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

(11) **EP 1 693 111 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
22.08.2007 Bulletin 2007/34

(51) Int Cl.:
B04B 1/20 *(2006.01)* ***A23N 1/00*** *(2006.01)*
A23N 15/02 *(2006.01)* ***C12G 1/00*** *(2006.01)*

(21) Application number: **05077127.8**

(22) Date of filing: **19.09.2005**

(54) **Cleaning device for olive residue collector for cleaning olive residue coming out from a decanter**

Reinigungseinrichtung für einen Olivenrestesammler, zum Reinigen von Olivenresten, welche aus einem Dekanter zugeführt werden

Dispositif de nettoyage pour une chambre collectrice de résidus d'olives pour nettoyer les résidus d'olives sortant d'un décanteur

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **16.02.2005 IT RE20050013**

(43) Date of publication of application:
23.08.2006 Bulletin 2006/34

(73) Proprietor: **Ing. Bonfiglioli S.p.A.**
40050 Castello d'Argile (Bologna) (IT)

(72) Inventor: **Bonfiglioli, Giancarlo,**
c/o Ing. Bonfiglioli S.p.A
40050 Castello d'Argile (Bologna) (IT)

(74) Representative: **Corradini, Corrado et al**
Ing. C. Corradini & C. S.R.L.
Via Dante Alighieri 4
I-42100 Reggio Emilia (IT)

(56) References cited:
US-A- 2 544 006
US-A- 2 919 848
US-A- 5 918 819

EP 1 693 111 B1

Description

[0001] The present invention refers to a cleaning device of olive residue coming out from a decanter.

[0002] More specifically, the present invention refers to a cleaning device of olive residue associated with the annular collector fixed to the outlet end of the olive residue from the decanter.

[0003] As known, the olives, once crushed and transformed into paste, arrive at the centrifugal separator with horizontal axis, known as a decanter. The decanter allows the three phases present in the paste (oil, water, olive residue), with different specific weight, to be separated by means of centrifugal force. The decanter is frustoconical cylinder shaped, with an inner Archimedean screw (responsible for pushing the olive residue towards the outlet), and coaxial with an outer drum and a casing that encloses the whole thing. The conical part improves the separation of the solid (olive residue) from the liquid and the cylindrical part allows the separation of the oil from the water.

[0004] At the end opposite the introduction of the olive paste and water there is a motor, with a connection system to the Archimedean screw and to the drum, and a differential revolution regulator that allows intervention on the degree of separation and on the retention time of the paste inside the decanter, according to the type of olives and paste processed.

[0005] The oily must (water and oil), coming out from the decanter, is pumped inside a centrifugal separator with vertical axis that takes care of completing the separation of the oil from the vegetation waters.

[0006] On the other hand, the olive residue is collected at the outlet end by an annular collector and sent to an expulsion Archimedean screw.

[0007] It may be that, during operation, part of the olive residue pushed by the inner Archimedean screw towards the expulsion Archimedean screw, can accumulate on the inner walls of the annular collector causing it to become clogged and thus blocking the passage to the expulsion Archimedean screw.

[0008] This happens since the olive residue is expelled radially with force against the inner walls of the collector, where it sticks due to the high humidity percentage present in the olive residue.

[0009] In such a case it therefore becomes necessary to interrupt the operating cycle and intervene from the outside to remove the olive residue that has accumulated, with consequent drawbacks in terms of productivity.

[0010] Therefore, there is a great requirement to have a cleaning device of olive residue coming out from a decanter that allows the olive residue that sticks to the inner walls of the collector and that thus blocks the passage towards the expulsion Archimedean screw to be removed automatically, i.e. without needing to intervene from the outside.

[0011] US 2,919,848 discloses a cleaning device of olive residue collector for olive residue coming out from a decanter, the cleaning device having cleaning elements arranged so as to lick the inner wall of the olive residue collector having annular shape and fixed to the decanter near to the olive residue outlet. The cleaning elements are composed of scraper blades supported on a cylindrical member provided with rollers and put into rotation by a motor and belt assembly. The cleaning elements follow a substantially circular cleaning path.

[0012] The purpose of the present invention is that of providing a cleaning device of olive residue coming out from a decanter having structural and functional characteristics such as to satisfy the aforementioned requirements and at the same time to avoid the aforementioned drawbacks with reference to the prior art.

[0013] Such a purpose is accomplished through a cleaning device of olive residue coming out from a decanter in accordance with claim 1.

[0014] The dependent claims outline preferred and particularly advantageous embodiments of the cleaning device of olive residue coming out from a decanter according to the invention.

[0015] Further characteristics and advantages of the invention shall become clear from reading the following description provided as an example and not for limiting purposes, with the help of the figures illustrated in the attached tables, in which:

- figure 1 shows a side view partially in section of a cleaning device of olive residue according to the invention, associated with a collector fixed to the olive residue outlet end of a decanter;
- figure 2 shows a schematic view taken from the arrow A of figure 1;
- figures 3 and 4 show a schematic view from above of a detail of the device of figure 1, in two different configurations.

[0016] With reference to the aforementioned figures, a cleaning device of olive residue coming out from a decanter 100 in accordance with the present invention is globally indicated with 1.

[0017] The decanter 100 has an inner screw according to the invention, schematised in figure 1, and coaxial with an outer drum 102 having a cylindrical frustoconical-shaped perforated wall, and a casing 103 that encloses the whole thing.

[0018] At the end opposite to the introduction of the olive paste and water, to the right in figure 1, there is a motor 104 that, with a connection system, of the known type and therefore not described in detail, actuates into rotation both the Archimedean screw 101 and the drum 102. During the operating cycle, the olive residue, which occupies the space between the inner Archimedean screw 101 and the rotary drum 102, is pushed by the inner Archimedean screw 102 towards the outlet holes 105, arranged radially, from where it is expelled by means of the centrifugal force (3000-4000 rpm of the drum, 10-15 rpm of the Archimedean screw) against the inner

walls of a collector 107, in the example of the annular type, and sent to an expulsion Archimedean screw, arranged below and schematised in figure 1.

[0019] In order to clean the inner walls of the collector 107 from the olive residue that often sticks there, the cleaning device 1 according to the invention is used.

[0020] Said cleaning device 1 comprises a circular crown 2, arranged inside the collector 107, on which a plurality of cleaning elements are fixed, in the example rods 3, preferably rigid, arranged parallel to each other and equally spaced apart.

[0021] The crown 2 is free to rotate in a guide channel 4 formed inside the collector 107.

[0022] In accordance with the invention, the rods 3 lick the inner circular wall of the collector 107 that surrounds the holes 105 from which the olive residue is expelled with force.

[0023] The actuation of the crown 2 carrying the rods 3 is carried out through a motor reducer 5 that transmits motion, through an eccentric 9, to a connecting rod 6 connected to a pin 7 fixed to the circular crown 2. The pin 7 is free to move with alternating motion (Fig. 3, 4) sliding inside a guide slot 8 formed on the collector 107 (Fig. 2).

[0024] Basically, the motor reducer 5, rotating, transmits, via the eccentric 9, through the connecting rod 6, an alternating motion to the pin 7 integral with the crown 2 that, consequently, rotates alternately, by a certain angle of circumference in the clockwise or anti-clockwise direction, inside the guide channel 4. This allows the rods 3 that lick the inner wall of the collector 107 to scrape away the olive residue that has solidified on the inner wall making it easier for it to fall by gravity into the underlying expulsion Archimedean screw 106.

[0025] In order to scrape the entire inner wall of the collector 107 with alternating motion of the pin 7, the distance between two consecutive rods 3 is equal to the oscillation size of the crown 2 in the channel 4.

[0026] As an alternative to the use of a plurality of rods 3 fixed to the crown 2, it is possible to use a single cleaning element that by licking the inner wall of the collector 107 is actuated to scrape such a wall.

[0027] The activation of the device 1 of the present invention can be carried out either manually, each time that this is necessary or else through an automatic electronic management system that is actuated autonomously at predetermined periods and according to the amount of olive residue treated.

[0028] As can be appreciated from what has been described, the cleaning device of olive residue coming out from a decanter according to the present invention allows the requirements to be satisfied and allows the drawbacks mentioned in the introductory part of the present description with reference to the prior art to be overcome.

[0029] Indeed, the cleaning device of olive residue coming out from a decanter according to the present invention allows the inner walls of the collector associated with the outlet end of the olive residue to be cleaned automatically, i.e. without the intervention of an operator from the outside.

[0030] Of course, a man skilled in the art can bring numerous modifications and variants to the cleaning device of olive residue coming out from a decanter described above in order to satisfy contingent and specific requirements, all of which are covered by the scope of protection of the invention, as defined by the following claims.

Claims

1. Cleaning device (1) for olive residue collector (107) for cleaning olive residue coming out from a decanter (100) comprising at least one cleaning element (3) arranged so as to lick at least one portion of the inner wall of an olive residue collector (107) suitable for being fixed to the decanter (100) near to the olive residue outlet end, said collector (107) having annular configuration, actuation means (5, 6, 7, 9) suitable for actuating said cleaning element (3) along a path corresponding at least in part to the configuration of said inner wall so as to keep the cleaning element (3) licking said part of wall, wherein said cleaning element (3) is fixed to a circular crown (2) suitable for rotating in a guide channel (4) formed inside the collector (107), and wherein said circular crown (2) is provided with a plurality of cleaning elements (3), **characterized in that** said cleaning elements comprise a plurality of rods (3) arranged equally spaced apart and parallel to each other along said circular crown (2), and **in that** said actuation means (5, 6, 7, 9) are adapted to actuate said circular crown (2) provided with rods (3) with alternating motion.

2. Cleaning device (1) according to claim 1, wherein said motion is oscillating motion of predetermined magnitude.

3. Cleaning device (1) according to claim 2, wherein said magnitude is at least equal to the distance between two consecutive rods (3).

4. Cleaning device (1) according to claim 3, wherein said actuation means comprise a motor reducer (5) that transmits the motion to a connecting rod (6) connected to a pin (7) fixed to the circular crown (2).

5. Cleaning device (1) according to claim 4, wherein said pin (7) slides inside a guide slot (8) formed on said collector (107).

6. Cleaning device (1) according to claim 1, wherein said collector (107) is associated with an expulsion Archimedean screw (106) of the olive residue coming from the decanter (100).

Patentansprüche

1. Reinigungsvorrichtung (1) für einen Ölivenrückstandsammler (107) am Ausgang eines Setztanks (100), umfassend mindestens ein Reinigungselement (3), das derart angebracht ist, dass es mindestens eine Seite der Innenwand eines Olivenrückstandsammlers (107) berührt, der geeignet ist, am Setztank (100) in der Nähe des Olivenrückstandauslasses und der das oben genannte Reinigungselement (3) antreibenden Organe (5, 6, 7, 9) längs einer zumindest teilweise an der Konfiguration der genannten Innenwand verlaufenden Strecke befestigt zu werden, damit das genannte Reinigungselement (3) in der das genannte Teil der Wand leicht berührenden Position gehalten wird. Da dieser Sammler (107) ringförmig und das oben genannte Reinigungselement (3) an einem runden Kranz (2) befestigt ist, der geeignet ist, sich in einem im Innenraum des Sammlers (107) realisierten Führungskanal (4) zu drehen, in der der genannte runde Kranz (2) mit einer Vielzahl von Reinigungselementen (3) ausgestattet ist und dass diese Reinigungselemente mit einer Vielzahl von in gleichmäßigem Abstand und parallel zueinander längs dem genannten runden Kranz (2) angeordneter Stangen (3) ausgestattet sind, und dass die oben genannten Antriebsorgane (5, 6, 7, 9) für den Antrieb des mit Stangen mit alternierender Bewegung ausgestatteten genannten runden Kranzes (2) geeignet sind.

2. Reinigungsvorrichtung (1) entsprechend dem Patentanspruch 1, in dem die genannte Bewegung eine Schwingbewegung vorgegebenen Umfangs ist.

3. Reinigungsvorrichtung (1) entsprechend dem Patentanspruch 2, in dem der Umfang der Bewegung mindestens dem Abstand zwischen zwei aufeinander folgenden Stangen (3) entspricht.

4. Reinigungsvorrichtung (1) entsprechend dem Patentanspruch 3, in dem die genannten Antriebsorgane einen Getriebemotor (5) umfassen, der die Bewegung auf eine Pleuelstange (6) überträgt, die die Bewegung auf eine an einen Zapfen (7) angeschlossene Pleuelstange überträgt, wo der Zapfen (7) an dem runden Kranz (2) befestigt ist.

5. Reinigungsvorrichtung (1) entsprechend dem Patentanspruch 4, in dem der genannte Zapfen (7) in einer Führungsrinne (8) gleitet, die an dem genannten Sammler (107) realisiert ist.

6. Reinigungsvorrichtung (1) entsprechend dem Patentanspruch 1, in dem der genannte Sammler (107) mit einer Schnecke (106) zum Austragen des aus dem Setztank (100) austretenden Olivenrückstands kombiniert ist.

Revendications

1. Dispositif de nettoyage (1) pour un collecteur (107) de résidu d'olives à la sortie d'un décanteur (100), comprenant au moins un élément de nettoyage (3) placé de façon à effleurer au moins une partie de la cloison interne d'un collecteur (107) de résidu d'olives adapté à être fixé au décanteur (100) à proximité de l'extrémité de sortie du résidu d'olives, des organes (5, 6, 7, 9) d'actionnement aptes à l'actionnement dudit élément de nettoyage (3) le long d'un parcours correspondant au moins partiellement à la configuration de ladite cloison interne, de façon à maintenir ledit élément de nettoyage (3) dans une position telle à effleurer ladite partie de cloison. Ledit collecteur (107) étant conçu de façon annulaire, où ledit élément de nettoyage (3) est fixé à une couronne circulaire (2) indiquée pour la rotation dans un canal de guidage (4) formé à l'intérieur du collecteur (107) où ladite couronne circulaire (2) est munie d'une pluralité d'éléments de nettoyage (3), **caractérisé par le fait que** lesdits éléments de nettoyage comprennent une pluralité de barres (3) distancées uniformément et parallèles entre elles le long de ladite couronne circulaire (2), et **par le fait que** les susdits organes (5, 6, 7, 9) d'actionnement sont aptes à l'actionnement de ladite couronne circulaire (2) munie de barres (3) à mouvement alterné.

2. Dispositif de nettoyage (1) conforme à la revendication 1, où le mouvement susdit est un mouvement oscillant d'une ampleur préétablie.

3. Dispositif de nettoyage (1) conforme à la revendication 2, où ladite ampleur correspond au moins à la distance entre deux barres (3) consécutives.

4. Dispositif de nettoyage (1) conforme à la revendication 3, où les susdits organes d'actionnement comprennent un motoréducteur (5) qui transmet le mouvement à une bielle (6) reliée à un axe (7) fixé à la couronne circulaire (2).

5. Dispositif de nettoyage (1) conforme à la revendication 4, où l'axe susdit (7) glisse à l'intérieur d'une rainure de guidage (8) formée sur ledit collecteur (107).

6. Dispositif de nettoyage (1) conforme à la revendication 1, où ledit collecteur (107) est associé à une vis d'Archimède (106) qui expulse le résidu d'olives à la sortie du décanteur (100).

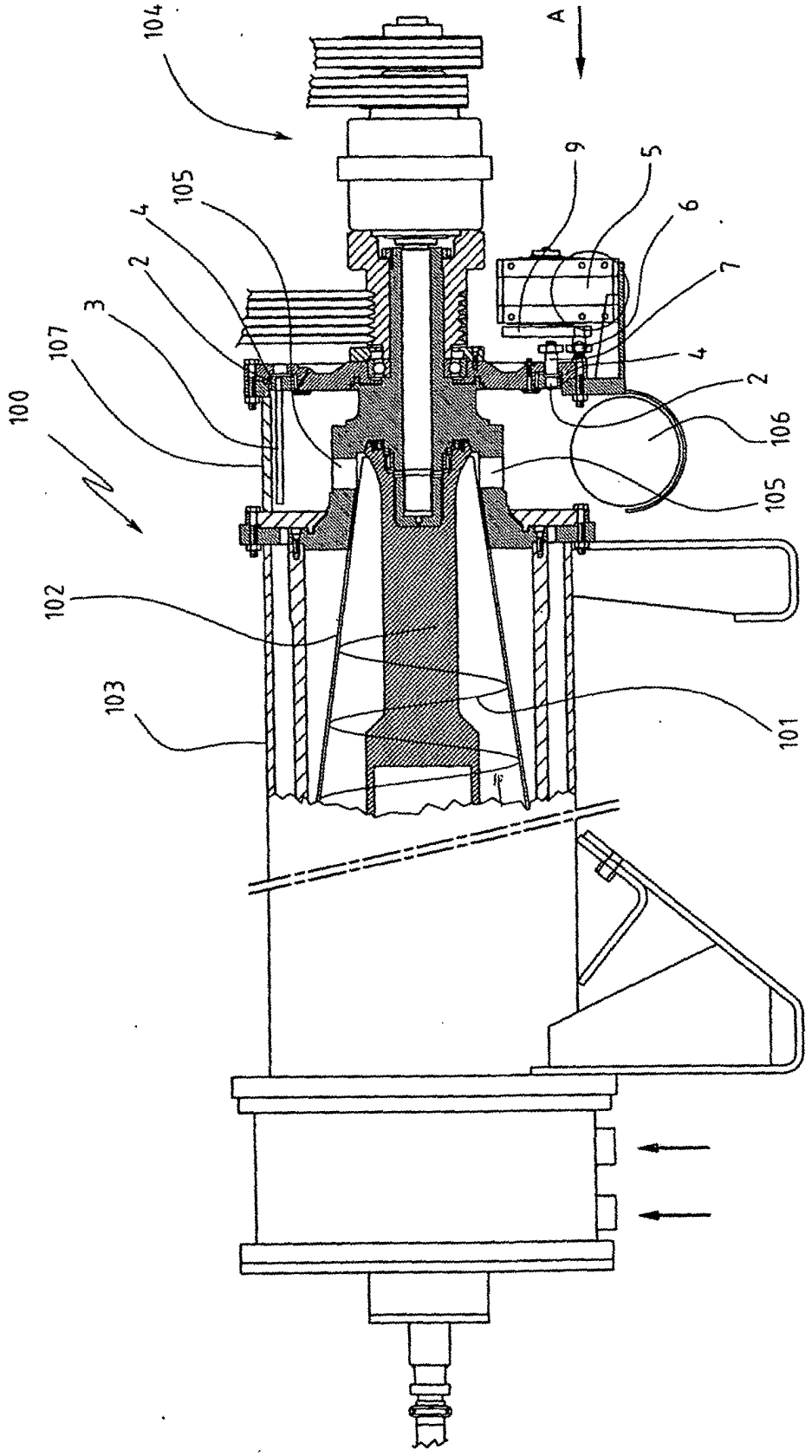
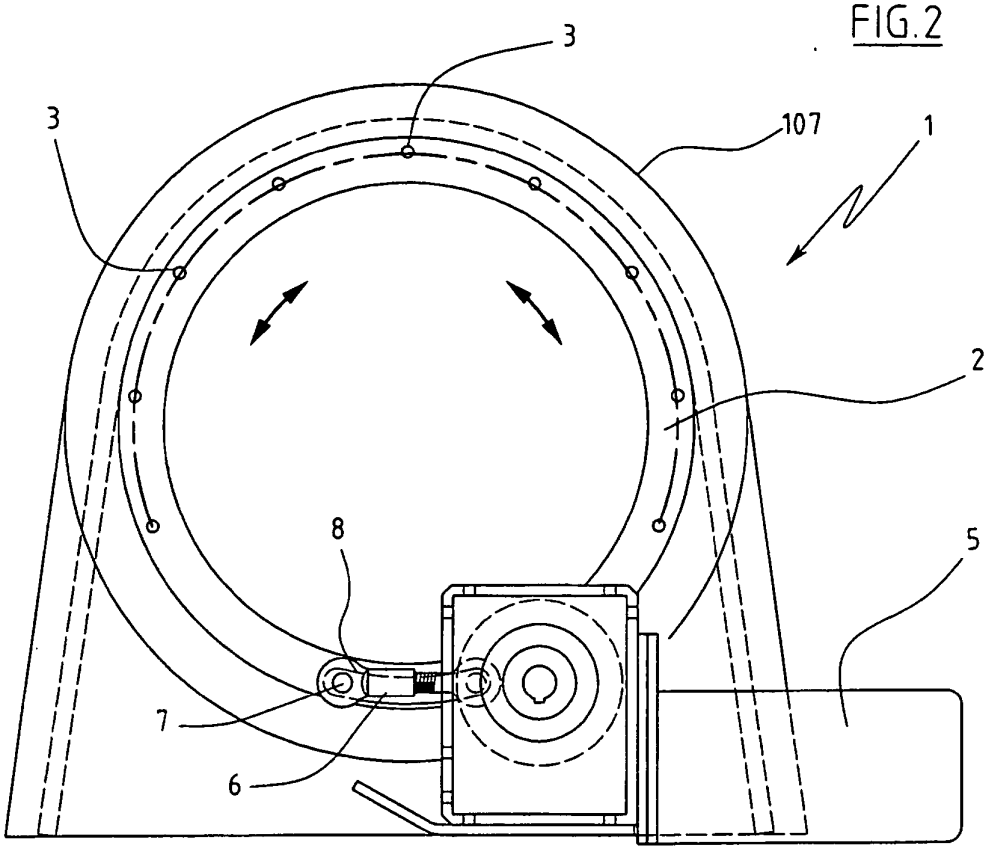


FIG.1

FIG.2



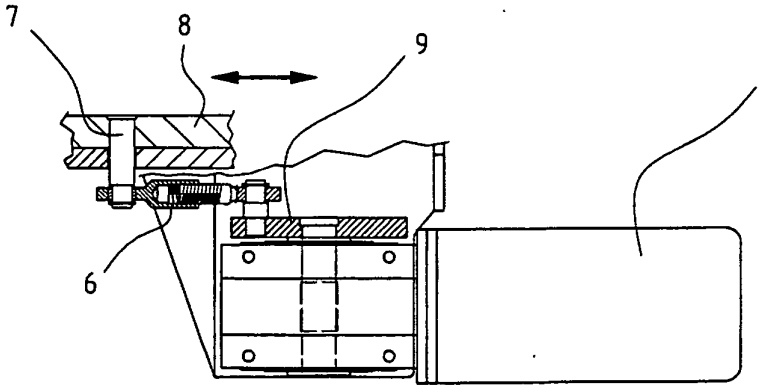


FIG.3

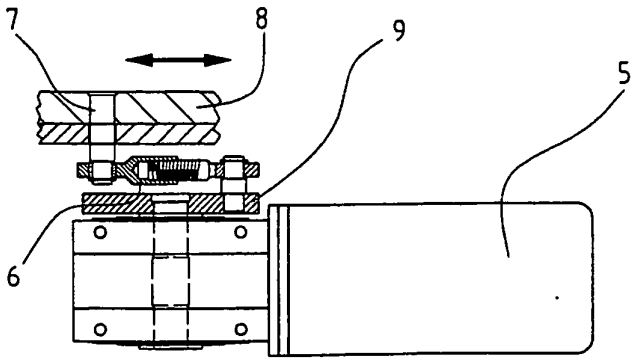


FIG.4

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 2919848 A **[0011]**