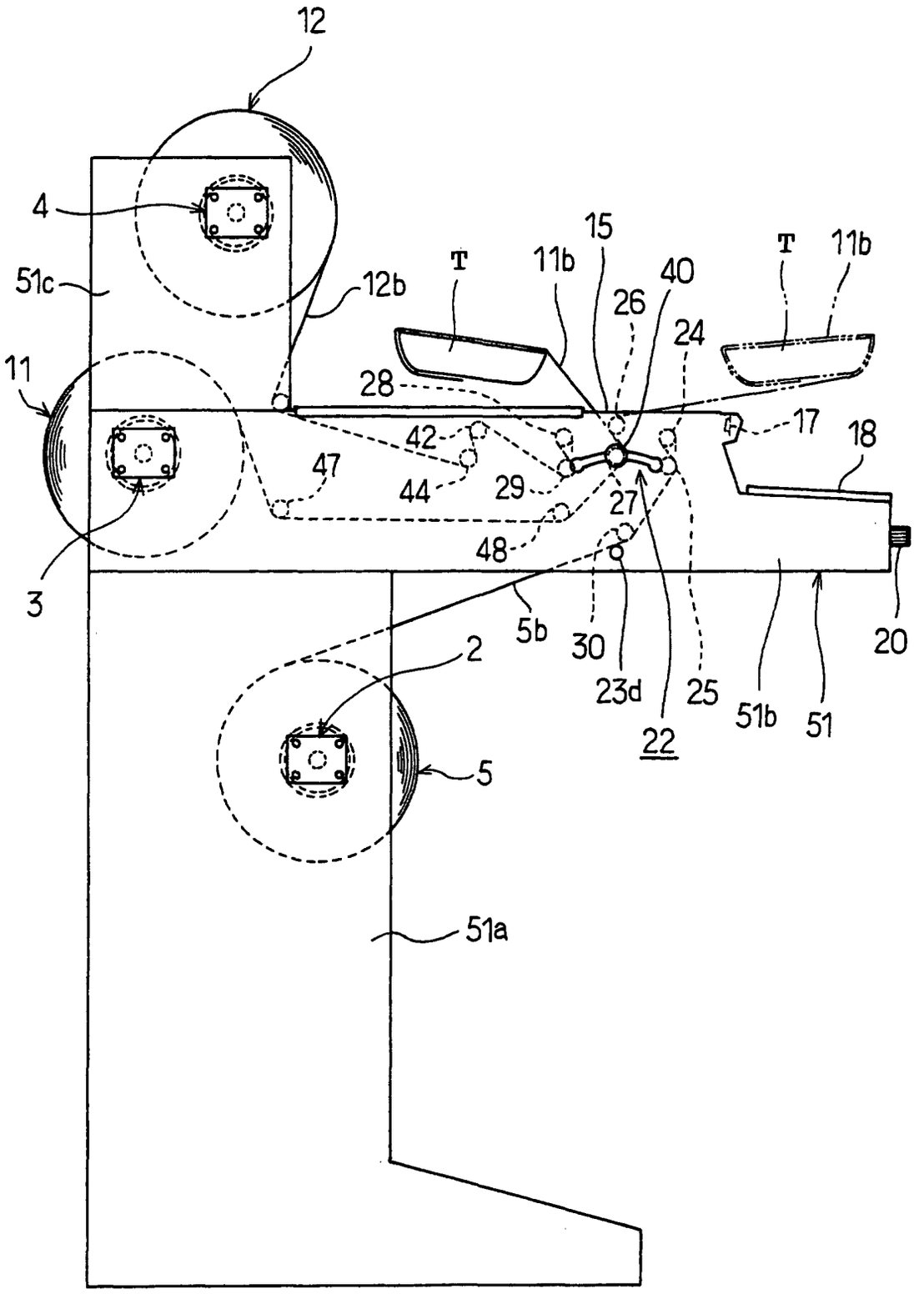
12
4
51c
12b
T
11b
15
40
26
24
T
11b
11
28
17
18
42
47
44
29
27
48
3
5b
30
23d
22
25
51b
51
20
2
5
51a

FIG. 13

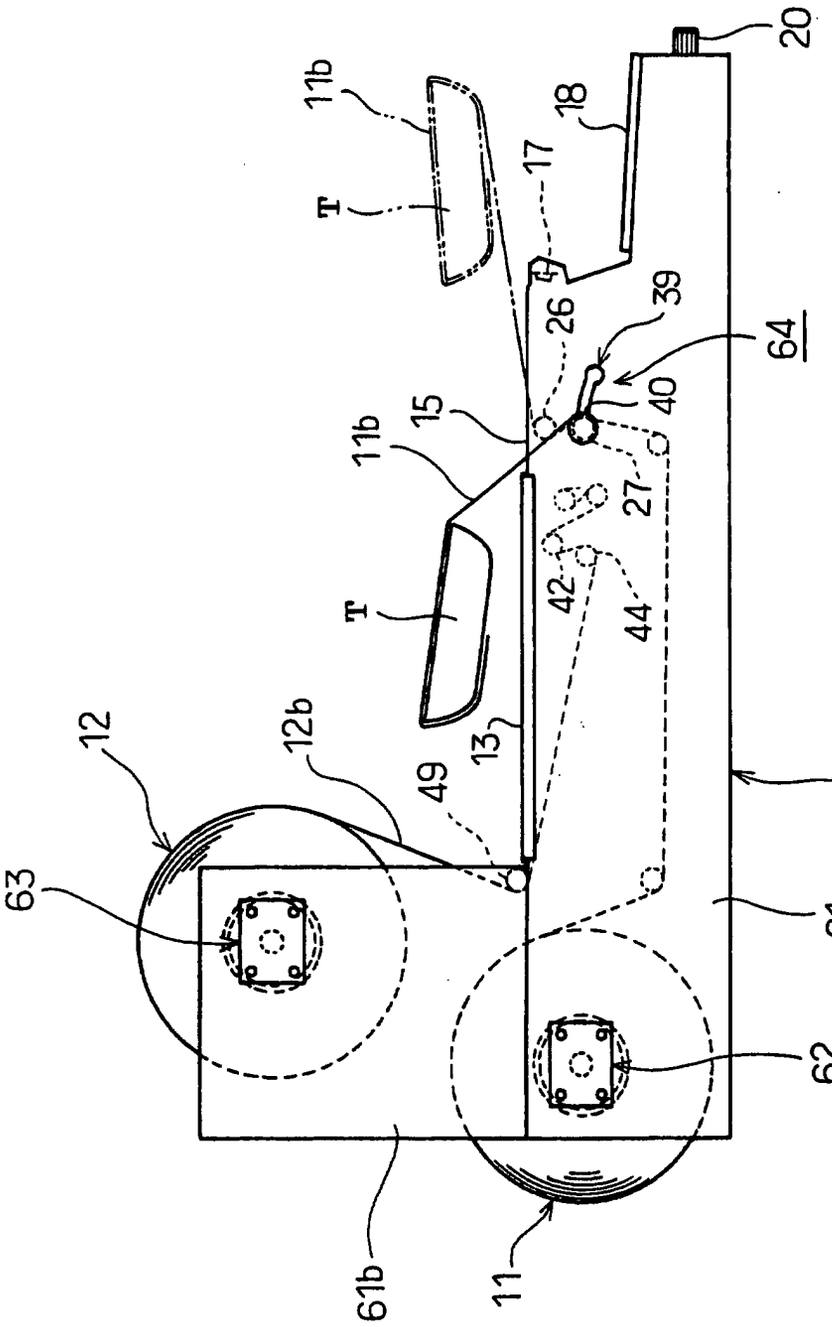
20
11b
18
17
T
26
39
64
40
15
11b
27
42
44
T
13
49
12b
12
63
61
61a
62
61b
11

FIG. 14

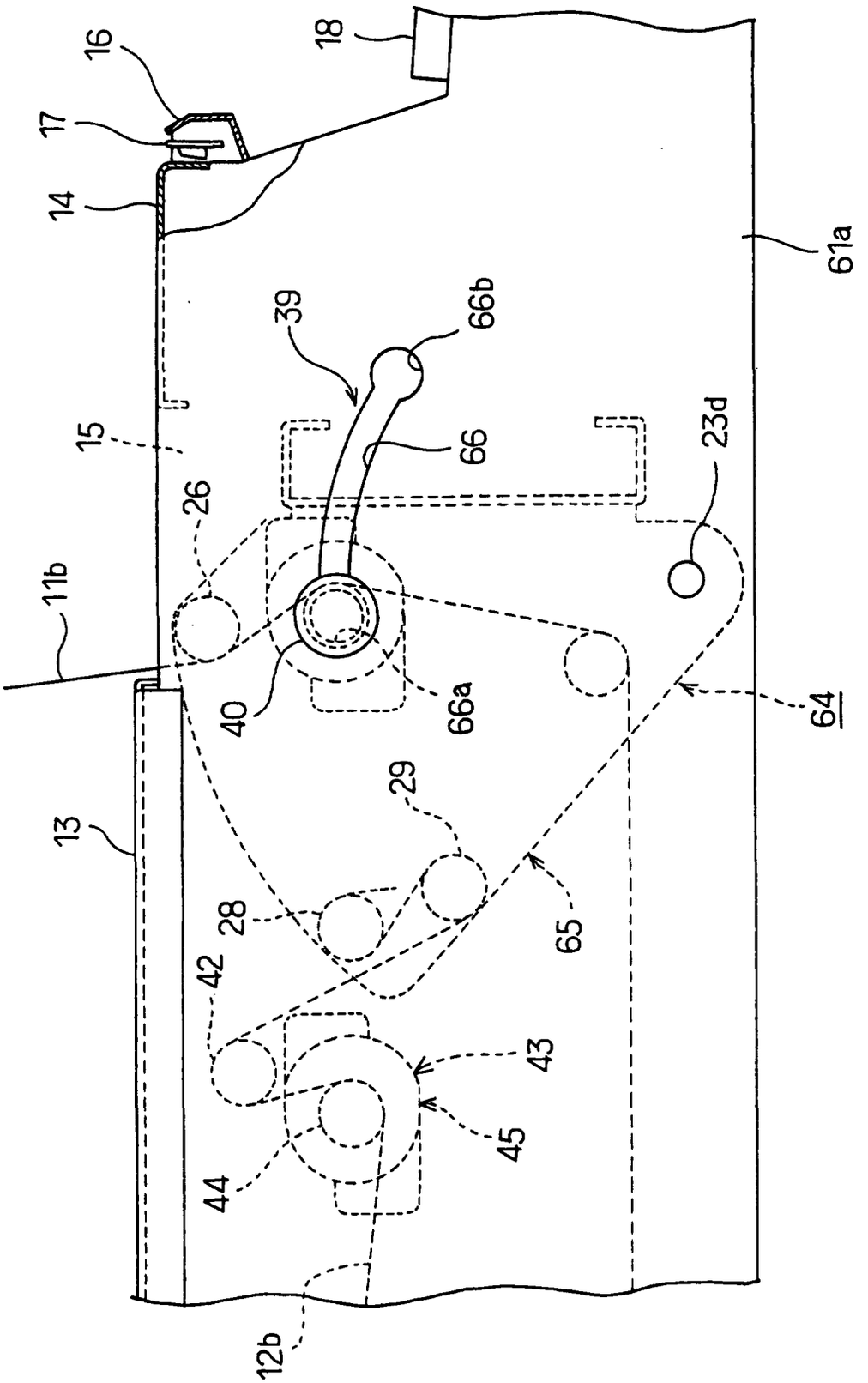
16
17
14
18
61a
39
66b
66
15
23d
26
11b
40
66a
64
29
13
28
65
42
43
45
44
12b

FIG. 15

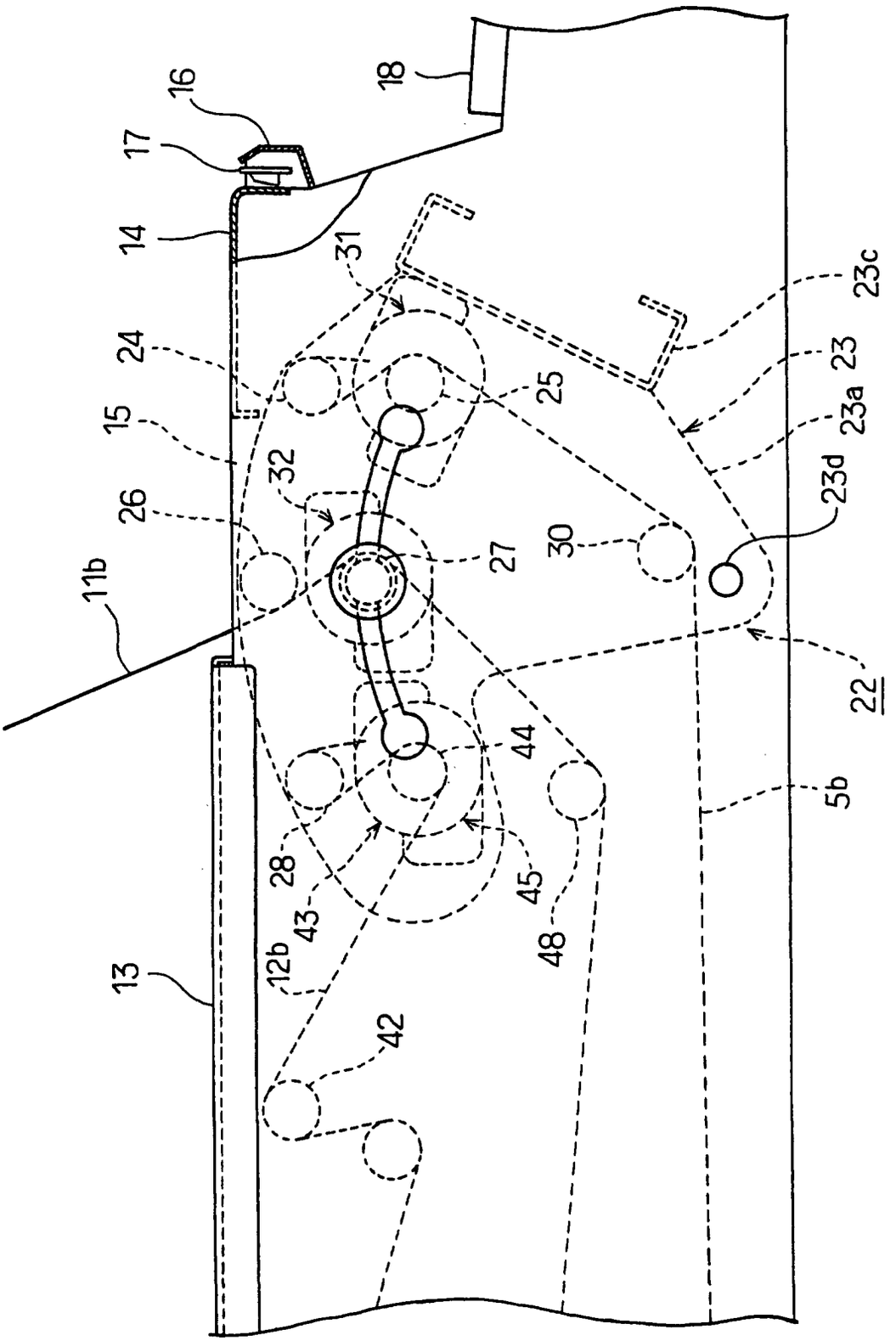
16
18
17
14
31
23c
24
23
25
15
23a
32
23d
26
30
27
11b
22
44
5b
28
45
43
48
12b
13
42

FIG. 16

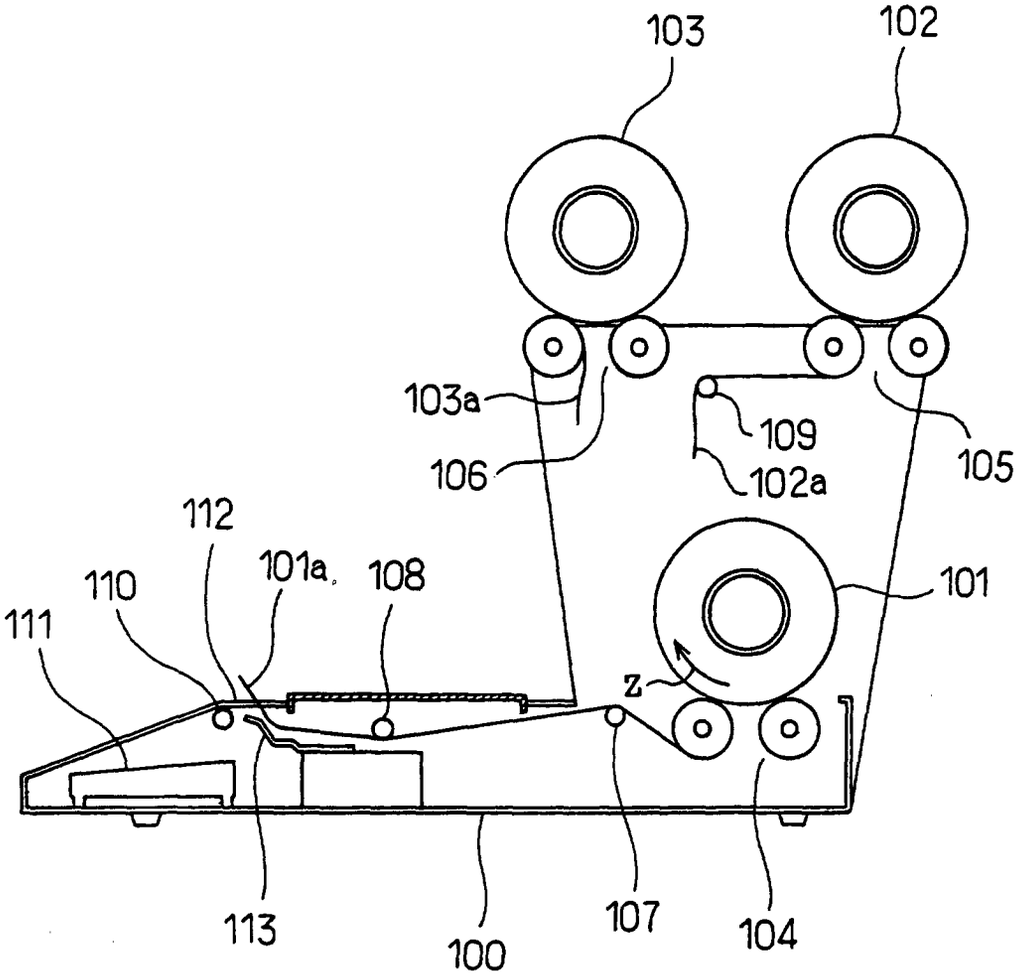

FIG.17 PRIOR ART