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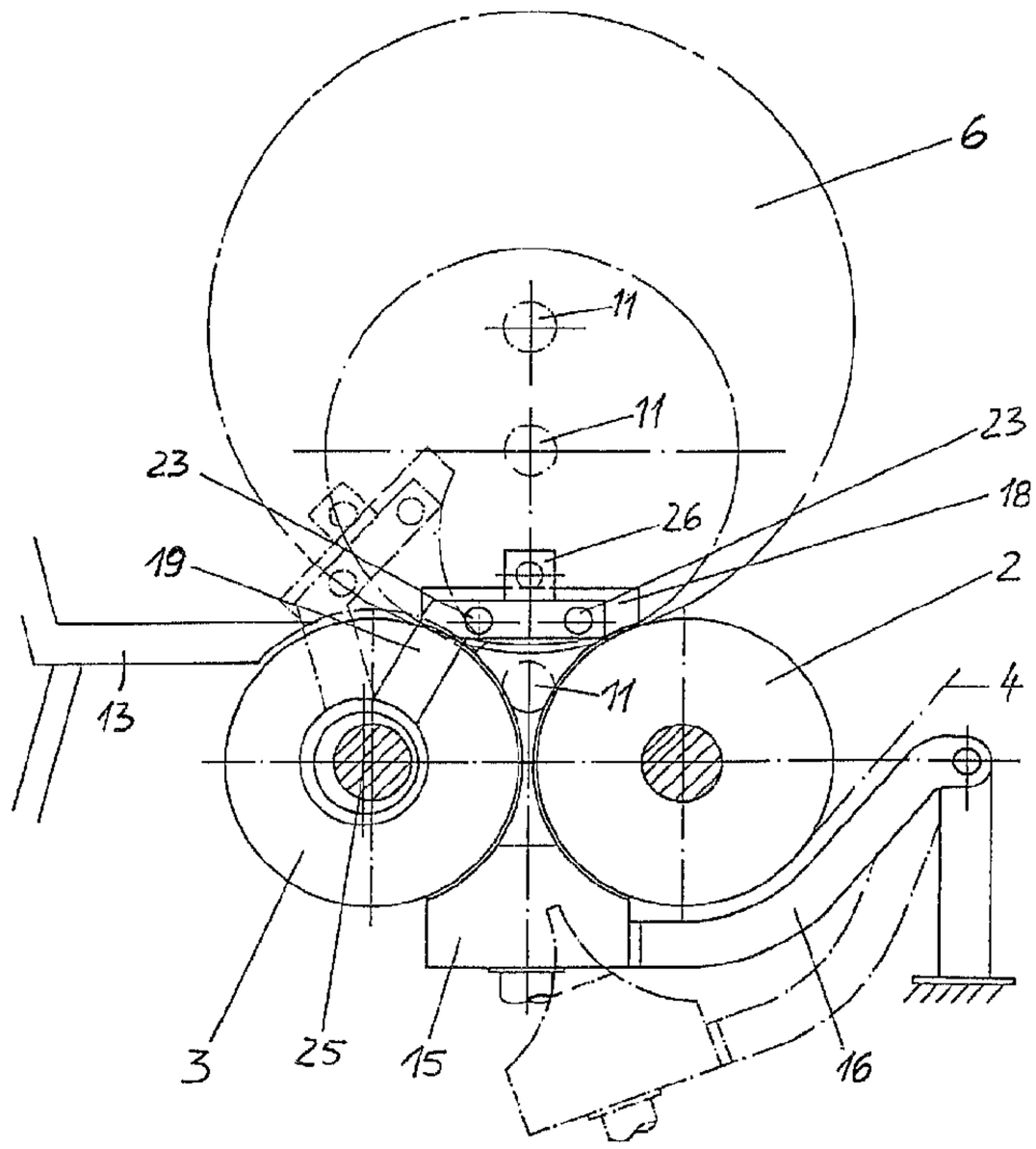

(57) Abrégé/Abstract:
The known king roll reeling machines for shaftless winding of a web of material (4) divided by a lengthwise cut, in particular a web of paper of cardboard, onto sleeves (11) have take-up rollers (6) which are applied during take-up to two king rolls (2, 3) and are supported by guide heads (10) which can be inserted sideways into the sleeves of the two outer take-up rollers (6). The take-up rollers (6) can only be wound with high winding quality up to a maximum diameter. According to the invention, the space delimited by the king rolls (2, 3) and the take-up rollers (6) is sealed and an overpressure is produced in the space. To this end, sealing elements (18) which can be displaced axially to suit webs of different widths and which can be moved simultaneously in an area outside the area of movement of the guide heads (10) and their fastener (carriage (9)) are arranged in the region of the two side ends of the king rolls (2, 3). Frictional engagement between the king rolls is prevented when the sealing elements (15, 18) are in the sealing position.

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The known king roll reeling machines for shaftless winding of a web of material (4) divided by a lengthwise cut, in particular a web of paper of cardboard, onto sleeves (11) have take-up rollers (6) which are applied during take-up to two king rolls (2, 3) and are supported by guide heads (10) which can be inserted sideways into the sleeves of the two outer take-up rollers (6). The take-up rollers (6) can only be wound with high winding quality up to a maximum diameter. According to the invention, the space delimited by the king rolls (2, 3) and the take-up rollers (6) is sealed and an overpressure is produced in the space. To this end, sealing elements (18) which can be displaced axially to suit webs of different widths and which can be moved simultaneously in an area outside the area of movement of the guide heads (10) and their fastener (carriage (9)) are arranged in the region of the two side ends of the king rolls (2, 3). Frictional engagement between the king rolls is prevented when the sealing elements (15, 18) are in the sealing position.

Technical Domain

The present invention relates to a support roller winder for winding onto cores a web of material that is divided by one or more longitudinal cuts or slits, and a procedure to wind webs of material.

Support roller winder machines of this kind are used for the arborless winding of webs of material that have been divided by a longitudinal cut, said webs being, in particular, of paper or cardboard, onto cores, when the winding rolls lie aligned on the support rollers during the winding process. Other than in the case of the so-called on-axle rolling, in which a set of winding rolls are held by means of an axle that passes through all the cores during the winding process, in arborless winding, two guide heads are moved into the cores of the outermost winding rolls from outside.

Prior Art

Using the support roller winders of this kind, as are known from DE-A 36 18 955, it is only possible to produce rolls of the desired winding quality up to a specific diameter. The reason for this is that the hardness of a roll is effected decisively by the line load (i.e., the contact load per width of a winding roll) on the two supporting lines of the rolls on the supporting

rolls. As far as possible, the winding hardness should be even for the whole set of winding rolls and around the diameter of each individual roll and be of a predetermined value which, in known support roller winders, is exceeded beyond a certain diameter because of the increasing contact load, and thus determines the maximal winding roll diameter.

In order to relieve the dead weight in support roller winders with on-axle rolling, DE-PS 11 11 496 teaches that an over-pressure can be generated in the area that is defined by the support rollers and the winding roll. Cover plates, which are matched to the shape of the support rollers, serve to seal off the hollow space at the sides, these being moveable so that then they can be applied to the face sides of the winding rolls. Sealing off below is effected with a roller or group of rollers that are tangent to both support rollers. The sealing elements that are shown in DE-PS 11 11 496 are not suitable for use on support roller winders with arborless winding because they and their attachment elements are located in the area of movement of the guide heads. Furthermore, a friction connection is generated between the two support rollers by the sealing roller that lies against them, and this makes it impossible to adjust various torsional moments so as to influence the quality of the winding.

Description of the Invention

It is the task of the invention to create a support roller winder of this kind, with arborless rolling, through which winding of rolls of large diameter and a high level of winding quality can be produced.

The invention provides a support roller winder for winding a web of material that is divided by a longitudinal cut onto cores to form wound rolls, comprising: two support rollers on which rolls being wound lie during the winding-on process, said support rollers spaced by a gap; at each end of said winder a vertically moveable guide head that is selectively moveable from above downwards into the area of the upper side of the gap between the support rollers, on respective ends of the support rollers, each said guide head being moveable axially inwards in order to engage the cores of the two outer rolls; means to seal the space between the support rollers and the rolls and to generate an over-pressure therein; sealing elements arranged at opposite ends of the support rollers seal off at least the cross sectional area of the upper gap between the two support rollers, said sealing elements being axially displaceable to accommodate different web widths; said sealing elements being moveable to locations outside the area of movement of the associated guide heads; wherein said sealing means and sealing elements when in sealing position do not frictionally engage said support rollers.

The invention also provides a process for winding webs of material onto cores wherein during the winding process rolls being wound lie on two supporting rollers and are held by two lateral guide heads, wherein contact load with the supporting rollers of the rolls being wound is kept constant during the winding process, a rising overpressure

being generated in the space defined by the supporting rollers and the winding rolls being wound by regulated controlled introduction of compressed air into said space, this overpressure compensating for the increasing weight of the rolls as they are wound.

The support roller winder according to the present invention incorporates the advantages of an arborless rolling procedure (no inconvenient manipulation of a heavy and long shaft, in particular in the case of wide webs; and rapid roll changeovers) without the maximum wound roll diameter being restricted by the contact load, to the known degree. Furthermore, relieving of the over-pressure constitutes an additional adjustment parameter by means of which the hardness of the roll can be controlled or regulated.

The use of compressed air feed from below means, on the one hand, that the elements used to supply the compressed air can be arranged beneath the supporting roll, and, on the other hand, that compressed air can be injected from below as additional sealing barrier air.

Vertical adjustability of the element that provides the lower sealing can be effected by means of raising or pivoting elements. On the one hand, this serves to remove the sealing element from the support rollers, e.g., to remove paper scraps after a paper blockage. On the other hand, it can be adjusted vertically downwards to the point that the face-side sealing elements that are arranged on the upper side of the sealing element are no longer located in the area of movement of the guide heads.

Because of the fact that the lower sealing element can be pivoted into the area beneath a support roller, free space is created for a separator blade that can be raised

from below through the support roller gap. Separator blades of this kind can be used providing the web is fed through the support roller gap from below.

In an embodiment the face-side sealing elements can be moved axially out of the area of the support rollers. The movement out of the area of the guide heads is effected either by means of a continued axial movement to the outside, or by means of an additional lowering movement as soon as they have left the area of the support rollers.

In other embodiments of the invention the face-end sealing elements can be removed from the area of the guide heads by a pivoting movement. Division entails the advantage that less space is required for any particular pivoting movement. Thus, the sealing elements can be used even at a small winding diameter, at which the guide heads are located even lower: i.e., the over-pressure can be employed at an earlier time in the winding process in order to effect the quality of said winding.

An embodiment, with round guides attached to the pivot arms on which the face-end sealing elements are supported, is advantageous from the structural point of view and is economical with respect to space. A somewhat eccentric displacement of the axis of pivot to the axes of the support rollers and outwards in the form that is claimed means that on being pivoted over one of the supporting rollers the sealing elements move somewhat away from this. This means that paper scraps, e.g., after a paper blockage, can be removed without any problem. When this is done, the sealing elements are either secured at the inner end of the round guides which, in this case, are supported in the pivot arms in such a way that they can be moved outwards, or else the pivot arms are angled, when the apex of the angles is

located outside the area of the support rollers. Then, continuous round guides that extend to the whole working width can be secured to the pivot arms, with the sealing elements being secured to these so as to be moveable. Thus, the round guides do not need to be moved out beyond the support rollers on being adjusted to the maximal web width.

The sealing elements can be provided with labyrinth seals which makes it possible to seal without any friction being generated with a winding roll or a support roller. The compression effect can be increased by feeding in blocking air.

Embodiments of the sealing surfaces have sealing elements that achieve a high sealing effect with only a small amount of friction.

A particularly advantageous embodiment permits lateral sealing with the smallest possible losses of compressed air, at various over-pressures. It is possible to arrive at a balance of forces between the contact pressure generated by the pneumatic plunger-cylinder unit and the counterforce from the over-pressure such that a minimum gap is set automatically between the sealing element and the face-side of the outer winding roll. In the event that the gap grows smaller or larger as a result of axial displacement of the winding roll, the over-pressure will either increase or decrease so that the increased or reduced counterforce initiates a correcting movement of the sealing element.

A pneumatic plunger-cylinder unit serves to displace the sealing elements simultaneously in a structurally advantageous manner in order to match them to different web widths. An additional electrical or hydraulic drive system may be provided for axial displacement.

The moveable attachment of the pneumatic plunger-cylinder unit about the axis parallel to the parallel-axis guide ensures that the sealing elements can move freely on the guides.

The described procedure used for winding webs of material as makes it possible to wind up winding rolls of very large diameter, when regulation or control of the winding hardness is made considerably simpler because one of the decisive effecting factors, namely the line load on the two contact lines between the winding rolls and the support rollers, no longer changes.

Brief Description of the Drawings

The drawings serve to describe the present invention on the basis of embodiments that are shown in simplified form.

Figure 1: a diagrammatic side view of a support roller winder according to the present invention;

Figure 2, 3: sections of the associated cross section wherein the axial length of the air box differs;

Figures 4, 5 or 6, 7, respectively: two additional embodiments, each in side view and plan view, wherein only those parts that are essential to the present invention are shown;

Figure 8: a diagrammatic side view of part of the support roller winder, in which the side sealing elements can be pressed pneumatically against the outer winding roll;

Figure 9: a plan view of the winder as in figure 8:

Figure 10: an enlarged section of figure 9.

Construction of the Present Invention

The double support roller winder, of which only those parts that relate to the present invention are described in detail, incorporates two support rollers 2, 3 that are supported in the machine frame 1. The axis of these support rollers are parallel, are spaced at a small distance from each other, and extend across the whole working width, i.e., the maximum width of the web 4 that is to be wound. The diameters of the support rollers 2, 3 are either different, in which case the height of the axes of

said rollers are offset somewhat (figures 1 to 3), or the diameters of these rollers are the same, when the axes of rotation of said rollers lie in a horizontal plane (figures 4 to 10). A longitudinal cutter 5 divides the web 4 into individual webs from which the winding rolls 6 are produced; these rolls 6 lie aligned with each other on the two support rollers 2, 3 during the winding process. The web 4 is fed to the winding point either from below through the support roller gap (figures 1, 4, 8), or from above, when it wraps slightly around one of the support rollers (figure 6).

On both sides of the machine, within the frame 1, slides 9 that can be raised and lowered by means of a plunger-cylinder unit 8 are secured in guides 7 that are almost vertical; these support a guide head 10 that projects inwards. In order to guide the winding rolls 6 in an axial direction during the winding process, each of the two guide heads 10 move inwards into the two outer cores 11 prior to the start of the winding process, and remain there until the winding rolls 6 have been wound to completion. In order that they can be moved into the empty cores 11, and to ensure accommodation to different web widths, the guide heads 10 are secured to the slides 9 so as to be axially displaceable by means of a drive system. To this end, the slide 9 supports a hollow cylinder guide that extends horizontally inwards, and within which there is a trunnion that is axially displaceable by means of a spindle, the guide head 10 being secured at the end of

this [trunnion]. This construction is described in detail in US-PS 4, 483, 493.

The guides 7 run outside the area of the upper gap between the two support rollers 2, 3 at a distance parallel to the perpendicular to the connecting line between the two support roller axes, through the middle of the support roller gap. They end a little above the connecting line between the two support roller axes. Thus, the guide heads 10 can move into the cores 11 that lie in the gap between the two support rollers 2, 3. As soon as the lower edges of the slide 9 together with the cores 11 have moved far enough upwards on the guides 7 as the winding rolls 6 become larger, there is space available on both sides of the machine, above the support rollers 2, 3, in order to avoid collisions with the sealing elements, which are described in greater detail below.

The machine incorporates a roll ejection beam 12 and a drop stage 13 that accommodate the finished winding rolls 6 and which can be lowered for purposes of unloading. If the web is fed in from below, a cutter 14 can be arranged beneath the support rollers 2 and 3 in such a manner as to be moveable upwards through the gap between the rolls in order to separate the web 4, as is shown in figure 6 [There is no reference figure 14 shown in figure 6--Tr.].

In order to reduce the contact weight of the winding roll 6 on the support roller 2, compressed air can be used to generate an over-pressure in the space that is defined by the support rollers 2, 3 and the winding roll 6. The following elements, which are described in greater detail below, are used to do this.

In all of the embodiments that are shown in the drawings, within the lower gap between the two support rollers 2, 3, there is an air box 15 with a compressed air feed line, this extending at least over the area of the minimal width of the web 4 and having on its upper defining surface, which is proximate to the winding rolls 6, outlet openings for compressed air. On its underside, the air box 15 is secured to raising and lowering elements in order that it can be lowered. Because of the fact that beneath the support rollers 2, 3, there is a cutter 14 that can be moved upwards through the roller gap, pivot arms 16 are secured to the air box 15 and these permit a downward pivoting movement to a point beneath one support roller (support roller 3 in figures 4 and 8), in order to create free space for the blade 14 to move upwards. Without this sort of blade, the air box 15 is lowered by means of lifting elements (lifting cylinders 17) (figures 1, 6). The sides of the upper part of the air box 15 that are proximate to the support rollers 2, 3 are curved so as to match the surfaces of the supporting rolls 2, 3, such that when they are in the sealing position, there is only a small gap left open so as to avoid friction. On their sides that are proximate to

the support rollers 2, 3, the side surfaces incorporate a series of grooves that are parallel to the axes of the support rollers, and these, running transversely through the direction of flow of the outflowing compressed air, act as labyrinth-type seals. The height of the side surfaces that act as seals is matched to the sealing performance that is required. On the side of the support roller 2, that moves inwards into the upper gap, they can be smaller than on the other side since, because of the direction of rotation, air that acts against the outflow will be carried along with the support roller 2 or with the web 4 that is located on it.

In the embodiments shown in figures 1 to 3, the upper side of the air box 15 also serves as a guide surface for two face-side sealing elements 18 that are secured on both sides of the machine so as to be axially displaceable. In order that the sealing elements can be moved in an axial direction to a point outside the area of the support rollers 2, the air box 15 extends to a point beyond the supporting rolls 2, 3 on both sides of the machine, as is shown in figures 2 and 3. The shape of the face-side sealing elements 18 is matched to the unobstructed cross sectional area between the support rollers 2 and 3, with the upper portion being extended rectangularly to a point above the connecting line between the two apexes in order to provide an adequate sealing surface for winding rolls of large diameter. On the side that is proximate to the winding rolls 6, the extended

portion incorporates grooves which, acting as labyrinth seals, bring about a sufficient reduction of compressed air losses. There are also grooves on the curved sides that are proximate to the support rollers 2, 3. They also run transversely to the possible direction of outflow, thus approximately corresponding to the periphery of the particular adjacent support roller 2, 3. The sealing elements 18 move laterally next to the guides 7, so that they can be moved against the face sides of the winding rolls 6 when, once in the sealing position, a small gap remains and thus no friction is generated.

In order to provide for axial movement of the support rollers 2 and 3, in each instance displacing elements, e.g., a driveable spindle (not shown herein), is secured to the outer side of each sealing element 18. In the embodiment shown in figure 2, the sealing elements 18 can be moved so far outwards that the slides 9 together with the guide heads 10 can be lowered into the gap between the two support rollers 2, 3 in order to move into empty cores 11 that are located there.

In the embodiment shown in figure 3, the air box 15 together with the sealing elements 18 can be lowered so far that the upper edges of the sealing elements 18 are located beneath the narrowest point between the two support rollers 2, 3. Thus, the air box 15 need only extend a small distance beyond the ends of the support rollers 2, 3. The axial movement of the sealing

elements 18 at the outermost ends of the air box 15 then permits only a subsequent lowering, either by tilting down or a linear lowering, which then creates the free space that is required for the slides 9.

Figures 4 to 10 show preferred embodiments of the present invention in which the face-end sealing elements 18 are moved in or against the direction of movement of the web, which is to say out beyond the support rollers 2, 3, out of the lower working area of the guide heads 10. In this case, it is not necessary that the air box 15 extend laterally beyond the support rollers 2, 3 and for this reason its length is approximately equal to the length of the support rollers 2, 3. In order to permit them to pivot upwards, the sealing elements 18 end at the narrowest point between the support rollers 2, 3. Accordingly, the air box reaches from below up to this point. The sealing elements 18 are connected on both machine sides with pivot arms 19, 20, the pivot axes 21, 22 of which either coincide with the particular axis of the support rollers or extend somewhat eccentrically outwards on the line of connection between the two support roller axes. This small eccentricity leads to the fact that the side surfaces of the sealing elements 18, which are proximate to the support rollers 2, 3 respectively, move somewhat away from the particular support roller surface when being pivoted outwards so that, for example, scraps of paper can be removed. In the event that it is necessary to move the sealing elements 18 even further away from

the support rollers, they are secured to double levers. In the embodiments shown in figures 4 to 7, too, the sides of the sealing elements 18 that are proximate to the support rollers 2 and 3 and of the air box 15 are provided with labyrinth-type seals such as have been described heretofore.

In the embodiments shown in figures 4 to 5, the arms 19 that can pivot about the runout-side support roller 3 support on each machine side a one-piece sealing element 18. To this end, the arms 23 are angled at their ends so that when in the inward pivoted position they extend approximately horizontally between the support rollers 2, 3. On each angled end of the two pivot arms 19, there are two round guides 23 that are supported so as to be axially displaceable, and the sealing elements 18 are secured to the inner ends of these. In the embodiment shown in figures 6 and 7, each face-side sealing element 18 is divided along the perpendicular through the middle of the support roller gap. Each of the parts 24, 25 is secured to a pivot arm 19, 20 that can be pivoted over the adjacent support roller 2, 3. As is shown in figure 6, the pivoting movement thus requires less space, so that the sealing element 18 can be used at an earlier time.

In the embodiment shown in figures 8 and 10, too, the sealing elements 18 are supported so as to be axially moveable--which is to say transversely to the web 4--on arms 19 that can pivot about

the support roller 3 on the runout side. In this way, they can be pivoted out of the lower working area of the guide heads 10 (indicated by the dashed line in figure 8) by pivoting over the support roller 3. The pivot arms 19 are angled at their unattached ends so that when pivoted inwards these extend approximately horizontal between the support rollers 2, 3. Their axis of pivot 25 extends, displace somewhat eccentrically outwards, on the connecting line between the two support roller axes. The slight eccentricity leads to the fact that the side surfaces of the sealing elements 18 that are proximate to the support roller 2 or 3, respectively, move somewhat away from the particular support roller surface when being pivoted outwards so that, for example, paper scraps can be removed. At the angled ends of each of the two pivot arms 19 there are two round guides 23, these being supported so as to be axially displaceable, and sealing elements 18 are attached to the inner ends of these. The plunger 26 of a pneumatic plunger-cylinder unit is secured to the upper side of the pivot arm 19 in order to effect the axial displacement of the sealing elements 18 and permit them to be pressed against the face sides of the outer winding rolls 6. The end of the plunger rod 27 is supported on the sealing element 18 so as to be moveable about both axes perpendicular to the guides 23. To this end, a spindle 28 is secured to the upper side of each sealing element 18 and this passes through the eye of the plunger rod 27. The pneumatic plunger-cylinder unit 26, 27 is connected to a control system (not shown herein) to permit the

axial displacement of the sealing element 18 and to set an adjustable contact pressure.

In the preceding embodiments, the plunger-cylinder unit 26, 27 displaces the sealing elements 18 axially to match them to different web widths, and to press them against the winding rolls 6. In the same way, it is also possible to have both these tasks carried out by separate drive systems. Then, an electrical or hydraulic drive system is secured to the pivot arms 19 to effect this axial displacement, and this is connected through the pneumatic plunger-cylinder units 26, 27 to the sealing elements 18.

In an embodiment of the present invention that is not shown herein, the pivot arms that support the sealing elements 18 are angled, when the apex of the angle is located outside the area of the support rollers 2, 3. The ends of guides that extend to the whole length of the support rollers 2, 3 are secured to the apex points of the angles and the sealing elements 18 are movably supported on these guides. This means that the guides are no longer displaced in an axial direction in order to permit adjustment to different web widths.

Once new cores 11 have been installed in the support roller bed from above, the guide heads 10 are moved in. After the start of

the web 4 has been secured to the cores and the pressure roll 26 has been moved into position, the winding process begins.

As long as the installed weight of the winding roll 6 is not sufficient to achieve the desired degree of hardness in the winding rolls, the pressure roll 26 is additionally pressed in the direction of the support rollers 2, 3. As soon as the contact load becomes too great, an over-pressure is generated in the space that is defined by the support rollers 2, 3 and the winding roll 6, and this then reduces the contact load. At this time, the winding roll 6 will already be of a sufficiently large diameter (approximately 800 mm), so that their cores 11, and thus the slides 9 are at a sufficient distance above the support rollers 2 and 3 to avoid a collision with the sealing elements 18. In order to seal off the space that is defined by the winding rolls 6 and the support rollers 2, 3, the air box 15 is first moved into the lower gap between the support rollers 2 and 3 so that the side surfaces of the air box 15 lie against the support rollers 2 and 3 so as to leave a narrow gap and thus seal it off from below. Then, the face-side sealing elements 18 are moved upwards and inwards until only a small gap is left between them and the face sides of the winding roll 6, so that these sides are also sealed off. Now, compressed air is introduced through the air box 15 until such a high pressure is built up beneath the winding roll 6 that the contact load of the winding roll 6 is reduced to the extent that is desired.

In the embodiment shown in figures 8 to 10, compressed air is first introduced through the air box 15 that has been pivoted upwards and then the sealing elements 18 are moved axially against the face sides of the winding roll 6 by means of the plunger-cylinder units 26, 27. The pressure in the plunger 26 is so controlled that as the over-pressure builds up a force equilibrium is set up in such a way that a small gap remains between the sealing elements 18 and the winding roll 6. Thus, friction at minimal compressed air losses is avoided. In the event that the width of the gap grows larger or smaller, e.g., because of an axial displacement of the winding roll 6, the pressure beneath the winding roll 6 will fall or rise because of the increased or reduced losses of compressed air. The resulting pressure differential relative to the pressure in the pneumatic plunger-cylinder unit 26, 27 automatically leads to a correction of the width of the gap until such time as the force equilibrium has been re-established. As an alternative, a smaller gap can be maintained between the sealing elements 18 and the winding roll 6 such that a smaller distance is set automatically to the position of the guide heads 10.

It is preferred that the contact load of the winding roll 6 be kept constant during the winding process. To this end, after the desired contact load, a control or regulating system sets the over-pressure beneath the winding roll 6 such that compensation is constantly made for the increased weight. The regulation or

control of the winding hardness is greatly simplified by this, since one of the decisive influential factors, namely, the line load on the two contact lines between the winding roll 6 and the support rollers 2 and 3 no longer changes.

Alternatively, the reduction of the contact load can also be effected incrementally by building up an appropriate over-pressure in order to keep the contact load within a specified range. In the same way, the increase in the contact load can be compensated for only in part or it can be reduced according to a given function. Under some circumstances, a one-time reduction by a constant value will be sufficient. In each case, building up an over-pressure provides yet another parameter to control the wound hardness of the winding roll 6.

In the embodiment shown in figures 8 to 10, the pressure in the pneumatic plunger-cylinder units 26, 27 is increased by the regulating system in keeping with the growing over-pressure, in order that the distance between the sealing elements 18 and the winding roll 6 remains constant.

In place of the labyrinth seals on the sealing surfaces, both in the upper gap and in the lower gap between the support rollers 2, 3, it is possible to seal the outlet openings for compressed air with blocking air. In the same way, the sealing effect achieved by the labyrinth seals can be enhanced by feeding blocking air

into the grooves of these labyrinth seals. If the support rollers 2, 3 are arranged very close together, it may be sufficient to inject compressed air through the narrowest point by means of a slot nozzle. The compressed air that is injected from below then works simultaneously as blocking air in order to reduce losses through the narrow gap between the support rollers 2, 3.

In the same way, it is also possible to use sealing elements such as brushes, rubber lip seals, felt overlays, and the like, providing that the friction between the support rollers 2 and 3 and the winding roll 6 can be kept sufficiently low, either because of the fact that the sealing elements rest with very little friction on the winding roll 6 and the support rollers 2, 3 or are positioned from these at such a small distance that losses of compressed air are acceptably low. When sealing, it is also important that the sealing elements do not restrict the rotational movement of the two support rollers 2, 3 independently of each other, and in particular that there is no frictional connection between the two support rollers 2, 3. In other cases, the different torsional moments of the support rollers 2, 3, which are required to effect the quality of the winding, cannot be controlled to the required degree.

CLAIMS:

1. A support roller winder for winding a web of material that is divided by a longitudinal cut onto cores to form wound rolls, comprising:

two support rollers on which rolls being wound lie during the winding-on process, said support rollers spaced by a gap;

at each end of said winder a vertically moveable guide head that is selectively moveable from above downwards into the area of the upper side of the gap between the support rollers, on respective ends of the support rollers, each said guide head being moveable axially inwards in order to engage the cores of the two outer rolls;

means to seal the space between the support rollers and the rolls and to generate an over-pressure therein;

sealing elements arranged at opposite ends of the support rollers seal off at least the cross sectional area of the upper gap between the two support rollers, said sealing elements being axially displaceable to accommodate different web widths;

said sealing elements being moveable to locations outside the area of movement of the associated guide heads;

wherein said sealing means and sealing elements when in sealing position do not frictionally engage said support rollers.

2. A support roller winder as in claim 1, wherein a compressed air feed is effected from below through the gap between the support rollers to generate said overpressure.

3. A support roller winder as in claim 1 or claim 2, wherein an air box is arranged in the area of the lower gap between the support rollers, said air box sealing off the gap between the support rollers from below and extending axially beyond the working width of the machine and being supported so as to be vertically adjustable.

4. A support roller winder as in claim 3, wherein the air box is pivotably displaceable downwards into the area beneath one support roller.

5. A support roller winder as in claim 3 or claim 4, wherein the air box extends axially beyond the ends of the support rollers, and on the upper side of the gap between the support rollers face side sealing elements are secured so as to be displaceable in the axial direction.

6. A support roller winder as in any one of claims 1 to 4, wherein said face side sealing elements are supported so as to be pivotable above one of the support rollers.

7. A support roller winder as in claim 6, wherein the face-side sealing elements are divided, having respective parts that are pivotable over one or the other of the support rollers.

8. A support roller winder as in claim 6 or claim 7, wherein the face-side sealing elements are supported on round guides that extend parallel to the axes of the support rollers, the round guides being secured to respective side pivot arms that have pivot axes which run along one support roller axis or somewhat eccentrically outwards in the direction of the connecting line between the two support roller axes.

9. A support roller winder as in claim 8, comprising pivot arms that are angled outside the area of the support rollers, round guides that extend over the whole working width being in each instance secured to the apex point of the angles.

10. A support roller winder as in any one of the claims 1 to 9, wherein the sealing elements have sealing surfaces incorporating grooves that are transverse to the outflow direction and which act as labyrinth-type seals.

11. A support roller winder as in any one of claims 1 to 10, wherein the sealing elements have sealing surfaces that incorporate outlet openings for compressed air that are oriented opposite the outflow direction.

12. A support roller winder as in any one of claims 1 to 11, wherein sealing is effected by means of sealing elements selected from: brushes, rubber-lip type seals, and felt overlays, that are secured to the sealing surfaces of the sealing elements, and lie with very little friction against the winding rolls and the support rollers which are positioned at a short distance therefrom.

13. A support roller winder as in any one of claims 1 to 12, wherein said axially displaceable side sealing elements can be pressed against the face side of the outer winding roll by means of a controllable pneumatic plunger-cylinder unit.

14. A support roller winder as in claim 13, wherein the pneumatic plunger-cylinder unit simultaneously serves for axial displacement of the sealing elements to match them to different web widths.

15. A support roller winder as in claim 13, comprising an additional electric or hydraulic drive for axial displacement of the sealing elements.

16. A support roller winder as in any one of the claims 13 to 15, wherein the side sealing elements are supported on a rectilinear guide that is parallel to the support roller axis and the pneumatic plunger-cylinder unit is secured to the sealing elements so as to be moveable about the axis parallel to said guide.

FETHERSTONHAUGH & CO.

OTTAWA, CANADA

PATENT AGENTS

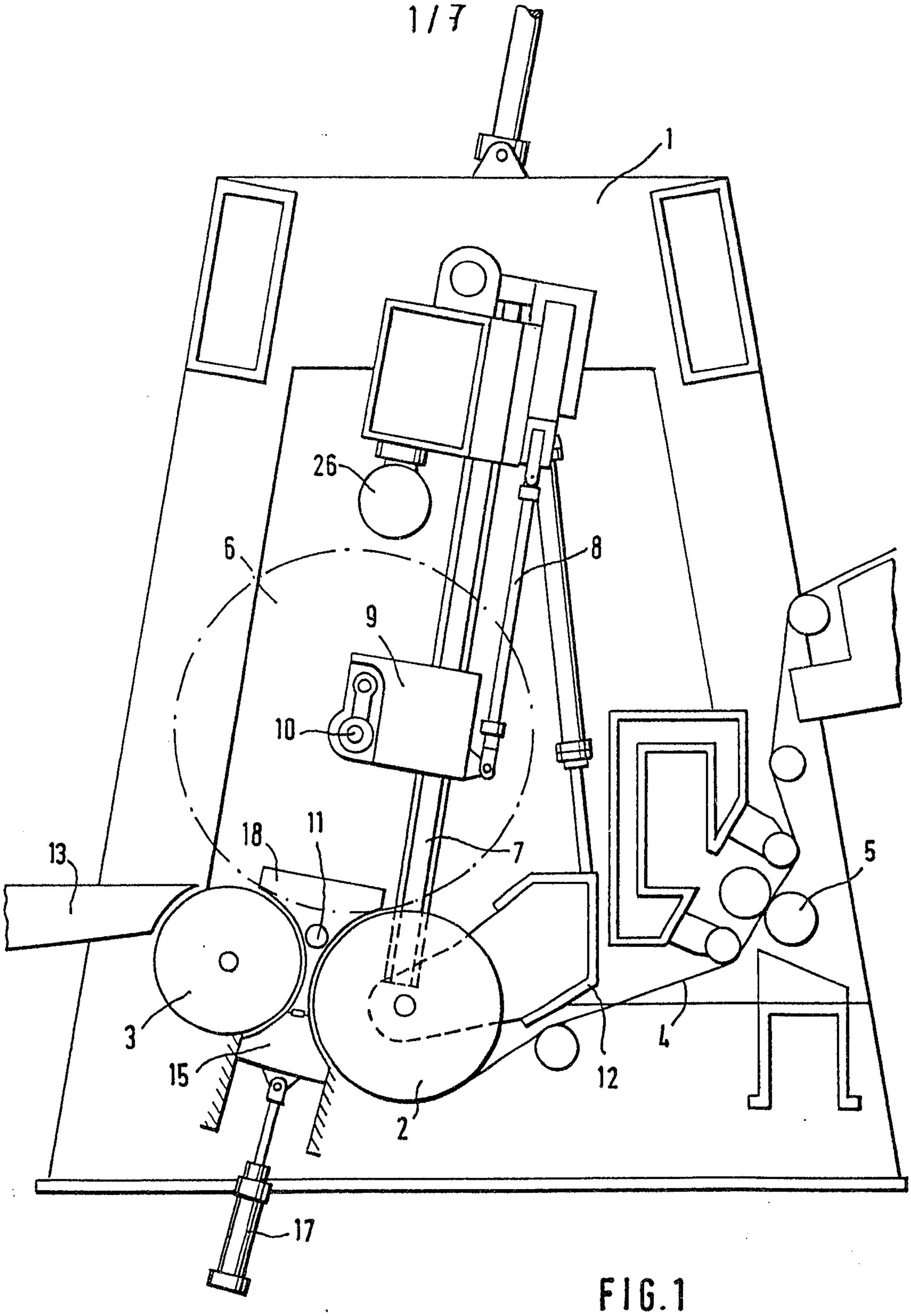

FIG.1

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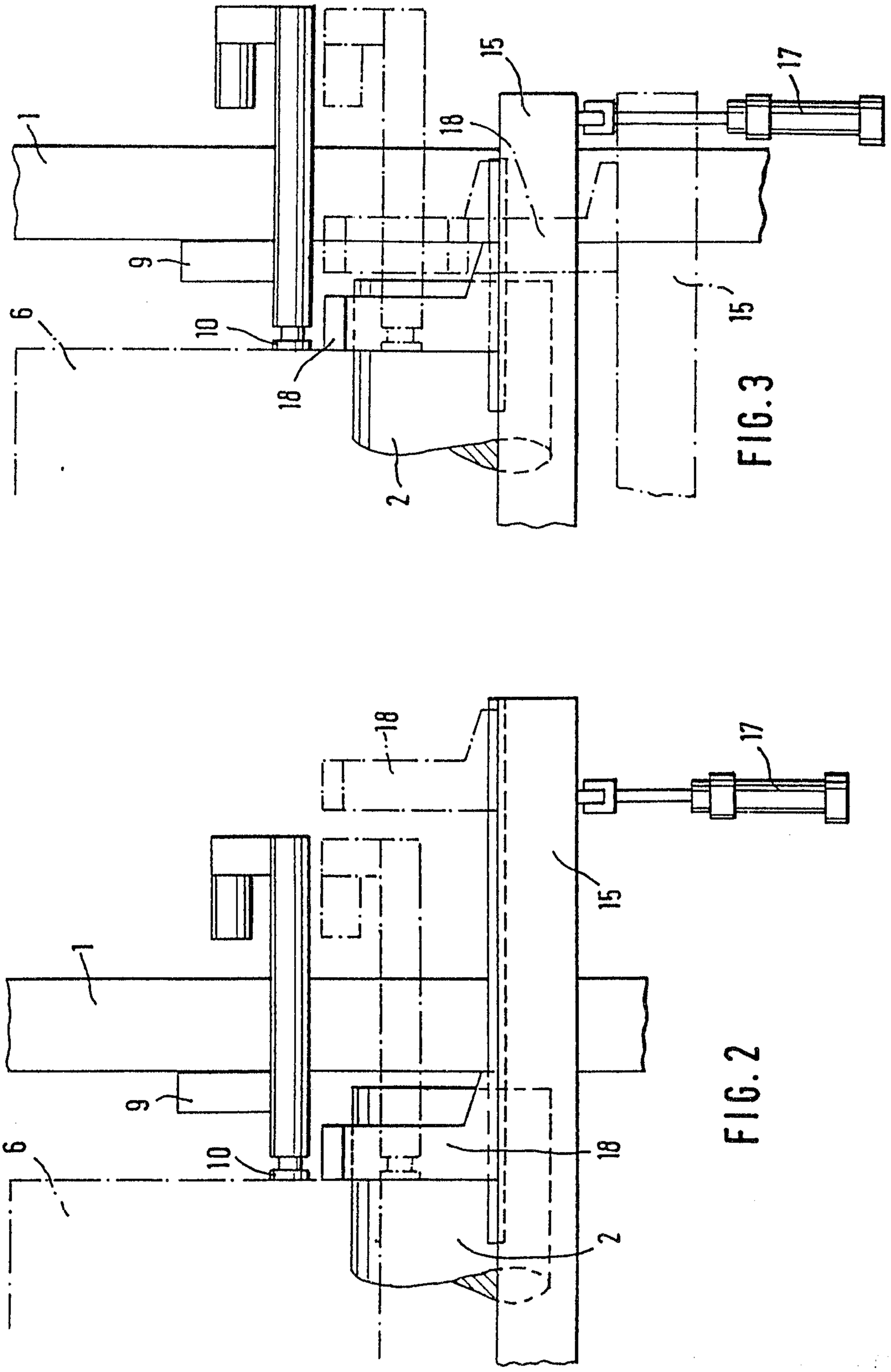

FIG. 3

FIG. 2

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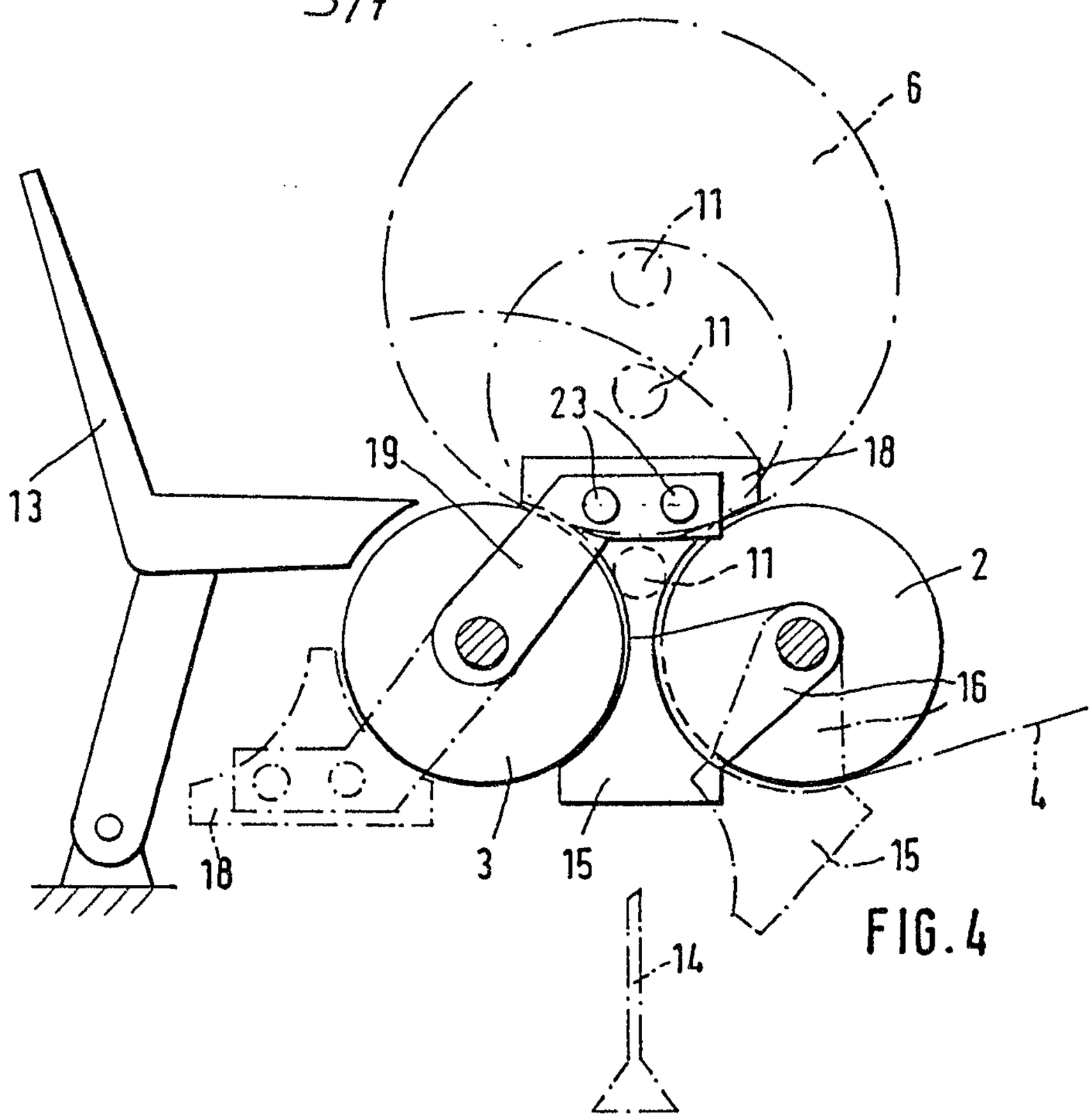

FIG.4

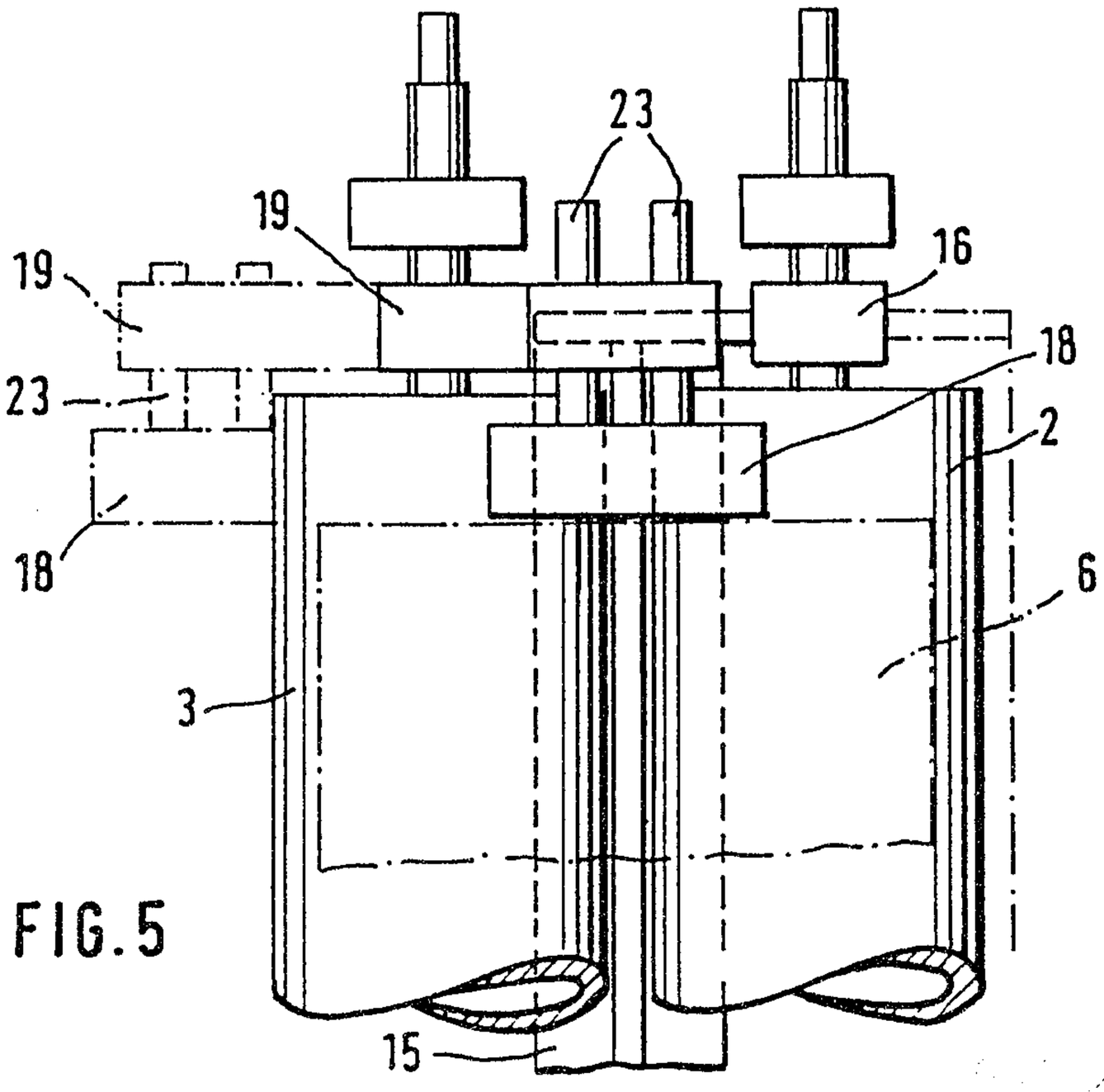

FIG.5

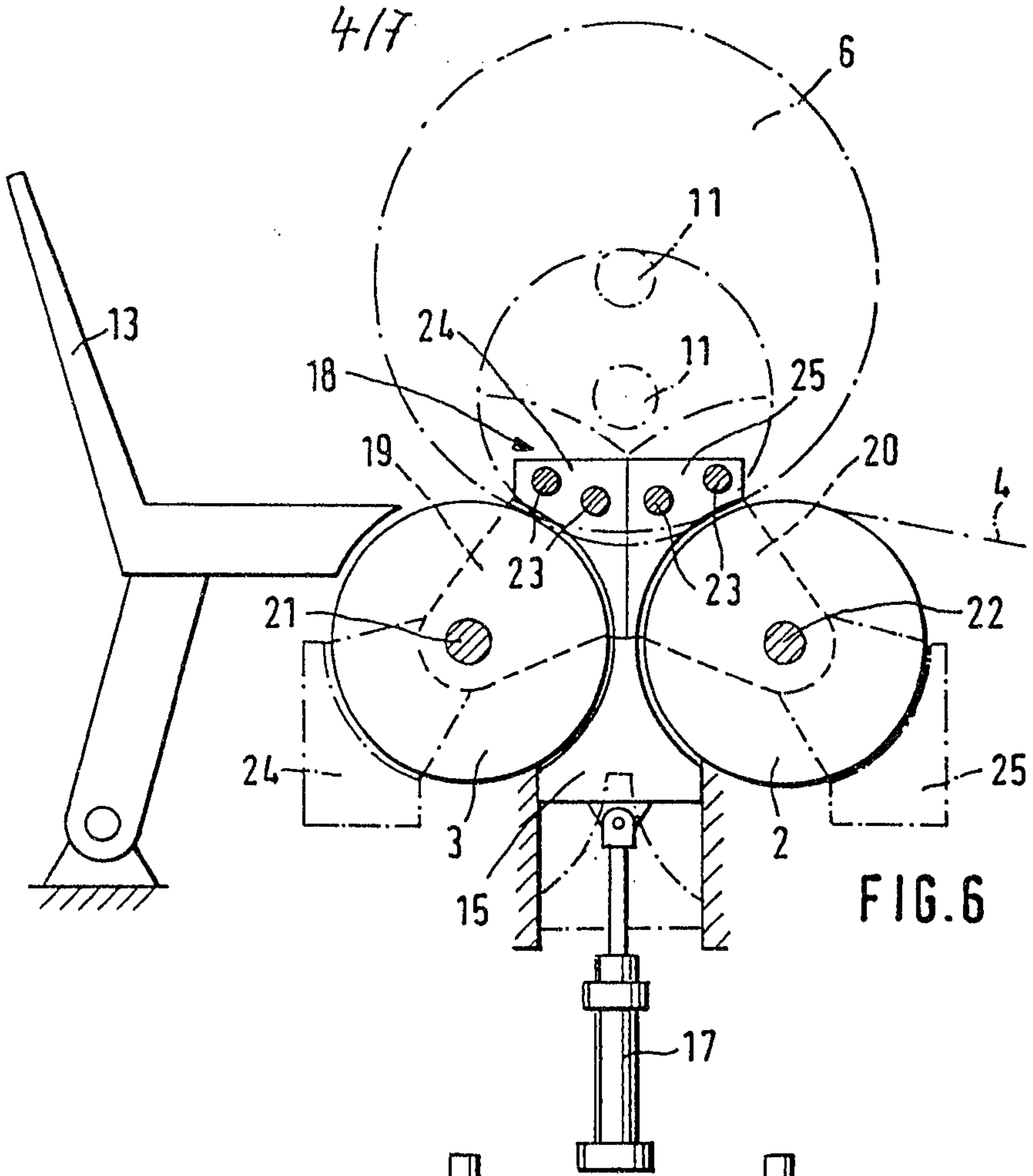
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FIG.6

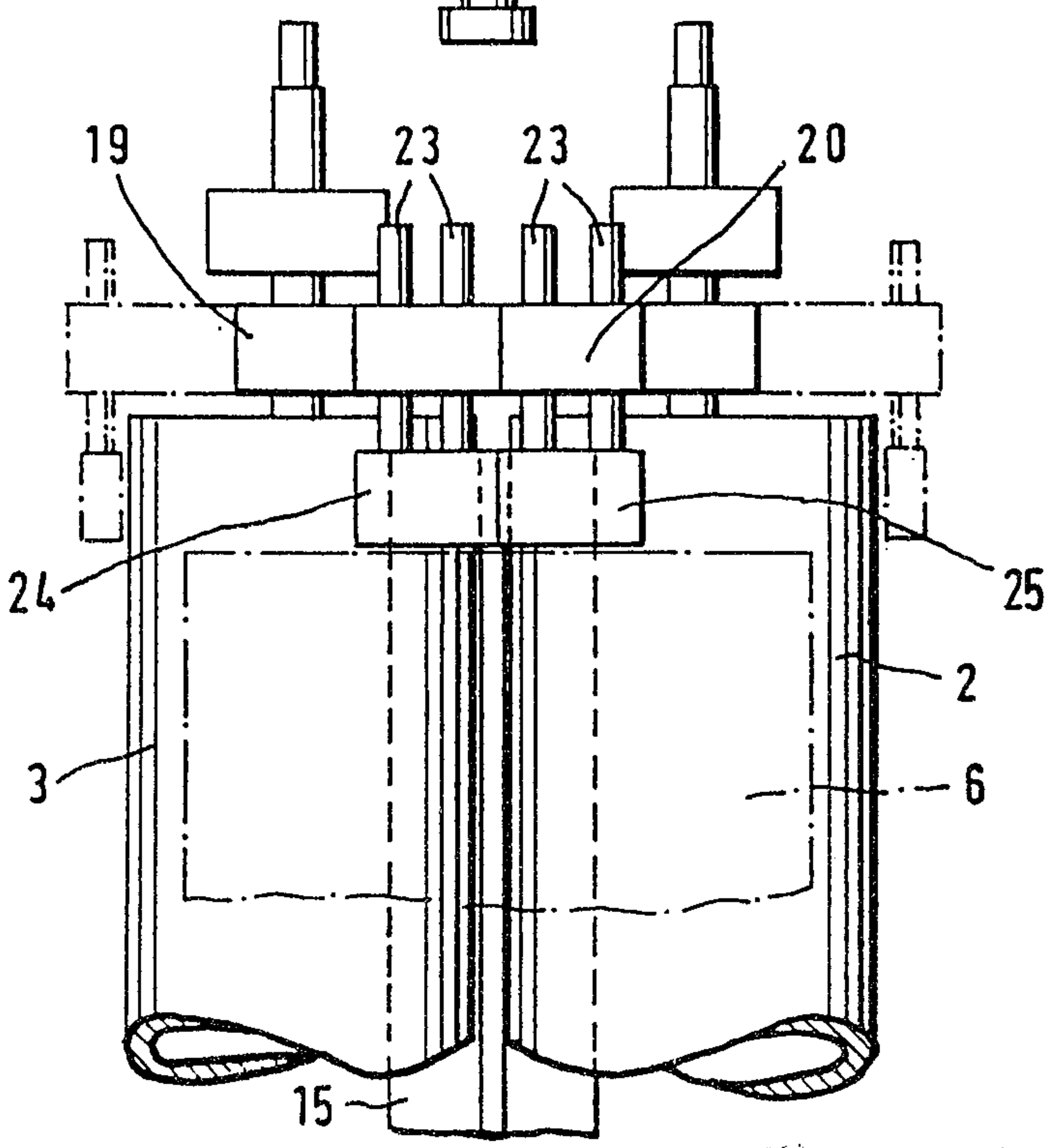
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FIG.7

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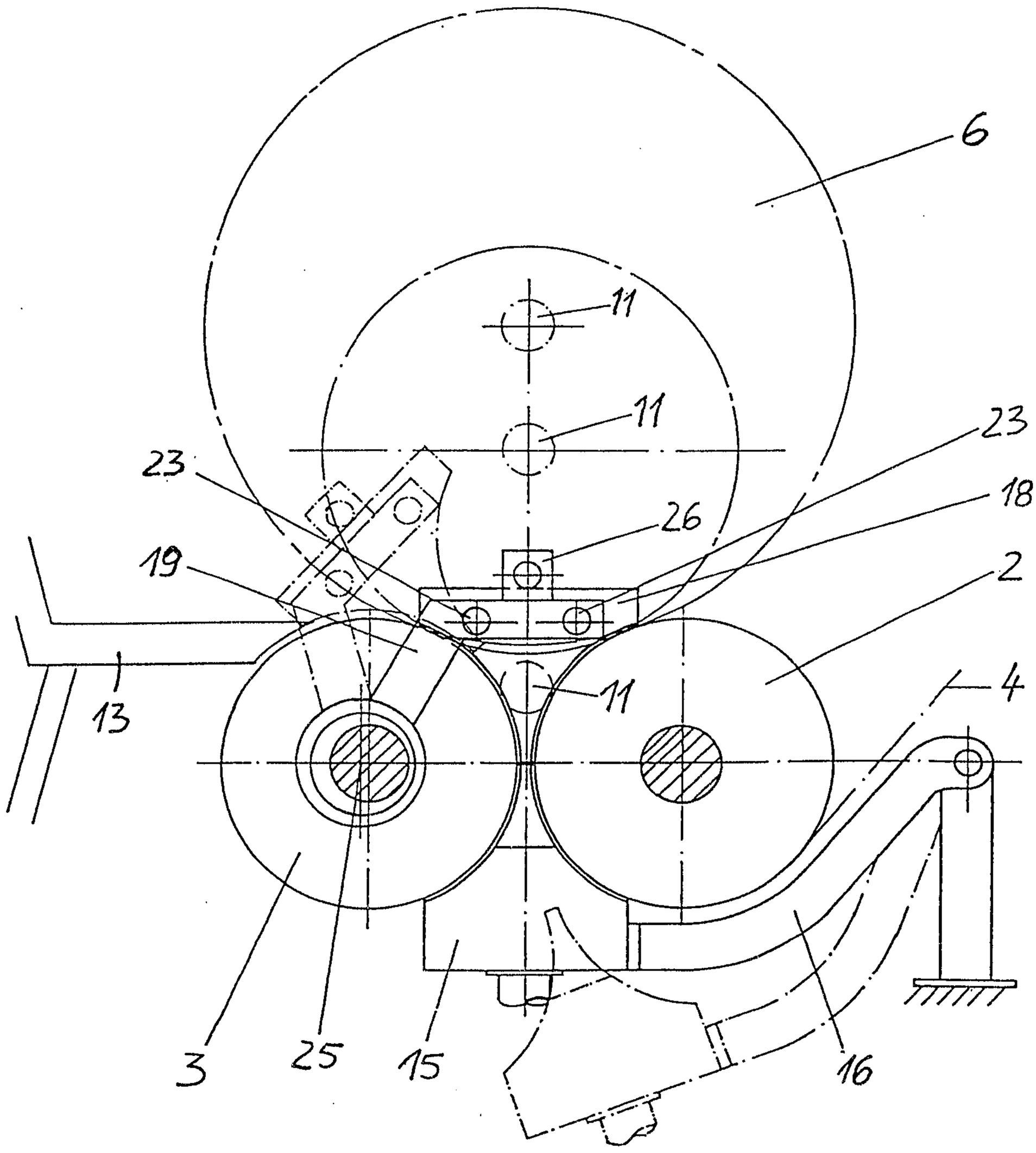

FIG. 8

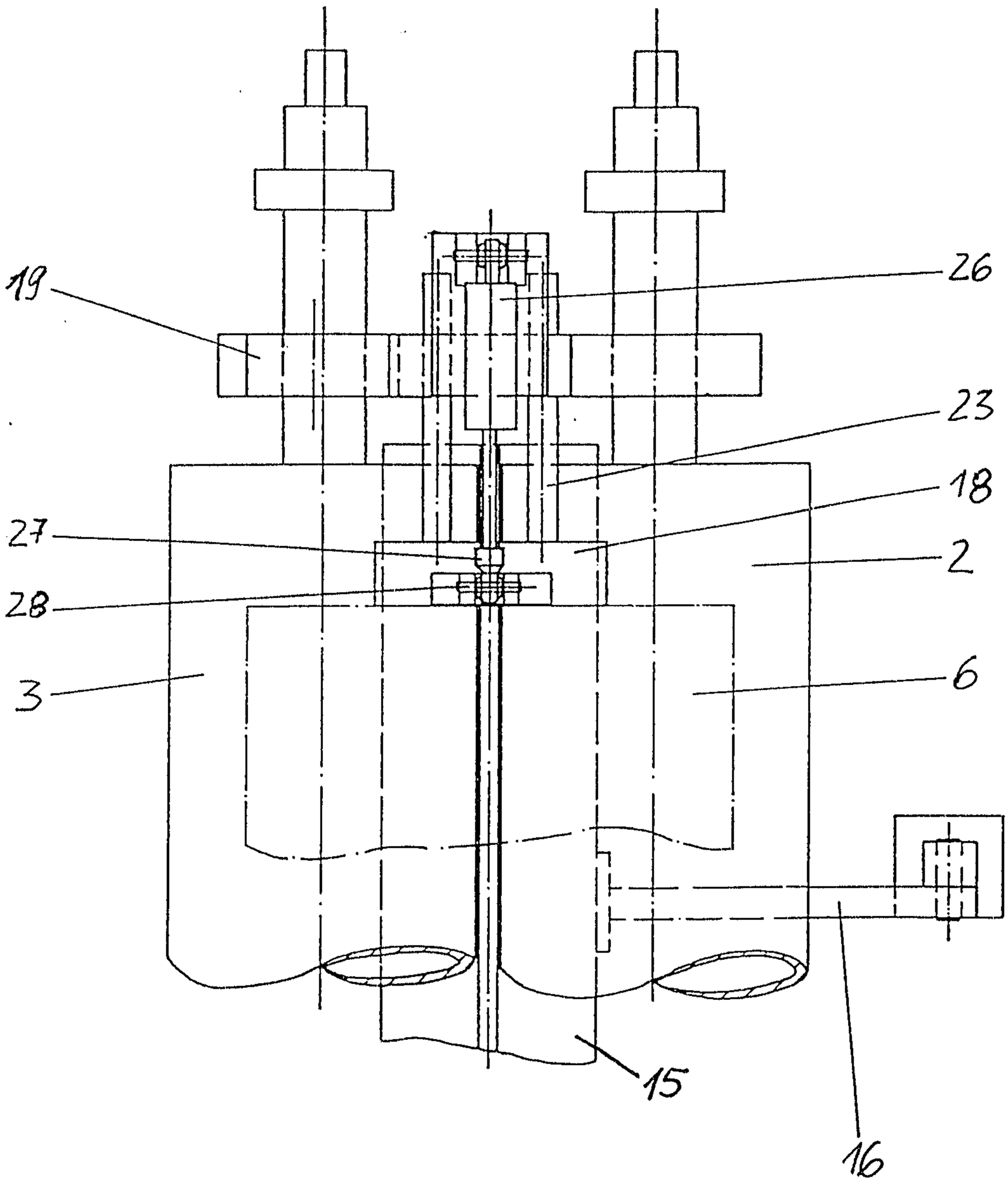

FIG. 9

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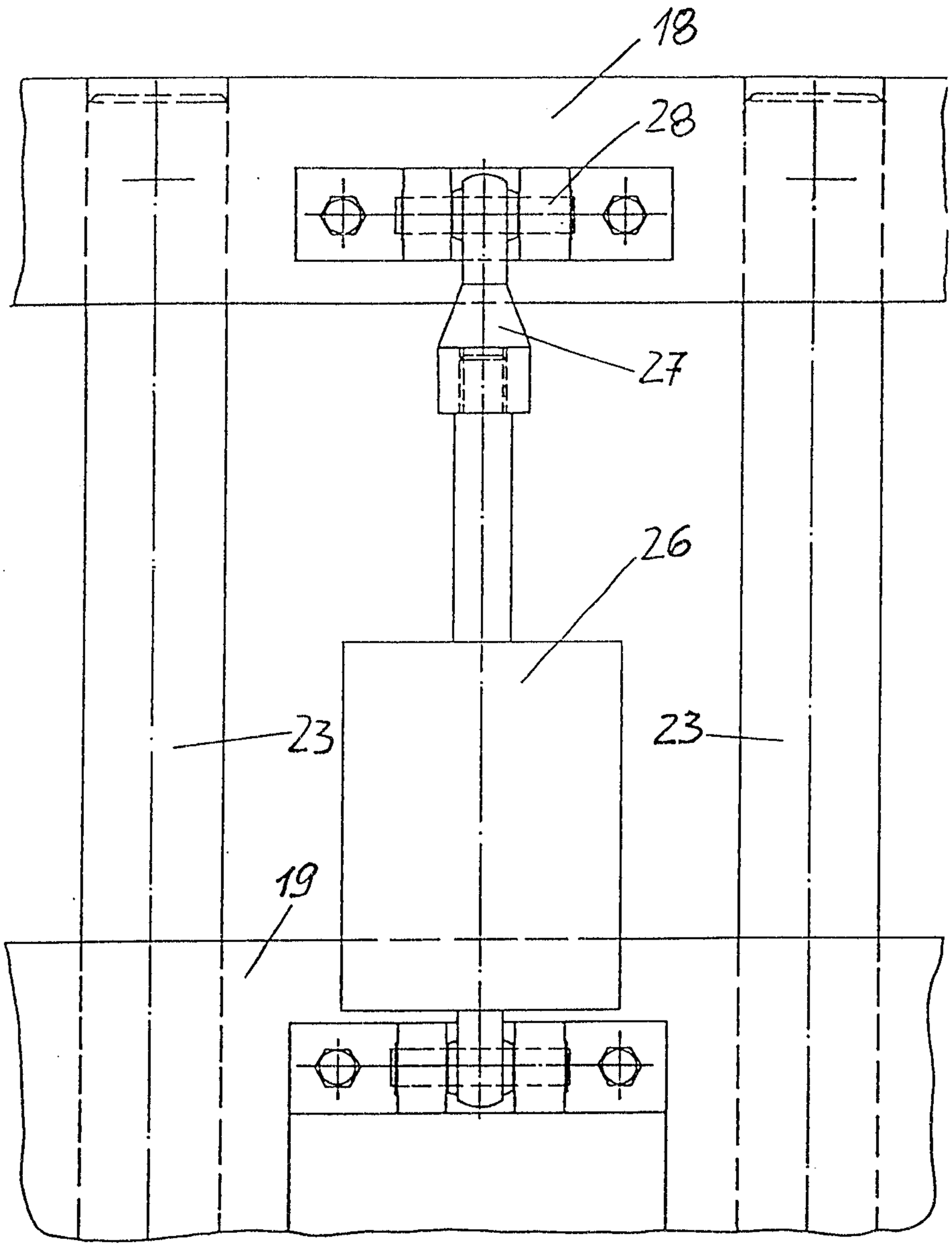

Fig. 10

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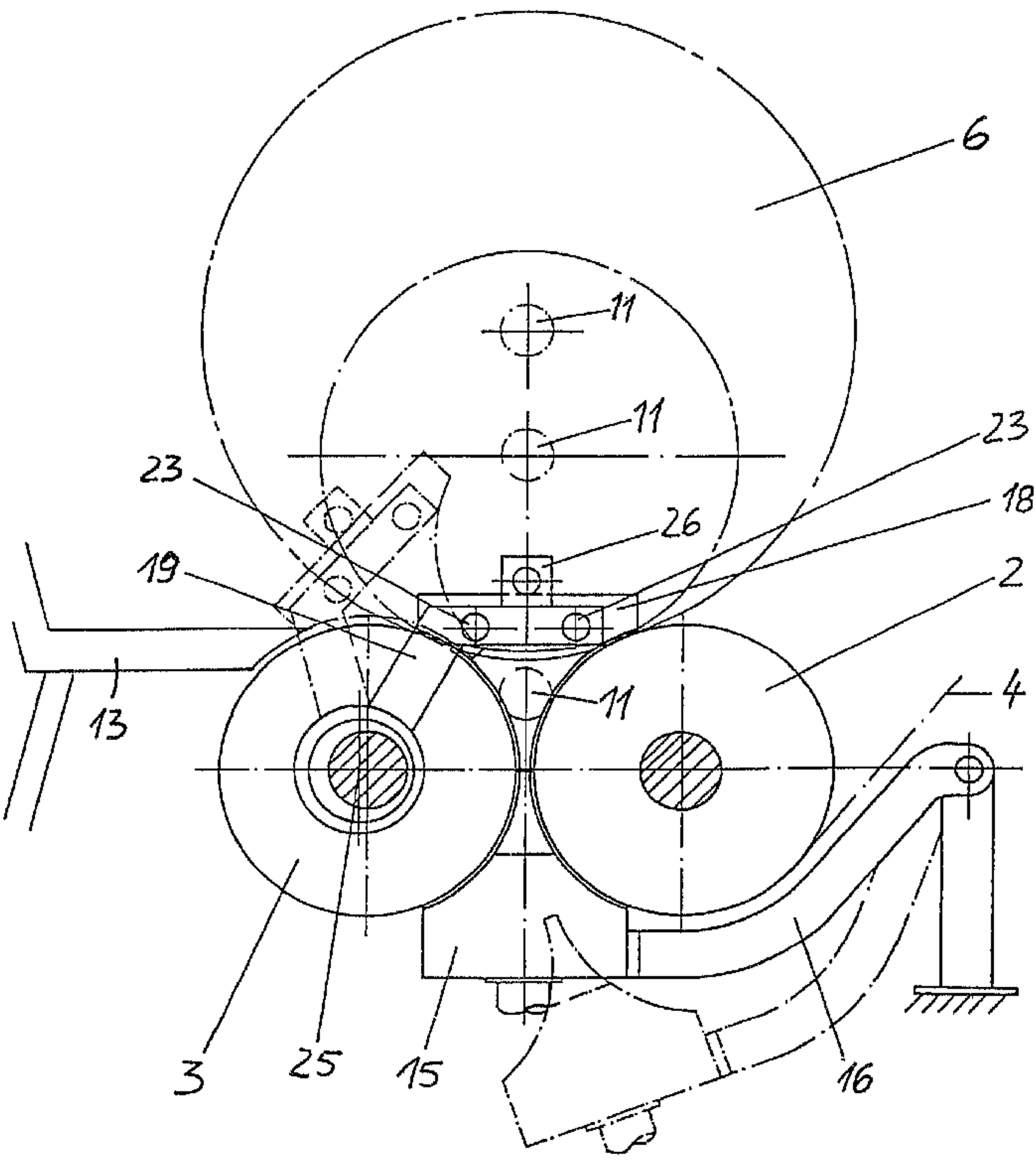
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