(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 245 492 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
02.10.2002 Bulletin 2002/40

(51) Int Cl.[7]: **B65B 43/50**, B65B 43/30

(21) Application number: **02007135.3**

(22) Date of filing: **28.03.2002**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **29.03.2001 JP 2001096221**

(71) Applicant: **Toyo Jidoki Co., Ltd.**
Tokyo (JP)

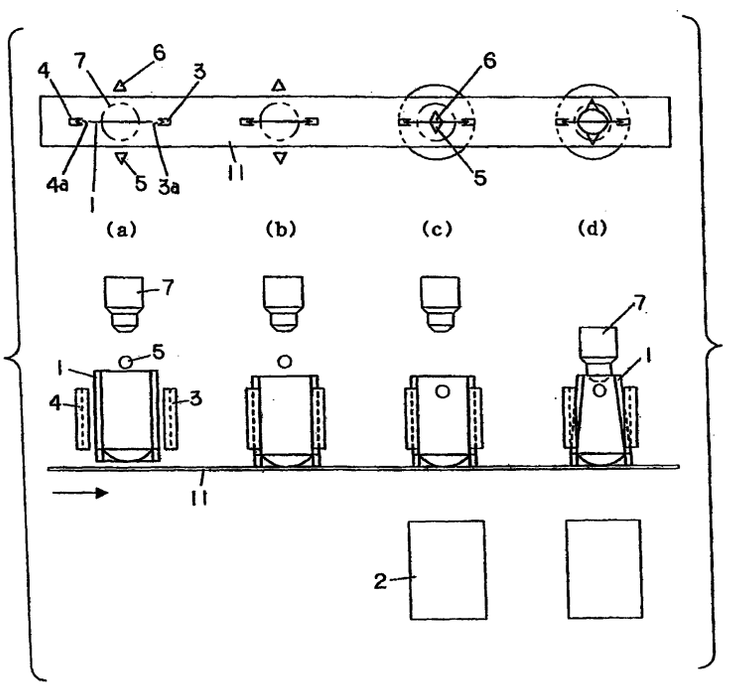
(72) Inventors:
- **Hiramoto, Shinichi**
  Iwakuni-shi, Yamaguchi (JP)
- **Tsutsui, Shoji**
  Iwakuni-shi, Yamaguchi (JP)

(74) Representative: **Schubert, Siegmar, Dipl.-Ing.**
Patentanwälte
Dannenberg Schubert Gudel
Grosse Eschenheimer Strasse 39
60313 Frankfurt (DE)

(54) Method and apparatus for inserting bags into retainers

(57) In a method and apparatus for inserting empty bags (1) into retainers (2), guide members (3, 4) are caused to approach both side edges of each supplied bag (1) so that the vertically oriented guide grooves of the guide members contacted the side edges of the bag (1), thus positioning the bag (1) in a position that is vertically aligned with a retainer (2). The bag mouth is opened by suction disks (5, 6), and a plug (7) is brought into the opened bag mouth. Then, the plug (7) is lowered toward the retainer (2), so that both side edges of the bag (1) is inserted into the insertion grooves of the retainer (2). After this insertion, a compressed gas is jetted out of a discharge opening at the tip end of the plug (7) into the bag (1), so that the bag (1) is spread open to the bottom thereof.

FIG. 1



EP 1 245 492 A1

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a method and apparatus for successively inserting empty bags into retainers in a retainer type bag-filling packaging system.

2. Prior Art

[0002] In retainer type bag-filling packaging systems, self-standing bags are inserted into retainers in the following manner: the mouth of bags (called "bag mouth (s)") are first opened by being suction-chucked from both sides by a pair of suction-chucking members, plugs are brought into the opened bag mounts, the plugs are then lowered so that the bags are inserted into retainers that are positioned below, and then, the bags are completely opened including the bottom areas inside the retainer by way of blowing compressed air into the bags from the plugs.

[0003] This insertion method and insertion apparatus is described in, for instance, the "Prior Art" section of Japanese Patent Application Laid-Open (Kokai) No. 2000-142630.

[0004] Generally, in retainers, a retaining section and a pair of insertion grooves are formed inside the retainers and extend in the longitudinal orientation. The retaining section is an empty space closed at the bottom and has a cross section that can receive the body portion of a self-standing bag after the opening of the bag by suction-chucking members. The insertion grooves are formed so as to receive both side edge portions of the self-standing bag. These insertion grooves are symmetrically provided on both (left and right) sides of the retaining section.

[0005] In order to prevent swinging of a bag after the bag is inserted into the retainer (especially preventing swinging of the bag after the contents are put in the bag), the insertion grooves are formed with a fairly narrow width (so that there is little play between the groove surfaces and the bag surface). Accordingly, when a bag is inserted into the insertion grooves from above, insertion mistakes may occur. The reason for this is that if a bag is warped, or if the attitude of a bag is inclined at the time of insertion, the bottom edge of the bag would deviate from positions directly above the insertion grooves, so that the bottom edge (lower end) of the bag catch on the edges of the retainer when the bag is lowered.

[0006] Accordingly, the entry portion of the insertion grooves formed in a retainer is formed with a greater width (i.e., the areas in the vicinity of the entry portion are formed with a tapered shape) so that the bag can be inserted into the grooves even if the bag is somewhat warped.

[0007] In some cases, warping may occur when the bag mouth is opened by the suction-chucking members even though the bag is not warped to begin with. Moreover, when the mouth of a bag that is warped is opened, the warping of the lower portion of the bag may be increased even further.

[0008] When the entry portion of the insertion grooves (and retaining sections) of a retainer has an expanded width so as to be in a tapered shape, this measure is effective in regard to the insertion of a bag into such a retainer. However, the portions having a tapered shape do not contact snugly to the opened bag and therefore do not function to hold the bag securely. Accordingly, as the size of such portions having a tapered shape increases, the function of suppressing swinging of the bags that have been filled with the contents deteriorates.

[0009] Conversely, if priority is given to the function of suppressing swinging of the bags, and the portions having a tapered shape are therefore reduced in size, then the insertion of the bag is impeded.

[0010] To solve these problems, the retaining section and insertion grooves can be formed with an increased depth, thus fulfilling both functions described above. However, this deep hole and groove structure has its own problem. The size of the retainer in the longitudinal direction increases, and the weight of the retainer also increases. Since the retainers are intermittently or continuously conveyed, it is desirable that the retainers be as small and light as possible. This is desired even stronger when the retainers are conveyed at a high speed.

[0011] Furthermore, when plug is inserted and pushed into the bag mouth, the bag may tilt in the direction of width, causing a positional deviation. In this case, a discrepancy occurs between the center of the retaining section and the center of the bag; and the contact between the bag surface and the inside circumferential surface of the retaining section may drop when the bag is opened up to the bottom after being inserted into the retainer. In such cases as well, the problem of swinging of the bags following filling with a liquid would occur, so that the liquid splashes out of the bag.

SUMMARY OF THE INVENTION

[0012] Accordingly, the present invention is to solve the above-described problems that occur when bags whose mouths have been opened are inserted into retainers.

[0013] It is an object of the present invention to provide a method and apparatus for inserting empty bags into retainers in which bags are set in retaining sections and insertion grooves of retainers without any interference.

[0014] It is another object of the present invention to provide a method and apparatus for inserting empty bags into retainers in which bags are set in the centers of retaining sections and insertion grooves.

[0015] It is still another object of the present invention

to provide a method and apparatus for inserting empty bags into retainers that uses lightweight and compact retainers.

[0016] The above objects are accomplished by unique method of the present invention for inserting bags into retainers in which:

the mouth of a bag is caused to open by way of suction-chucking the mouth from both sides thereof by suction-chucking members, and
the bag and a retainer positioned beneath the bag are caused to approach each other, thus inserting the bag into the retainer; and
the method includes the steps of:

bringing guide members, which have guide grooves that are oriented in a vertical direction, to both side edges of the bag so that the guide members come into contact with the side edges of the bag, thus positioning the bag with respect to the grooves formed in the retainer, and
guiding the bag by the guide members so that the bag is inserted into the retainer.

[0017] The above objects are accomplished by another unique method of the present invention for inserting bags into retainers in which:

the mouth of a bag is caused to open by way of suction-chucking the mouth from both sides thereof by suction-chucking members,
a plug is caused to be brought into the mouth of the bag, and
the plug and a retainer positioned beneath the plug are caused to approach each other, thus inserting the bag into the retainer; and
the method includes the steps of:

bringing guide members, which have guide grooves that are oriented in a vertical direction, to both side edges of the bag so that the guide members come into contact with the side edges of the bag, thus positioning the bag with respect to the grooves formed in the retainer, and
guiding the bag by the guide members so that the bag is inserted into the retainer.

[0018] The above objects are accomplished by still another unique method of the present invention for inserting bags into retainers in which:

the mouth of a bag is caused to open by way of suction-chucking the mouth from both sides thereof by suction-chucking members,
a plug is caused to be brought into the mouth of the bag, and
the plug is caused to be lowered toward a retainer that is positioned beneath the plug, thus inserting the bag into the retainer; and

the method includes the steps of:

bringing guide members, which have guide grooves that are oriented in a vertical direction, to both side edges of the bag so that the guide members come into contact with the side edges of the bag, thus positioning the bag with respect to the grooves formed in the retainer, and
guiding the bag by the guide members so that the bag is inserted into the retainer.

[0019] In the above insertion bag methods, when the guide members are caused to contact both side edges of the bag, the guide members that face each other after being opened to an extent that exceeds the bag width are caused to approach both side edges of the bag in, for instance, the horizontal plane. However, it is also possible to insert the bags between the guide grooves of the guide members from above. In this case, as long as the spacing of the facing guide groove gradually narrows in the downward direction, it is not necessary to cause the guide members themselves to approach the bag.

[0020] In addition, when the bag is lowered toward the retainer below, it is desirable to lower the pair of guide members to a point immediately above the retainer as the bag is lowered. This is done in order to prevent the lower end of the bag from slipping downward out of the guide grooves to an excessive extent as a result of the lowering motion of the bag, thus resulting in a loss of the guiding effect provided by the guide members. By lowering the bag together with the guide members, it is possible to guide the lower end of the bag to a position that is as close as possible to the retainer.

[0021] It is preferable that the bag mouth is opened by the suction-chucking members after the bag has been positioned by the guide members with respect to the grooves formed in the retainer. By thus positioning the bags beforehand by means of the guide members, the suction-chucking members always perform suction chucking on specified positions on the bag. Also, warping of the bag surfaces caused by the opening action of the bag mouth by the suction-chucking members can be suppressed.

[0022] Furthermore, the above-described insertion methods can be executed by the use of a plurality of sets of insertion assemblies. In this case, each insertion assembly is comprised of, for instance, suction-chucking members, guide members, a plug, and a plurality of sets of such insertion assemblies are continuously conveyed. When such insertion assemblies are used, supplied bags are positioned by the guide members, the retainers that are vertically aligned with the positioned bags are continuously conveyed, and insertion of the bags into the retainers is performed during the process of this continuous conveying.

[0023] It is also possible to execute the bag insertion process in such a manner that the bags and retainers are intermittently conveyed, the bags and retainers are vertically aligned in the stopping position, and insertion is performed by means of suction-chucking members, guide members, a plug, etc. that are disposed in the stopping position.

[0024] The above objects are accomplished by a unique structure for an apparatus for inserting bags into retainers, wherein the apparatus includes:

guide members which have guide grooves oriented in a vertical direction and are opened and closed,
suction-chucking members which are moved toward and away from each other so that the suction-chucking members open a mouth of a bag, which is positioned by the guide members, by way of suction-chucking the mouth from both sides thereof,
a vertically movable plug which is brought into the mouth that is opened by the suction-chucking members, and
a retainer positioning member that positions a retainer beneath the guide members; and
the bag is positioned in a specified position by way of closing the guide members so that the guide members come into contact with both side edges of the bag,
a mouth of the bag is opened by way of suction-chucking both sides of the mouth of the bag by the suction-chucking members,
the plug is lowered and brought into the mouth of the bag, and
the plug is lowered toward the retainer positioned beneath the plug so that the bag is inserted into the retainer.

[0025] In this insertion apparatus, for example, a plurality of sets of insertion assemblies each comprising the guide members; suction-chucking members and plug are continuously conveyed over an annular path at a constant speed and uniform intervals, the retainers are conveyed over a specified path at the same speed and same interval; and in at least portions of the paths, retainers and bags are conveyed in a state in which the retainers and bags are vertically aligned. Thus, the bags can be inserted into the retainers while the bags and retainers are continuously conveyed.

[0026] The above objects are accomplished by a unique structure for a rotary type bag insertion apparatus that receives a supply of bags and retainers, inserts the bags into the retainers and then discharges the bags together with the retainers. The rotary type bag insertion apparatus of the present invention includes:

a plurality of sets of insertion assemblies which are disposed at equal intervals around a circumference of a continuously rotating rotor, each of the insertion assemblies comprising:
guide members which have guide grooves oriented in a vertical direction and are opened and closed,
suction-chucking members which are moved toward and away from each other so that the suction-chucking members open a mouth of a bag, which is positioned by the guide members, by way of suction-chucking the mouth from both sides thereof,
a vertically movable plug which is brought into the mouth that is opened by the suction-chucking members, and
a retainer positioning member that positions a retainer beneath the guide members;

wherein as the rotor is rotated,
the bag is positioned in a specified position by way of closing the guide members so that the guide members come into contact with both side edges of the bag,
a mouth of the bag is opened by way of suction-chucking both sides of the mouth of the bag by the suction-chucking members,
the plug is lowered and brought into the mouth of the bag, and
the plug is lowered toward the retainer positioned beneath the plug so that the bag is inserted into the retainer.

[0027] The above rotary type bag insertion apparatus may further includes a receiving stand which supports the lower end of the bag and is disposed along a track of revolution of the guide members. This receiving stand extends from at least a bag supply position to a plug insertion position on a circumference of a rotor beneath the guide members.

[0028] In the above apparatuses for inserting bags into retainers of the present invention, wherein the guide members are raised and lowered, and when the plug is lowered further after the plug is lowered so as to be brought into the bag, the guide members are lowered together with the plug.

[0029] In addition, in the above apparatuses for inserting bags into retainers, the plug is provided with a gas discharge opening. In this case, the bottoms of the self-standing bags can be spread opened by blowing a compressed gas into the bag after the bag is inserted into the retainers.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030]

Figure 1 is a model diagram that shows (in the form of a time sequence) the steps (a) through (d) of the operation of the respective members used in the bag insertion method of the present invention;
Figure 2 is a model diagram of the steps (e) through (g) of the operation, a continuation of the steps of Figure 1;

Figure 3 is a sectional view of the overall structure of the rotary type bag insertion apparatus of the present invention;
Figure 4A is an enlarged sectional view of the main portion of the raising-and-lowering mechanisms of the guide device and insertion device, 4B is a side view thereof, and 4C is a sectional top view thereof;
Figure 5A shows the essential portion of opening-and-closing mechanism of the guide device, 5B is a partially sectional bottom view thereof, and 5C is a side view thereof;
Figure 6 is a sectional view of the essential portion of the opening-and-closing mechanism of the guide device;
Figure 7 is a sectional view of the main portion of the opening-and-closing mechanism of the guide device;
Figure 8 is a sectional view of the main portion of the raising-and-lowering mechanism of the guide device;
Figure 9 is a sectional view of the retainer positioning member;
Figure 10 is an enlarged front view of the structure of the opening device;
Figure 11 is a partial sectional top view thereof;
Figure 12 is a sectional view of the overall structure of another rotary type bag insertion apparatus of the present invention;
Figure 13 is a model diagram that illustrates (in the form of a time sequence) the steps (d) through (g) of operations of the respective members used in the insertion method of the present invention with another type of plug being employed;
Figure 14A is a front view of another plug used in the method of Figure 13, Figure 14B is a side view thereof, and Figure 14C is a bottom view thereof showing the of the first step of the plug;
Figure 15A is a top view a self-standing bag before the bag is spread open, and figure 15B is a side view thereof;
Figure 16A is a top view of the self-standing bag after the bag has been spread open, and Figure 16B is a side view thereof;
Figure 17A is a top view of a retainer used in the present invention with a bag therein, and Figure 17B shows the vertical section of the center portion thereof;
Figure 18A is a top view of another retainer used in the present invention with a bag therein, and Figure 17B shows the vertical section of the center portion thereof; and
Figure 19A is a top view of still another retainer used in the present invention with a bag therein, and Figure 19B shows the vertical section of the center portion thereof.

DETAILED DESCRIPTION OF THE INVENTION

[0031] The present invention will be described in detail below with reference to the embodiments shown in the accompanying drawings.

[0032] Figures 1 and 2 show, in terms of a time sequence, how self-standing bags which are conveyed continuously at a constant speed with their mouths (called "bag mouth(s)") facing upward are inserted into the insertion grooves of retainers that are vertically aligned beneath the bags and moved at the same speed in the horizontal plane.

[0033] The conveying path in Figures 1 and 2 is rectilinear. However, it can take an annular (e.g., circular) shape. Furthermore, in the actual insertion apparatus, a plurality of sets of insertion assemblies each substantially comprising, as seen from Figure 1, a pair of guide members 3 and 4, a pair of suction-chucking members (suction disks) 5 and 6 and a plug 7 are continuously conveyed over a specified conveying path at equal intervals. Also, a plurality of retainers are continuously conveyed at the same intervals beneath these sets of insertion assemblies. The respective sets and retainers thus successively perform the insertion of the bags into the retainers.

[0034] More specifically, the guide members 3 and 4 are formed with guide grooves 3a and 4a respectively, and these guide grooves 3a and 4a face each other. The guide grooves 3a and 4a have a cross-sectional V shape when viewed from above and perpendicularly oriented in the vertical direction. The guide members 3 and 4 are moved toward each other and away from each other, thus opening and closing in the horizontal direction more or less along the conveying path.

[0035] The pair of suction disks 5 and 6 are moved toward and away from each other, thus opening and closing on the vertical plane perpendicular to the conveying path.

[0036] The plug 7 is raised and lowered between the pair of guide members 3 and 4 and between the pair of suction disks 5 and 6.

[0037] Each of the retainers 2 has a retaining section 8 at the center and a pair of insertion grooves 9 (see step (f) shown in Figure 2) that are located on both sides of the retaining section 8. The retaining section 8 (a main interior space of substantially cylindrical that receives the main body portion of a bag) and the insertion grooves 9 (subordinate interior spaces that receive the side edges of the bag) are formed in a longitudinal orientation and extend in the vertical direction. The retainers 2, that can be made of any appropriate materials including a metal, synthetic resins, etc., are positioned and continuously conveyed so that the insertion grooves 9 are oriented along the conveying path as seen from Figure 2.

[0038] The process for successively inserting bags 1 into retainers 2 is performed by steps (a) through (g) in Figures 1 and 2.

[0039] Step (a): A bag 1 is supplied by a bag supply means (not shown) from outside the conveying path of the guide members 3 and 4, etc. The direction of width of the bag 1 is oriented parallel to the bag conveying path that is shown by laterally elongated rectangle P in Figure 1. In step (a), the guide members 3 and 4 and suction disks 5 and 6 are respectively separated so as to be in an open state, the plug 7 is in the raised position, and the bag 1 is supplied to a center position between the facing guide grooves 3a and 4a of the guide members 3 and 4.

[0040] Step (b): The guide members 3 and 4 are moved toward each other so as to be closed, so that their guide grooves 3a and 4a come into contact with side edges of the bag 1. Thus, a positioning is made for the bag 1. At more or less the same time, the bag 1 is released from the bag supply means (not shown). As a result, the bag 1 that has thus been positioned by the guide members 3 and 4 drop onto a receiving stand 11. Thus, the bag 1 is supported by the receiving stand 11 and is slid over the surface of the receiving stand 11 by the guide members 3 and 4 that are moved from left to right as shown by arrow in Figure 1.

[0041] Step (c): The suction disks 5 and 6 that were in the retracted positions are moved toward each other and thus closed, so that the suction disks 5 and 6 suction-chuck the bag mouth. At this point, the retainer 2 supplied by a retainer supply means (not shown) is positioned beneath the bag 1 so as to be in a vertically aligned position with respect to the bag 1. In other words, the bag 1 and insertion grooves formed in the retainer are in a parallel relationship, and the center of the bag with respect to its width direction and to its thickness direction coincide with the centers of the insertion grooves and retaining section of the retainer. Keeping this aligned positions, the bag 1, the retainer 2, the guide members 3 and 4, the suction disks 5 and 6 and the plug 7 are conveyed from left to right in Figure 1 at the same and constant speed.

[0042] Step (d): The suction disks 5 and 6 are moved away from each other and thus opened, so that the mouth of the bag 1 is opened (at this point, the lower portion of the bag is not spread open yet and remains flat). The plug 7 is, with a timing that matches this movement of the suction disks 5 and 6, lowered, and a part of the plug 7 is brought into the opened bag; and thus, the plug 7 is engaged with the mouth. The receiving stand 11 ends at the finishing point of step (d). In other words, the step (d) is completed at the end of the received stand 11.

[0043] Step (e): The suction of the suction disks 5 and 6 is stopped, and the suction disks 5 and 6 are moved back to the retracted positions. The plug 7 is further lowered so as to lower the bag 1 toward the retainer 2. At the same time, the guide members 3 and 4 are also lowered. The lowering of the guide members 3 and 4 is not essential; however, by lowering the guide members 3 and 4 together with the bag 1, the flat lower end of the bag 1 is oriented more accurately toward the centers of the insertion grooves of the retainer 2.

[0044] Step (f): The lowering of the guide members 3 and 4 is stopped immediately above the retainer 2, but the plug 7 is lowered even further. The bag 1 is guided by the guide grooves 3a and 4a of the guide members 3 and 4 and is inserted, at its side edges, into the centers of the insertion grooves 9 of the retainer 2.

[0045] Step (g): A compressed gas is jetted out of the gas discharge opening (not shown) which is at the tip end of the plug 7, and the bag 1 is as a whole including its bottom is spread open by the inserted gas. The bag 1 is set in the retainer 2 so that the center of the bag 1 with respect to the direction of width thereof is positioned in the centers of the retaining section 8 and insertion grooves 9 of the retainer 2. Accordingly, the center of the retaining section 8 and the center of the bag 1 are kept coincide with each other even after the bag has been spread open. Thus, a tight contact is ensured between the surfaces of the bag and the inside circumferential surface of the retaining section 8. Next, the guide members 3 and 4 and plug 7 are returned to their original positions, so that the process returns to the state shown in step (a), thus completing one cycle of insertion of the bag into the retainer.

[0046] In the above steps, a description is made for only one bag. However, with a use of plurality of sets of insertion assemblies (each substantially comprising the pair of guide members 3 and 4, the pair of suction-chucking members (suction disks) 5 and 6 and the plug 7), a plurality of bags are processed simultaneously.

[0047] The above-described insertion apparatus is applicable to a rotary type insertion apparatus, and such a rotary type insertion apparatus will be described below with reference to Figures 3 through 11.

[0048] As shown in Figure 3, a main stand 13 is installed in an upright attitude on a base 12, and a rotating shaft 14 is rotatably supported in the main stand 13. An upper table 15 is fastened to the upper portion of the rotating shaft 14, and a lower table 17 is rotatably supported on the circumference of the main stand 13 via a bearing 16. The rotating shaft 14 and tables 15 and 17 are referred to as a rotor in the present invention. Around the circumferences of the tables 15 and 17, a plurality of supporting frames 18 that are substantially C-shaped in cross section are provided at equal intervals. The supporting frames 18 extend in the vertical direction; and the upper ends of the supporting frames 18 are fastened to the upper table 15, and the lower ends are fastened to the lower table 17.

[0049] An opening device 21 is provided in the upper portion of the outer circumferential surface of each one of the supporting frames 18 via an attachment plate 19. Likewise, a retainer positioning member 22 (see Figure 9) is provided in the lower portion of the outer circumferential surface of each one of the supporting frames 18. Furthermore, a retainer supporting plate 24 is provided at the lower end of each one of the supporting

frames 18 via a supporting plate 23.

[0050] As shown in Figure 4B, slots 25 and 26 are respectively formed in the outer circumferential surface of each supporting frame 18. A connecting member 28 of an upper raising-and-lowering element 27 extends to the outside from the interior of the supporting frame 18 through the slot 25, and an insertion device 29 is provided on the tip end of the connecting member 28. Beneath this insertion device 29, a pair of connecting members 32 of a lower raising-and-lowering element 31 extend to the outside through the slots 25 and 26, and a guide device 33 is mounted to the tip ends of the connecting members 32.

[0051] Inside each supporting frame 18, as seen from Figure 4A, upper slide members 34 are attached to the upper raising-and-lowering element 27 in an outward-facing orientation. The upper slide members 34 slide on a slide rail 35 that is fastened to the supporting frame 18. A cam roller 36 is disposed on the inside end of the upper raising-and-lowering element 27, and a tubular raising-and-lowering cam 38 is disposed on the circumference of a cam attachment plate 37 which is fastened to the main stand 13. The cam roller 36 runs on this raising-and-lowering cam 38.

[0052] Likewise, lower slide members 39 are attached to the lower raising-and-lowering element 31 in an outward-facing orientation, and these slide members 39 slide on the slide rail 35. A cam roller 41 is disposed on the inside end of the lower raising-and-lowering element 31. The cam roller 41 runs inside the groove of a raising-and-lowering cam 42.

[0053] The reference numeral 43 seen in Figures 4A and 4C is a tension spring. The tension spring 43 extends vertically through holes 44 and 45 formed in the upper and lower raising-and-lowering elements 27 and 31 and presses the cam roller 36 against the raising-and-lowering cam 38.

[0054] As best seen from Figure 4A, the insertion device 29 is comprised, along with other elements, of a supporting flange 46 which is fastened to the connecting member 28 of the upper raising-and-lowering element 27, a pipe-form rod element 47 that is slidably provided in this supporting flange 46, and a plug 7 which is provided at the tip end of the rod element 47. One end (upper end) of the rod element 47 is connected to a compressed air source or gas supply source via a filter, a switching valve, etc. (not shown), so that a compressed gas is caused to jet out of a gas discharge opening opened at the lower end of the plug 7 at a specified timing. The rod element 47 is provided so that when an upward-oriented force referred to by arrow U is applied to the plug 7, the rod element 47 is caused to retract or moved upward relative to the supporting flange 46 by the action of a stopper 48 fastened to the rod element 47, a spring receiving plate 49 and a compression spring 50 which is interposed between the spring receiving plate 49 and the supporting flange 46.

[0055] The guide device 33 is provided, as seen from Figure 5A, at the tip end of the connecting member 32 of the lower raising-and-lowering element 31. The guide device 33 is comprised of guide members 3 and 4 which have substantially V-shaped grooves 3a and 4a (see Figure 8), which extend in the vertical direction, and an opening-and-closing mechanism that opens and closes the guide members 3 and 4.

[0056] As seen from Figures 5A through Figure 8, the guide members 3 and 4 are respectively attached to an opening-and-closing driving arm 51 and an opening-and-closing driven arm 52. The opening-and-closing driving arm 51 is fastened to a hollow shaft 54 which is supported on a supporting member 53 on the tip ends of the connecting members 32 so that the hollow shaft 54 is free to rotate. The opening-and-closing driven arm 52 is likewise fastened to an opening-and-closing driven shaft 55 which is fastened to the supporting member 53 so that the shaft 55 is free to rotate.

[0057] Gears 56 and 57 which engages with each other are respectively fastened to the lower portions of the hollow shaft 54 and opening-and-closing driven shaft 55, so that the opening-and-closing driving arm 51 and the opening-and-closing driven arm 52 open and close (or moved toward and away from each other) simultaneously.

[0058] Furthermore, a slide bearing 58 that has longitudinal grooves formed in its inside circumferential surface is fastened to the lower portion of the hollow shaft 54. An opening-and-closing driving shaft 59, which has longitudinal ribs formed on its outer circumferential surface, is inserted into the slide bearing 58. With its longitudinal ribs being engaged with the longitudinal grooves, the shaft 59 slides upward and downward as shown by arrow in Figure 5.

[0059] The opening-and-closing driving shaft 59 is rotatably supported at its lower end area by a bearing 61 that is attached to the supporting plate 23.

[0060] A swing lever 62 is fastened to the lower end of the opening-and-closing driving shaft 59, and this swing lever 62 is connected to one end 64a of a cam lever 64 via a connecting rod 63. The cam lever 64 is shaft-supported on a supporting part 65 so that the cam lever 64 can pivot, and a cam roller 66 is attached to another end of the cam lever 64. The cam roller 66 is pressed by the driving force of a tension spring 67 (see Figure 5B) against an annular cam 68 which is disposed on the base 12 (see Figure 3), so that the cam roller 66 runs over the upper surface of the annular cam 68. As a result, the cam lever 64 pivots, the swing lever 62 pivots, the opening-and-closing driving shaft 59 and hollow shaft 54 are rotated, and thus the opening-and-closing driving arm 51 and opening-and-closing driven arm 52 pivots, so that the guide members 3 and 4 open and close.

[0061] The opening device 21 is mounted on the attachment plate 19; and it includes, as seen from Figures 10 and 11, suction disks 5 and 6 and a mechanical assembly that operates the suction disks 5 and 6.

[0062] More specifically, the suction disks 5 and 6 are respectively attached to the lower ends of pipe-form opening-and-closing arms 71 and 72 as best seen from Figure 10. The opening-and-closing arms 71 and 72 are respectively attached to pivot levers 73 and 74 which are pivotally shaft-supported on the attachment plate 19. Open ends at the upper ends of the opening-and-closing arms 71 and 72 are connected to a vacuum means via filters, switching valves, etc. (not shown), so that the suction disks 5 and 6 apply suction on a bag with a specified timing.

[0063] A cam roller 75 is rotatably mounted on one end of the pivot lever 73. The cam roller 75 is pressed by the force of a tension spring 76 against an opening-and-closing cam 77. The opening-and-closing cam 77 is disposed in the form of a circular arc on the circumference of the rotor, so that the cam roller 75 runs along the undersurface of the opening-and-closing cam 77.

[0064] A connecting link 78 is pin-connected between the other end of the pivot lever 73 and the pivot lever 74. Thus, when the pivot lever 73 pivots, the pivot lever 74 also simultaneously pivots in the opposite direction, thus causing the opening-and-closing arms 71 and 72 to move toward and away from each other so as to open and close as indicated by the solid lines (closed) and imaginary dashed lines (opened) in Figure 10.

[0065] The reference numeral 79 in Figures 10 and 11 is a stopper that regulates the pivoting limit of the pivot lever 74, i.e., the opening limit of the opening-and-closing arms 71 and 72.

[0066] In operation of the above rotary type insertion apparatus, when a gear 80 (see Figure 3) that is linked to a driving means (not shown) and is fixed to the rotating shaft 14 is rotated, the upper and lower tables 15 and 17 are rotated at a constant speed together with the rotating shaft 14. As a result, the cam roller 36 attached to the upper raising-and-lowering element 27, the cam roller 41 attached to the lower raising-and-lowering element 31, the cam roller 66 attached to the cam lever 64 and the cam roller 75 attached to the pivot lever 73 run over the respective corresponding cam surfaces; and with the timing shown above in Figures 1 and 2, the guide member 3 and 4 are opened and closed and also raised and lowered, the suction disks 5 and 6 are opened and closed, and the plug 7 is raised and lowered.

[0067] Of course, during these movements, the application of suction by the suction disks 5 and 6 and the jetting out of the compressed gas from the discharge opening of the plug 7 are also performed with the above-described timing.

[0068] Furthermore, into the above rotary type insertion apparatus, bags 1 are supplied by a bag supply means (not shown, but such a supply means shown in the rotary type transfer apparatus disclosed in Japanese Patent Application Laid-Open (Kokai) No. 2000-318713), and retainers 2 are supplied by a universally known retainer supply means. When the bags and retainers are thus supplied, the bags 1 are immediately positioned by the guide members 3 and 4 and moved while slipping on the receiving stand 11; and the retainers 2 are positioned on the retainer receiving plates 24 with respect to the retainer positioning members 22 by a universally known means, and bags are inserted into the retainers by the steps shown above in Figures 1 and 2.

[0069] In the above description, self-standing bags (bags having fold-ins in the bottoms) are described as an example of the bags 1. However, the insertion method and apparatus of the present invention can be used for ordinary flat bags.

[0070] Figure 12 shows the above-described rotary type insertion apparatus with an addition of a mechanism that allows adjustment of the opening width of the guide members 3 and 4 so as to comply with bags of various sizes. In this insertion apparatus, the annular cam 68 is adjustable in height.

[0071] The annular cam 68 is fastened to the outer circumference of an annular attachment bracket 81, and a plurality of internally threaded members 82 are disposed around the circumference of the annular attachment member 81. Rotating shafts 84 which are rotatably supported on stands 83 that are disposed on the base 12 are screw-engaged with the internally threaded members 82, thus supporting the attachment bracket 81 in a horizontal attitude.

[0072] Gears 85 are attached to the lower ends of the rotating shafts 84. The gears 85 are engaged with the outer circumference of an intermediate gear 86 which is rotatably attached to the circumference of the rotating shaft 14.

[0073] Furthermore, a sprocket 87 is attached to one of the gears 85. The sprocket 87 is connected via a chain 88 and sprocket 89 to a rotating shaft 92 that is rotatably supported in a stand 91 disposed on the base 12.

[0074] Accordingly, when a handle 93 fastened to the rotating shaft 92 is turned, the plurality of rotating shafts 84 are rotated by the same amount, and the bracket 81 and annular cam 68 are raised or lowered while maintaining their horizontal attitude.

[0075] As seen from the above, the height of the annular cam 68 is adjusted in accordance with the bag width; and when the bags to be processed have a large width, then the annular cam 68 is lowered.

[0076] Figure 13 shows (in the form of a time sequence) the bag insertion process performed with a use of plug 94 shown in Figures 14A through 14C instead of the plug 7 that is shown in Figures 1 and 2.

[0077] As seen from Figures 14A and 14B, each plug 94 has three (first, second and third) stepped portions 94a, 94b and 94c that are continuously formed with inclined surfaces in between, the inclined surfaces having more or less a shape of truncated circular cones. The first stepped portion 94a (located at the lower most or the bottom of the plug 94 and has a smallest diameter) has flat outer surfaces 94e that are diametrically oppo-

site from each other. Thus, the first stepped portion 94a is somewhat flat when viewed from below; and its lower end is pointed and faces downward (or to face the bag mouth), so that the flat outer surfaces 94e are set so as to be parallel to the surfaces of the bag or to the conveying path. The plug 94 has a gas discharge opening 94d at the end of this first step portion 94a.

[0078] The insertion process of Figure 13 is substantially the same as that of Figures 1 and 2 up to the point where the tip end of the plug 94 is brought into the bag. Accordingly, only the steps that are taken after the bag has been inserted into the retainer (that corresponds to steps (d) through (g) in Figure 1) are shown in Figure 13. The insertion process of a bag into a retainer in Figure 13 is as follows:

Step (d): The suction disks 5 and 6 are moved away from each other so as to open, thus opening the mouth of the bag 1 (at this point, the bottom portion of the bag is not spread open yet and remains flat). The plug 94 is lowered with a timing that matches the mouth opening movement of the suction disks 5 and 6, and the first step 94a of the plug 94 is brought into the opened bag so that the plug 7 is engaged with the mouth.

Step (e): The suction of the suction disks 5 and 6 is stopped, and the suction disks 5 and 6 are moved further away from each other to return to the retracted positions. In this case, the opened mouth of the bag 1 is caused to return to flat (as far as the thickness of the tip end of plug 94 that is defined by the flat surfaces 94a) by its own elastic force. As a result, the inclination of both edges of the bag 1 is smaller compared to the bags processed by the steps in Figures 1 and 2. Then, the plug 94 is further lowered, thus lowering the bag 1 toward the retainer 2. The guide members 3 and 4 are also simultaneously lowered.

Step (f): The downward movement of the guide members 3 and 4 is stopped immediately above the retainer 2, but the plug 94 is lowered even further. The bag 1, being guided by the guide grooves 3a and 4a of the guide members 3 and 4 and, is inserted into the centers of the insertion grooves 9 of the retainer 2.

Step (g): The second stepped portion 94b of the plug 94 is completely brought into the bag 1, so that the mouth of the bag 1 is opened wider. Next, the inclined surface between the second stepped portion 94b and the third stepped portion 94c (that has the largest diameter among the three stepped portions) comes into contact with the edge of the bag mouth, and a compressed gas is jetted out of the gas discharge opening 94d of the plug 94. As a result, the bag 1 is, for its entirety including the bottom thereof, spread open. In the retainer 2, the center of the bag 1 with respect to its width direction is positioned in the centers of the retaining section 8 and insertion grooves 9 of the retainer 2. Accordingly, the center of the retaining section 8 and the center of the bag 1 coincide with each other even after the bag 1 is spread open, so that tight contact is maintained between the bag surface and the inside circumferential surface of the retaining section 8. The guide members 3 and 4 and plug 94 are then returned to their original positions.

[0079] In the above embodiment, the tip end of the plug (the first stepped portion 94a) that is brought into the bag when the bag mouth is opened by the suction disks is in a flattened shape. Accordingly, the bag returns to flat when the suction disks are separated from the bag, allowing less inclination at both edges of the mouth thereof. Accordingly, the bag being processed show less of a tendency to incline to the left and right in the guide members than in the previous example shown in Figures 1 and 2 in which the plug 7 used has no flat outer surfaces 94e and thus not in a flattened shape at its tip end. Accordingly, an even more accurate guidance of the bag is accomplished with the use of the plug 94.

[0080] Next, a retainer that is used when the present invention processes self-standing bags will be disclosed.

[0081] First, a description is made about a bag 1. As shown in Figures 15A and 15B, the lower end of a bag 1 is horizontal when the bag 1 is flat. However, when the bag 1 is spread open by gas as shown in Figure 16B to its bottom in the retainer, both edges of the bag are slightly lifted as indicated by arrows in Figure 16B, and the lower ends of the bag 1 is curved when viewed from the side as shown in Figure 16B. As a result, the bag 1 becomes unstable inside the retainer, and the bag may be tilted or may show a positional deviation to the left or right during conveying.

[0082] In typical conventional retainers, a drainage hole that has a diameter much smaller than that of the retaining section is formed in the center of the bottom of the retaining section as disclosed in, for example, Japanese Patent Application Laid-Open (Kokai) No. 2000-302106.

[0083] The retainer 95 shown in Figures 17A and 17B is the same as a conventional retainer in that it has a retaining section 8 and insertion grooves 9 that extend longitudinally or in the axial direction. However, the feature of the retainer 95 is that the insertion grooves 9 has bottoms 9a thus being closed, but the retaining section 8 has no bottom thus being opened. As a result, only the edge portions of the lower end of the bag 1 inserted in the retaining section 8 and insertion grooves 9 are supported by the bottoms 9a of the insertion grooves 9, and the curved central portion of the bag is not supported. Accordingly, the bag 1 inside the retainer 2 is set with a higher stability.

[0084] The retainer 96 shown in Figures 18A and 18B is also the same as a conventional retainer. The retainer

96 has a retaining section 8 and insertion grooves 9 that extend longitudinally or in the axial direction, and a drainage hole 96a which is slightly smaller than the retaining section 8 in diameter is formed in the bottom. However, this retainer 96 is characterized in that the entire bottom surface 96b of the retaining section 8 and insertion grooves 9 is curved in a concave shape. It is preferable that this curvature more or less coincide with the lower end curvature of the bag, so that the lower end of the bag 1 is snugly supported. The retaining section 8 can be formed without a bottom as in the retainer 95 shown in Figures 17A and 17b.

[0085] The retainer 97 shown in Figures 19A and 19b is also the same as a conventional retainer in terms of the longitudinal or axial formation of the retaining section 8 and insertion grooves 9. The retainer 97, however, is characterized in that the bottom of the retaining section 8 is formed only at the left and right ends, i.e., near the insertion grooves 9, and no bottom is formed in the central area. This structure is similar to that of the retainer 95 shown in Figures 17A and 17B in terms of structure and function. Also, the entire bottom can be curved in the same manner as in the retainer 96 of Figures 18A and 18B.

[0086] In the above retainers 95, 96 and 97, the entry portions of the retaining section 8 and insertion grooves 9 are not tapered; nevertheless, a stable and accurate insertion of bags is assured in the present invention since the positioning of both side edges of each bag is made by guide members, so that the side edges are guided into the retainer. The entry portions of the retainers 95, 96 and 97 can be formed with a tapered shape as in conventional retainers. However, because of the use of the guide members, the size of the tapered portion can be made smaller than in the conventional retainers.

[0087] As a result of the tapered shape of the entry portions being eliminated or reduced in size, the bag holding function can be improved at the same longitudinal size of the retainer, or the longitudinal size of the retainer can be reduced by an amount equal to the taper with the same bag holding function being maintained. Thus, the retainer can be made more compact and lightweight.

[0088] Furthermore, in the retainers 95, 96 and 97, the left and right ends of the insertion grooves 9 are closed in all cases (these parts are called the "retainer sides") as typically indicate in Figure 17A by the reference numerals 9b. In a conventional insertion method, these retainer sides are important for preventing tilting and positional deviation since the retainer sides come in contact with both side edges of the bags 1. However, in the insertion method of the present invention, positioning is securely accomplished by the guide members. Accordingly, these retainer sides can be omitted. In other words, the left and right outside portions indicated by arrows in Figures 17A, 18A and 19A can be removed. By doing this, the size of the retainer in the lateral direction is reduced, and the retainer can be more compact and light in weight.

[0089] When retainers that have no retainer sides are used, it is advisable to perform the compressed air discharge twice (i.e., to stop or weaken the discharge for a very short period of time during the discharge) or to perform the compressed air discharge with a gradual increase in gas pressure. With such performance of compressed air discharge, bags are self-centered in the retaining sections 8; and even if bags should tilt or show a positional deviation during insertion into the retainers, defective bags can be prevented. Nonetheless, these compressed air discharging methods are effective for retainers that have retainer sides.

[0090] As seen from the above, according to the present invention, bags whose mouths have been opened are inserted into the retaining sections and insertion grooves of retainers without any interference. Furthermore, in the present invention, since the bags are inserted into the centers of the retaining sections and insertion grooves of the retainers, the centers of the retaining sections and the centers of the bags coincide, and the contact between the bags and the inside circumferential surfaces of the retaining sections after the bags have been spread open by gas is improved. As a result, swinging of the bags and splashing out of the liquid contents after the bags have been filled with a liquid can be effectively prevented.

[0091] Furthermore, in the present invention, compact, light weight retainers are used. This is advantageous for increasing the running speed of the bag insertion apparatus and therefore for increasing the running speed of the entire system that involves the bag-filling apparatus.

Claims

1. A method for inserting bags into retainers wherein:

mouth of a bag is caused to open by way of suction-chucking said mouth from both sides thereof by suction-chucking members, and
said bag and a retainer positioned beneath said bag are caused to approach each other, thus inserting said bag into said retainer,

wherein said method comprises the steps of:

bringing guide members, which have guide grooves that are oriented in a vertical direction, to both side edges of said bag so that said guide members come into contact with said both side edges, thus positioning said bag with respect to grooves formed in said retainer, and
guiding said bag by said guide members into said retainer.

2. A method for inserting bags into retainers wherein:

a mouth of a bag is caused to open by way of suction-chucking said mouth from both sides thereof by suction-chucking members,
a plug is caused to be brought into said mouth of said bag, and
said plug and a retainer positioned beneath said plug are caused to approach each other, thus inserting said bag into said retainer,

wherein said method comprises the steps of:

bringing guide members, which have guide grooves that are oriented in a vertical direction, to both side edges of said bag so that said guide members come into contact with said side edges, thus positioning said bag with respect to grooves formed in said retainer, and
guiding said bag by said guide members into said retainer.

3. A method for inserting bags into retainers wherein:

a mouth of a bag is caused to open by way of suction-chucking said mouth from both sides thereof by suction-chucking members,
a plug is caused to be brought into said mouth of said bag, and
said plug is caused to be lowered toward a retainer that is positioned beneath said plug, thus inserting said bag into said retainer,

wherein said method comprises the steps of:

bringing guide members, which have guide grooves that are oriented in a vertical direction, to both side edges of said bag so that said guide members come into contact with said side edges, thus positioning said bag with respect to grooves formed in said retainer, and
guiding said bag by said guide members into said retainer.

4. The method for inserting bags into retainers according to any one of Claims 1 through 3, wherein said guide members, which face each other while opening to an extent that is greater than a width of said bag, are caused to approach and contact both side edges of said bag in a horizontal direction.

5. The method for inserting bags into retainers according to any one of Claims 1 through 4, wherein

said bag is lowered toward said retainer that is positioned below said bag, and

upon said bag is thus lowered, said guide members are lowered to a point immediately above said retainer.

6. The method for inserting bags into retainers according to any one of Claims 1 through 5, wherein said mouth of said bag is opened after said bag is positioned by said guide members with respect to said grooves formed in said retainer.

7. The method for inserting bags into retainers according to any one of Claims 1 through 6, wherein said bag that is positioned and said retainer are conveyed at a constant speed with said bag and said retainer being vertically aligned.

8. An apparatus for inserting bags into retainers, said apparatus comprising:

guide members which have guide grooves oriented in a vertical direction and are opened and closed,
suction-chucking members which are moved toward and away from each other so that said suction-chucking members open a mouth of a bag, which is positioned by said guide members, by way of suction-chucking said mouth from both sides thereof,
a vertically movable plug which is brought into said mouth that is opened by said suction-chucking members, and
a retainer positioning member that positions a retainer beneath said guide members, wherein said bag is caused to be positioned in a specified position by way of closing said guide members so that said guide members come into contact with both side edges of said bag,
a mouth of said bag is caused to open by way of suction-chucking both sides of said mouth of said bag by said suction-chucking members,
said plug is lowered and brought into said mouth of said bag, and
said plug is lowered toward said retainer positioned beneath said plug so that said bag is inserted into said retainer.

9. The apparatus for inserting bags into retainers according to Claim 8, wherein

a plurality of sets of insertion assemblies each comprising said guide members, suction-chucking members and plug are continuously conveyed over an annular path at a constant speed and uniform intervals,

a plurality of retainers are conveyed over a specified path at a same speed and same intervals as said insertion assemblies, and

said retainers and bags are conveyed, in at least a part of said specified path, with said retainers and bags being aligned vertically.

10. An apparatus for inserting bags into retainers in which said apparatus is a rotary type bag insertion

apparatus that receives a supply of bags and retainers, inserts said bags into said retainers and then discharges said bags together with said retainers, said apparatus comprising:

a plurality of sets of insertion assemblies which are disposed at equal intervals around a circumference of a continuously rotating rotor, each of said insertion assemblies comprising:

guide members which have guide grooves oriented in a vertical direction and are opened and closed,
suction-chucking members which are moved toward and away from each other so that said suction-chucking members open a mouth of a bag, which is positioned by said guide members, by way of suction-chucking said mouth from both sides thereof,
a vertically movable plug which is brought into said mouth that is opened by said suction-chucking members, and
a retainer positioning member that positions a retainer beneath said guide members,

wherein as said rotor is rotated,
said bag is caused to be positioned in a specified position by way of closing said guide members so that said guide members come into contact with both side edges of said bag,
a mouth of said bag is caused to open by way of suction-chucking both sides of said mouth of said bag by said suction-chucking members,
said plug is lowered and brought into said mouth of said bag, and
said plug is lowered toward said retainer positioned beneath said plug so that said bag is inserted into said retainer.

11. The apparatus for inserting bags into retainers according to Claim 10, further comprising a receiving stand which supports a lower end of said bag and is disposed along a track of revolution of said guide members, said receiving stand extending from at least a bag supply position to a plug insertion position on a circumference of a rotor beneath said guide members.

12. The apparatus for inserting bags into retainers according to any one of Claims 8 through 11, wherein said guide members are raised and lowered; and when said plug is lowered further after said plug is lowered so as to be brought into said bag, said guide members are lowered together with said plug.

13. The apparatus for inserting bags into retainers according to any one of Claims 8 through 12, wherein said plug is provided with a gas discharge opening.

FIG. 1

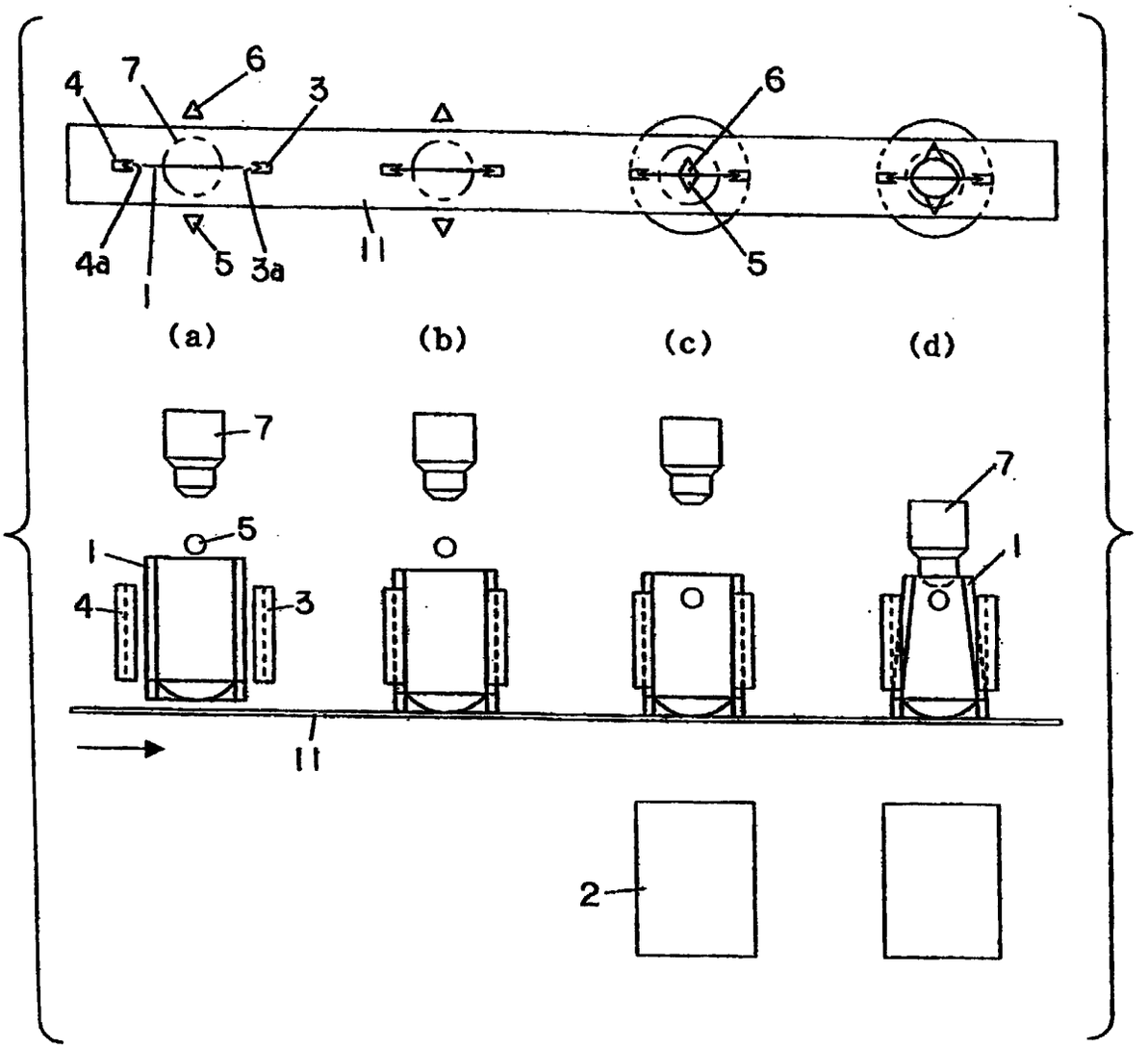
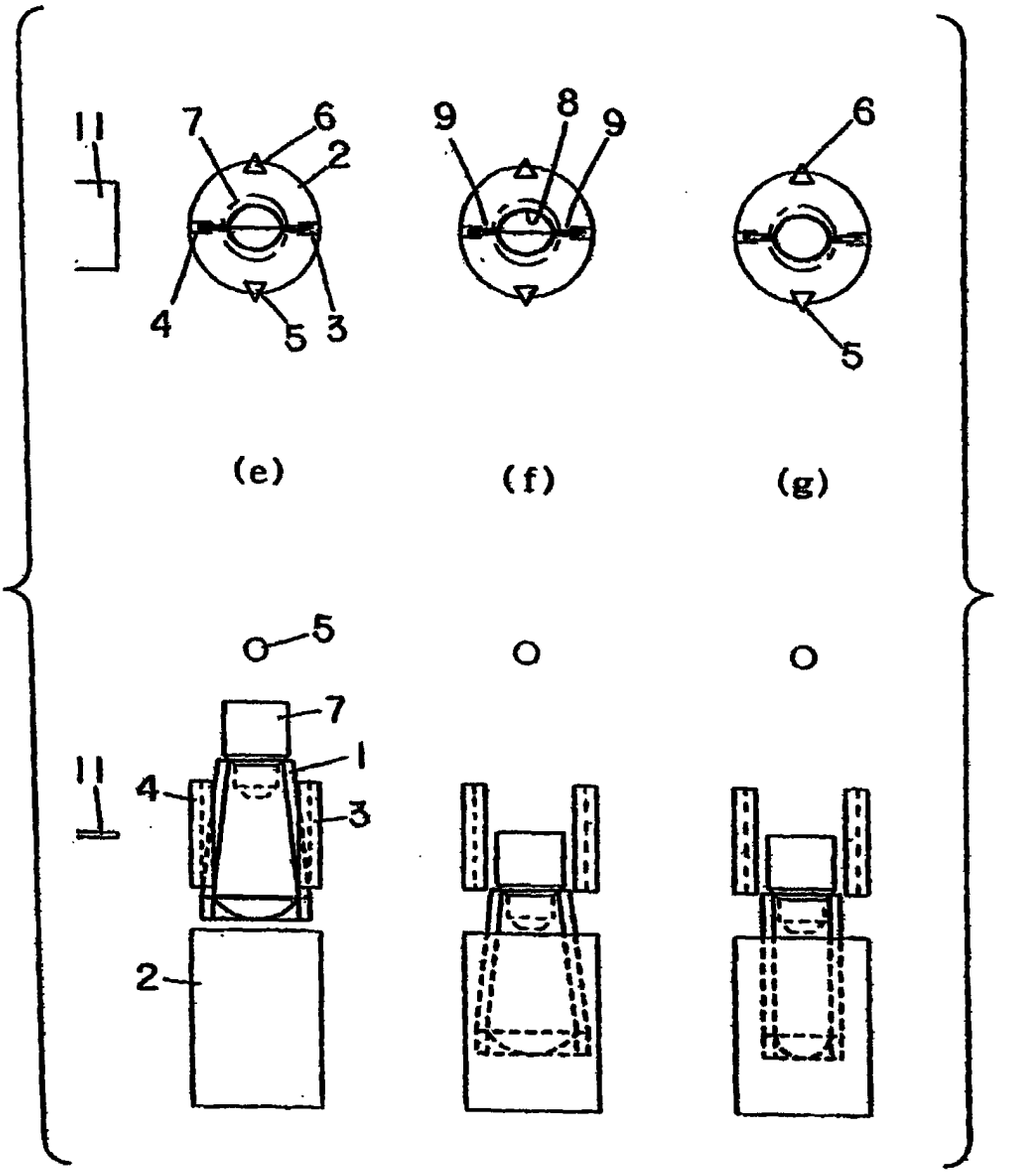


FIG. 2



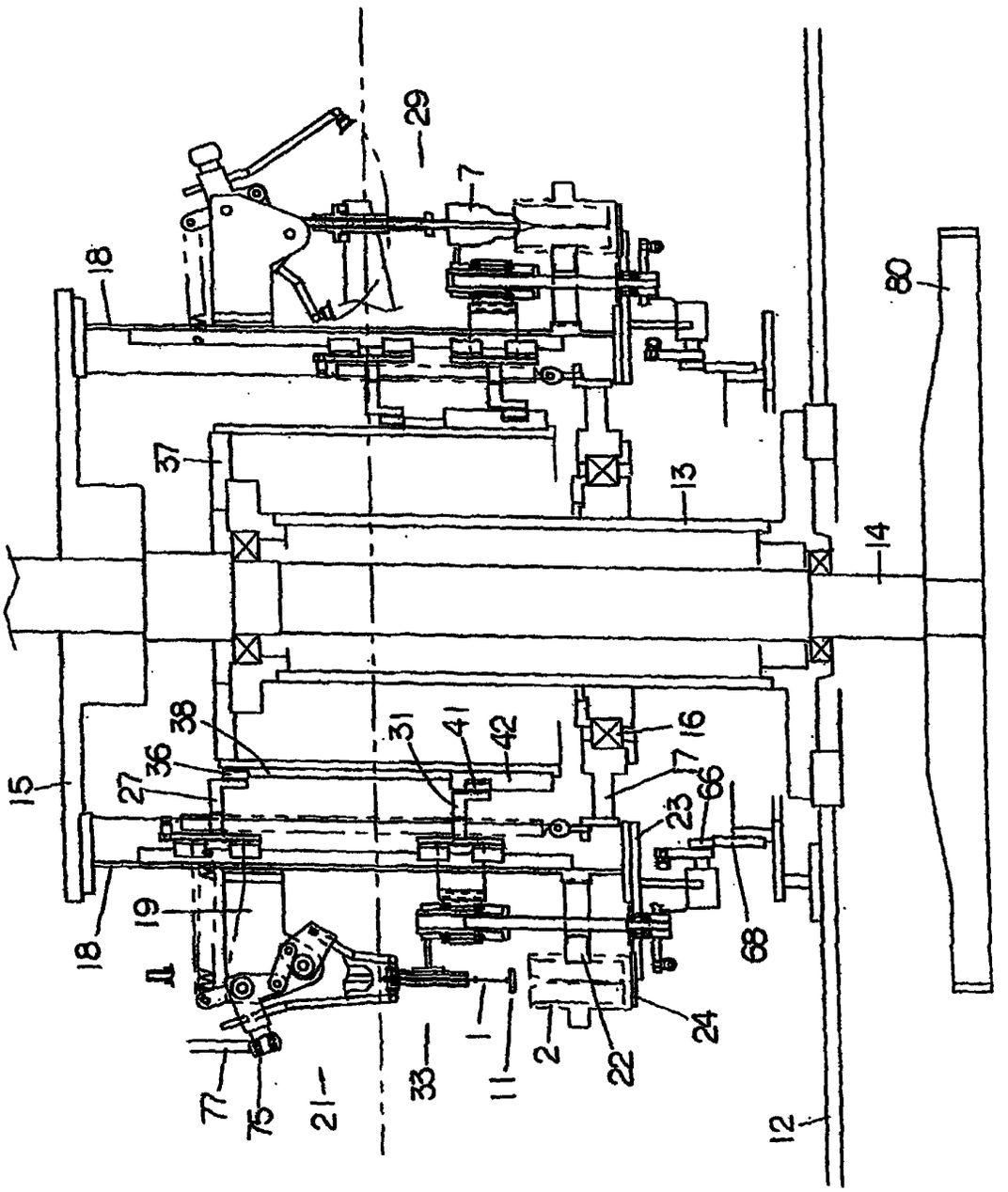

29
7
18
80
37
13
14
38
31
41
42
16
36
17
15
27
66
23
19
68
18
24
1
2
22
33
11
77
75
21
12

FIG. 3

FIG. 4B

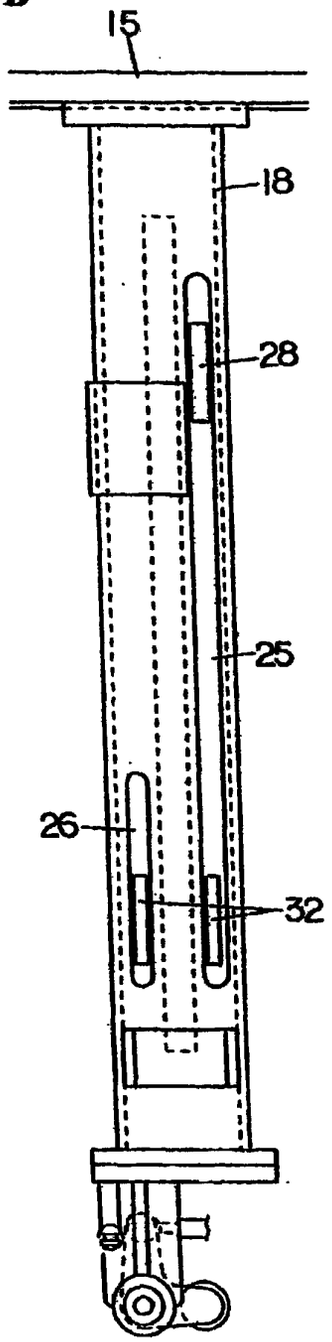


FIG. 4A

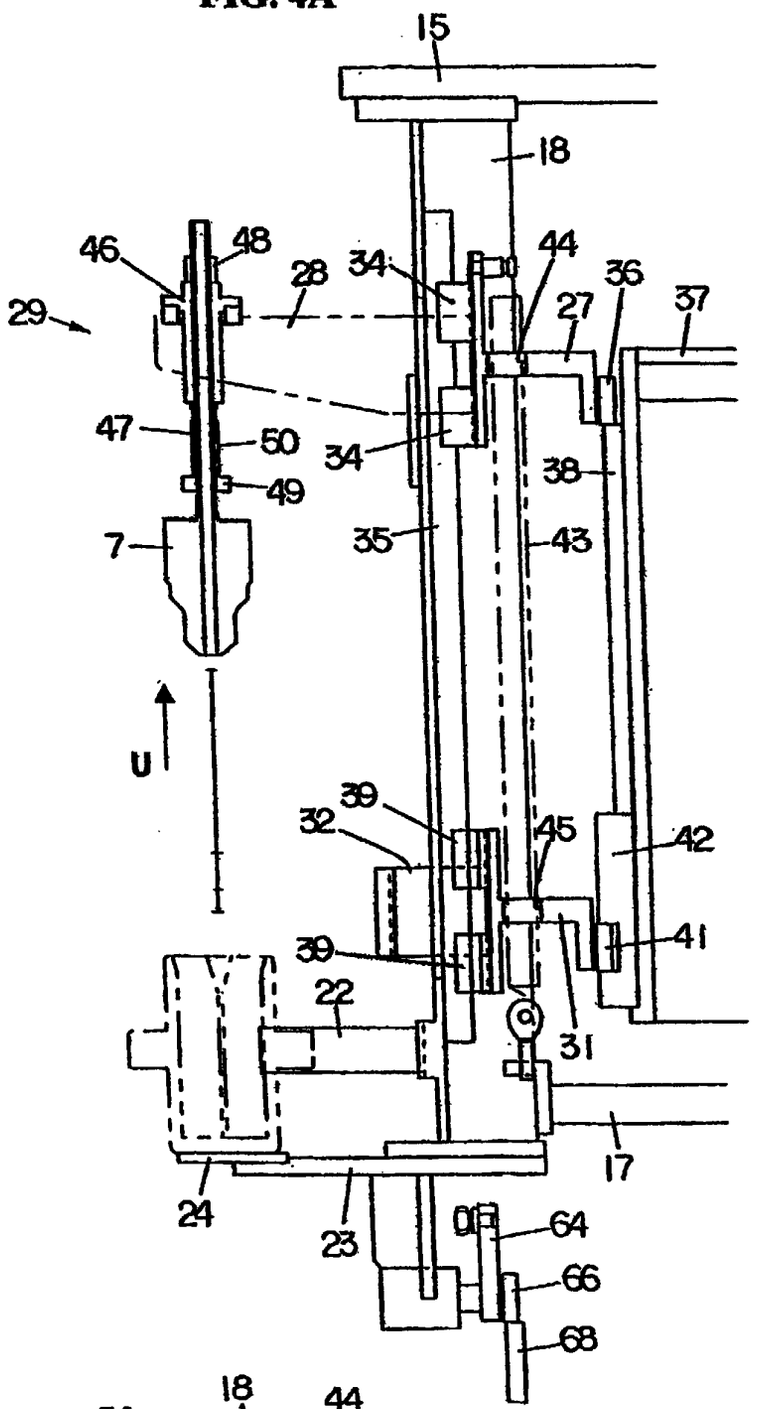


FIG. 4C

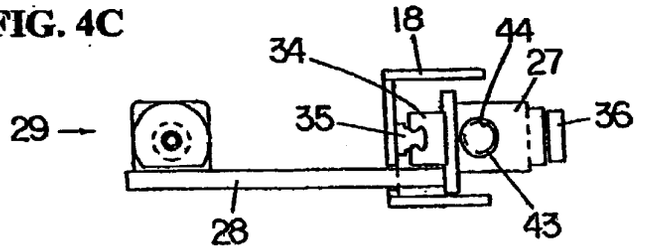


FIG. 5A

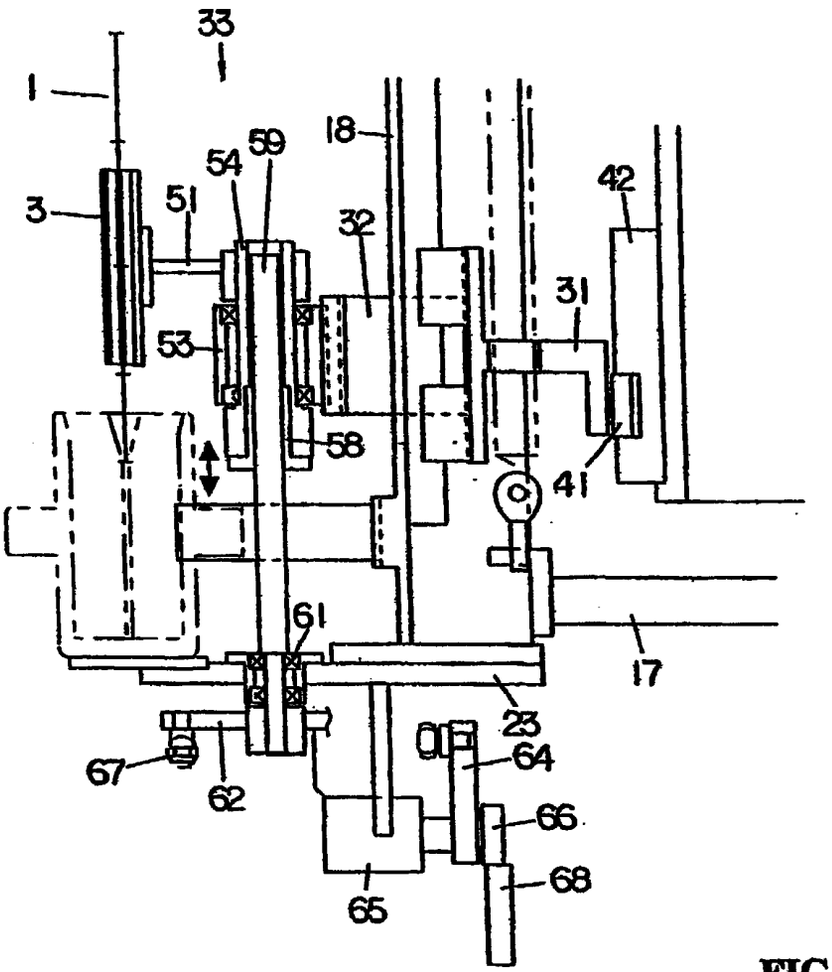


FIG. 5B

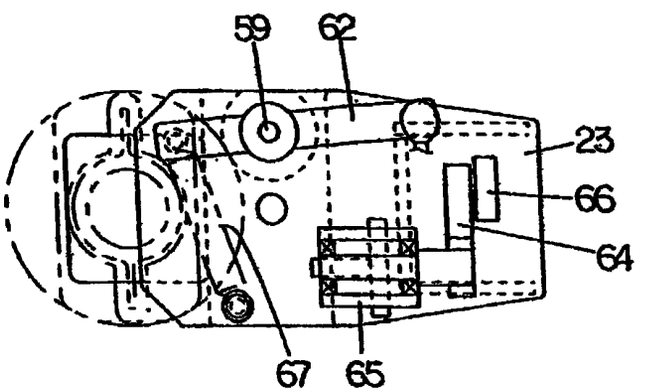


FIG. 5C

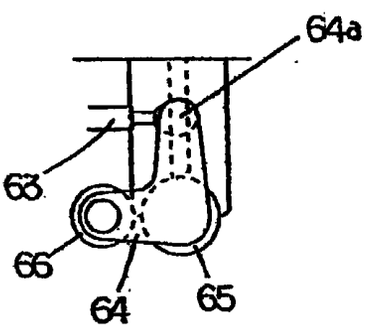
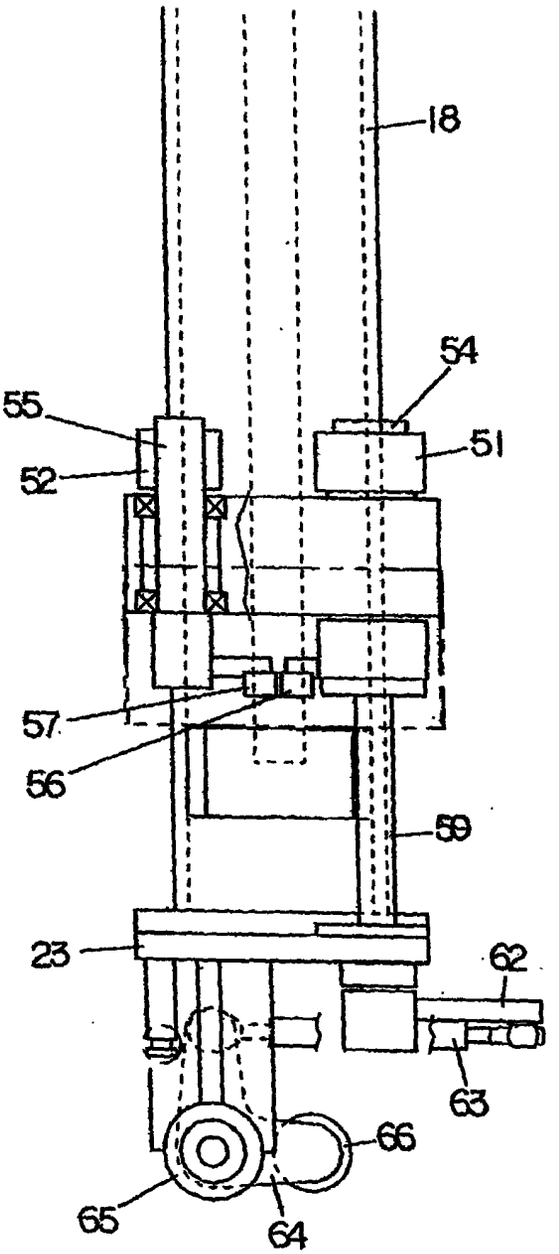


FIG. 6



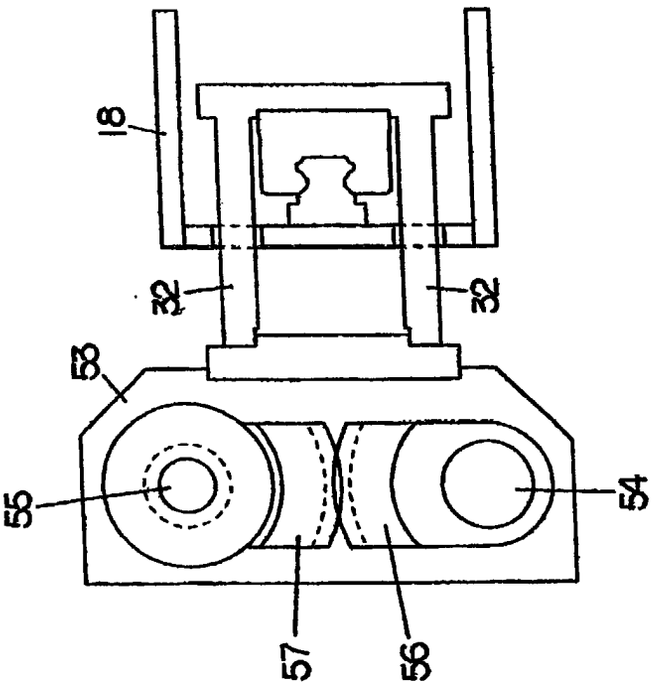


FIG. 7

FIG. 8

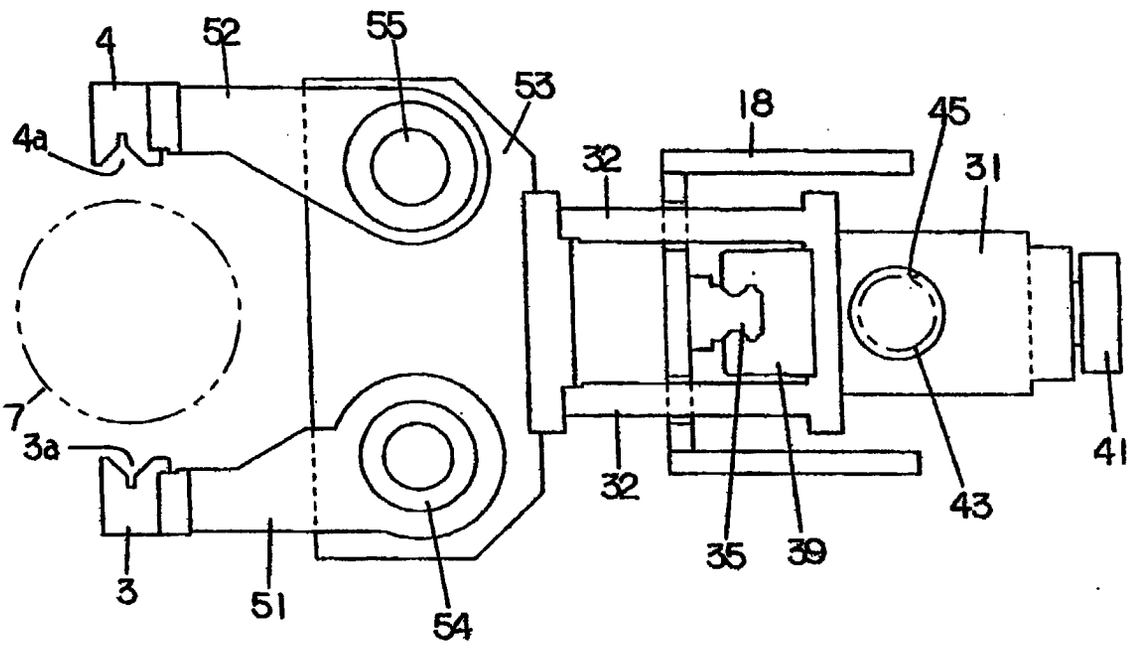
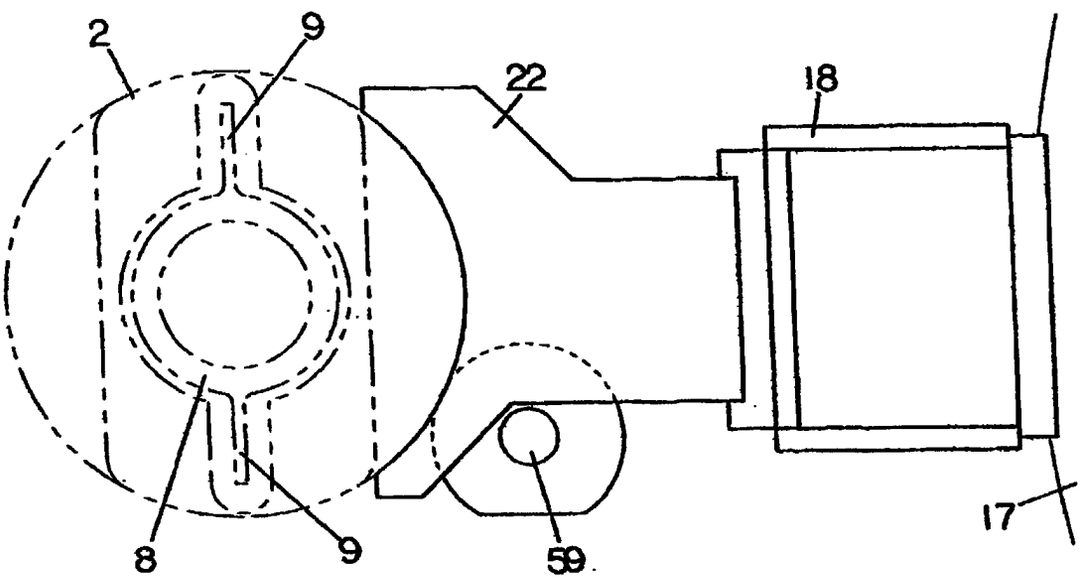


FIG. 9



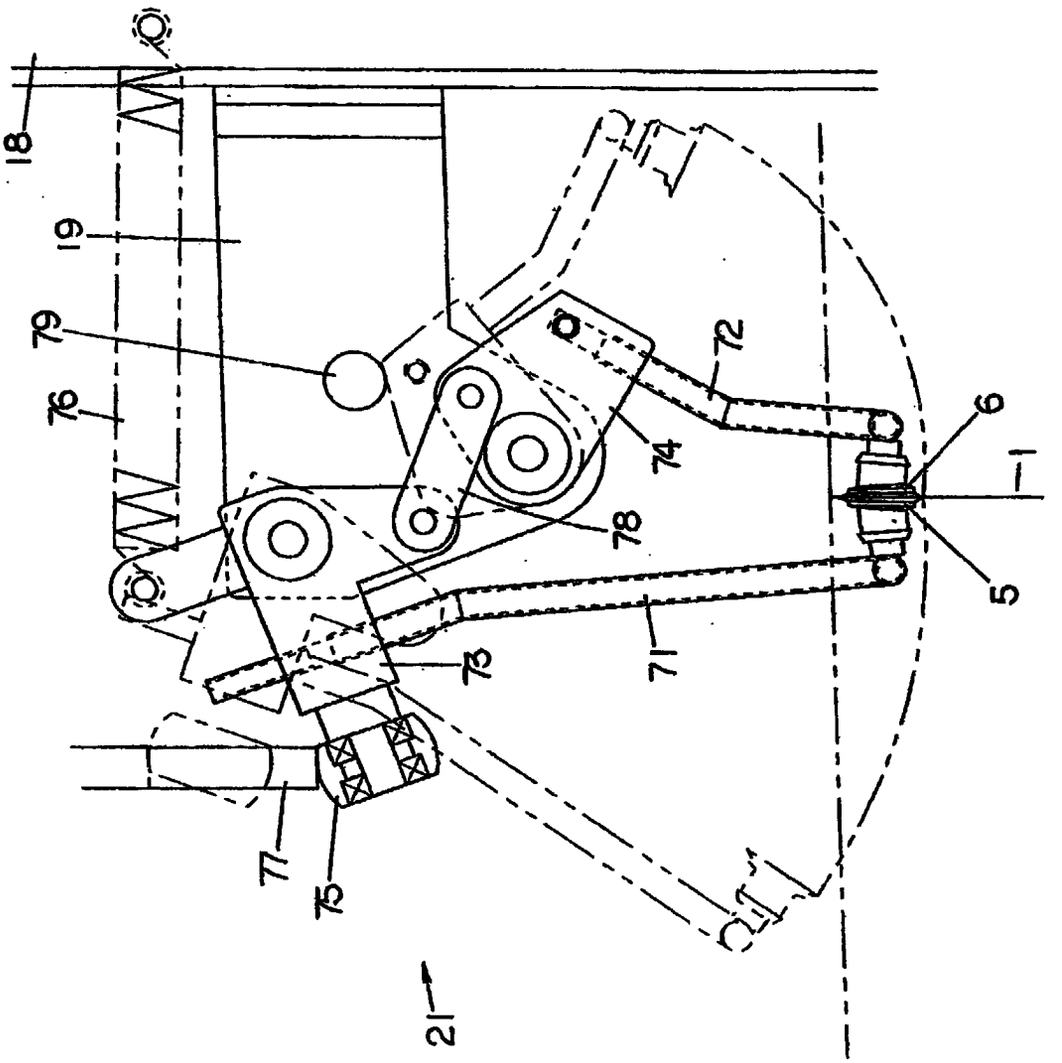


FIG. 10

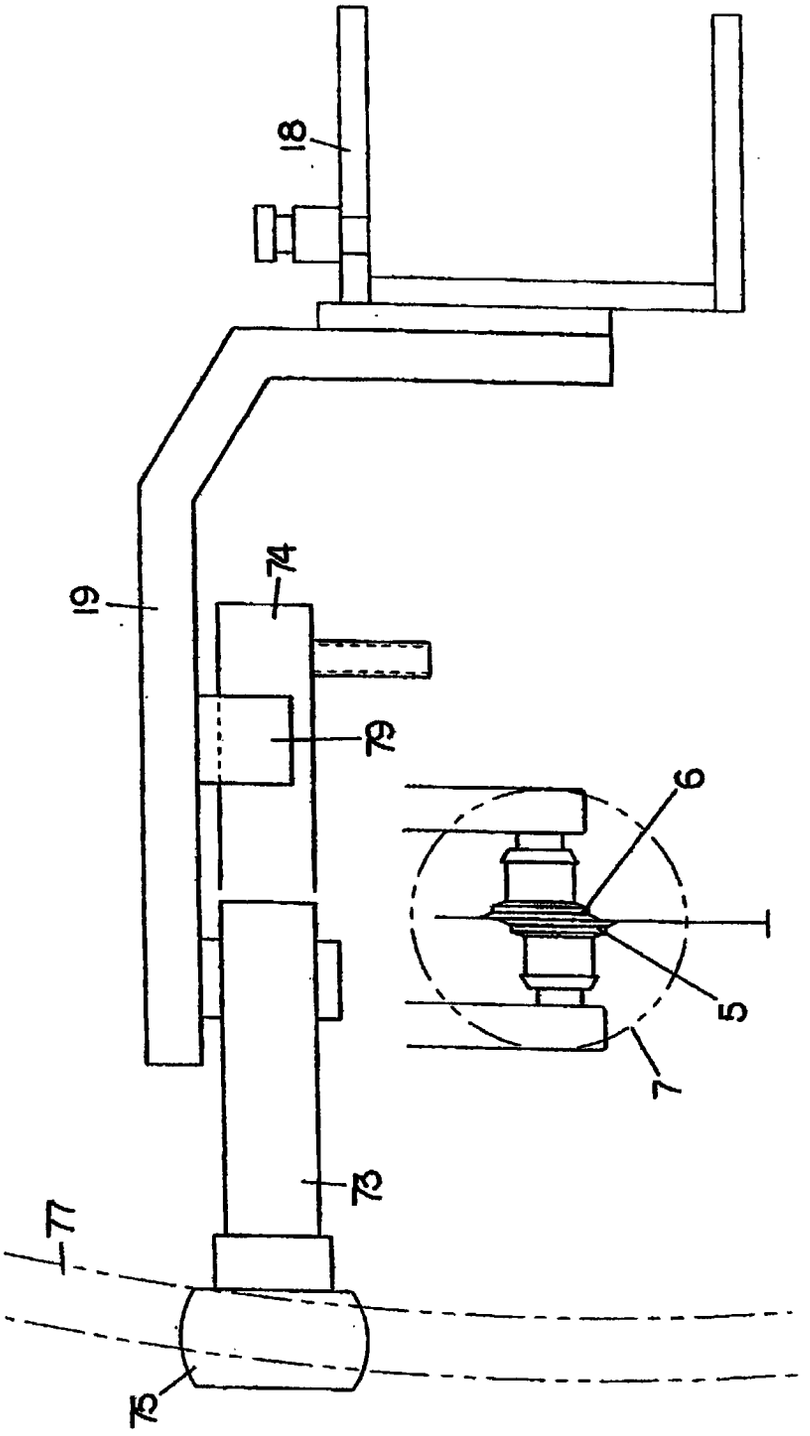


FIG. 11

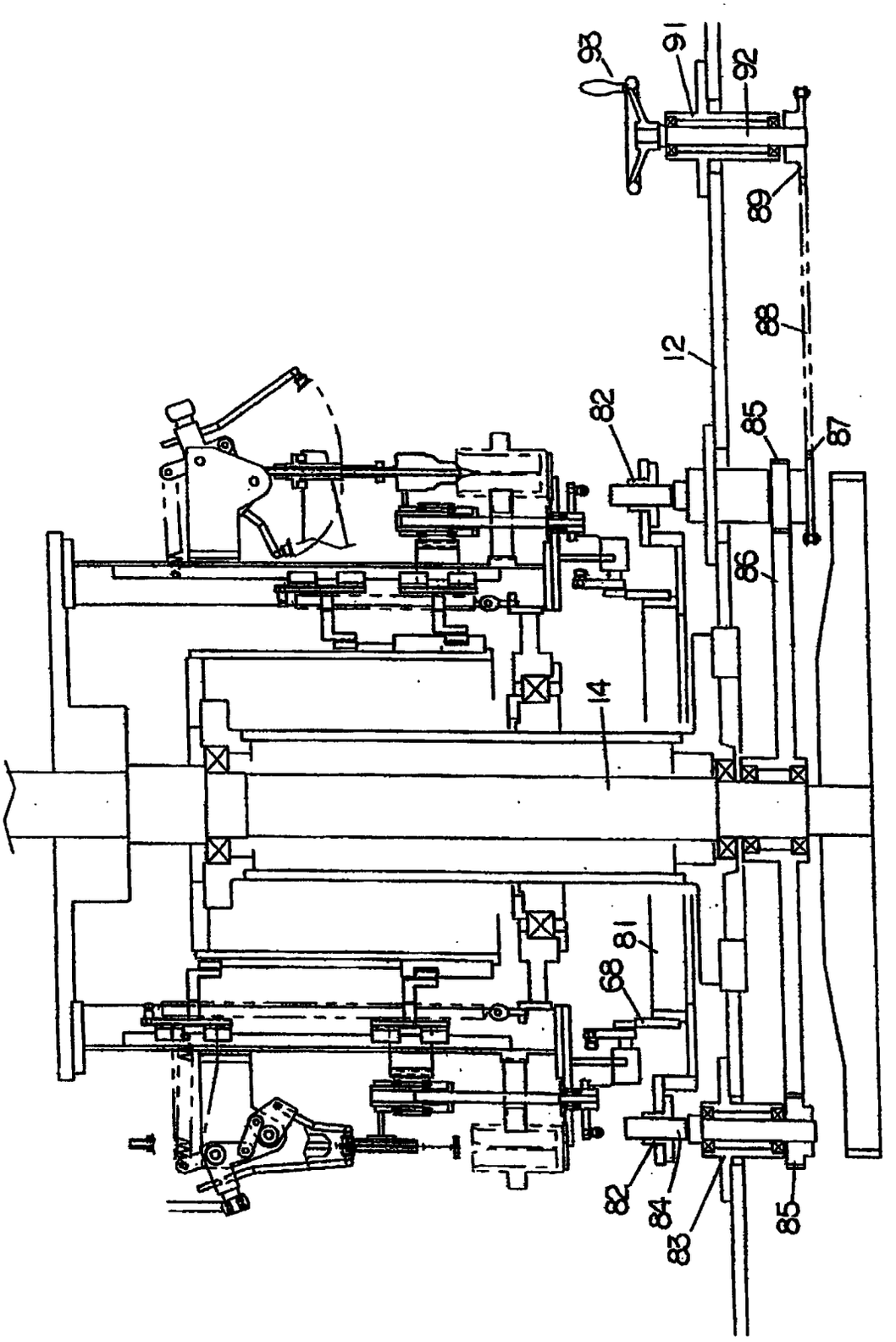
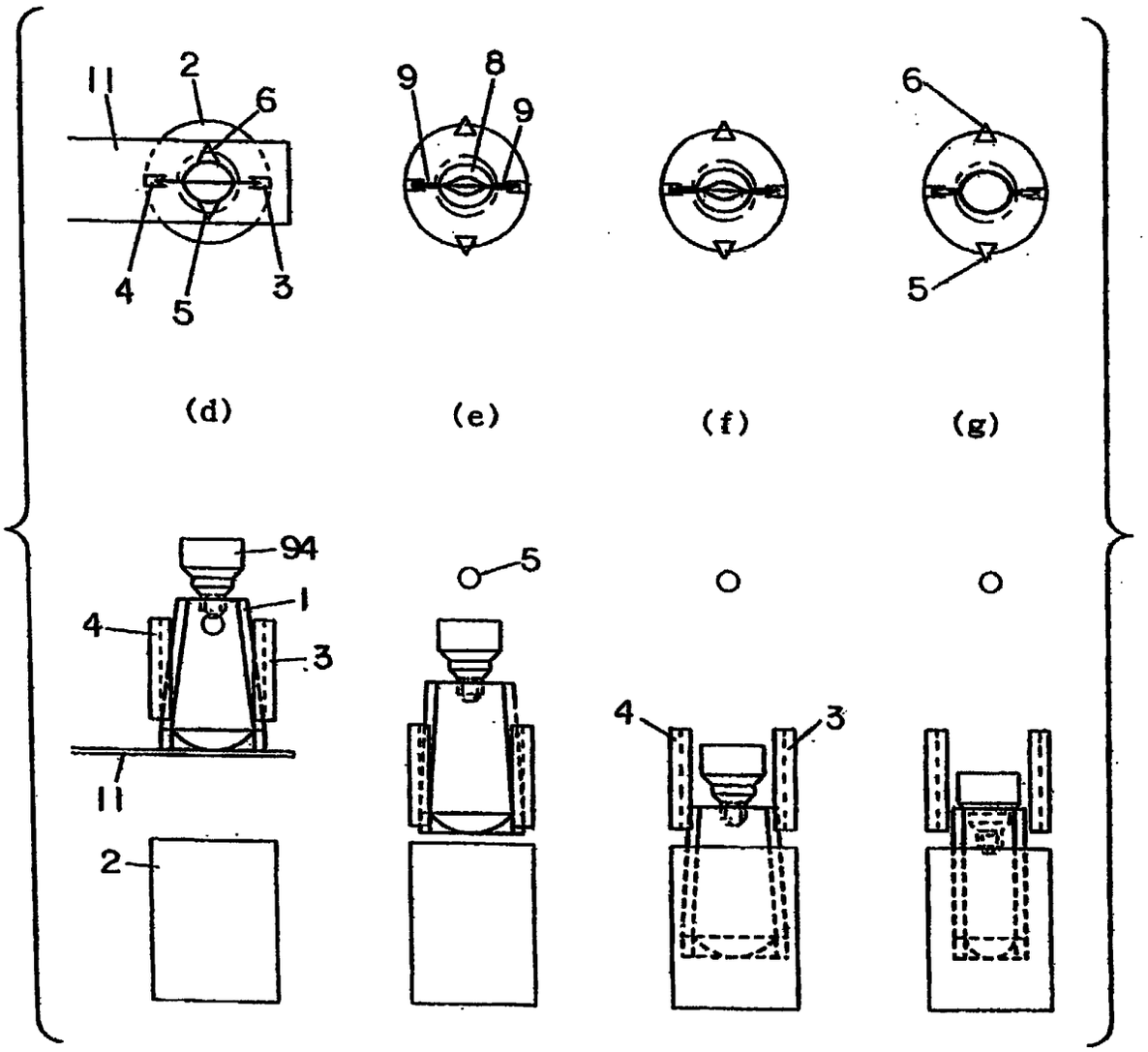


FIG. 12

FIG. 13



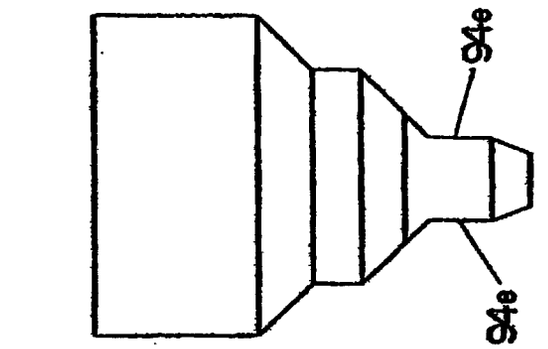


FIG. 14B

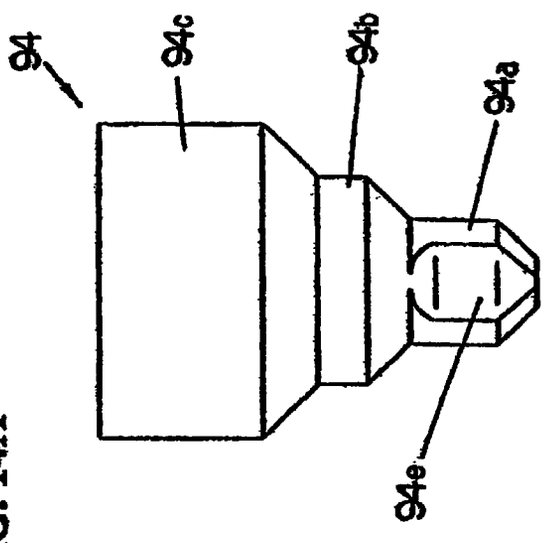


FIG. 14A

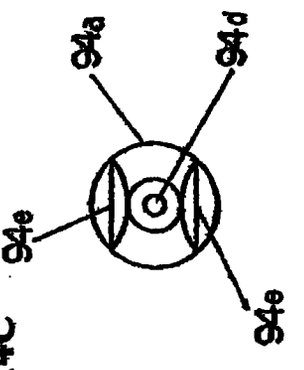


FIG. 14C

FIG. 15A

FIG. 15B

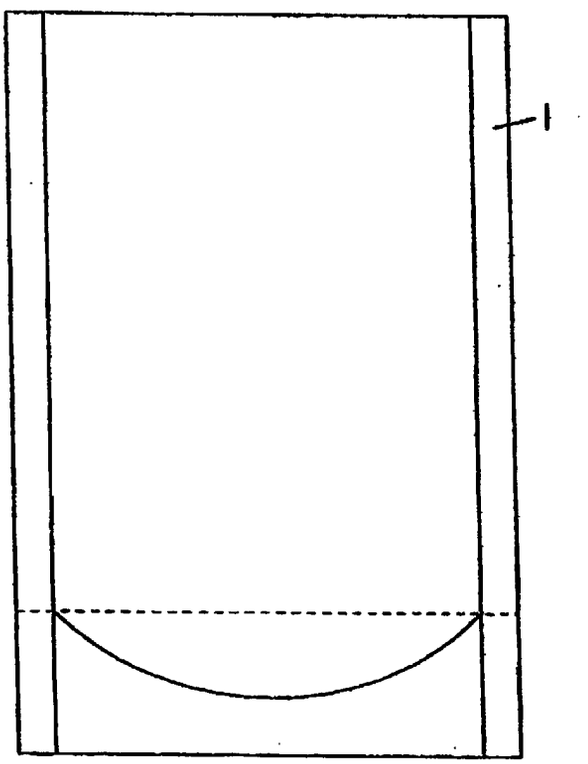


FIG. 16A

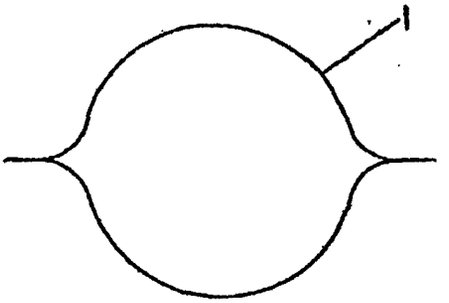


FIG. 16B

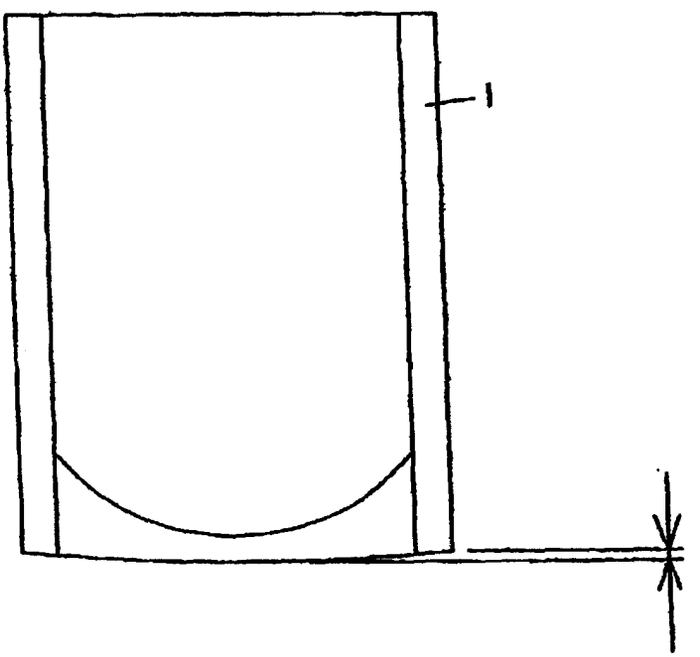


FIG. 17A

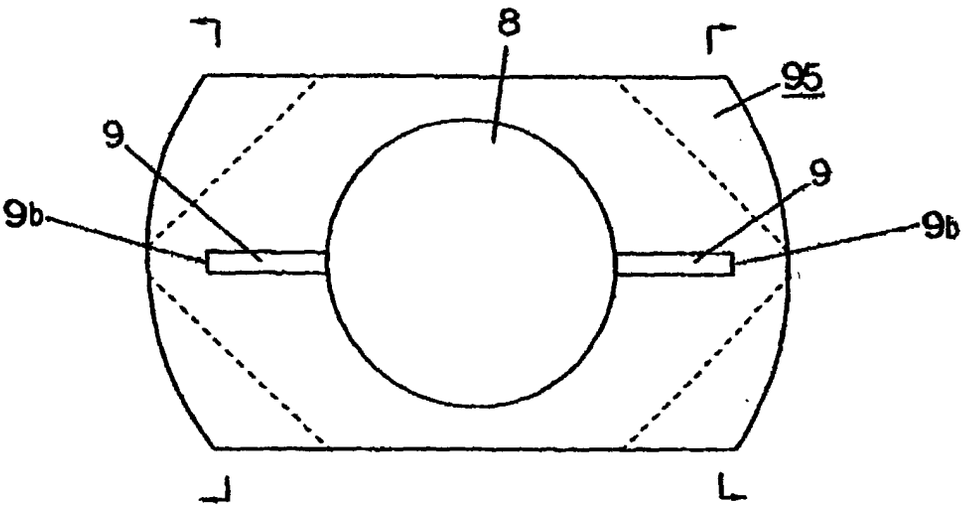


FIG. 17B

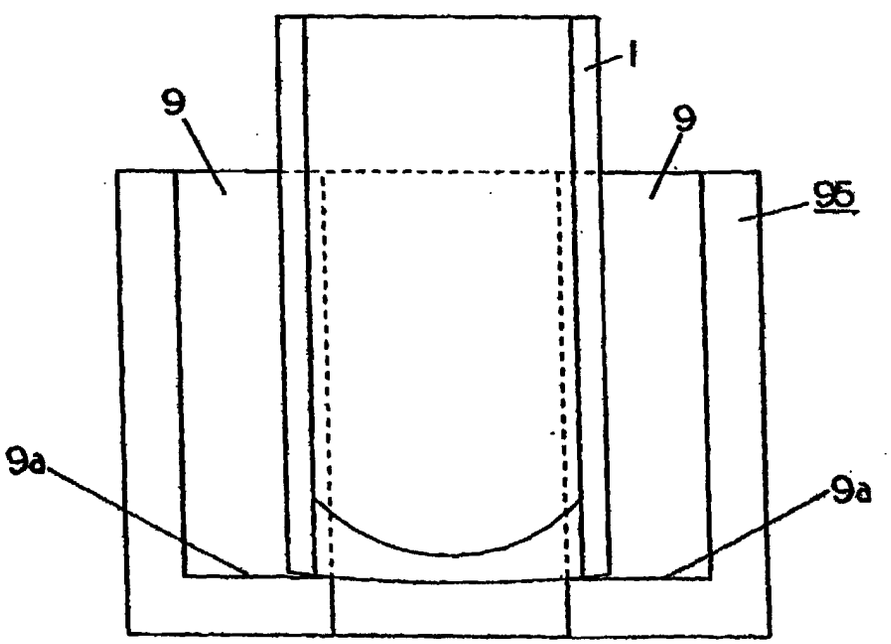


FIG. 18A

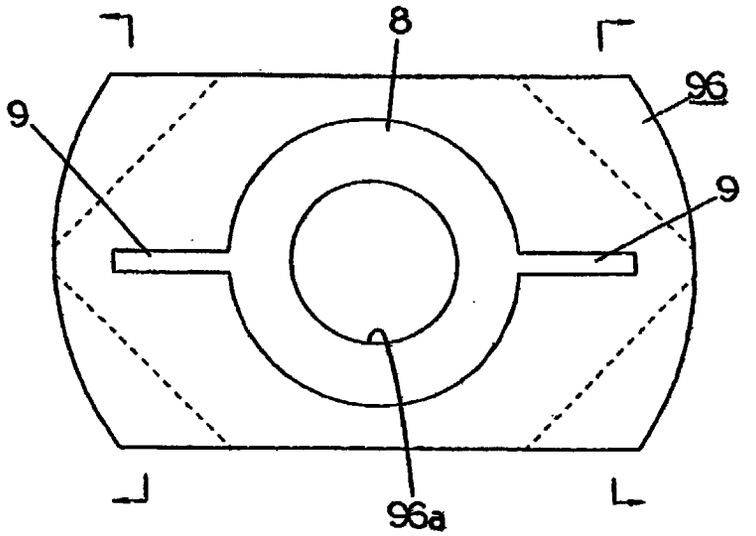


FIG. 18B

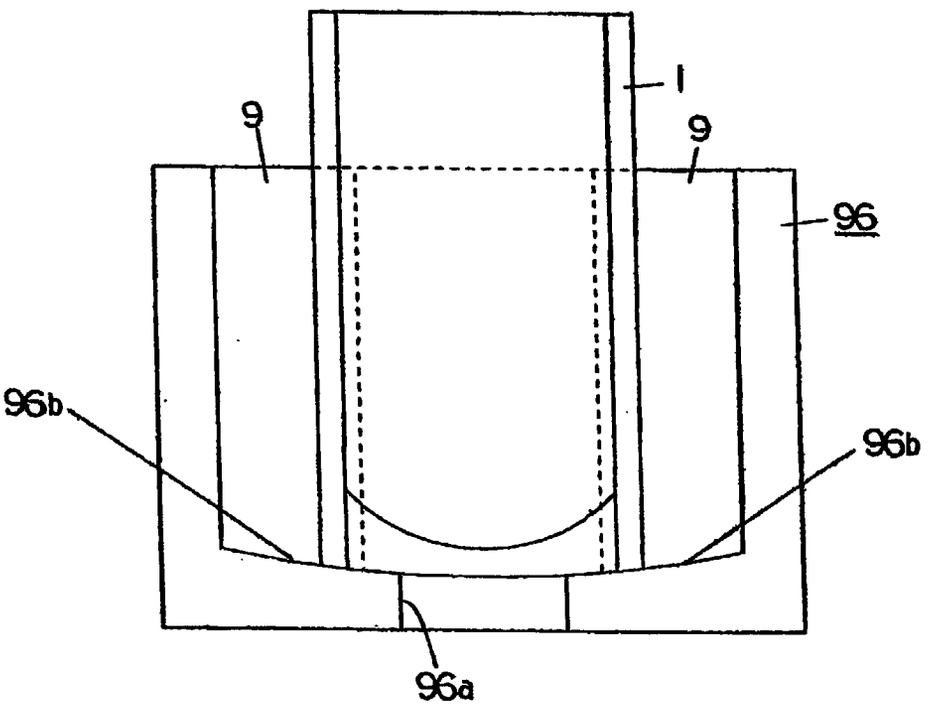


FIG. 19A

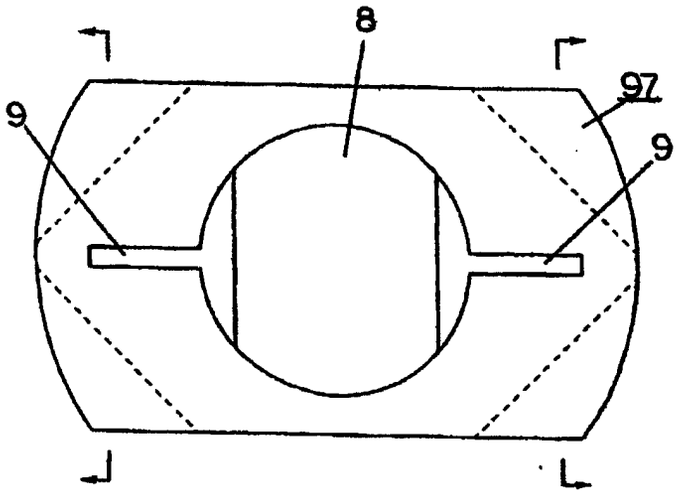
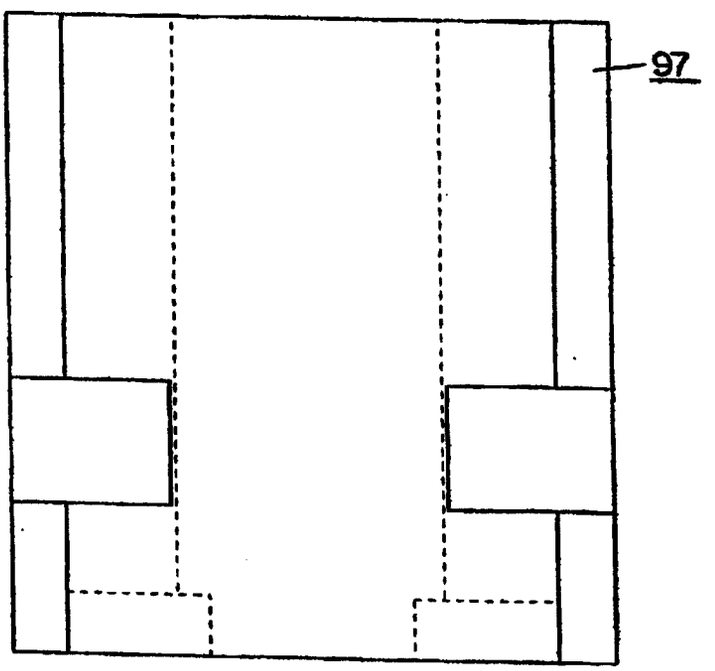


FIG. 19B



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 00 7135

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	GB 749 897 A (HESSER AG MASCHF) 6 June 1956 (1956-06-06) * page 3, line 83-118; figures 6,7 *	1-4,6,8,13	B65B43/50 B65B43/30
D,A	EP 1 035 022 A (TOYO JIDOKI KK) 13 September 2000 (2000-09-13) * column 15, line 13 - column 16, line 3; figures 5-7 *	7,9-11	
D,A	JP 2000 142630 A (SHIKOKU KAKOKI CO LTD) 23 May 2000 (2000-05-23) * figure 9 *	1-3,8,10,13	
A	US 4 473 989 A (TSUTSUMI YOTARO ET AL) 2 October 1984 (1984-10-02) * column 8, line 28 - column 10, line 15; figures 8,9,12,13 *	1,8	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 June 2002	Grentzius, W

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 00 7135

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

25-06-2002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 749897 A	06-06-1956	NONE	
EP 1035022 A	13-09-2000	JP 2000318713 A	21-11-2000
		EP 1035024 A1	13-09-2000
		EP 1035022 A1	13-09-2000
		EP 1035023 A1	13-09-2000
		JP 2000318834 A	21-11-2000
		JP 2000318714 A	21-11-2000
		US 6390272 B1	21-05-2002
JP 2000142630 A	23-05-2000	CN 1253102 A	17-05-2000
		TW 458922 B	11-10-2001
US 4473989 A	02-10-1984	JP 57204802 A	15-12-1982
		JP 1212815 C	27-06-1984
		JP 57077417 A	14-05-1982
		JP 58048414 B	28-10-1983
		CA 1179996 A1	25-12-1984
		GB 2085835 A ,B	06-05-1982

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82