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(72) Inventeur/Inventor:
MEIER, JACQUES, CH

(73) Propriétaire/Owner:
FERAG AG, CH

(74) Agent: FETHERSTONHAUGH & CO.

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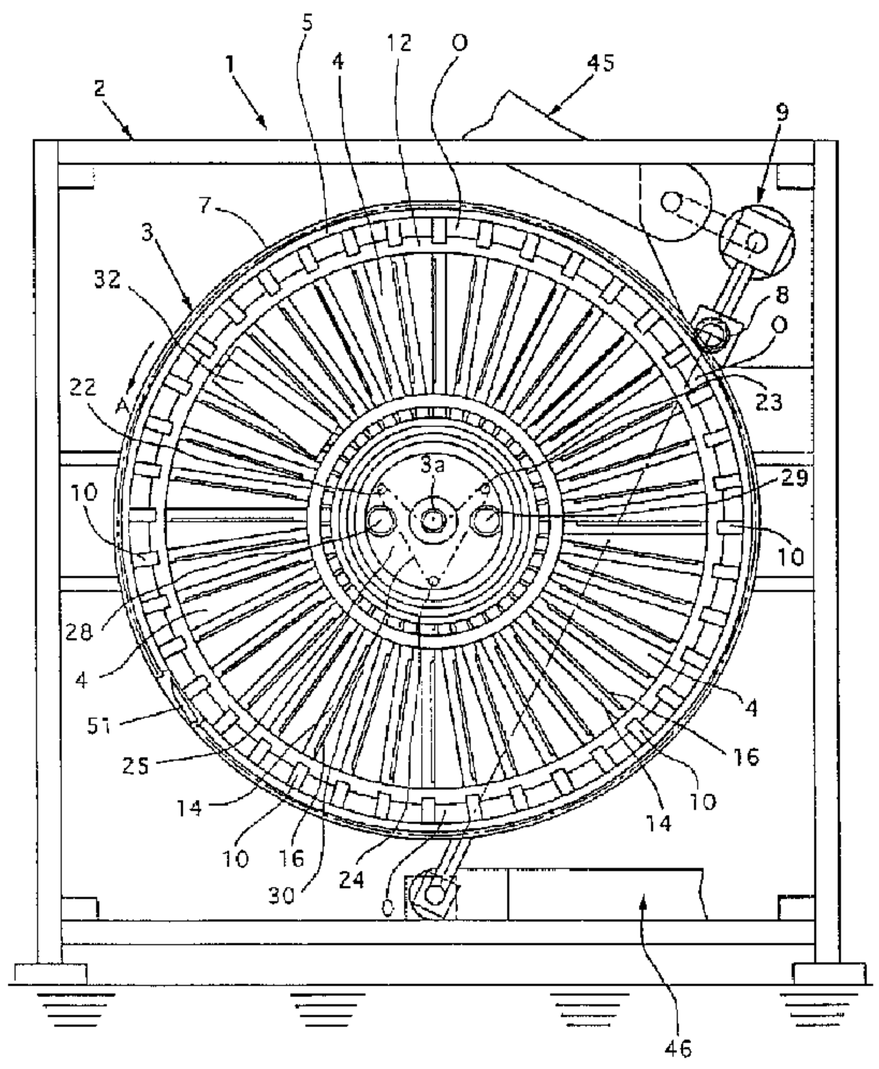

(57) Abrégé/Abstract:
An apparatus for trimming printed prorducts. The apparatus includes a drum with a plurality of radially displaced receiving compartments. The printed products which are to be trimmed rest, along their folded edges, against stops which form the base of the radial receiving compartments. The products are gripped by a displacement device and displaced radially outwards into a cutting position. In the cutting position, the printed products are clamped in the region of their side border located opposite the fold edge. When the clamped printed products run past a stationary cutter element, the printed products are trimmed on the side border. After completion of the cutting operation, the clamping of the printed products is released and the displacement device is moved by a further distance radially outwards. Consequently, the trimmed printed products are advanced into a removal position, in which they are gripped by grippers of a removal conveyor. The controlled advancement of the printed products both into the cutting position and into the removal position ensures that the printed products can be trimmed and received by the grippers of the removal conveyor in precisely defined positions along the printed products.

APPARATUS FOR TRIMMING FOLDED PRINTED PRODUCTS, SUCH AS NEWSPAPERS, PERIODICALS, BROCHURES AND THE LIKE

Abstract of the Disclosure

An apparatus for trimming printed prorducts. The apparatus includes a drum with a plurality of radially displaced receiving compartments. The printed products which are to be trimmed rest, along their folded edges, against stops which form the base of the radial receiving compartments. The products are gripped by a displacement device and displaced radially outwards into a cutting position. In the cutting position, the printed products are clamped in the region of their side border located opposite the fold edge. When the clamped printed products run past a stationary cutter element, the printed products are trimmed on the side border. After completion of the cutting operation, the clamping of the printed products is released and the displacement device is moved by a further distance radially outwards. Consequently, the trimmed printed products are advanced into a removal position, in which they are gripped by grippers of a removal conveyor. The controlled advancement of the printed products both into the cutting position and into the removal position ensures that the printed products can be trimmed and received by the grippers of the removal conveyor in precisely defined positions along the printed products.

APPARATUS FOR TRIMMING FOLDED PRINTED PRODUCTS, SUCH AS NEWSPAPERS, PERIODICALS, BROCHURES AND THE LIKE

Field of the Invention

The present invention relates to an apparatus for trimming folded, in particular multi-sheet, printed products, e.g. newspapers, periodicals and brochures, at least on the side border parallel to the fold edge.

Background of the Invention

An apparatus generally related to the present invention is disclosed in EP-A-0 367 715 and the corresponding U.S. Patent No. 5,113,731. According to that apparatus, the receiving compartments are driven in rotation around a common, horizontal axis and extend in the radial direction. The receiving compartments are open on the circumference and on the two end sides of the apparatus, which is designed as a processing drum. The printed products which are to be trimmed are introduced into the receiving compartments, through the receiving-compartment openings arranged on the drum circumference, with their fold edge in front and drop onto the folding-compartment base, the latter serving as support. Controllable clamping arrangements which clamp the printed products at least during the cutting operation are provided in the receiving compartments.

For the trimming of the printed products on the side border located opposite the fold edge and parallel thereto, the clamping arrangements are

released when the receiving compartments, during their rotational movement around the axis of rotation, extend downwards. The temporarily released printed products slide outwards and abut, by means of their side border which is to be trimmed, against a stop which is at a small spacing from the circumference of the processing drum. The printed products are then clamped again. Subsequently, the printed products, which are now projecting some way beyond the opening of the receiving compartments, are moved past a stationary cutter element which interacts with a cutter element which is arranged at the opening of the receiving compartments and rotates along with the latter. The projecting border strip is cut away by the interaction of the two cutter elements. As the receiving compartments continue to rotate, the trimmed, no longer clamped printed products slide out of the receiving compartments and are transported away by a removal conveyor.

In order to move the printed products into the correct cutting position for the trimming of the side border parallel to the fold edge, the side border usually being an open side border, the printed products, as has already been mentioned, are conveyed out of the receiving compartments, under the action of gravitational and centrifugal forces, and against a stop. This may, on one hand, result in damage to the side edge which is to be trimmed and also, in the case of multipart printed products, in the individual printed-product parts, which are located one inside the other, slipping with respect to one another. Since the ready-trimmed printed products are also conveyed out of the receiving compartments under the action of gravitational and centrifugal force, it is not ensured that the finished printed products will be received by the removal conveyor in the correct position.

A similar prior art apparatus for trimming printed products is described in EP-A-0 602 594. In the case of this apparatus, the receiving compartments

of a first processing drum rotate around a vertical axis of rotation. The printed products which are to be trimmed are fed in a hanging position with their fold edge downwards and are allowed to drop into the receiving compartments, which are open at the bottom. In order to position the printed products in the cutting position, there is provided beneath the processing drum, a support which is separate from the drum and against which the printed products come to rest by means of their fold edge. After the trimming of the side border located opposite the fold edge, the printed products drop, again under the action of gravitational force, into the receiving compartments of a second processing drum, having a horizontal axis of rotation, in which the printed products are trimmed on the side borders running at right angles with respect to the fold edge.

Finally, CH-A-685 153 discloses a comparable type of cutting apparatus which likewise has a processing drum with radially running receiving compartments which are open on the circumference and on the end sides. The printed products which are to be trimmed are introduced into the receiving compartments with their side border which is to be trimmed, these being located opposite the fold edge, in front and are allowed to drop against a stop. The printed products, which rest against the stop by means of their side border which is to be trimmed, assume a standby position, from which, at a suitable point in time, the printed products are displaced, by means of a displacement device, radially towards the axis of rotation and into the cutting position. In this arrangement, the displacement device grips the printed products on the fold edge. After the subsequent trimming of the side borders at right angles with respect to the fold edge, during which the printed products continue to be gripped by the displacement device, the printed products are displaced outwards again and, in the upper region of the processing drum,

are removed from the receiving compartments by means of a removal conveyor running above the processing drum. The removal conveyor has grippers which are arranged at regular intervals one behind the other and grip the printed products on the fold edge.

Summary of the Invention

An object of the present invention is to provide an apparatus of the general type mentioned above wherein printed products are moved into proper position for trimming the side border parallel to the fold edge and, if appropriate, also the side borders running at right angles with respect to the same, and also for being received by the removal conveyor.

This object is achieved by providing an apparatus for trimming folded printed products at least on the side border thereof parallel to the folded edge. The apparatus includes receiving compartments which are rotatably driven and which are open at least on one side running transverse to the direction of rotation to receive the printed products to be trimmed. Within each receiving compartment is a support for supporting the folded edge and a controllable clamping arrnagement for clamping the printed products during cutting. On the open sides of the receiving compartments is positioned a cutter element which moves along therewith and interacts with a stationary cutter element for trimming the side borders of the printed product. Also within the receiving compartments is a controllable displacement device which, during movement, moves the seized product away from the support into the cutting position and then to a discharge position in which the conveyor removes the printed and trimmed products.

Since a displacement device, the movement path of which is precisely defined, is provided for the displacement of the printed products from their initial position, which they assume by way of their fold edge bearing on the support, into the cutting position, the printed products are always displaced into the correct

cutting position without their being any danger, in the case of multi-part printed products, of the individual product parts shifting with respect to one another. The same displacement device then moves the trimmed printed products into the removal position, which is likewise precisely defined, with the result that the printed products can be received by the removal conveyor in a controlled manner, which is particularly advantageous, in particular, in the case of removal conveyors which have grippers.

In accordance with one aspect of the present invention, there is provided an apparatus for trimming folded printed products on at least one side border parallel to a fold edge, said apparatus comprising a plurality of receiving compartments which are driven in rotation along a rotary path, said compartments are open on at least a first side extending transversely with respect to a direction of rotation for receiving the printed products which are to be trimmed, said apparatus including a feed conveyor for feeding the printed products to the receiving compartments and a removal conveyor for transporting the trimmed printed products, said receiving compartments comprising a support upon which the fold edge of the printed products introduced into the compartment contact and a controllable clamping device for clamping the printed products during a cutting operation, said receiving compartments further comprising, on said first open side, a cutter element which moves along therewith and interacts with a stationary cutter element for trimming a side border parallel to the fold edge, said plurality of receiving compartments each comprising a controllable displacement device which acts on an associated printed product of said printed products in an associated receiving compartment of said plurality of receiving compartments and means for moving each displacement device

in a predetermined direction, wherein each displacement device is moveable from an initial position to a first operating position wherein said at least one side border is trimmed and, further, to a second operating position, wherein the product which has been trimmed is removed from the associated compartment, wherein the displacement device acts on the associated printed product located in the associated receiving compartment during movement from the initial position into the first operating position wherein the printed product is moved away from the support into a cutting position for trimming of the side border parallel to the fold edge and continuously acts on the printed product during subsequent movement in the same direction from the first operating position into the second operating position wherein the trimmed printed product is moved into a discharge position, in which the removal conveyor receives the printed products.

Brief Description of the Drawings

An exemplary embodiment of the subject matter of the invention is explained in more detail hereinbelow with reference to the drawings, in which, purely schematically:

Figure 1 shows a side view of an apparatus according to the present invention;

Figure 2 shows an axial section of the processing drum of the apparatus according to Figure 1;

Figure 3 shows, on an enlarged scale, the top half of the apparatus shown in Figure 2;

Figure 4 shows a cross-section of the processing drum of the apparatus according to Figure 1;

Figure 5 shows, on an enlarged scale with respect to Figure 4, a cross-section of a number of receiving compartments of the processing drum in various operating phases;

Figure 6 shows a sectional view taken along line VI-VI in Figure 5;

Figure 7 shows, on an enlarged scale, a detail view of the circumferential region of the processing drum;

Figure 8 shows a plan view of the processing drum in the direction of the arrow Z in Figure 7; and

Figure 9 shows, in a representation corresponding to Figure 5, a number of receiving compartments in another section plane.

Detailed Description of the Preferred Embodiments

Figures 1-4 are used hereinbelow to explain the construction of the novel apparatus **1** for trimming folded printed products on three side borders. Thereafter, Figures 5-9 are used to describe design details of the apparatus **1**.

The apparatus **1** for trimming printed products has a processing drum **3** which is mounted rotatably in a framework **2**. The longitudinal axis of the processing drum **3** is designated by **3a**. The processing drum **3** has a number of receiving compartments **4**, which run radially and are open both on the circumference and on the two end sides of the processing drum **3**. The circumferential opening of the compartments **4** is designated by **O**. As Figures 1-4 show, the processing drum **3** has two outer rings **5** and **6** which are coaxial with the drum longitudinal axis **3a** and are provided on their circumference with a toothed rim **7**. Each of these toothed rims **7** meshes with a drive pinion **8** (Figures 1 and 4) which is driven by a drive **9** mounted in the framework **2**. With the two outer rings **5** and **6**, which are spaced apart in the axial direction, are connected to one another via connecting struts **10** which extend in the direction of the longitudinal axis **3a** and are, for example, screwed to the outer rings **5**, **6**. The number of connecting struts **10** corresponds to the number of compartments **4**. As can be seen from Figure **3**, the connecting struts **10** comprise two strut parts **10a** and **10b**, which are spaced apart from one another by spacer elements **11**.

Arranged within the interior formed by the outer rings **5**, **6** and the connecting struts **10** are two inner rings **12** and **13**, which likewise run coaxially with the drum longitudinal axis **3a**. The inner rings **12**, **13** can be displaced in the direction of the drum longitudinal axis **3a** in a manner which is yet to be described and are in entrainment connection with the connecting struts **10**, with the result that, upon rotation of the outer rings **5** and **6**, the inner rings

12, **13** are entrained in the direction of rotation **A**. The entrainment and displacement connection between the inner rings **12** and **13** and the connecting struts **10** is ensured in that the connecting struts **10**, i.e. the strut part **10b**, engage into a groove on the circumference of the inner rings **12**, **13**. These grooves are designated by **12a** in Figure 5. Consequently, the inner rings **12**, **13**, as has been mentioned, can be displaced in the longitudinal direction of the connecting struts **10** and, upon rotation of the outer rings **5**, **6**, can be entrained.

Fastened on the inner rings **12**, **13** are supporting elements **14** and **15**, respectively, which extend in the radial direction towards the drum axis3a. The supporting elements **14**, **15** form part of the partition walls between the receiving compartments 4 and serve as supporting means for the printed products which are to be trimmed, as will be described in more detail later. On the outwardly directed side, the supporting elements **14**, **15** are provided with a cutter element **16** and **17**, respectively (Figures 2 and 3). The supporting elements **14**, **15** are mounted rotatably on disc-shaped bearing elements **20**, **21** via bearing rings **18**, **19** (Figures 2 and 3). The bearing elements **20**, **21** have three threaded spindles **22**, **23**, **24** passing through them, which spindles are mounted rotatably in two flanges **25** and **26** which are fastened on the framework **2**. The bearing elements **20**, **21** are connected to thread sleeves **27** which are seated on the thread spindles **22**, **23**, **24**. Furthermore, two guide rods **28** and **29** pass through the bearing elements **20** and **21**. The guide rods **28**, **29** are parallel to the threaded spindles **22**, **23**, **24** and parallel to the drum longitudinal axis **3a** and are likewise fastened on the flanges **25** and **26**. The three threaded spindles **22**, **23**, **24** are connected to one another via a chain **30** and can be rotated by means of a common adjustment wheel **31**.

By virtue of the adjustment wheel **31** being rotated, the bearing elements **20**, **21** and, with these,

also the supporting elements **14**, **15** including the inner rings **12**, **13** can be adjusted, via the threaded spindles **22**, **23**, **24**, in the direction of the drum longitudinal axis **3a**. In this manner, the spacing between the supporting elements **14**, **15** (and thus the width of the receiving compartments **4**) can be adapted to the width of the printed products which are to be trimmed (format setting). In Figures 2 and 3, solid lines show the supporting element **14** in the position for the smallest product width and the supporting element **15** in the position for the largest product width. Dashed lines indicate the supporting element **14'** in the position for the largest product width and the supporting element **15'** in the position for the smallest product width.

Arranged adjacent to the outwardly directed sides of the supporting elements **14**, **15** is in each case one stationary cutter element **32**, **33** which is fastened on the bearing element **20** and **21**, respectively, and is thus adjusted therewith. The stationary cutter elements **32**, **33** are located opposite one another, as seen in the direction of the drum axis **3a**, and interact with the rotating cutter elements **16**, **17** of the supporting elements **14**, **15** for the simultaneous trimming of the two mutually opposite open side borders of the printed products. In this arrangement, the cutting operation is similar to that for the apparatus described in the already mentioned EP-A-0 602 594.

Arranged between the supporting elements **14**, **15** of the receiving compartments **4**, which supporting elements are in alignment with one another in the circumferential direction of the processing drum **3**, are two supports **34**, **35** (Figures 2-4) which are designed in the manner of segments, are stationary, extend in the direction of rotation **A** and form the lower boundary of the receiving compartments **4** in the region of introduction of the printed products into the receiving compartments **4**. The two supports **34**, **35** can be adjusted in the radial direction by means of an adjustment mechanism **36** (Figure 4) in order for it to

be possible to set the depth of the receiving compartments **4** to correspond to the height of the printed products which are to be trimmed. Figure 3 shows the support **34** in the position for printed products of the smallest height, while the other support **35** is represented in the position for printed products of the greatest height.

Furthermore, a displacement device **37** is arranged in each compartment, and this displacement device will be described in more detail with reference to Figure 9. The displacement device **37** is arranged in each case between the supporting elements **14**, **15** of each receiving compartment **4**. The displacement device **37** can be displaced in the radial direction along a linear guide **38**, as has yet to be described in more detail. Provided for the control of the opening and closing movements of the displacement device **37** and the radial displacement of the latter are two control cams **39** and **40**, with which control rollers **41** and **42** arranged on the displacement device **37** interact. The control cam **40** is designed such that the control rollers **42** are guided positively. The two control cams **39**, **40** are fastened on a carrying part **43** which is arranged in a stationary manner in the framework **2**.

Furthermore, a clamping device **44** is provided in each receiving compartment **4**, which clamping device, for the sake of clarity, is not shown in Figures 1-3 and has its construction explained in more detail with reference to Figures 5-8. Said clamping device **44** interacts with the supporting elements **14**, **15** in order to clamp the printed products during trimming of the two mutually opposite, usually open, side borders. In addition, the clamping device **44** is also used in order to clamp the third side border, running parallel to the fold edge, during the cutting operation, as will be described in more detail with reference to Figures 5-8.

As can further be seen from Figures 1 and 2, the processing drum **3** is assigned a feed conveyor **45** and a removal conveyor **46**, these two being driven by

the drive **9**. Both the feed conveyor **45** and the removal conveyor **46** have controlled grippers **47** and **48**, respectively, which are spaced apart one behind the other on a drawing member **49** which is driven in circulation (Figure 4). The feed conveyor **45** is used for feeding and introducing into the receiving compartments **4** the folded printed products **50** which are to be trimmed. In this arrangement, the usually multi-part printed products **50** are introduced into the receiving compartments **4** with their fold edge **50a** in front. Consequently, the printed products **50** are retained by the grippers **47** on the open side border **50b** located opposite the fold edge **50a**. The grippers **48** of the removal conveyor **46** again grip the ready-trimmed printed products **50** on the open side border **50b** located opposite the fold edge **50a**.

Provided for the trimming of the abovementioned open side border **50b** is a stationary cutter element **51**, which is represented only schematically in Figures 1 and 4 and is arranged on the circumference of the processing drum **3**.

A printed product **50'** of relatively small height is shown by dashed lines in Figure **4**. The abovementioned adjustment of the supports **34**, **35** achieves the situation where the side edge **50b** always assumes the same position at the beginning of the cutting operation irrespective of the height of the printed products **50** or **50'**, i.e. is always spaced apart by the same distance from the drum longitudinal axis **3a**. This situation is represented in Figure 4 in the receiving compartment designated by **4'**. This thus achieves the situation where, irrespective of the format of the printed products **50**, the latter can always be advanced by the same distance in the radial direction in order to pass into the correct position for the trimming of the side border **50b**.

As can be seen from the representations in Figures 2, 3, 5 and 9, the strut parts **10a** of the connecting struts **10** are provided on their leading

edge, as seen in the direction of rotation **A**, with an elongate cutter element **52** which interacts with the stationary cutter element **51** for the trimming of the printed products **50** on the open side border **50b** located opposite the folded edge **50a** of said printed products. Said side border **50b** is trimmed in a similar manner as in the case of the apparatus in accordance with the already mentioned EP-A-0 602 594.

The construction of the clamping device **44** will now be described hereinbelow with reference to Figures 5-8.

Each clamping device **44** comprises two flat pressing elements, of which only one pressing element **53** can be seen in Figure 5. Each pressing element **53** interacts with a supporting element **14**, **15**. The open side borders running at right angles with respect to the fold edge **50a**, it being possible to see only one side border **50c** in Figure 5, are clamped, for the purpose of the cutting operation, between a pressing element **53** and the associated supporting element **14**, **15**. At the radially outer end, each pressing element **53** has a guide member **54** which is firmly connected to it. The pressing elements **53** with the associated guide members **54** can be displaced, together with the supporting elements **14** and **15** and the inner rings **12** and **13**, in the direction of the drum longitudinal axis **3a** for the purpose of format setting. Each guide member **54** has a groove **54a** into which a connecting member **55** engages by means of an extension **55a**. The connecting member extends over the entire width of a receiving compartment **4** and connects the guide members **54** of the two pressing elements **53** assigned to the same receiving compartment **4**. The extension **55a** is used as a guide element for the axial displacement of the pressing element **53** and guide member **54**. A pressing strip **56** which likewise extends over the entire width of the receiving compartments **4** is connected to the connecting member **55**. For clamping the printed products on the open side border **50b**, the pressing

strip **56** interacts with the facing surface of the strut part **10a** of the connecting struts **10**. The surface of the connecting struts **10** is located in the same plane as the supporting surfaces of the supporting elements **14** and **15**.

An actuating mechanism **57**, which is represented in more detail in Figures 7 and 8, is provided on both sides of the processing drum **3** in order to move the clamping devices between a rest position and a clamping position. The actuating mechanism **57** has a toggle lever **58**, the joint of which is designated by **58a**. One lever **59** of the two levers **59**, **60** of the toggle lever **58** is fastened in an articulated manner on an anchoring element **61** which is fastened on the outer ring **5** or **6** or on a connecting strut **10**. The other lever **60** is connected in an articulated manner to a slide element **62** which is in connection with the connecting member **55** via a connecting element **63**. Each slide element **62** is mounted displaceably on a guide rod **64** which extends between adjacent anchoring elements **61** and is connected thereto.

The lever **60** of the toggle lever **58** comprises two parts **60a** and **60b**. The lever part **60b** engages telescopically into the other lever part **60a** (see Figure 8). A compression spring **65** is clamped in between the lever parts **60a** and **60b**, and this spring permits adaptation to printed products of different thicknesses. Provided on the joint **58a** of the toggle lever **58** is a follow-on roller **66** which can be rotated around the joint axis. The follow-on roller **66** interacts with a stationary control cam **67**, which is indicated only schematically in Figure 8. As Figure 8 likewise shows, the lever part **60a** is provided with a slot **100** in which there is guided a pin **101** which is fastened on the other lever part **60b**. Clamped between the slide part **62** and the anchoring element **61** for the associated toggle lever **58** is a tension spring **S** which has the tendency of drawing the clamping device back

into the rest position, which is shown for the receiving compartment **4** on the right-side in Figures 5, 7 and 8.

The mode of functioning of the actuating mechanism **57** can be readily derived with reference to Figure 8. In order to move the clamping device **44**, i.e. the pressing element **53** and the pressing strip **56**, from the rest position into the clamping position, the toggle lever **58** is moved into the extended position by means of the control cam **67**, as is represented on the left in Figure 8. The tension spring **S** is stressed thereby. The tension spring **S** then ensures that the clamping device **44** is moved back into the rest position again as soon as this is made possible by a corresponding arrangement of the control cam **67**.

The clamping device **44**, i.e. the pressing element **53**, can be adapted, in terms of its position with respect to the associated supporting element **14**, **15**, to the thickness of the printed products **50** which are to be trimmed in each case. For this purpose, use is made of a setting mechanism **68**, which is represented in Figures 5 and 6. The setting mechanism **68**, which is arranged on the two end sides of the processing drum **3**, has a setting ring **69** which can be rotated in the direction of the arrow B in a manner which is not shown in any more detail. Mounted in an articulated manner on the setting ring **69** are connecting members **70** which are each assigned to a clamping device **44** and are designed in the manner of a link plate, as can be seen from Figure 6. The connecting members **70** are connected to the setting ring **69** by means of an articulation bolt **71** (Figure 6). The opposite end of the connecting members **70** is connected in an articulated manner to the associated pressing element **53** via a further articulation bolt **72**. The connecting members **70** are under the action of a compression spring **73** which is supported, at the other end, on the setting ring **69**. An arresting device **74** is provided for the guidance and blocking of the setting ring **69**. By virtue of the

setting ring **69** being rotated, the spacing between the pressing elements **53** and the associated supporting elements **14**, **15**, this spacing being indicated by a in Figure 5, can be changed in order thus to take account of the different thicknesses of the printed products **50** which are to be clamped.

The construction of the displacement device **37** will now be explained in more detail with reference to Figure 9.

The displacement device **37** has a clamping member **75** which is fastened pivotably on a mounting part **76**. The latter can be displaced along the linear guide **38**. An actuating lever **77** is connected to the clamping member **75**, and the control roller **41** which has already been mentioned with reference to Figures 2 and 3 is mounted at the end of the actuating lever **77**. The clamping member **75** is retained in the clamping position by means of a compression spring **78**. The compression spring **78** is arranged between the clamping member **75** and a supporting element **79** which is used as a supporting means for the printed products **50**. The supporting element **79** is fastened both on the mounting part **76** and on a second mounting part **80**, which can likewise be displaced along the linear guide **38**. The control roller **42** is also fastened on said supporting element **79**, which control roller is, as has already been mentioned, guided positively by the control cam **40**.

The mode of operation of the displacement device **37** can be readily seen from Figure 9. The control cam **39** acting on the control roller 41 forces the clamping member **75**, counter to the force of the compression spring **78**, into the open position, this permitting introduction of a printed product between the clamping member **75** and the associated supporting element **79**, as is represented on the right-side of Figure 9. After the return of the clamping member **75** into the clamping position (left-hand side in Figure 9), the displacement device **37** is displaced outwards in

the radial direction by means of the other control cam **40**, to be precise in two steps. The printed product introduced into a receiving compartment **4** assumes a basic position, which is defined by the fold edge **50a** butting against the supports **34**, **35** (see right-hand side of Figure 9). In the basic position, the printed product **50** is clamped in the displacement device **37** located in the initial position. This state is represented in the receiving compartment designated by **4'**. In a first step, the printed product is then moved from said basic position into the cutting position, to be precise by displacement of the displacement device **37**, i.e. the clamping member **75**, out of the initial position into a first operating position. This state is represented in Figure 9 in the receiving compartment designated by **4"**. In this cutting position, the side border **50b** which runs parallel to the fold edge **50a** is trimmed. In a second step, the trimmed printed product **50** is advanced from the cutting position into a removal position. This is achieved by displacement of the displacement device **37** or of the clamping member **75** from the first operating position into a second operating position, which is represented in the receiving compartment designated by **4"'**. In this removal position, the printed product **50** projects beyond the receiving compartments **4** by means of its side border **50b** and can be gripped by the grippers **48** of the removal conveyor **46**. In this second operation position, the clamping member **75** is, of course, moved out of the clamping position into the open position.

The mode of functioning of the apparatus **1**, insofar as this is not obvious from what has gone before, will now be explained hereinbelow, reference being made, in particular, to Figures 4, 5 and 9.

The printed products **50** fed to the feed conveyor **45** are introduced into the receiving compartments **4** and butt, by means of their fold edges **50a**, against the supports **34** and **35**. As has already been mentioned, the latter are set such that the side

borders **50b** located opposite the fold edges **50a** are always located at the same level irrespective of the format of the printed products **50**. As the processing drum **3** continues to rotate, the printed products are aligned laterally in a manner which is not shown in any more detail. This alignment region is designed in Figure 4 by **D**. Before the printed products **50** run off the supports **34** and **35**, they are clamped in their basic position by means of the clamping device **44**. Subsequently, the clamped printed products **50** run past the stationary cutter elements **32** and **33** located opposite one another in the axial direction. In this process, the side borders **50c** running at right angles with respect to the fold edge **50a** are simultaneously trimmed (so-called head and foot trimming). The corresponding first cutting region is designated in Figure 4 by **E**.

After that, the printed products **50** are gripped by the displacement device **37**, i.e. the clamping member **75** is displaced into the clamping position. The clamping device **44**, on the other hand, is opened (see also the corresponding representations in those receiving compartments in Figures 5 and 9 which are designated by **4'**). This is followed by the commencement of the movement of the displacement device **37** from the initial position into the first operating position, in which the printed products **50** are located in a second cutting position (region **F**, Figure 4). In this second cutting position, the printed product **50** is clamped again by means of the clamping device **44**, with the result that the border **50b** which is then to be trimmed is clamped between the pressing strip **56** and the associated connect ing strut **10**. This is represented in Figures 5 and 9 in the receving compartments designated by **4"**. In this first cutting position, the stationary cutter element **51** then interacts with the cutter element **52** in order to trim the side border **50b** (so-called face trimming). This takes place in the region designated by **G** in Figure 4.

Thereafter, the clamping device **44** is released again and the displacement device **37** is then displaced from the first operating position into the second operating position. In the process, the then ready-trimmed printed product is advanced into the removal position, in which it projects out of the circumferential opening **O** of the receiving compartment **4** and can be gripped by the grippers **48** of the removal conveyor **46**. This displacement into the removal position is represented in Figures 5 and 9 in the receiving compartments designated by **4"'** and takes place in the region designated by **H** in Figure 4. In order to ensure that the trimmed printed products **50** are received in a satisfactory manner by the grippers **48** of the removal conveyor **46**, the spacing between the grippers **48** is smaller than the separation of the receiving compartments .

Since the side borders running at right angles with respect to the fold edge **50a** are trimmed simultaneously (head and foot trimming), compensation between the forces occurring during cutting is achieved. If there is no need for any head or foot trimming, then the cutter elements **32**, **33** can be disengaged.

Since, as has been mentioned, corresponding setting of the supports **34**, **35** ensures that, irrespective of the format size, the side edges **50b** are always spaced apart by the same distance from the longitudinal axis **3a** of the processing drum **3**, the displacement device **37** may always be advanced by the same distance for each format, in order to pass from the initial position into the first operating position and from the latter into the second operating position. This means that the structural outlay for the displacement device **37** is kept as low as possible. The guided displacement of the printed products **50** in the radial direction from a basic position into the second cutting position and, subsequently, into the removal position ensures that the printed products **50** always

assume a precisely defined position for the trimming of the side border **50b** and for removal by the removal conveyor **46**.

Instead of providing a processing drum **3** in which the receiving compartments **4** extend in the radial direction and rotate around a horizontal drum axis **3a**, it is also conceivable to allow the receiving compartments to circulate along a continuous circulatory path with their openings **O** always directed upwards, as is known, for example, from CH-A-668 216.

The following variants are also possible within the scope of the concept according to the invention:

Use may also be made of a processing drum with a vertical drum axis, the side border **50b** located opposite the fold edge **50a** then being trimmed on an end side of the processing drum, as is the case for the apparatus described in the already mentioned EP-A-0 602 594. The side borders **50c** running at right angles with respect to the fold edge **50a** are trimmed in a second processing drum, which may be arranged upstream or downstream of the first processing drum.

Of course, it is also possible only to trim the side border **50b** parallel to the fold edge **50a** in the depicted processing drum **3** with horizontal axis of rotation **3a** and to trim the other side borders **50c** in another apparatus. However, it is obvious that, in comparison with this, the depicted and described apparatus has the advantage of time-saving processing and, in addition, requires a low outlay in terms of equipment.

25561-113

CLAIMS:

1. An apparatus for trimming folded printed products on at least one side border parallel to a fold edge, said apparatus comprising a plurality of receiving compartments which are driven in rotation along a rotary path, said compartments are open on at least a first side extending transversely with respect to a direction of rotation for receiving the printed products which are to be trimmed, said apparatus including a feed conveyor for feeding the printed products to the receiving compartments and a removal conveyor for transporting the trimmed printed products, said receiving compartments comprising a support upon which the fold edge of the printed products introduced into the compartment contact and a controllable clamping device for clamping the printed products during a cutting operation, said receiving compartments further comprising, on said first open side, a cutter element which moves along therewith and interacts with a stationary cutter element for trimming a side border parallel to the fold edge, said plurality of receiving compartments each comprising a controllable displacement device which acts on an associated printed product of said printed products in an associated receiving compartment of said plurality of receiving compartments and means for moving each displacement device in a predetermined direction, wherein each displacement device is moveable from an initial position to a first operating position wherein said at least one side border is trimmed and, further, to a second operating position, wherein the product which has been trimmed is removed from the associated compartment, wherein the displacement device acts on the associated printed product located in the associated receiving compartment during movement from the initial position into the first operating position wherein

the printed product is moved away from the support into a cutting position for trimming of the side border parallel to the fold edge and continuously acts on the printed product during subsequent movement in the same direction from the first operating position into the second operating position wherein the trimmed printed product is moved into a discharge position, in which the removal conveyor receives the printed products.

2. Apparatus according to claim 1, wherein said first open side of the receiving compartments is formed by an introduction opening for the printed products which are to be trimmed.

3. Apparatus according to claim 1, wherein said receiving compartments are driven in rotation around a common axis and the compartments extend away from the axis of rotation in a radial direction and said compartments are open on an outer side, extending in a direction of the axis of rotation.

4. Apparatus according to claim 1, wherein said support, which defines a base of the receiving compartments, is adjusted in the direction of said open side of the receiving compartments so that spacing between the cutter element of the receiving compartments and the side border, which is to be trimmed of the printed products resting against the support, is kept substantially the same for each product format.

5. Apparatus according to claim 3, wherein the support which is arranged in a region of introduction of the printed products into the receiving compartments is displaced in the radial direction, but is otherwise stationary, and said clamping arrangement clamps the printed

products before the products are moved out of the region of the support.

6. Apparatus according to claim 1, wherein said receiving compartments are open on a second side which runs at a right angle with respect to said first open side and on which there is arranged, in each case, one cutter element which runs along therewith and interacts with the stationary cutter element for trimming side borders of said printed products running at right angles with respect to the fold edge of the printed products.

7. Apparatus according to Claim 6, wherein said two stationary cutter elements are located opposite one another with respect to the direction of rotation of the receiving compartments, so that said side borders of the products are trimmed at substantially the same time.

8. Apparatus according to Claim 1, wherein each receiving compartment has two supporting elements for the printed products which are adjusted at right angles with respect to the direction of rotation of the receiving compartments away from one another and towards one another for adapting their mutual position to a width of the printed products which are to be trimmed.

9. Apparatus according to Claim 8, wherein said displacement device is arranged between said two supporting elements.

10. Apparatus according to Claim 6, wherein each supporting element on an outer side thereof supports a cutter element which runs along therewith, and the stationary cutter elements which interact with the running cutter elements can be adjusted along with the supporting elements.

11. Apparatus according to Claim 3 wherein said supporting elements which are arranged on the same side of the receiving compartments and are each fastened on a ring which is coaxial with the axis of rotation and are ajustable in the direction of the axis of rotation and are driven in rotation.

12. Apparatus according to Claim 11, wherein the two rings on their outer circumference are in entrainment connection with guides which run in the direction of the axis of rotation and can be driven in rotation around the axis of rotation, the two rings being displaceable along said guides.

13. Apparatus according to Claim 1, wherein each displacement device includes a clamping member which interacts with an abutment element to support the printed products and can be adjusted between an open position and a clamping position and, along with the abutment element, can be displaced from the initial position into the first and second operating positions.

14. Apparatus according to Claim 1 wherein each clamping arrangement has a pressing device which can be pivoted from an open position into a clamping position, in which it interacts with supporting means which separate the receiving compartments from one another and support the printed products, the pivot axis of the pressing device being adjusted by means of a setting mechanism in a direction away from the supporting means and in a direction towards the same, so that spacing between the pressing device and the supporting means can be set depending upon a thickness of the printed products which are to be trimmed.

15. Apparatus according to Claim 8 wherein the pressing device has two pressing elements which are adjusted in terms of their spacing of which each interacts, in the clamping position, with a supporting element and which are in connection with a pressing bar running at right angles with respect to the direction of rotation of the receiving compartments and interacting, in the clamping position, with an abutment element, which is in connection with the supporting elements.

16. Apparatus according to Claim 1, wherein the removal conveyor has controllable grippers which are fastened on a traction member driven in circulation for gripping the printed products on their trimmed side located opposite the fold edge.

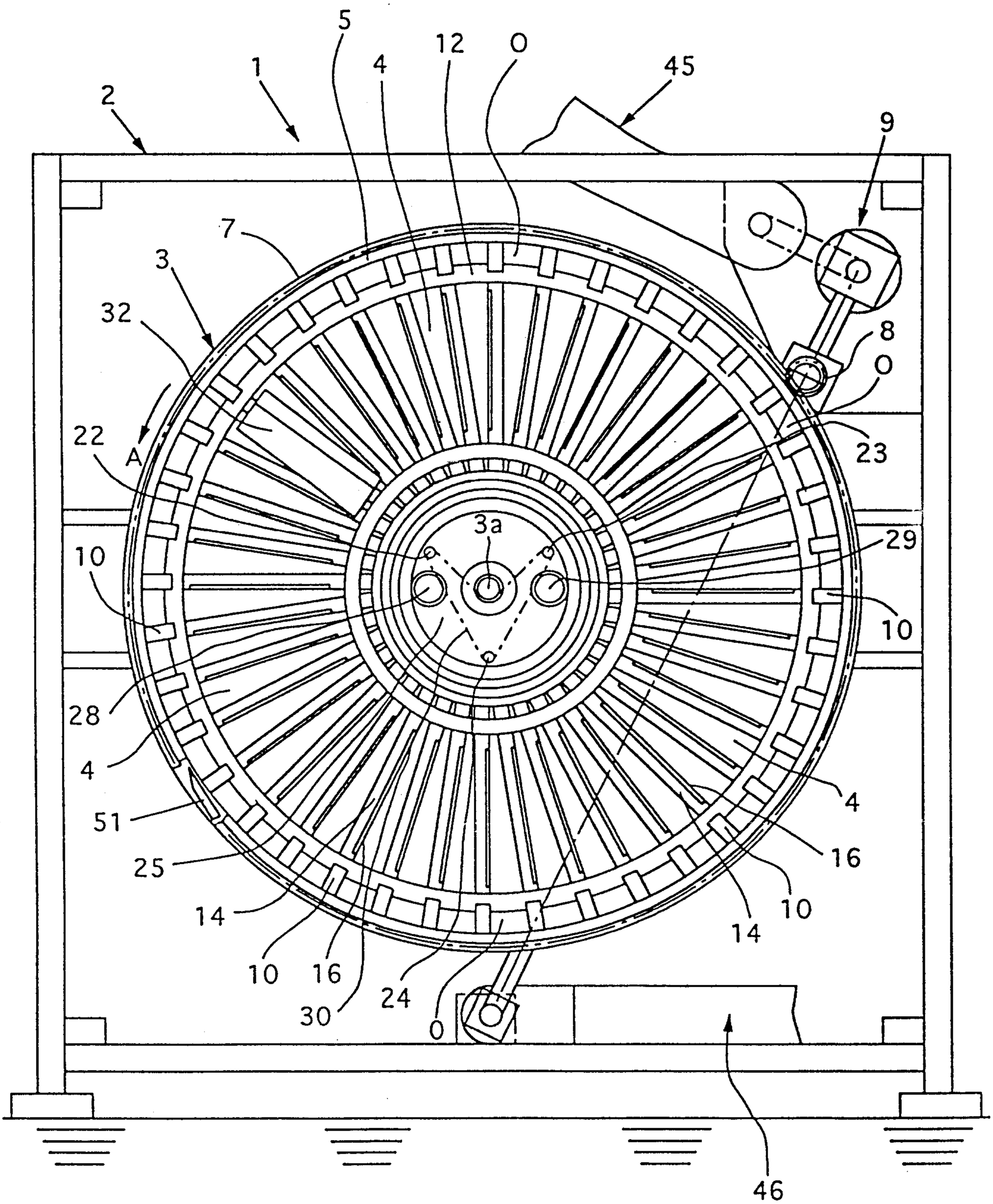
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Fig.1

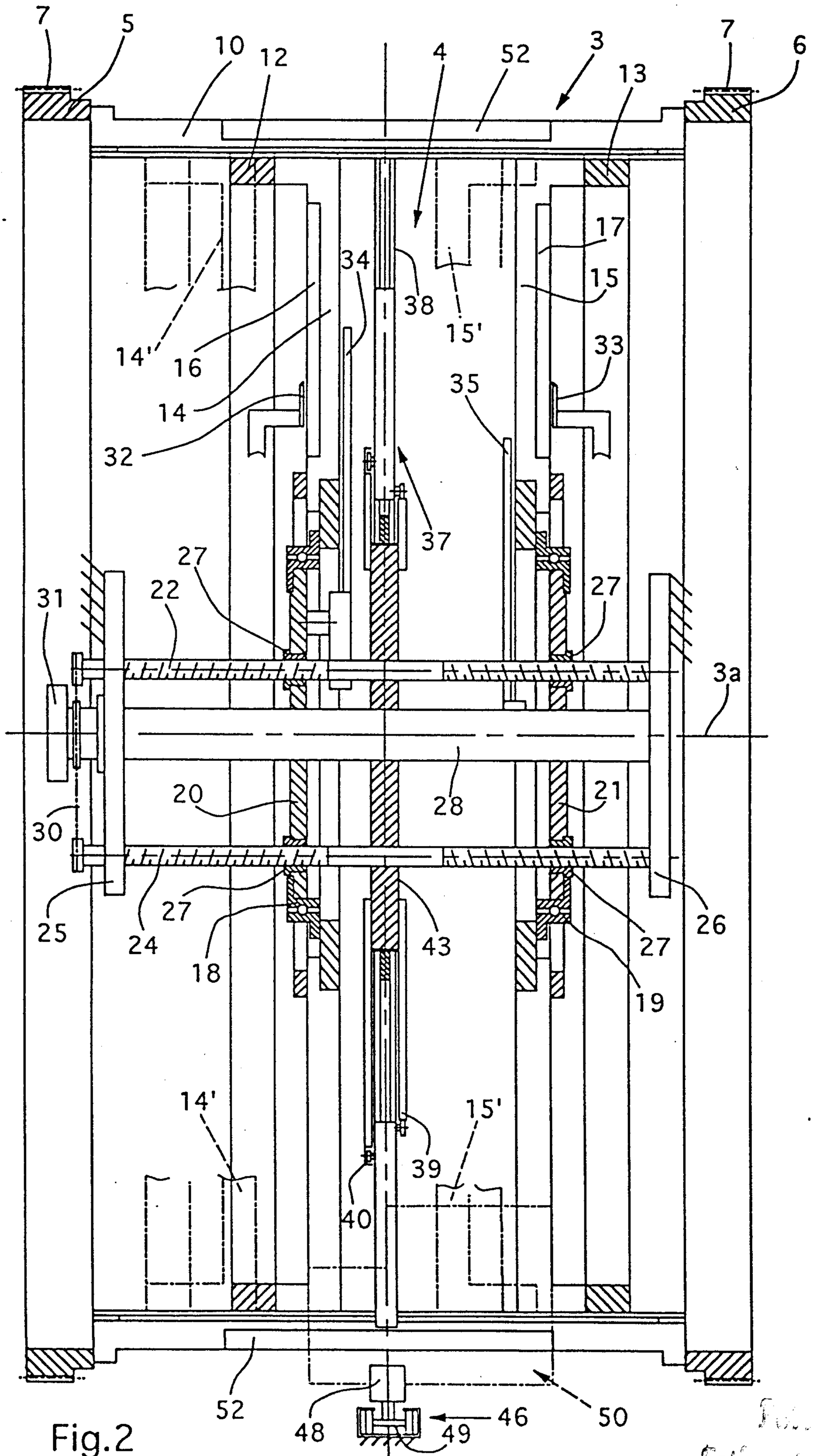
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Fig.2

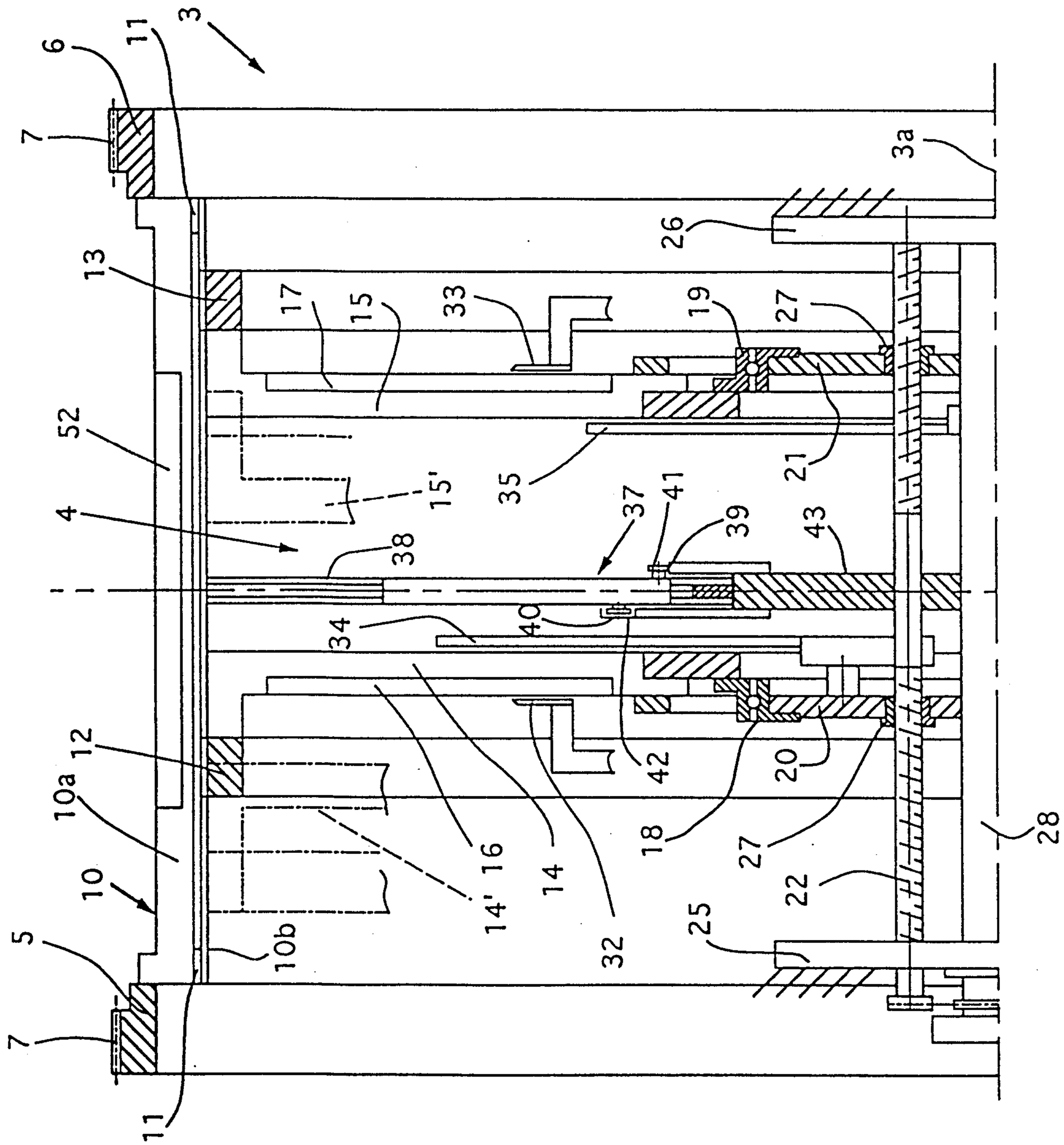
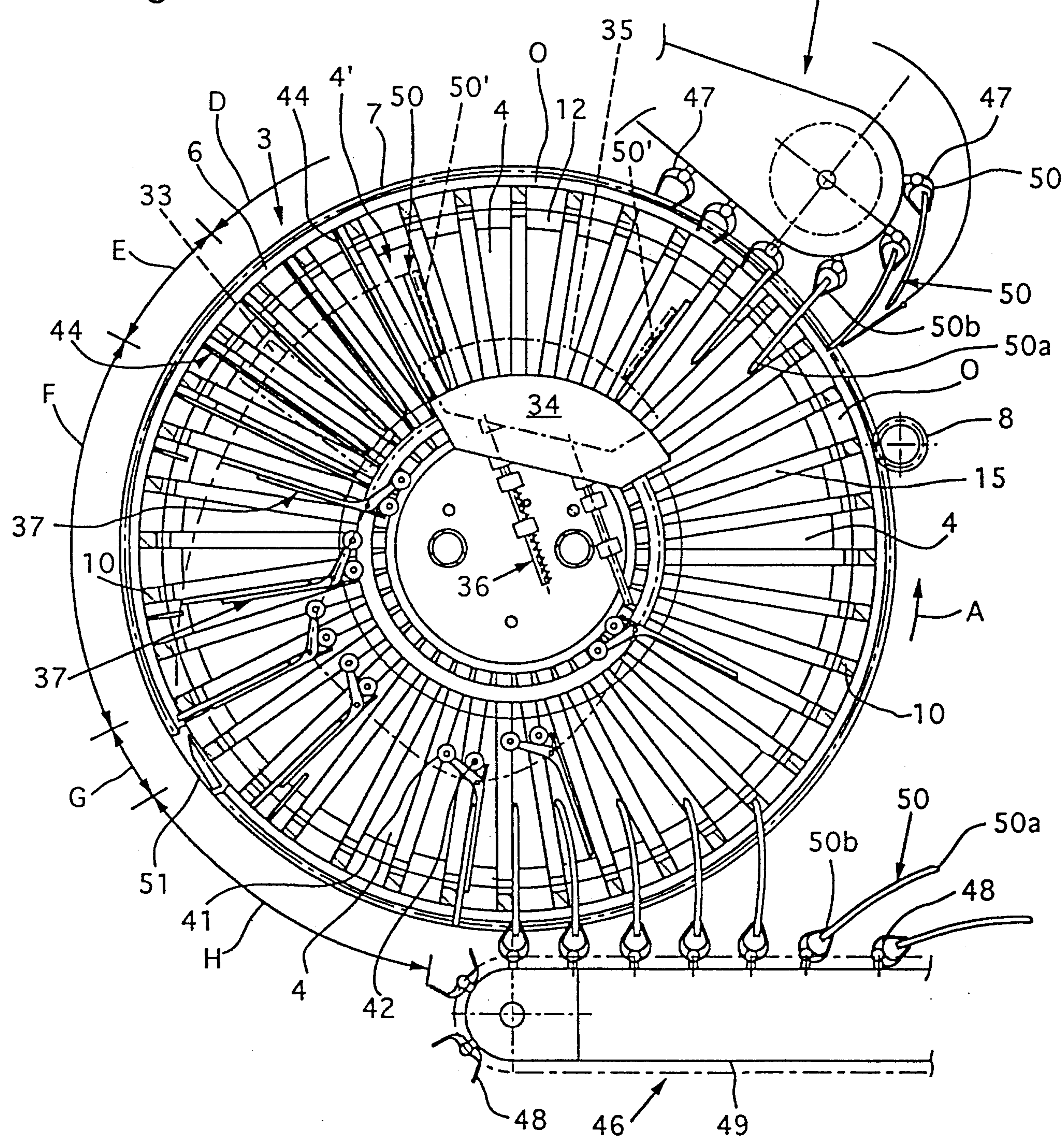


Fig.3

Fig.4



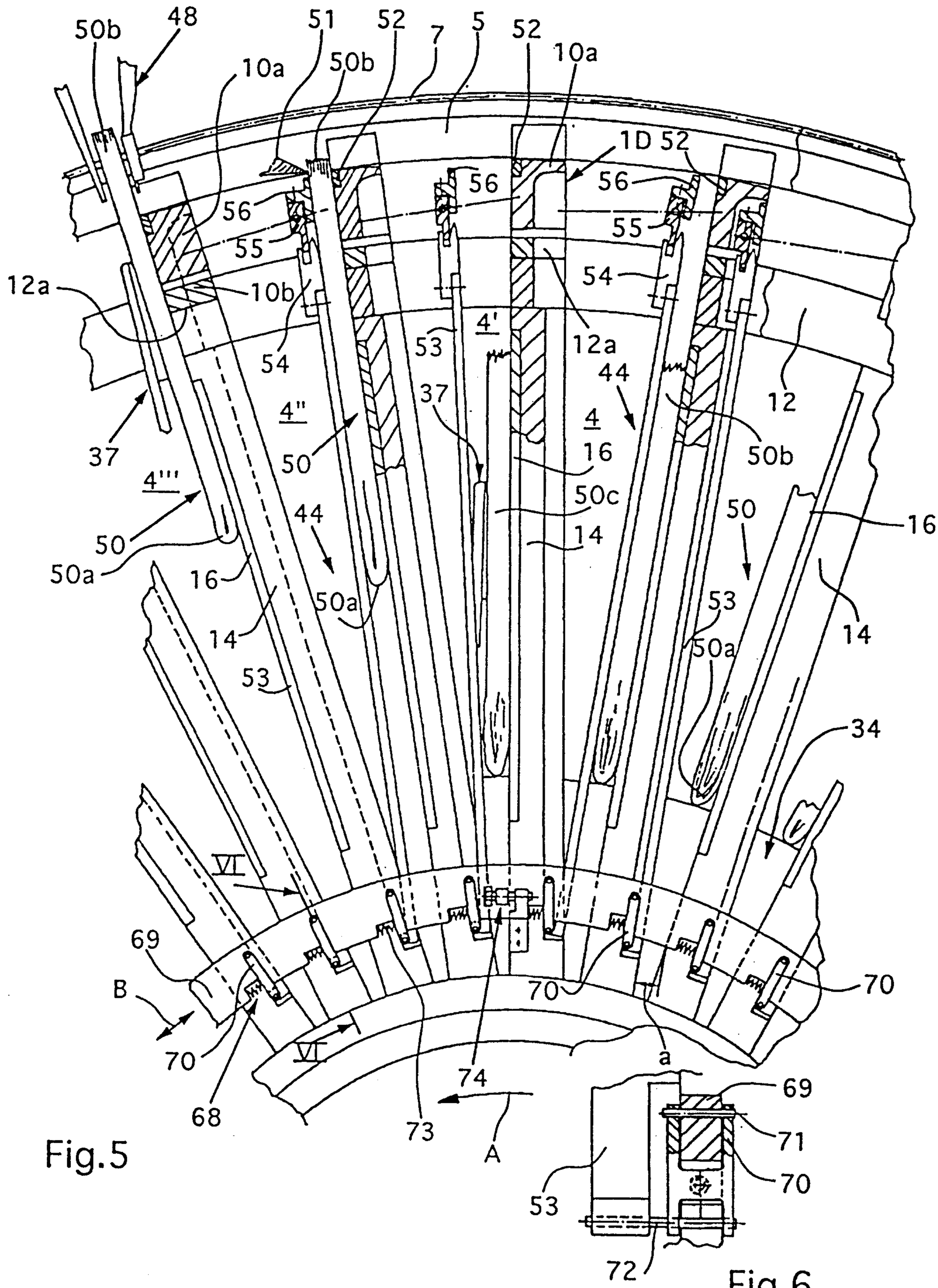


Fig.5

Fig.6

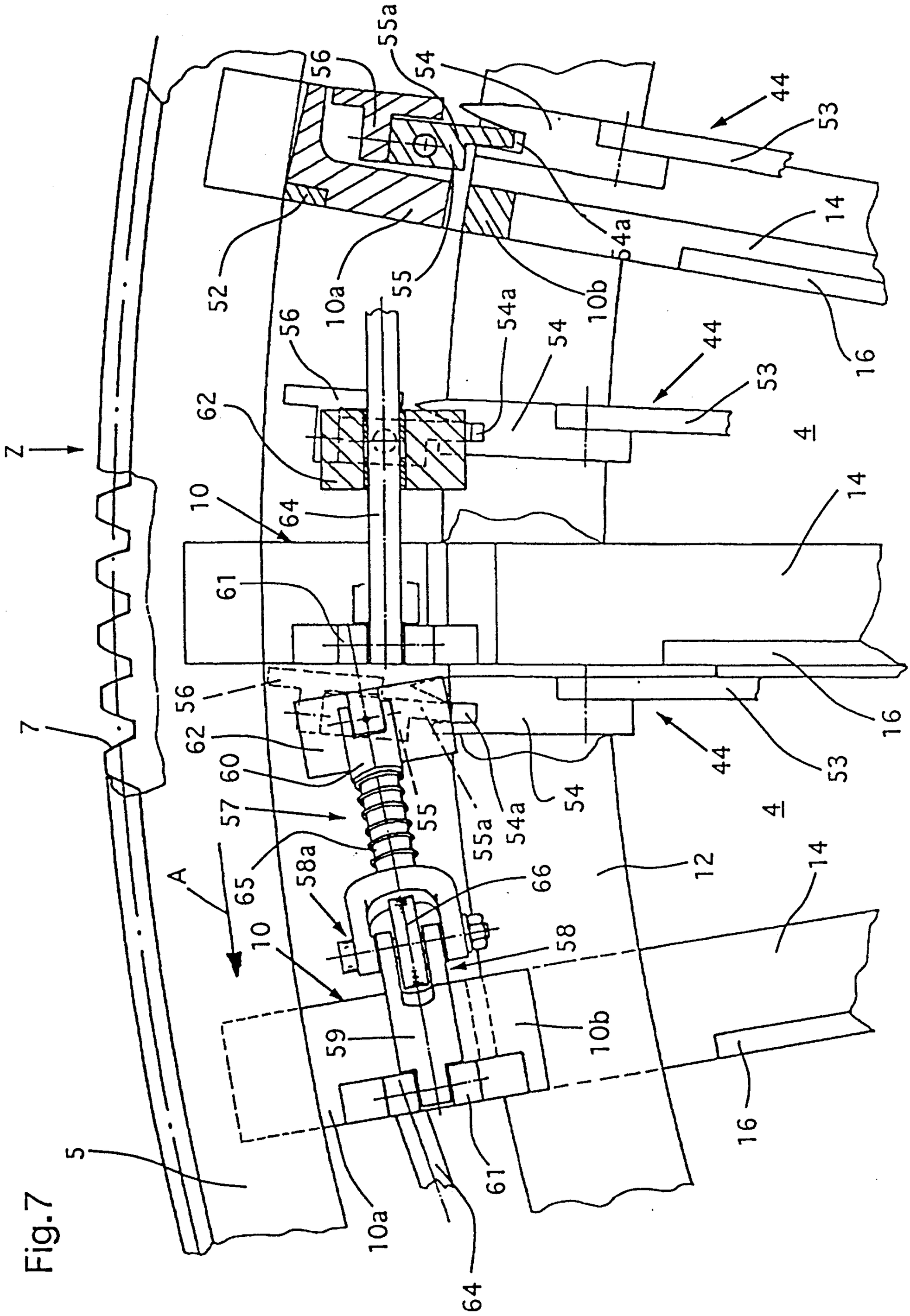


Fig.7

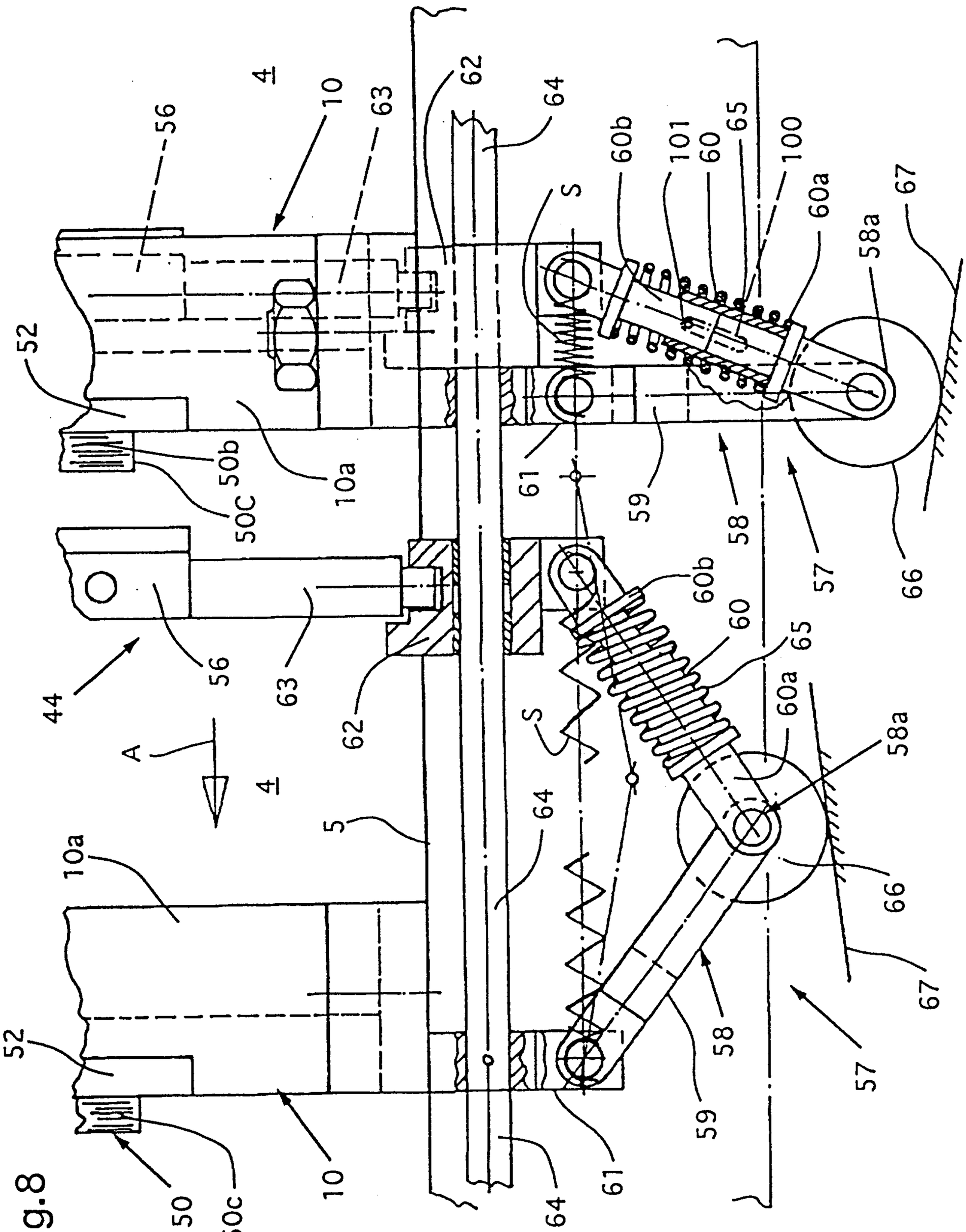

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Fig.8

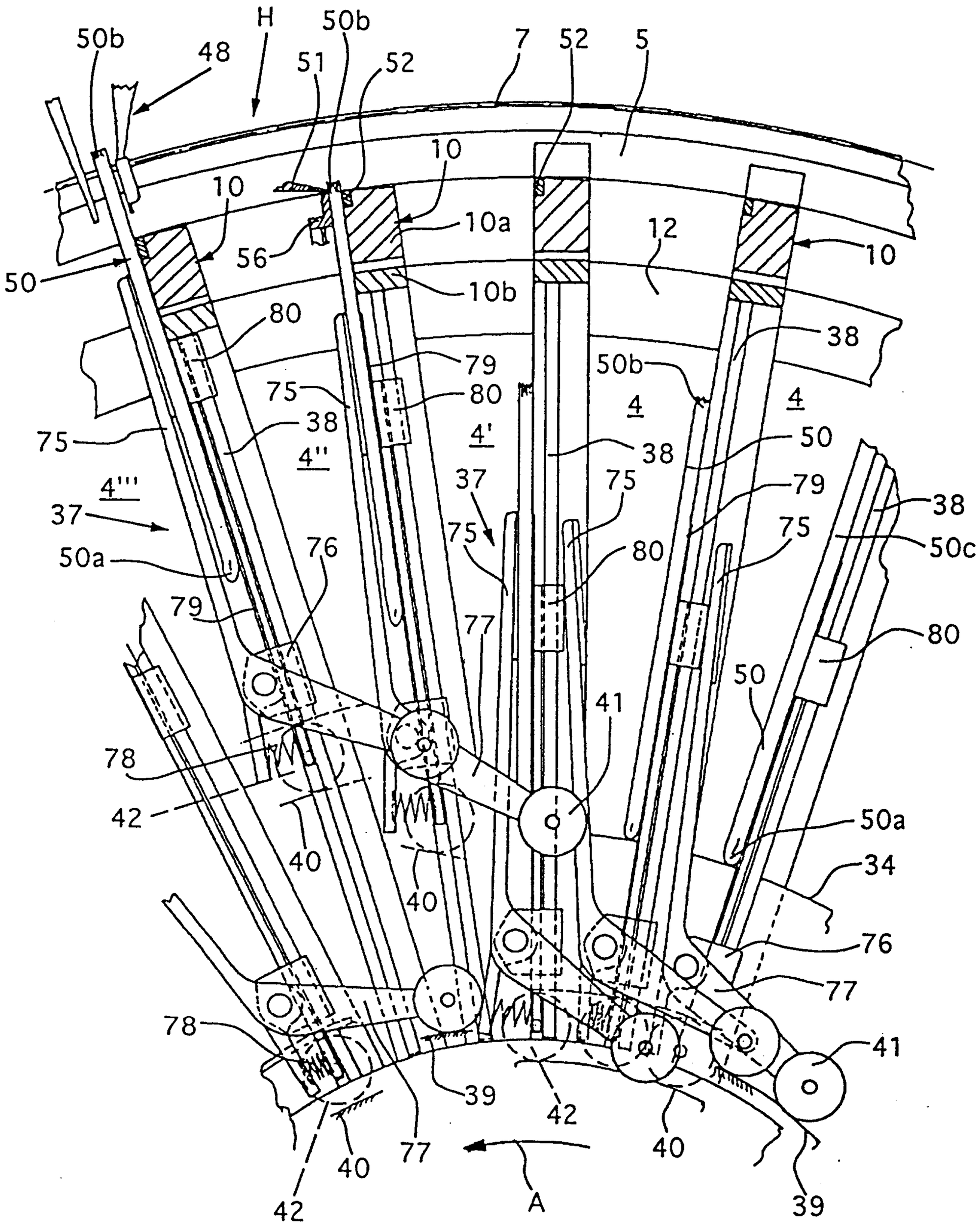
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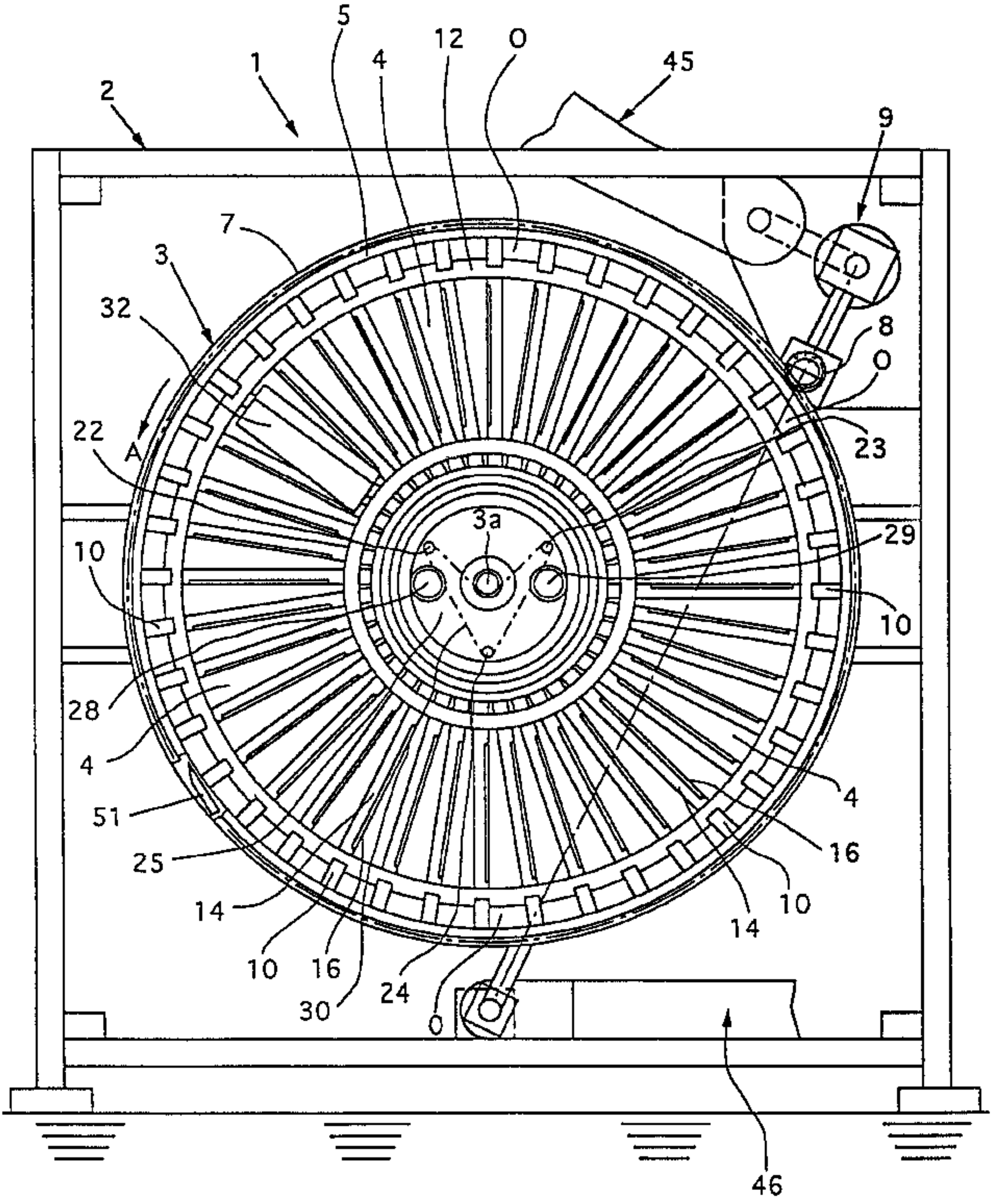
Fig.9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