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(54) Transverse cutting device for wood veneer

Vorrichtung zum Querschneiden von Holzfurnier

Dispositif de coupe transversale pour placage

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(56) References cited:
EP-A- 0 427 244
WO-A-92/11979
WO-A-93/00206
CH-A- 353 890
DE-A- 3 632 779

Remarks:
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Description

Production of wood sheets by transverse cutting performed by special automatic cutters from a continuous sheet of veneer is known. The cutter is usually commanded to cut sheets in preset dimensions or transverse strips to be eliminated because they contain defects of the wood, e.g. holes.

For example, CH-354 890 discloses a transverse cutting apparatus wherein cutting means comprises two side-by-side transverse blades. If the sheet is wide, the two blades are operated simultaneously, whereas if the sheet is narrower than one blade, only one blade is operated.

With this procedure it is obvious that the waste of material is quite high since it is necessary to cut a strip of material as long as the longitudinal dimension of the defect and as wide as the entire veneer strip even if the transverse width of the defect is very limited. In addition, because of the repeated defects the possibility of obtaining long sheets is compromised.

Subject matter of the co-pending application EP-A-O 500 161 is a machine for carrying out transverse cuts selectively on the entire width or on a portion of the veneer width in connection with longitudinal cuts, so as to enable the scrap of defective parts with minimal wood waste.

The general purpose of the present invention is to provide a cutting device for carrying out accurate transverse cuts.

In view of said purpose it has been sought to provide in accordance with the present invention a device as defined in claim 1.

To further clarify the explanation of the innovative principles of the present invention and its advantages as compared with the known art there is described below with the aid of the annexed drawings a possible embodiment as a nonlimiting example applying said principles. In the drawings:

- FIG. 1 shows a schematic front view of a veneer cutting device provided in accordance with the present invention,
- FIG. 2 shows a schematic partial cross section view of a disengageable joint of the device shown in FIG. 1,
- FIG. 3 shows a schematic side view of a possible variant of the device shown in FIG.1, and
- FIG. 4 shows a cross section view along line of cut VII-VII of FIG. 3.

With reference to the figures, FIG. 1 shows a cutting device 15 comprising a rotating blade consisting of two blade sections 21 and 22 arranged side by side to rotate coaxially between bucking rollers 23 and 24 by motors 25 and 26 respectively having position sensors.

While the blade 21 is supported at the motor end to rotate without axial sliding, the blade 22 is supported at the end near its own motor by an axially sliding support 27.

Axial sliding is controlled by a double action piston 28 driven hydraulically through the ducts 40, 54 by a hydraulic control unit 29 connected to electronic processing and control means 19.

Between the two blades 21 and 22 is placed an axially sliding clutch 30 having a spring 31, e.g. the Melville type, which usually holds it in engagement of the two blades (blades brought near). Another spring 32, weaker than the spring 31, placed in the piston 28, maintains axial tension of the blades.

FIG. 2 shows schematically an example of an embodiment of the axial clutch 30. As may be seen in the figure, integral with the blade 21 is a supporting and containing structure 46 in which a shaft 47 integral with the blade 22 is inserted in a sliding manner. Reciprocal rotation between the structure 46 and the shaft 47 is permitted by bearings 48 and 49.

The spring 31 pushes between an element 50 integral with the shaft 47 and an element 51 rotating with the shaft 47, sliding coaxially thereto and butted axially on the structure 46 with an interposed bearing 52.

The bearing 48 is of known type permitting mutual axial translation of the parts between which it is placed.

In this manner is assured firm coaxial alignment of the rotation axes of the blades 21 and 22, allowing simultaneously their reciprocal axial sliding away against the action of the spring 31.

Between the structure 46 and the element 50 are arranged facing rings with frontal teeth 53, 55 for engagement between the parts brought together by the thrust of the spring 31.

Thus the axial traction of one of the blades (in this specific case the blade 22 by means of the piston 28) to permit disengagement and independent rotation.

The various parts of the station are controlled and commanded to operate by electronic processing and control means 19, e.g. provided by programmed logics such as a microprocessor of the known art programmed in accordance with the description given below and optionally interconnected to a personal computer or the like.

Such a device, especially in the light of the following operation description, can readily be imagined by those skilled in the art and therefore is not further described here.

The control device 19 synchronises the movements of the blades 21, 22 and commands coupling or not of the two blades of the transverse cutter depending on requirements.

In particular, if independent operation is necessary, the device 19 commands the control unit 29 to supply fluid to the piston through the duct 54. In this manner the piston moves the blade 22 axially away from the blade 21, thus disengaging the clutch 30 and permitting the two motors 25 and 26 to rotate the respective blade independently with independent speeds.

To engage again the blades so that they behave substantially as a single blade the control device 19 first resynchronizes them electronically, putting the motors in step (by means of the signals emitted by their position sensors), so that the blades are rearranged as much as possible with parallel faces, and then commands the control unit 29 to supply the piston 28 with a fluid counterpressure through the duct 40, thus reconnecting the mechanical clutch 30 between the blades.

It is therefore apparent how the proposed purposes are achieved, providing a device performing an accurate and quick transverse cut on the entire width of a veneer or only on a half.

In use the device is usually utilized in a station for combined transverse and longitudinal cuts, as disclosed, for example, in the above mentioned application EP-A-500 161, so as to receive between blades and bucking roller an unbroken strip of wood veneer separated or not longitudinally by a known longitudinal cutting blade.

In this way, the device is controlled for cutting transversely a half-strip or the entire strip (depending on what is the case) in connection with longitudinal cuts, so as to form wood sheets having a size suitable for minimizing wood scrap.

Figure 3 shows schematically a different embodiment 15' of the cutting device according to the present invention.

As may be seen in said figure, the cutter 15' comprises a shaft 56 on which are supported independently in a rotating manner two blade holder units (57, 58) or sections, each having a plurality 59, 60 of equally spaced radial blades (as may be seen well in FIG. 4).

Parallel to the shaft 56 is a bucking roller 61 on which slides the veneer 12.

Each blade holder 57 and 58 is rotated by a motor 62 or 63 through a kinematic transmission, e.g. with a chain, 64 and 65. The motors are mechanically engaged together through an electromechanical joint of the known art, e.g the electromagnetic type controlled by the device 19.

In use the cutting station operates as described above. When cuts are to be made on half strips the joint 66 is disengaged and the motors drive the blade holders independently. When a full transverse cut is required, the device 19 first synchronizes the blades by controlling the motors 62, 63 through position sensors, similarly to the motors of the cutter 15, and then operates the clutch 66 so that the blades of the two blade holders rotate integrally and with mated cutting edges.

Obviously, the above description of an embodiment applying the innovative principles of the present invention is given merely by way of example and therefore is not to be taken as a limitation of the patent right claimed here.

For example, although FIG. 4 shows three blades for each blade unit, as a compromise between cutting speed and manufacturing cost it is also possible to use cutters with a different number of blades.

In addition the connection means between the blades of the cutters 15 or 15' can be provided differently than described schematically or could even be replaced by only electronic synchronization of the rotation of the respective motors.

Claims

Claims for the following Contracting States : AT, BE, SE

1. Device (15, 15') for cutting transversely a wood veneer strip by means of a blade rotating around an axis for getting in contact transversely with the strip, wherein the blade consists of two blade sections (21, 22; 57, 58) arranged side by side to rotate coaxially and independently, rotationally controllable about the axis.

2. Device in accordance with claim 1 characterized in that the two blade sections (21, 22; 57, 58) have operating means comprising means of synchronization (19, 30, 66) to perform jointly, on command, a continuous cut along the entire width of the strip.

3. Device in accordance with claim 1 characterized in that the blade axis is in a median position and the blade has two opposing edges to rotate between bucking rollers, the strip to be cut passing between one bucking roller and said blade.

4. Device in accordance with claim 2 characterized in that the synchronization means comprise a mechanical clutch (30) for mutual coupling of the blade sections.

5. Device in accordance with claim 4 characterized in that the mechanical clutch (30) comprises teeth (53, 55) on the facing ends of the two blade sections to engage mutually upon mutual axial approach of the blade sections.

6. Device in accordance with claim 5 characterized in that the blade sections are held in mutual nearness by elastic means (31), disengagement means (28) causing selectively axial withdrawal of the blade sections against the action of said elastic means (31).

7. Device in accordance with claim 6 characterized in that the disengagement means comprise a hydraulic piston (28) for movement against the action of a spring (32) placed at one end of one of the two blade sections (21, 22).

8. Device in accordance with claim 1 characterized in that the blade sections have a plurality of blades

(59, 60) arranged radially around a longitudinally rotating shaft (56) to move sequentially near to a bucking roller (61), the strip to be cut passing between the blade and the roller.

9. Device in accordance with claim 2 characterized in that the synchronization means comprise a disengageable mechanical clutch (66) between the shafts of rotation motors (62, 63) of each blade section.

10. Device in accordance with claim 9 characterized in that the disengageable mechanical clutch is an electromechanical coupling.

Claims for the following Contracting States : DE, ES, FR

1. Device (15, 15') for cutting transversely a wood veneer strip by means of a blade rotating around an axis for getting in contact transversely with the strip, the blade consisting of two blade sections (21, 22; 57, 58) arranged side by side to rotate coaxially and independently, rotationally controllable about the axis, the two blade sections (21, 22; 57, 58) having operating means comprising means of synchronization (19, 30, 66) to perform jointly, on command, a continuous cut along the entire width of the strip, the synchronization means comprising a mechanical clutch (30) for mutual coupling of the blade sections.

2. Device in accordance with claim 1 characterized in that the blade is a rotating blade with the axis in a median position and with two opposing edges to rotate between bucking rollers, the strip to be cut passing between one bucking roller and said blade.

3. Device in accordance with claim 1 characterized in that the mechanical clutch (30) comprises teeth (53, 55) on the facing ends of the two blade sections to engage mutually upon mutual axial approach of the blade sections.

4. Device in accordance with claim 3 characterized in that the blade sections are held in mutual nearness by elastic means (31), disengagement means (28) causing selectively axial withdrawal of the blade sections against the action of said elastic means (31).

5. Device in accordance with claim 4 characterized in that the disengagement means comprise a hydraulic piston (28) for movement against the action of a spring (32) placed at one end of one of the two blade sections (21, 22).

6. Device in accordance with claim 1 characterized in that the blade sections have a plurality of blades (59, 60) arranged radially around a longitudinally rotating shaft (56) to move sequentially near to a bucking roller (61), the strip to be cut passing between the blade and the roller.

7. Device in accordance with claim 1 characterized in that the synchronization means comprise a disengageable mechanical clutch (66) between the shafts of rotation motors (62, 63) of each blade section.

8. Device in accordance with claim 7 characterized in that the disengageable mechanical clutch is an electromechanical coupling.

Patentansprüche

Patentansprüche für folgende Vertragsstaaten : AT, BE, SE

1. Vorrichtung (15, 15') zum Querschneiden eines Holzfurnierstreifens mittels eines Messers, das sich um eine Achse dreht, um quer in Kontakt mit dem Streifen zu kommen, wobei das Messer aus zwei Messerabschnitten (21, 22, 57, 58) besteht, die nebeneinander angeordnet sind, um sich koaxial` und unabhängig, rotierend, steuerbar um die Achse zu drehen.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die beiden Messerabschnitte (21, 22; 57, 58) Betriebseinrichtungen aufweisen, die Synchronisationseinrichtungen (19, 30, 66) aufweisen, um gemeinsam auf Befehl einen durchgehenden Schnitt längs der gesamten Breite des Streifens durchzuführen.

3. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Messerachse sich in einer mittleren Position befindet, und das Messer zwei gegenüberliegende Kanten aufweist, um sich zwischen Schneidwalzen zu drehen, wobei der zu schneidende Streifen zwischen einer Schneidwalze und dem Messer durchgeht.

4. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Synchronisationseinrichtungen eine mechanische Kupplung (30) zum, gegenseitigen Kuppeln der Messerabschnitte aufweisen.

5. Vorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß die mechanische Kupplung (30) Zähne (53, 55) auf den gegenüberliegenden Enden der beiden Messerabschnitte aufweist, um auf eine gegenseitige axiale Annäherung der Messerabschnitte hin gegenseitig ineinander einzugreifen.

6. Vorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß die Messerabschnitte durch elastische Einrichtungen (31) in gegenseitiger Nähe gehalten werden, wobei Auskuppeleinrichtungen (28) selektiv einen axialen Rückzug der Messerabschnitte gegen die Wirkung der elastischen Einrichtungen (31) bewirken.

7. Vorrichtung nach Anspruch 6, dadurch gekennzeichnet, daß die Auskuppeleinrichtungen einen Hydraulikkolben (28) zur Bewegung gegen die Wirkung einer Feder (32) aufweisen, die an einem Ende eines der beiden Messerabschnitte (21, 22) angeordnet ist.

8. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Messerabschnitte mehrere Messer (59, 60) aufweisen, die radial um eine longitudinal rotierende Welle (56) angeordnet sind, um sich aufeinanderfolgend nahe zu einer Schneidwalze (61) zu bewegen, wobei der zu schneidende Streifen zwischen dem Messer und der Walze durchgeht.

9. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Synchronisationseinrichtungen eine auskuppelbare mechanische Kupplung (66) zwischen den Wellen der Umdrehungsmotoren (62, 63) jedes Messerabschnitts aufweisen.

10. Vorrichtung nach Anspruch 9, dadurch gekennzeichnet, daß die auskuppelbare mechanische Kupplung eine elektromechanische Kupplung ist.

Patentansprüche für folgende Vertragsstaaten : DE, ES, FR

1. Vorrichtung (15, 15') zum Querschneiden eines Holzfurnierstreifens mittels eines Messers, das sich um eine Achse dreht, um quer in Kontakt mit dem Streifen zu kommen, wobei das Messer aus zwei Messerabschnitten (21, 22, 57, 58) besteht, die nebeneinander angeordnet sind, um sich koaxial und unabhängig, rotierend, steuerbar um die Achse zu drehen, wobei die beiden Messerabschnitte (21, 22; 57, 58) Betriebseinrichtungen aufweisen, die Synchronisationseinrichtungen (19, 30, 66) aufweisen, um gemeinsam auf Befehl einen durchgehenden Schnitt längs der gesamten Breite des Streifens durchzuführen, wobei die Synchronisationseinrichtungen eine mechanische Kupplung (30) zum gegenseitigen Kuppeln der Messerabschnitte aufweisen.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das Messer ein rotierendes Messer mit der Achse in einer mittleren Position und mit zwei gegenüberliegenden Kanten ist, um sich zwischen Schneidwalzen zu drehen, wobei der zu schneidende Streifen zwischen einer Schneidwalze und dem Messer durchgeht.

3. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die mechanische Kupplung (30) Zähne (53, 55) auf den gegenüberliegenden Enden der beiden Messerabschnitte aufweist, umauf eine gegenseitige axiale Annäherung der Messerabschnitte hin gegenseitig ineinander einzugreifen.

4. Vorrichtung nach Anspruch 3, dadurch gekennzeichnet, daß die Messerabschnitte durch elastische Einrichtungen (31) in gegenseitiger Nähe gehalten werden, wobei Auskuppeleinrichtungen (28) selektiv einen axialen Rückzug der Messerabschnitte gegen die Wirkung der elastischen Einrichtungen (31) bewirken.

5. Vorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß die Auskuppeleinrichtungen einen Hydraulikkolben (28) zur Bewegung gegen die Wirkung einer Feder (32) aufweisen, die an einem Ende eines der beiden Messerabschnitte (21, 22) angeordnet ist.

6. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Messerabschnitte mehrere Messer (59, 60) aufweisen, die radial um eine longitudinal rotierende Welle (56) angeordnet sind, um sich aufeinanderfolgend nahe zu einer Schneidwalze (61) zu bewegen, wobei der zu schneidende Streifen zwischen dem Messer und der Walze durchgeht.

7. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Synchronisationseinrichtungen eine ausrückbare mechanische Kupplung (66) zwischen den Wellen der Umdrehungsmotoren (62, 63) jedes Messerabschnitts aufweisen.

8. Vorrichtung nach Anspruch 7, dadurch gekennzeichnet, daß die ausrückbare mechanische Kupplung eine elektromechanische Kupplung ist.

Revendications

Revendications pour les Etats contractants suivants : AT, BE, SE

1. Dispositif (15, 15') pour couper transversalement une bande de placage de bois au moyen d'une lame tournant autour d'un axe pour venir en contact transversalement avec la bande, dans lequel la lame se compose de deux sections de lame (21, 22 ; 57, 58) disposées côte à côte pour tourner coaxialement et de manière indépendante, pouvant être commandées en rotation autour de l'axe.

2. Dispositif selon la revendication 1, caractérisé en ce que les deux sections de lame (21, 22 ; 57, 58) ont des moyens de manoeuvre comprenant des moyens de synchronisation (19, 30, 66) destinés à l'exécution conjointe, sur commande, d'une coupe continue sur toute la largeur de la bande.

3. Dispositif selon la revendication 1, caractérisé en ce que l'axe de la lame est en position médiane et la lame a deux bords opposés destinés à tourner entre des rouleaux d'appui, la bande à couper passant entre un rouleau d'appui et ladite lame.

4. Dispositif selon la revendication 2, caractérisé en ce que les moyens de synchronisation comprennent un embrayage mécanique (30) destiné à accoupler mutuellement les sections de lame.

5. Dispositif selon la revendication 4, caractérisé en ce que l'embrayage mécanique (30) comporte des dents (53, 55) aux extrémités en regard des deux sections de lame destinées à coopérer mutuellement lors du rapprochement axial mutuel des sections de lame.

6. Dispositif selon la revendication 5, caractérisé en ce que les sections de lame sont maintenues à proximité mutuellement par des moyens élastiques (31), des moyens (28) de séparation provoquant un éloignement axial sélectif des sections de lame malgré l'action desdits moyens élastiques (31).

7. Dispositif selon la revendication 6, caractérisé en ce que les moyens de séparation comportent un vérin hydraulique (28) destiné à se déplacer malgré l'action d'un ressort (32) placé à une extrémité de l'une des deux sections de lame (21, 22).

8. Dispositif selon la revendication 1, caractérisé en ce que les sections de lame ont plusieurs lames (59, 60) disposées radialement autour d'un axe (56) tournant longitudinalement afin qu'elles se déplacent séquentiellement près d'un rouleau d'appui (61), la bande à couper passant entre la lame et le rouleau.

9. Dispositif selon la revendication 2, caractérisé en ce que les moyens de synchronisation comprennent un embrayage mécanique débrayable (66) placé entre les arbres des moteurs d'entraînement en rotation (62, 63) de chaque section de lame.

10. Dispositif selon la revendication 9, caractérisé en ce que l'embrayage mécanique débrayable est un accouplement électromécanique.

Revendications pour les Etats contractants suivants : DE, ES, FR

1. Dispositif (15, 15') pour couper transversalement une bande de placage de bois au moyen d'une lame tournant autour d'un axe pour venir en contact transversalement avec la bande, la lame se composant de deux sections de lame (21, 22 ; 57, 58) disposées côte à côte pour tourner coaxialement et de manière indépendante, pouvant être commandées en rotation autour de l'axe, les deux sections de lame (21, 22 ; 57, 58) ayant un dispositif de manoeuvre comprenant un dispositif de' synchronisation (19, 30, 66) destiné à l'exécution conjointe, sur commande, d'une coupe continue sur toute la largeur de la bande, le dispositif de synchronisation comprenant un embrayage mécanique (30) destiné à accoupler mutuellement les sections de lame.

2. Dispositif selon la revendication 1, caractérisé en ce que la lame est une lame rotative avec l'axe en position médiane et deux bords opposés destinés à tourner entre des rouleaux d'appui, la bande à couper passant entre un rouleau d'appui et ladite lame.

3. Dispositif selon la revendication 1, caractérisé en ce que l'embrayage mécanique (30) comporte des dents (53, 55) aux extrémités en regard des deux sections de lame destinées à coopérer mutuellement lors du rapprochement axial mutuel des sections de lame.

4. Dispositif selon la revendication 3, caractérisé en ce que les sections de lame sont maintenues à proximité mutuellement par un dispositif élastique (31), un dispositif (28) de séparation provoquant un éloignement axial sélectif des sections de lame malgré l'action dudit dispositif élastique (31).

5. Dispositif selon la revendication 4, caractérisé en ce que les moyens de séparation comportent un vérin hydraulique (28) destiné à se déplacer malgré l'action d'un ressort (32) placé à une extrémité de l'une des deux sections de lame (21, 22).

6. Dispositif selon la revendication 1, caractérisé en ce que les sections de lame ont plusieurs lames (59, 60) disposées radialement autour de l'axe (56) tournant longitudinalement afin qu'elles se déplacent séquentiellement près d'un rouleau d'appui (61), la bande à couper passant entre la lame et le rouleau.

7. Dispositif selon la revendication 1, caractérisé en ce que le dispositif de synchronisation comprend un embrayage mécanique débrayable (66) placé entre les arbres des moteurs d'entraînement en rotation (62, 63) de chaque section de lame.

8. Dispositif selon la revendication 7, caractérisé en ce que l'embrayage mécanique débrayable est un accouplement électromécanique.

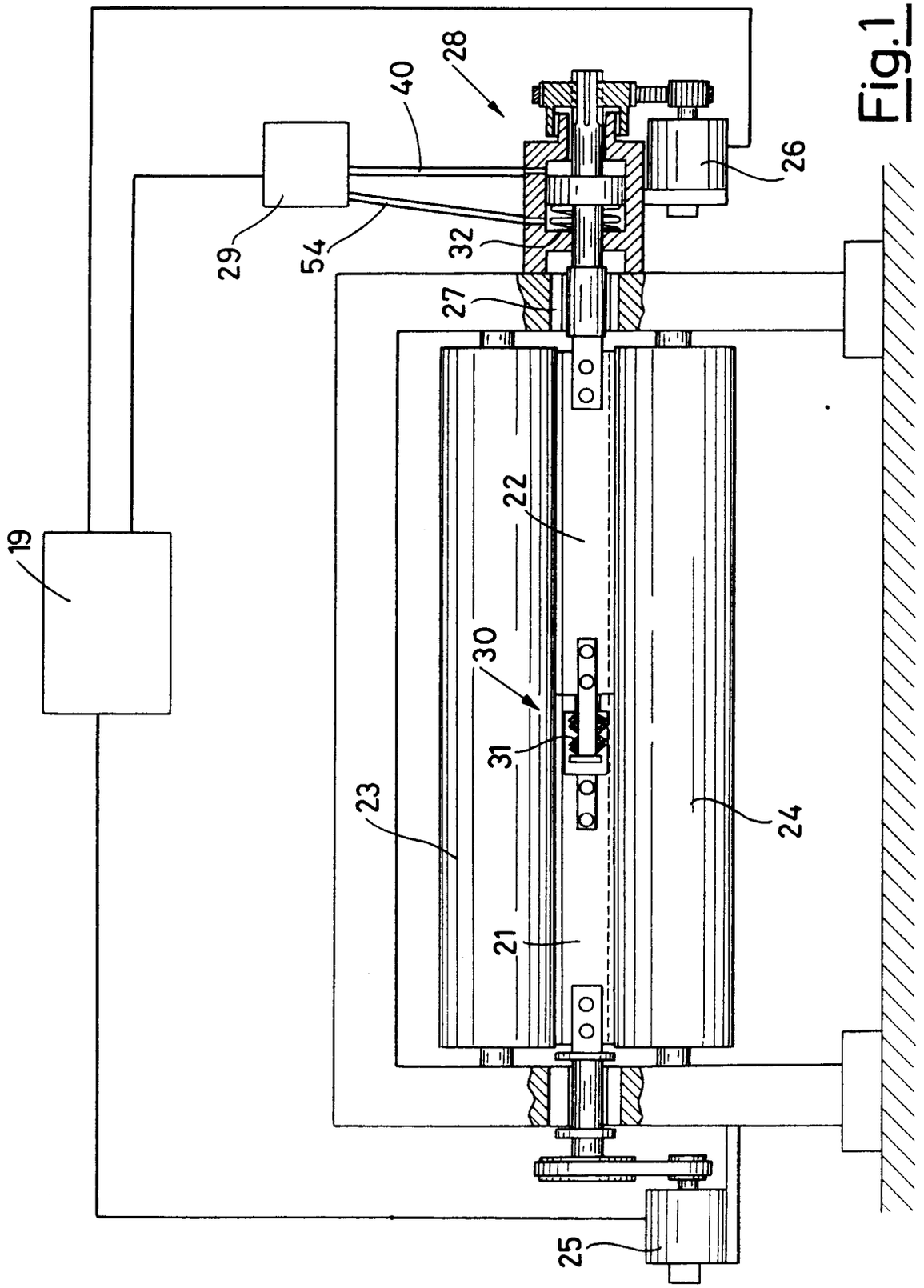


Fig.1

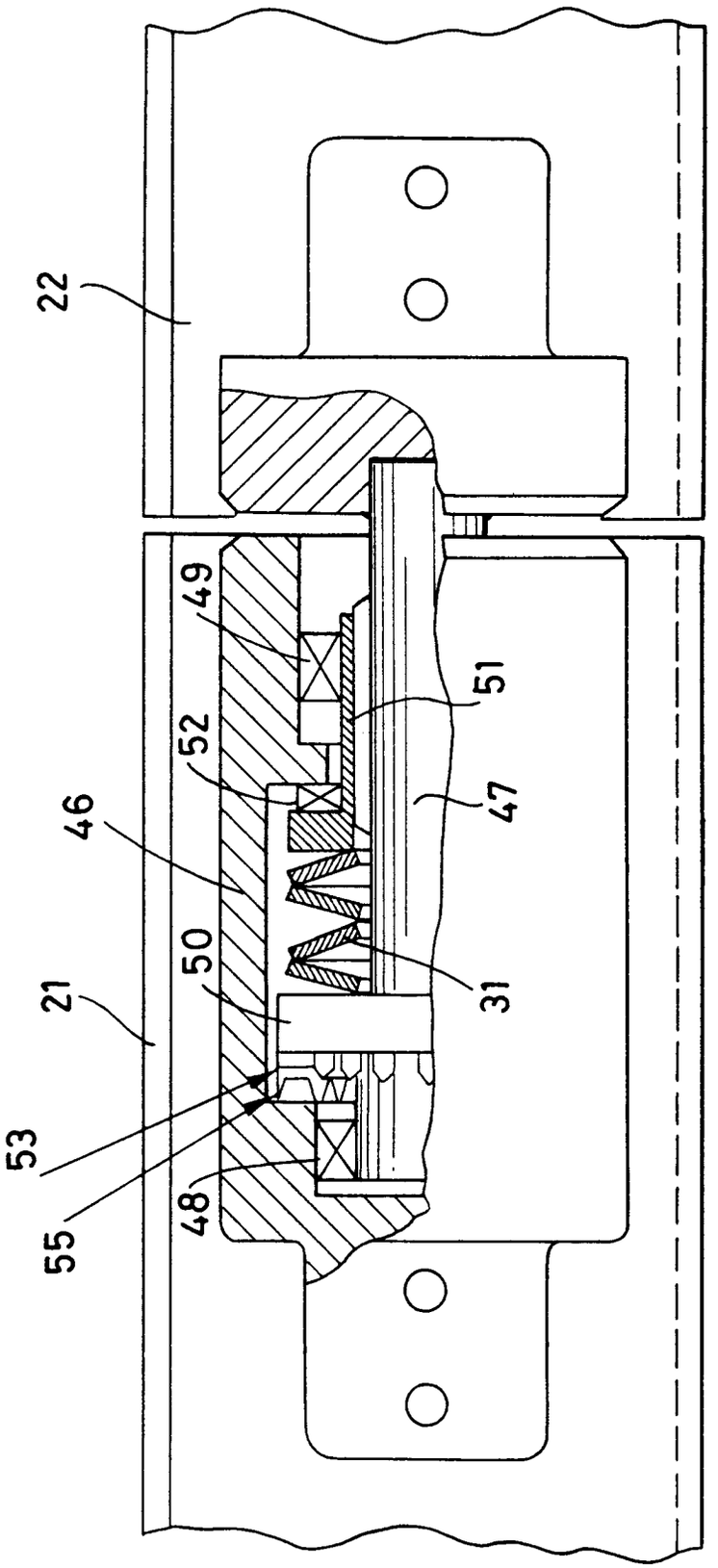


Fig.2

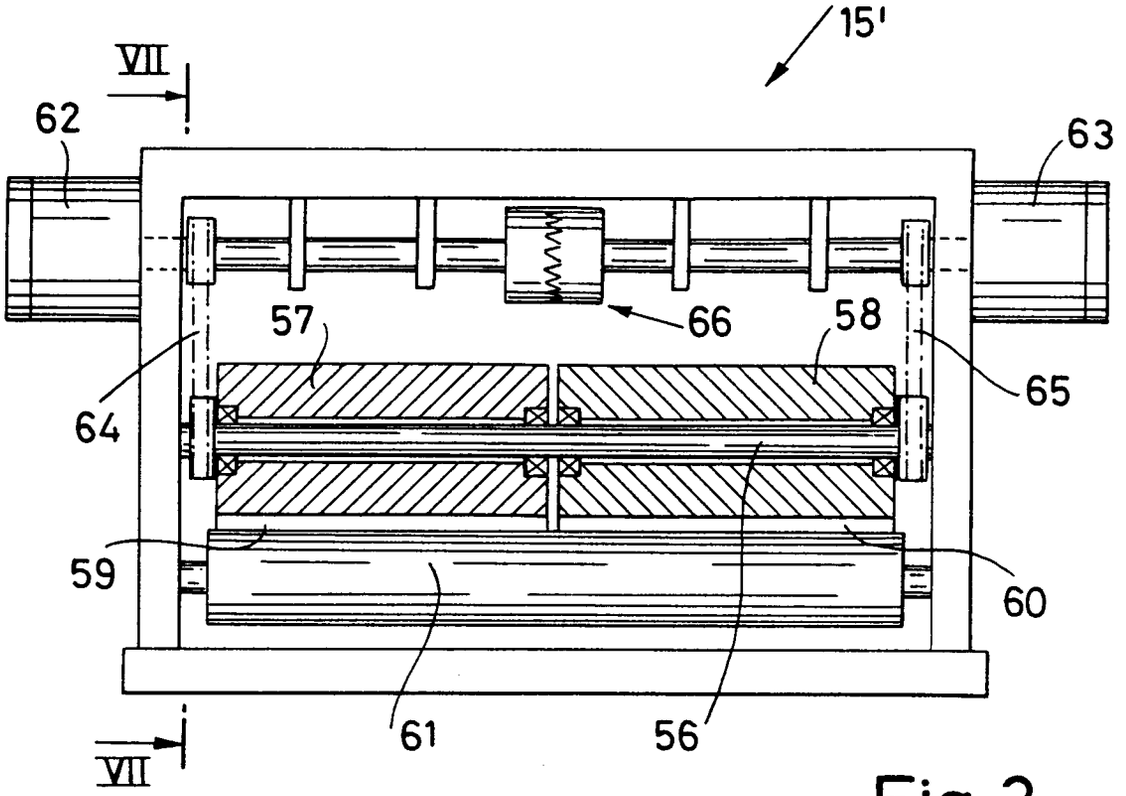

15'
VII
62
63
57
66
58
64
65
59
60
61
56
VII

Fig.3

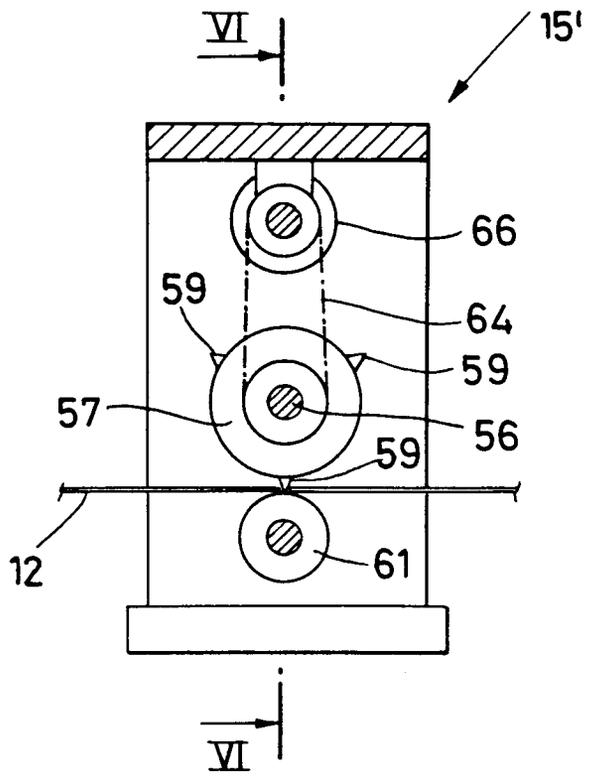

VI
15'
66
59
64
59
57
56
59
12
61
VI

Fig.4