

(19)



(11)

EP 1 676 644 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
21.10.2015 Bulletin 2015/43

(51) Int Cl.:
B06B 1/10 (2006.01)

(21) Application number: **05019753.2**

(22) Date of filing: **12.09.2005**

(54) **Vibrating device**

Rüttelvorrichtung

Dispositif de vibration

(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**

(30) Priority: **04.01.2005 ES 200500009 U**

(43) Date of publication of application:
05.07.2006 Bulletin 2006/27

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(56) References cited:
**EP-A1- 0 600 526 FR-A1- 2 659 574
US-A- 3 332 293 US-B1- 6 321 610**

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DescriptionOBJECT OF THE INVENTION

[0001] The object of the present invention is an improved machinery vibrating device that includes significant innovations and advantages compared to the presently existing devices with the same purpose.

[0002] More specifically the new invention refers to a device, particularly applicable to vibro-compressor machines for the manufacture of moulded parts in concrete or similar that includes a vibrator table operated by means that include a motor linked by at least two motorised toothed pulleys, by means of a drive axle that, through a belt, turns pulleys connected to two moving cylinders transferring the transmission axle movement of the motor to two drive pulleys.

BACKGROUND TO THE INVENTION

[0003] At the present time devices are known to produce vibrations, whose mechanisms have been implemented in a satisfactory manner in machinery for the production of moulded concrete parts or materials having similar characteristics based on the misalignment of some eccentric masses by means of a mechanism formed by a pulley assembly activated by a belt. The owner of this present application is the owner of several Industrial Property registrations, all of which refer to the field of the technique that is here expounded.

[0004] However, in spite of the improvements that the already existing devices include and that have been protected by the same owner they still have some failings that lead to the wear and tear of the belts and pulleys that increases the costs of maintenance and that could be improved.

[0005] On the other hand, in the known mechanisms the belt tension is kept controlled thanks to the fact that the resistance offered by the action against the side towards which the pulleys slide is also controlled. This happens when the machine works with correct settings. However, it can arise that there is not sufficient resistance during the sliding of the pulleys against their guides, or that this resistance is irregular. Because of this, this working can give rise to a loss of belt tension and the consequent maladjustment and misalignment between the pulleys.

[0006] Also, It is known from prior art EP-0600526-A which discloses a vibrating arrangement for machinery, particularly designed for vibrocompressing machines, comprising a vibrating table driven by two vibrating centers with aid of motor means, each one with two shafts having eccentric masses with the same rotating center. The operation of this system is driven from a motor and is started by rotating an interlocked shaft together with two toothed pulleys. However, this vibrating arrangement does not solve at the least one of the above-mentioned problems.

DESCRIPTION OF THE INVENTION

[0007] The present invention according to claim 1 has been developed for the purpose of providing an improved vibrating device for machinery that solves the previously stated disadvantages, moreover, providing other advantages that will be clear from the description which is attached below.

[0008] The improved machinery vibrator of the present invention is especially applicable to vibro-compressor machines for the manufacture of moulded parts in concrete or similar, that includes a vibrator table activated by driving means that include a motor linked to at least two motorised toothed pulleys on a single one drive axle that, through a belt, turns pulleys connected to driving means, transmitting the movement of the transmission axle of the two eccentric masses, and is characterised in that the pulleys connected to the two cylinders are joined to some additional pulleys forming tandems that are displaceable in regard to an axis arranged in a nearby area or an imaginary union shaft between the centres of the pulleys that make up each tandem, said tandems being joined to each other by means of a connecting rod in such a way as to allow the relative movement between same so that the angle defined by the two axles of the opposing tandems present a variation such that the length of the complete travel of the belt around the pulleys remains constant and in which said tandems are connected to only one of the drive pulleys.

[0009] Thanks to these characteristics, a device is obtained with an improved working in comparison with those presently existing to align or to disalign eccentric masses, which in accordance with the relative position that they occupy, they are capable of bringing about vibration or not without the need of having to stop and resume the rotation of the pulley assembly likewise the motor that allows their turning movement.

[0010] The fact that the connecting rod allows a certain angle to be maintained (represented by means of the letter C in figure 2), it allows the belt to always maintain the same tension in all positions that can be taken up by the mechanism, this means, from its 100% performance working position to a position of rest.

[0011] Basically, the new device of the invention improves, on one hand, the angle included by the belt on the motorised and driven pulleys, so reducing the belt wear and, on the other hand, improves the greater mechanical precision in such a way that makes misalignment between the pulleys difficult, thus avoiding possible working irregularities.

[0012] In accordance with another aspect of the invention, the contact surface of the belt with the motorised toothed pulleys connected to the drive axle of the motor includes an angle of at least 175° that is considerably greater than that in the presently existing mechanisms.

[0013] By preference, the contact surface of the belt with the drive pulley takes in an angle of at least 200° in such a way that just the same as that stated in the pre-

vious paragraph, it is considerably greater than in the existing mechanisms.

[0014] The means of operation include operating cylinders that are slightly inclined in a convergent manner towards the toothed pulleys in respect of an imaginary horizontal axis.

[0015] In accordance with another characteristic of the invention, the belt is in contact with the lower pulley of the tandem by the more outward zone whilst the upper pulley of the tandem the contact with the belt is carried out by the innermost part.

[0016] On the other hand, with the new mechanism the tension of the belt is maintained constant and is kept secure by the presence of a connecting rod that forces it to remain in the correct relative position between the tandems.

[0017] Other characteristics and advantages of the improved vibrator device for machinery of the present invention will be clear from the present description of a preferred embodiment, but it is not exclusive, it illustrates by way of example, but the drawings attached are not by way of limitation, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

Figure 1 shows a front elevation diagram of the vibrator device corresponding to the known state of the art.

Figure 2 shows a front elevation diagram of the vibrator device corresponding to the present invention.

Figure 3 shows a side elevation diagram of the device represented in the previous diagram.

Figure 4 shows a front elevation diagram of the vibrator device of the present invention when it is working at maximum performance.

Figure 5 shows a front elevation diagram of the vibrator device of the present invention when it is working at 50% of its performance; and

Figure 6 shows a front elevation diagram of the vibrator device of the present invention when it is at rest.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0019] As and how shown in Figure 2, the vibrator device of the present invention includes operating means in order to carry out the vibratory movement of a table (11) (see Figure 3) that includes two motorised toothed pulleys (1), two drive pulleys (2), two tandems (3) each one of them made up of two pulleys (4) that can oscillate around some centres (5) that are connected to one of the drive pulleys (2), a connecting rod (6) that joins the two tandems (3) and pneumatic or hydraulic cylinders (7) that allows the movement of the tandems (3) to the required position. The movement of the different pulleys is transmitted by means of a belt (8).

[0020] The mechanism or device object of the invention is shown in figure 3 in phantom lines, the rest of the mechanism represented being of a known type.

[0021] By way of contrast to the known device in the earlier technique and that is represented in figure 1, in order to appreciate the differences between both in greater detail, likewise the improvements that have been described previously, it incorporates the connecting rod (6) that joins the tandems (3) represented in such a way as to allow an angle that can vary, the length of the entire run of the belt (8) around the different mechanism pulleys of the invention here described being able to remain constant.

[0022] The contact surface of the belt (8) with the motorised toothed pulleys (1) linked to the transmission axle (9) of the motor (10) takes in an angle of at least 175° represented by the letter B in contrast to the device represented in figure 1 that is around 130°, whilst the contact surface of the belt (8) with the drive pulley (2) takes in an angle of at least 200° represented with the letter A in contrast to the device represented in figure 1 that is around 115°.

[0023] In contrast to other known mechanisms, the belt (8) is in contact with the lower pulley (4) of the tandem (3) at the most outward area whilst the contact with the upper pulley (4) of the tandem (3) with the belt is made at the innermost part.

[0024] It is worth mentioning that the connection points of the connecting rod (6) with the tandems (3) likewise the length of said connecting rod (6) have values that are in line with the rest of the dimensions of the mechanism, such as the distance between the centres, the distance between the pulleys of each tandem, the distance between the centres of the motorised and drive pulleys, the distance between the centre of the motorised pulley and the line that links the points, in addition to the first diameter of each one of the pulleys around which the toothed belt runs and the total length of the belt.

[0025] The different positions of the mechanism represented in the invention can be appreciated in figures 4, 5 and 6 in which the connecting rod (6) adopts different positions. In the three positions shown, the belt (8) is always maintained with the same tension, this means, in all positions that the mechanism can adopt.

[0026] The details, shapes, dimensions and other ancillary elements, likewise the materials used in the manufacture of the improved vibrator device for machinery can be suitably substituted by others that are technically equivalent and do not deviate from the fundamentals of the invention or from the sphere defined by the claims that are included below.

Claims

1. Machinery vibrating device, particularly applicable to vibro-compressor machines for the manufacture of moulded parts in concrete or similar that includes

a vibrator table (11), operated by means that include a motor (10) linked to at least two motorised toothed pulleys (1) on a single one drive axle (9) that through a belt (8) turns pulleys connected to two means of operation (7) transferring the transmission axle (9) movement of the motor (10) to two drive pulleys to position at least two eccentric masses, **characterised in that** the pulleys (4) connected to the two means of operation (7) are linked to some additional pulleys forming tandems (3) that are moveable in regard to a centre (5) arranged between the centres of the pulleys that form each tandem (3), said tandems being joined to each other by means of a connecting rod in such a way as to allow relative movement between same so that the angle defined by the two axes of the opposing tandems (3) has a variation such that the complete length of the travel of the belt around the pulleys (4), (1), (2) remains constant and in which said tandems (3) are only connected to one of the two drive pulleys (2) and wherein each tandem is associated in an attachable manner to one mean of operation individually.

2. Machinery vibrating device according to claim 1, **characterised in that** the contact surface of the belt (8) with the toothed drive pulleys to the drive axle (9) of the motor (10), **in that** said contact surface is defined by an entry point and an exit point disposed in diameter of said toothed pulley relative to geometric centre of toothed drive pulley has an angle of at least 175°.
3. Machinery vibrating device according to claim 1, **characterised in that** the contact surface of the belt (8) with the drive pulley (2), **in that** said contact surface is defined by an entry point and an exit point disposed in diameter of said toothed pulley relative to geometric centre of toothed drive pulley has an angle of at least 200°.
4. Machinery vibrating device according to claim 1 **characterised in that** the means of operation (7) include operating cylinders that are inclined in a converging manner towards the toothed pulleys in respect of the imaginary horizontal axis.
5. Machinery vibrating device according to claim 1 **characterised in that** the belt (8) is in contact with the lower pulley (4) of the tandem (3) at the most outward area whilst the contact with the upper pulley (4) of the tandem (3) with the belt is made at the innermost part.

Patentansprüche

1. Vibrationsvorrichtung für Maschinen, insbesondere anwendbar auf Maschinen zur Vibrationsverdich-

tung zur Herstellung von Formteilen in Beton oder ähnlichem, die einen Vibrationstisch (11) umfasst, welcher von einem Motor (10) umfassenden Mitteln betrieben wird, verbunden mit zumindest zwei motorisierten Zahnscheiben (1) auf einer einzigen Antriebsachse (9), die über einen Riemen (8) Riemenscheiben antreiben, welche mit zwei Antriebsmitteln (7) verbunden sind, die die Bewegung der Übertragungsachse (9) des Motors (10) auf zwei Antriebscheiben übertragen, um wenigstens zwei exzentrische Massen zu positionieren, **dadurch gekennzeichnet, dass** die mit den beiden Antriebsmitteln (7) verbundenen Scheiben (4) mit weiteren Scheiben in Verbindung stehen, welche Tandems (3) bilden, die in Bezug auf ein zwischen den Zentren der jeweils ein Tandem (3) bildenden Riemenscheiben befindliches Zentrum (5) beweglich sind, wobei besagte Tandems miteinander mittels einer Pleuellstange derart verbunden sind, dass sie eine Relativbewegung zwischen denselben ermöglichen, so dass der durch die beiden Achsen der gegenüberliegenden Tandems (3) definierte Winkel eine solche Variation aufweist, dass die komplette Länge des Hubs des Riemens entlang der Scheiben (4), (1), (2) konstant bleibt, und wobei die besagten Tandems (3) lediglich mit einer der beiden Antriebsscheiben (2) verbunden sind und wobei jedes Tandem auf einhängbare Art individuell mit einem Antriebsmittel in Verbindung steht.

2. Vibrationsvorrichtung für Maschinen gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Kontaktfläche des Riemens (8) mit den Zahnscheiben zur Antriebsachse (9) des Motors (10), wobei besagte Kontaktfläche definiert ist durch einen Eingangspunkt und einen Ausgangspunkt, die sich im Durchmesser der besagten Zahnscheibe bezüglich des geometrischen Zentrums der Zahnscheibe befinden, einen Winkel von mindestens 175° aufweist.
3. Vibrationsvorrichtung für Maschinen gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Kontaktfläche des Riemens (8) mit der Antriebsscheibe (2), wobei besagte Kontaktfläche definiert ist durch einen Eingangspunkt und einen Ausgangspunkt, die sich im Durchmesser der besagten Zahnscheibe bezüglich des geometrischen Zentrums der Zahnscheibe befinden, einen Winkel von mindestens 200° aufweist.
4. Vibrationsvorrichtung für Maschinen gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Antriebsmittel (7) Antriebszylinder umfassen, welche in Bezug auf eine imaginäre horizontale Achse auf konvergierende Weise in Richtung der Zahnscheiben geneigt sind.
5. Vibrationsvorrichtung für Maschinen gemäß An-

spruch 1, **dadurch gekennzeichnet, dass** der Kontakt des Riemens (8) mit der unteren Scheibe (4) des Tandems (3) in der äussersten Zone stattfindet, während was die obere Scheibe (4) des Tandems (3) angeht, der Kontakt mit dem Riemen im innersten Abschnitt zustande kommt.

Revendications

1. Dispositif de vibration pour machines, particulièrement applicable aux machines vibro-compresseur pour la fabrication de pièces formées en béton ou similaire qui comprend une table vibrante (11) opérée par des moyens qui incluent un moteur (10) connecté par au moins deux poulies dentées motorisées (1) dans un seul axe d'entraînement (9) qui, par le biais d'une courroie (8), tournent des poulies connectées à deux moyens d'opération (7) en transférant le mouvement de l'axe de transmission (9) du moteur (10) à deux poulies actionnées afin de positionner au moins deux masses excentriques, **caractérisé en ce que** les poulies (4) connectées aux deux moyens d'opération (7) sont unies à des poulies additionnelles qui forment des tandems (3) qui peuvent être déplacés en regard d'un centre (5) agencé entre les centres des poulies qui forment chaque tandem (3), lesdits tandems étant unis l'un à l'autre par le biais d'une tige de connexion de manière qu'ils permettent un mouvement relatif entre eux, de sorte que l'angle défini par les deux axes des tandems opposés (3) présente une variation telle que la longueur complète du trajet de la courroie autour des poulies (4), (1), (2) reste constante et dans lequel lesdits tandems (3) sont seulement connectés à une des deux poulies actionnées (2) et dans lequel chaque tandem est associé d'une manière amovible à un moyen d'opération individuellement.

2. Dispositif de vibration pour machines suivant la revendication 1, **caractérisé par le fait que** la surface de contact de la courroie (8) avec les poulies dentées d'entraînement avec l'axe d'entraînement (9) du moteur (10), dans lequel ladite surface de contact est définie par un point d'entrée et un point de sortie agencés dans le diamètre de ladite poulie dentée en regard du centre géométrique de la poulie dentée d'entraînement possède un angle de pour le moins 175°.

3. Dispositif de vibration pour machines suivant la revendication 1, **caractérisé par le fait que** la surface de contact de la courroie (8) avec la poulie d'entraînement (2), dans lequel ladite surface de contact est définie par un point d'entrée et un point de sortie agencés dans le diamètre de ladite poulie dentée en regard du centre géométrique de la poulie dentée d'entraînement possède un angle de pour le moins

200°.

4. Dispositif de vibration pour machines suivant la revendication 1 **caractérisé par le fait que** le moyen d'opération (7) inclut des cylindres d'opération qui sont inclinés d'une manière convergente vers les poulies dentées en ce qui concerne leur axe horizontale imaginaire.

5. Dispositif de vibration pour machines suivant la revendication 1 **caractérisé par le fait que** la courroie (8) se trouve en contact avec la poulie inférieure (4) du tandem (3) dans la zone la plus extérieure tandis que le contact avec la poulie supérieure (4) du tandem (3) avec la courroie est réalisé par la partie la plus intérieure.

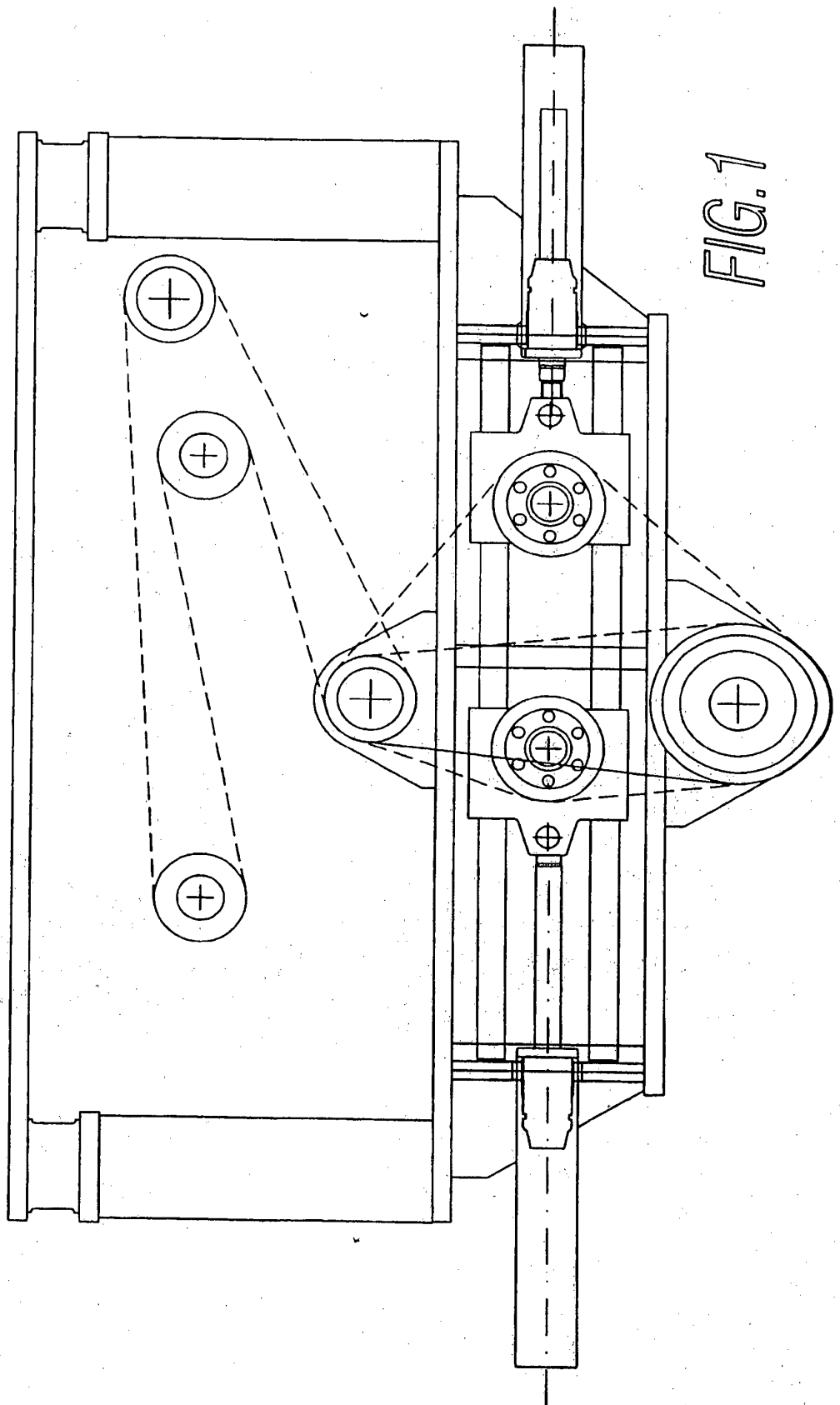


FIG.2

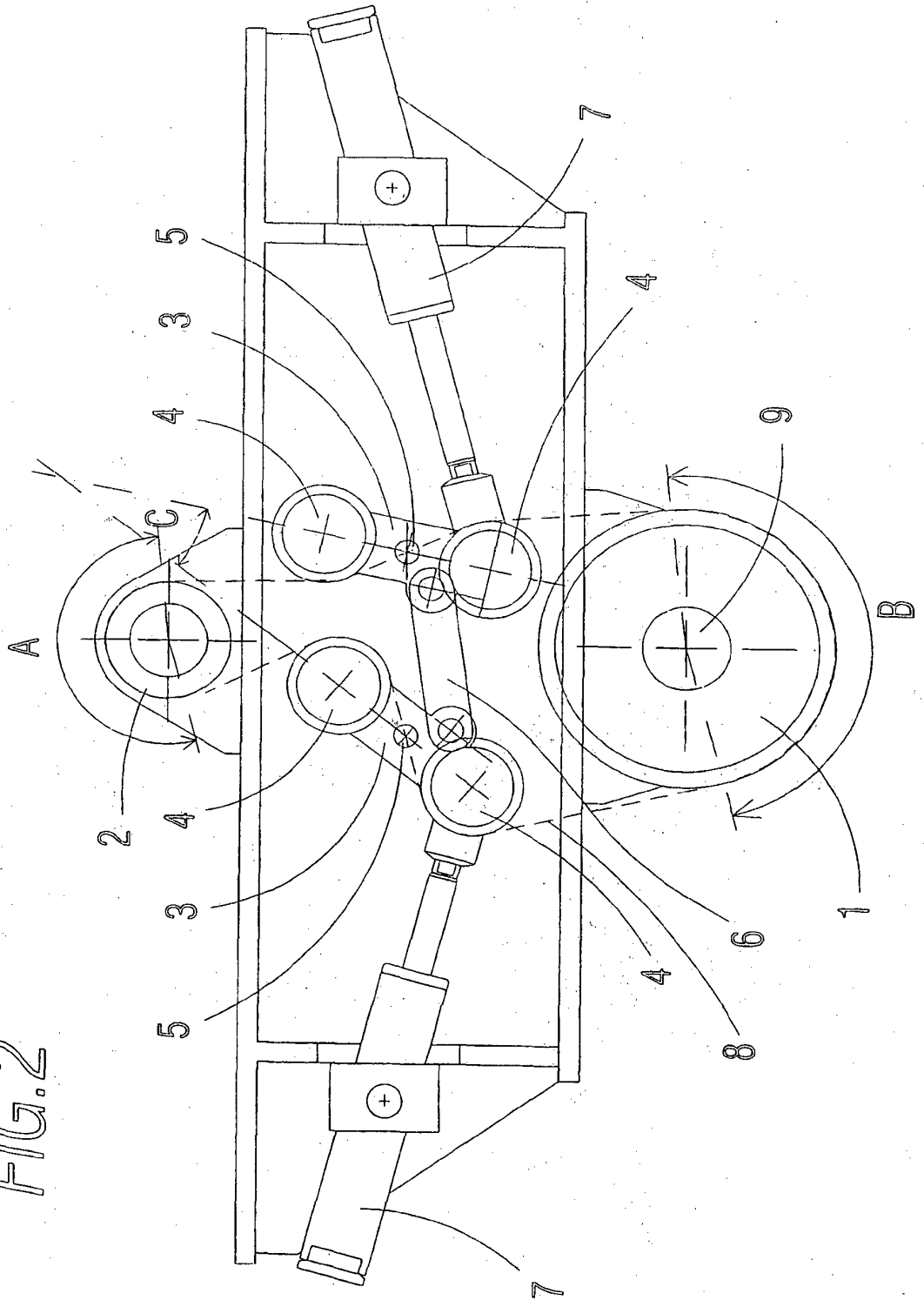


FIG. 3

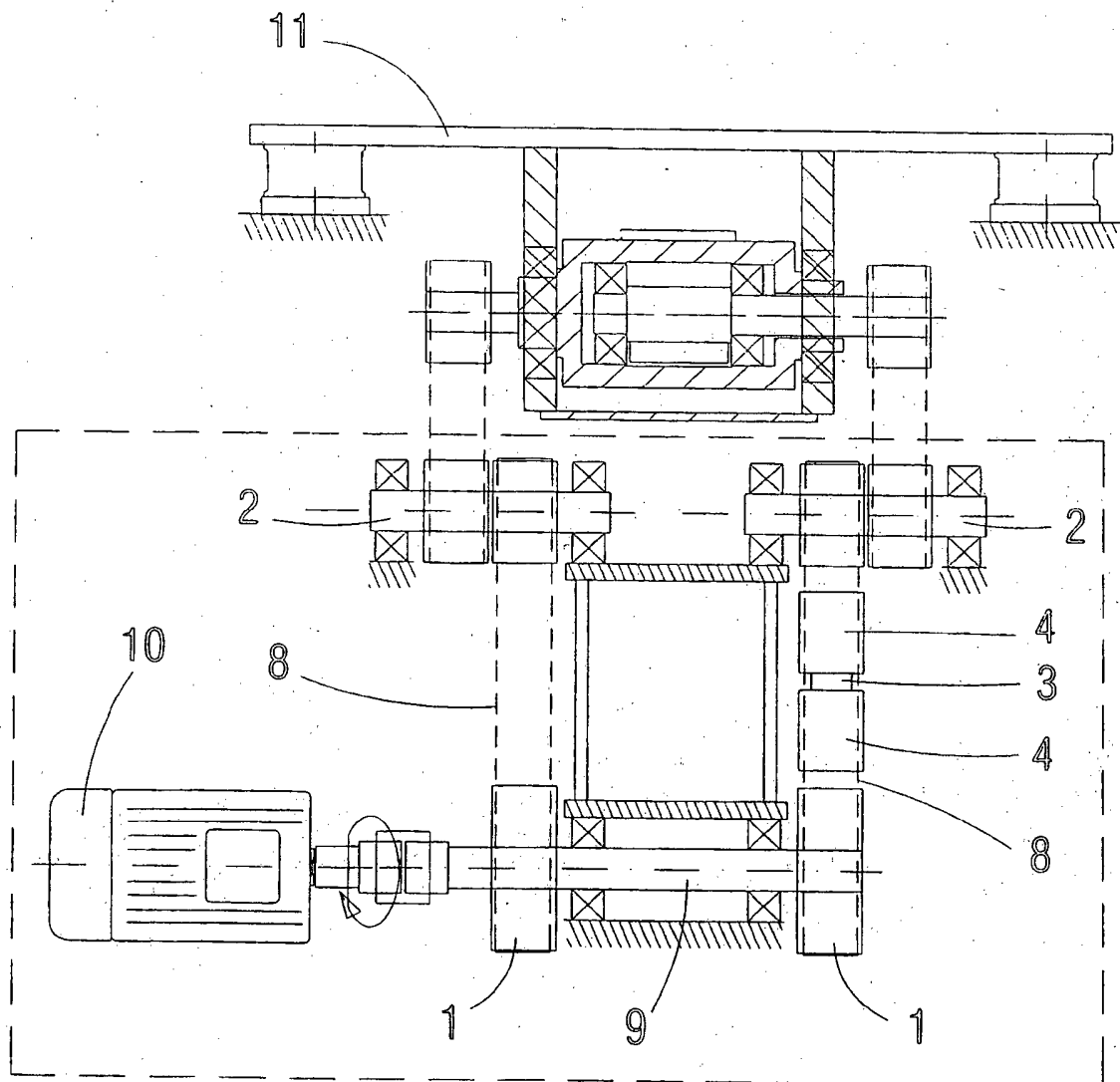


FIG. 4

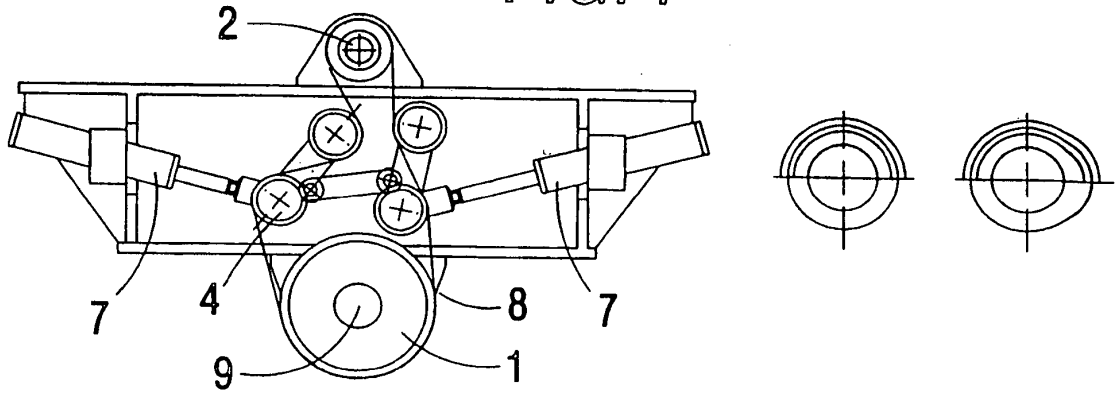


FIG. 5

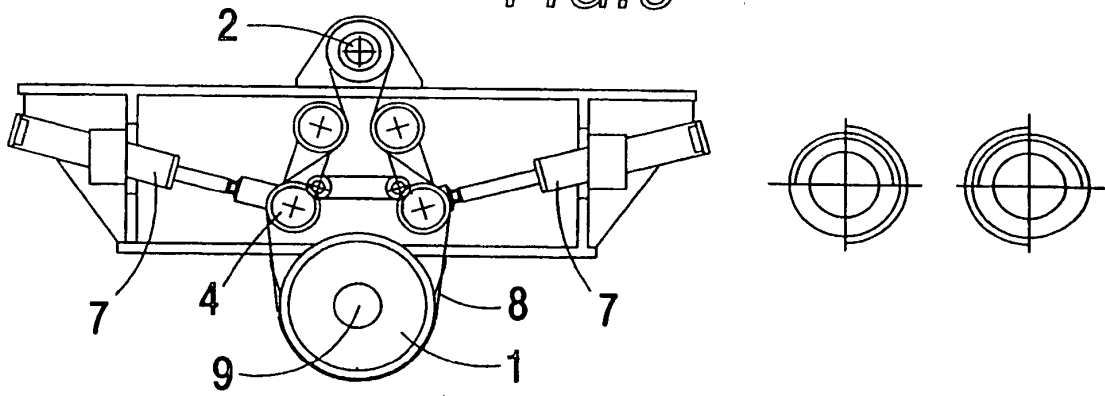
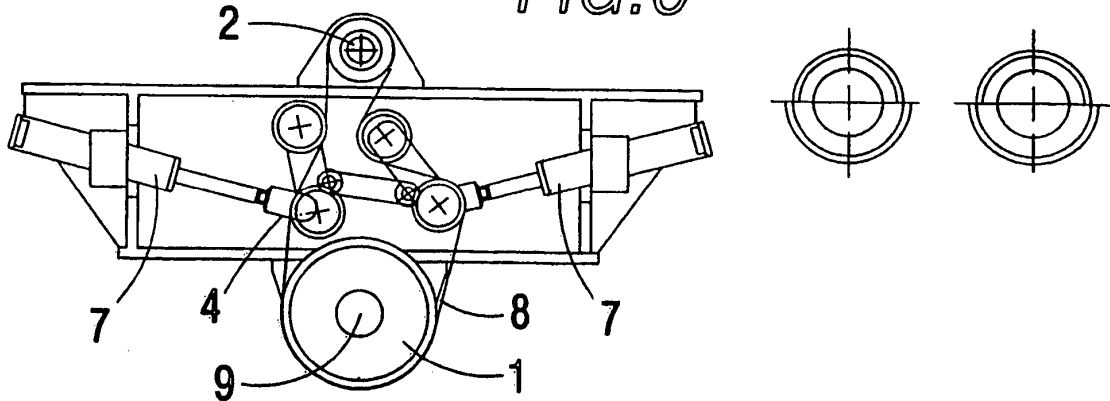


FIG. 6



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 0600526 A [0006]