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(54) **Central double drive unit for window winder system**

Zentraldoppelantrieb für Fensterheber

Entraînement centrale double pour lève-vitre

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(73) Proprietor: **Grupo Antolin Ingenieria, S.A.**
E-09007 Burgos (ES)

(72) Inventor: **Romero Magarino, Antonio**
09006 Burgos (ES)

(74) Representative: **Urteaga Simarro, José Antonio**
Principe de Vergara, 31
28001 Madrid (ES)

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EP-A- 0 834 634 **GB-A- 1 184 645**

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Description

[0001] This invention relates to a central double drive - unit for window winder systems, for double rail units - of this kind, which can be moved either manually or electrically.

[0002] Within this technique, and by means of European --patent application P.97500159 (EP-A-0 834 634), concerning a double kinematic chain for double rail window winders, one basic - condition is that the double chain is operated by a central unit that consists of two drums which are moved simultaneously by manual or electrical means. The text - of this application did not enter into a greater number of complementary details about the conditions that this chain system had to fulfil.

[0003] In the same way, by means of application EP. A. 072 4060, an arrangement is known that presents the condition of unification of fast interchangeability for the two systems, manual or electric.

[0004] Moreover, and by means of EP.A. 0653538 another -- arrangement is known of a simplified kinematic chain -- that eliminates constituent parts, based on an element which is fixed to the door of the vehicle by tightening the three nuts previously situated on the corresponding bolts or pins secured to the said element.

[0005] Based on these technique, the fundamental objective of the present invention is to define all the conditioning factors that must concur in the double outlet-central unit, so that it can move, compensate or adjust the positioning of the drive elements in their synchronous or out of phase movement, as convenient, on being either manually or electrically operated.

[0006] Another object of the invention is to provide a - central double drive unit for window winders that allows regulation, in a relative position, of the front and -- rear drive points of the window pane.

[0007] Another object of the invention is to provide a - central double drive unit for window winders in which - the means of operation, whether manual or electrical, - is used at the same time as a brake for and to immobilise the system.

[0008] Another object of the invention is to provide a - central double drive unit for window winders that allows that the window pane drive element of the first chain - can feasibly be displaced in an ascending or descending direction, without the other chain being moved, when -- the central unit is immobilised, thus achieving the positioning or adjustment of the window pane at the end - of the closing movement, by means of a simple and efficient operation.

[0009] Another object of the invention, finally, is to - provide a central double drive unit for window winders in which the power takeoffs on the said central unit have unified wiring on the drive drums which is of the -- universal, simple, firm type.

[0010] For the implementation of these objectives, the - invention presents a central unit connected to two kin-

ematic chains, of which the forward or front chain is of the type described in EP.A. 0653538 and the chain situated in the second position is of the Bowden system. The central unit includes a casing with two drums operated simultaneously by any manual or electrical means. The movement of these drums is determined starting from a central element, for instance a pinion or cog-wheel, each engaged with crown wheels or gear wheels that each have grooved power outlets or takeoffs that correspond with the cores of the said crown wheels. These grooved outputs are connected - with the corresponding interior of the drums, which for - this purpose are also grooved.

[0011] As indicated, in the case of manual operation or - drive, the winding handle directly operates a pinion and the unit becomes immobilised by a traditional braking system consisting of the expansion of a spiral spring --- onto the interior of a steel cylinder. When the lugs of this steel cylinder cease to be powered by the movement - of the drive shaft, the corresponding protrusions on the pinion become embedded on them, so that the pinion is immobilised.

[0012] In the case of an electrical drive by means of a - motor, the worm gear on the shaft outlet of the motor produces the immobilisation of the system, due to the fact - that it can not be reversed when the motor is stopped.

[0013] The casing, or central unit, which includes the -- crown wheels and the drums, must be connected or fixed -- firmly to the first rail, which is the rail of a simplified or direct kinematic chain. One of the drums takes - up a cable that goes towards this direct chain, while the other drum takes up the other cable that goes towards the Bowden type chain.

[0014] The casing is provided with the possibility of turning in relation to its central shaft, with this shaft -- being parallel and equidistant as regards the two shafts of the power takeoffs of the two drives, and the three -- shafts are also contained in this same plane.

[0015] The said continent plane of the three shafts is in turn the bisecting line of the angle formed by the meeting points of the sides of the cable, entry and exit, of the drum of the direct simplified chain.

[0016] In turn, the meeting point of the two sides of the cable, entry and exit, of the direct chain is situated at the diametrical end of this drum that is farthest from the central shaft of the casing or central unit.

[0017] When the system is blocked, if we make the casing - or central unit turn on its central shaft in one direction and the other, through an angle α , the incidence point of the entry and exit cables of the direct drum is displaced through the corresponding arc and consequently a displacement or movement of the said kinematic chain takes place by the same amount, with which there is also a relative - displacement of the fastening point of the window pane.

[0018] However, the other Bowden-type chain, which is co-nnected to the other drum of the central unit, allows

the distances between its corresponding support points, on one side and on the other, respectively, and the fixed outlets of the support casing of the drum and the outlets of the pulley supports at the ends of the rail, to be maintained constant.

[0019] Therefore, although the casing or central unit is - displaced in its turning on the central shaft, the fastening point of the window pane of the second chain will remain immobile, so that regulation can be carried out between the fastening points in order to make the window pane adapt perfectly to the end of its travel or movement - on the frame.

[0020] As the turning of the casing or central unit is carried out on its central shaft, which coincides with the rotation of the winding handle shaft, the position of this central shaft on the door remains immobile and fixing of the system by the appropriate means can take place.

[0021] In particular, these means consist of sets of diametrically opposed and protruding lugs on the casing, in -- which holes are determined. Bolts pass through these holes and also through the corresponding adjustment slots - in the rail support. These bolts can be loosened or tightened at will, as required for the regulation or fastening of the system, with the particularity that the total angle covered by the curved adjustment slots corresponds to the total angle covered by the meeting points of the sides or ends of the cable of the first or direct chain.

[0022] The power takeoffs of the two drums of the central unit are carried out, as already mentioned, by the grooved interior of the cores of the said drums, coinciding with the grooved exteriors of the sleeves of the cores or hubs of the two gear wheels. This system, apart from being -- simple and very robust, also allows previous regulation - of the positioning of the drive or fastening elements on the window panes.

[0023] The unit is also provided with a torque compensation system, similar to the one described in EP.A. 0724060, -- which in this case includes the corresponding spiral --- springs in the interior of the gear wheels, tightening -- them suitably to the required torque by means of some support covers.

[0024] Although it is normal for the drums of the central unit to be of the same diameter, it could be possible and interesting to use drums of different diameters, as a special application in order to cause transfer and simultaneous rotation movements.

[0025] If the central unit has an electric drive, a worm - gear originating from the shaft outlet of the motor reducer or gearbox acts on the two gear wheels, as previously stated. In this case, because of constructive reasons or for convenience of use, the cores or hubs of the respective gear wheels or crown wheels can be arranged with their outlets on the same plane or in an alternate and opposite manner in relation to the medium plane of the central --- unit.

[0026] Not only in the manual solution but also in the electrical one, it is again emphasised that the entry and

exit incidence point of the cables on the first drum are situated in a position diametrically opposed to and further -- away from the rotation and fastening shaft for the system, while at the same time the said incidence point, the drum shaft and the shaft of the central unit must be situated on the bisector plane of the angle formed by the entry -- and exit cables to the drum at this point.

[0027] With this arrangement, at the smallest turn of the central unit on its shaft through an angle α , either positive or negative, a greater displacement or movement is - achieved of the fastening point of the first kinematic -- chain and consequently the positioning required of this - point with regard to the one corresponding to the second chain, which always remains immobile.

[0028] As mentioned previously, the three turning or rotation shafts of the central unit, whichever type they might be, must be parallel and coplanar with each other, and -- the central unit will be fixed to its support on the rail by means of a screw or bolt with the same axis as that of its central drive, as well as by means of another two --- screws or bolts through the curved adjustment slots.

[0029] All these and other details of the invention will - be appreciated in greater detail by referring to the --- sheets of drawings which are attached, in which the following are represented, without any kind of limiting nature:

- Figure 1 is a general representation of an installation, in accordance with the invention.
- Figure 2 is an enlargement of a central unit, -- seen in plan view, which shows part of its movement, in - accordance with the invention.
- Figure 3 is an elevation of the central unit --- shown in Figure 2.
- Figure 4 represents the drive in the case of an electrical drive.
- Figure 5 is a side view of Figure 4.
- Figure 6 and 7 represent two views of a constructional version of Figures 4 and 5.
- Figure 8 shows a general view of the solution for the electrical drive, in accordance with the invention.

[0030] Looking now at Figure 1, we can appreciate the assembly of the double rail cable operated window winder, with a central unit (A) with a casing (24), in which are included the central pinion (3) on its shaft (EE') operated by the winding handle (4) that acts on the two drums incorporated into the casing. The casing is provided with sets of lugs (12) and is fastened by means of a support to the rail of the direct chain, which with a cable (C1) impinges on the point (13) on the corresponding drum of the unit.

[0031] The other drum has outlets (14,20) for the cable -- (C2) with the corresponding Bowden conductors and the outlets of the pulley supports (22,23).

[0032] When a displacement or movement takes place on the turning of the casing (24) on its central shaft (E-E') -- through an angle α , in one direction or the other, the incidence point (13) of the entry and exit cables of the -- left drum moves through the corresponding arc and consequently displaces the kinematic chain (C1) by the same -- magnitude or amount, with which the point (19) will be -- displaced by an amount of $+e$ or $-e$, with this point (19) corresponding to the window pane drive element.

[0033] The second chain is connected to the right drum and has Bowden conductors, so that it makes the distances between its support points (14,18) and (20,17), corresponding to the fixed outlets of the casing (24) and to the outlets of the pulley supports at the ends of the rail, always -- constant.

[0034] Therefore, although the casing (24) is displaced on turning on the shaft (E-E'), the point (21) of the chain (C2) remains immobile, and the required regulation is --- achieved between (19) and (21) so that the window pane -- adapts perfectly to the end of its travel in its frame.

[0035] In accordance with Figures 2 and 3, we can perfectly appreciate the arrangement of the different elements of the central unit, starting with the winding handle (4) and the pinion (3) arranged on the same shaft (E-E') and up until its end (5). In the interior, the pinion (3) - engages in the gear wheels or crown wheels (6,7) connected to internal spiral springs (16) that are tightened - to the required torque by means of the support covers -- (15).

[0036] The gear wheels (6,7) are mounted on shafts (E₁-E'₂), parallel to each other and in relation to the shaft (E-E') and with the three being contained in the same theoretical plane. These gear wheels protrude through their grooved cores or hubs (1,2), that engage with the interior of the two drums (8,9), that connect them to the cables (C1,C2), respectively.

[0037] Figure 2 shows the angular displacements α and α' of the central unit, as well as the outlets (24) for the Bowden conductors by the points (14,20). The lugs (10) are provided with holes to allow bolts (12) to pass --- through which are capable of fitting into the curved adjustment slots (11) of the rail support of the direct -- chain.

[0038] According to Figures 4 and 5, we can observe the - constructional arrangement when the drive is electric by means of the motor reducer (25) that makes the worm gear (26) turn and act directly on the two crown wheels (1,2) and drums (8,9). In this case, the lugs (27') can be -- appreciated, with the corresponding fastening bolts (12).

[0039] Figures 6 and 7 represent the same electrical drive solution in which the grooved crown wheels (1,2) and the drums (8,9) protrude towards opposite sides in relation to the casing.

[0040] Figure 8 shows the complete electrical drive installation, particularly with reference to Figures 6 and 7,

showing the behaviour and the regulation similar to those described when referring to Figure 1.

[0041] On the other hand, it must be pointed out that tightening of the cable of the two kinematic chains can be - carried out by using automatic tension regulation drums, such as those described in EP.A. 0653538 or by means of any other procedure for this purpose.

[0042] Finally, it must be emphasised that the regulation of the central unit is carried out on the central shaft (E-E'), which coincides with the rotation shaft of the - winding handle (4) or with the shaft of the worm gear -- (26), so that the position of the said shaft remains immovable. Therefore, we can carry out the turning of the - casing of the central unit (A) in the angle $(+\alpha)$ or $(-\alpha)$ required, so as to later be able to carry out the fastening or fixing of the system by tightening the bolts (12) on the curved adjustment slots (11) of the support for - the mechanism, which is fixed solidly to the forward or front rail and which is also fixed to the door.

Claims

1. Central double drive unit for window winder -- systems, with a double rail, in which the kinematic chain is operated by a central unit or assembly (A) with two - drums (8,9) moved simultaneously by manual or electrical means, with the central unit (A) being provided with the drums (8,9) interrelated, from which the cable extends - along two paths or routes (C1,C2) towards the ends of -- each one of the rails or, alternatively, towards the upper end of the first rail and lower end of the second -- rail and towards the lower end of the first rail and upper end of the second rail, and with the manual or electrical - drive also being unified by interchangeability, which is characterised by:

- the drive, manual (4,3,5) or electrical (25,26), becomes blocked in its movements when it stops being operated,
- one of the power takeoffs, the one situated in the first place, composed of gear wheel (1) and drum (8), moves one of the kinematic chains (C1), which is the simple direct type, whereas the second power takeoff, composed of gear wheel (2) and drum (9), moves the other chain (C2), which is the Bowden system, with the unit fixed -- firmly to the first rail,
- the central unit (A) is capable of turning --- through a certain angle (α, α') in a positive or negative direction in relation to its central shaft (E,E'), with this shaft being parallel to and equidistant from the -- two shafts (E₁,E'₁ - E₂,E'₂) of the power takeoffs of -- the two drives,
- the shaft (E,E') of the central unit (A) and -- the other two shafts (E₁,E'₁ - E₂,E'₂) are contained in the same theoretical plane, with this plane

being the bi-sector of the total angle ($\alpha + \alpha'$) formed by the meeting point (13) of the entry and exit sides or ends of the cable to the drum (8) of the simplified direct chain,

- the meeting point (13) of the entry and exit sides or ends of the cable to the drum (8) is situated at a diametrical end of the said drum opposed to and farther away in relation to the shaft (E,E') of the central unit and in alignment with the said shaft, 10
- the power takeoffs of the two drive drums (8,9) are carried out by means of their embedding into some -- grooved fine pitch sleeves moulded onto the cores (1,2) of the drive gear wheels or crown wheels (6,7). 15

2. Central double drive unit for window winder -- systems, in accordance with claim 1, **characterised in** -- that the central unit (A) is provided with a set of lugs (10,27) in which there are bolts (12) that fit into ad-justment slots (11) arranged on the rail support of the simplified direct chain. 20
3. Central double drive unit for window winder -- systems, in accordance with claim 1, **characterised in** -- that the power takeoffs (1,8 - 2,9) are carried out to-- wards one single side or face of the central unit (A). 25
4. Central double drive unit for window winder -- systems, in accordance with claim 1, **characterised in** -- that the power takeoffs (1,8 - 2,9) are carried out on - both sides or faces of the central unit (A). 30
5. Central double drive unit for window winder -- systems, in accordance with claim 1, **characterised in** -- that the gear wheels (6,7) include spiral springs (16) - in their interior, which are tightened to the required - torque by means of covers (15) of the said central unit. 35

Patentansprüche

1. Zentraleinheit mit doppeltem Antrieb für Fensterheber mit doppelter Schiene, auf der die kinematische Kette durch eine zentrierte Baugruppe (A) mit zwei Trommeln (8, 9) betätigt wird, die durch manuelle oder elektrische Mittel gleichzeitig bewegt werden. Dabei ist die Zentraleinheit (A) mit in Wechselbeziehung stehenden Trommeln (8, 9) ausgestattet, von denen aus sich das Seil über zwei Hübe (C1, C2) zu den Enden einer jeden Schiene oder alternativ zum oberen Ende der ersten und zum unteren Ende der zweiten Schiene und zum unteren Ende der ersten und oberen Ende der zweiten Schiene erstreckt, wobei der manuelle oder elektrische Antrieb zudem durch Austauschbarkeit vereinheitlicht 45

ist und sich folgendermaßen **kennzeichnet**:

- der manuelle (4,3,5) oder elektrische (25, 26) Antrieb blockiert sich in seiner Bewegung, wenn er nicht mehr betätigt wird,
- eine der Kraftabnahmen, die im Vordergrund steht und aus Rad (1) und Trommel (8) besteht, bewegt eine der kinematischen Ketten (C1), die direkt vereinfacht wird, während die zweite aus Rad (2) und Trommel (9) bestehende Kraftabnahme die andere Kette (C2) bewegt, die das Bowden-System aufweist, mit der fest an der ersten Schiene befestigten Einheit,
- die Zentraleinheit (A) kann in einem bestimmten Winkel (α, α') im positiven oder negativen Sinne hinsichtlich ihrer Mittelachse (E, E') drehen, wobei diese Achse zu den beiden Achsen (E1, E1' - E2, E2') der Kraftabnahmen der beiden Antriebe parallel und äquidistant steht,
- die Achse (E, E') der Zentraleinheit (A) und die anderen beiden Achsen (E1, E1' - E2, E2') liegen in einer gleichen Sollebene, wobei diese Ebene die Winkelhalbierende des Gesamtwinkels ($\alpha + \alpha'$) ist, der aus dem Treffpunkt (13) der Stränge des Eintritts- und Austrittsseils der Trommel (8) der direkt vereinfachten Kette gebildet wird,
- der Treffpunkt (13) der Stränge des Eintritts- und Austrittsseils der Trommel (8) liegt an einem diametralen Ende der besagten bezüglich der Achse (E, E') der Zentraleinheit gegenüberliegenden und weiter entfernten Trommel und in Ausrichtung mit dieser Achse,
- die Kraftabnahmen der Mitnehmer Trommeln (8, 9) erfolgen durch Einfügung dieser in gerillte Achsschenkel mit schmalen Durchgang, die auf die Naben (1, 2) der Antriebszahnäder oder -kränze (6, 7) geformt sind.

2. Zentraleinheit mit doppeltem Antrieb für Fensterheber gemäß Patentanspruch 1, die sich **dadurch kennzeichnet, dass** die Zentraleinheit (A) mit Ösen (10, 27) versehen ist, in denen Schrauben (12) spielen, die sich in Längslöcher (11) anpassen, die auf einem Träger der Schiene der direkt vereinfachten Kette angebracht sind. 40
3. Zentraleinheit mit doppeltem Antrieb für Fensterheber gemäß Patentanspruch 1, die sich **dadurch kennzeichnet, dass** die Kraftabnahmen (1,8 - 2,9) auf einer gleichen Seite der Zentraleinheit (A) vorgenommen werden. 50
4. Zentraleinheit mit doppeltem Antrieb für Fensterheber gemäß Patentanspruch 1, die sich **dadurch kennzeichnet, dass** die Kraftabnahmen (1,8 - 2,9) auf einer und der anderen Seite der Zentraleinheit (A) vorgenommen werden. 55

5. Zentraleinheit mit doppeltem Antrieb für Fensterheber gemäß Patentanspruch 1, der sich **dadurch kennzeichnet, dass** die Zahnräder (6, 7) innen Spiralfedern (16) enthalten, die sich durch Abdek-
kungen (15) der besagten Zentraleinheit mit dem
erforderlichen Moment spannen.

Revendications

1. Unité centrale de double actionnement pour lève-
vitres, avec double glissière dans laquelle la chaîne
cinématique est actionnée par un ensemble centré
(A) avec deux tambours (8, 9) déplacés simultanément
de façon manuelle ou électrique, avec l'unité
centrale (A) dotée des tambours (4, 9) reliés des-
quels le câble s'étend par deux courses (C1, C2) ou,
alternativement, vers les extrémités supérieures
de la première glissière et inférieures de la
deuxième et vers l'extrémité inférieure de la première
et supérieure de la seconde, tandis que l'action-
nement manuel ou électrique est unifié par inter-
changeabilité qui se **caractérise par**
- l'actionnement, manuel (4, 3, 5) ou électrique
(25, 26), se bloque dans son mouvement s'il
n'est plus actionné,
 - l'une des prises de force, celle qui est située en
premier lieu et composée d'élément rotatif (1)
et de tambour (8), agit sur l'une des chaînes
cinématiques (C1) laquelle est simplifiée direc-
te, tandis que la seconde prise composée d'élé-
ment rotatif (2) et de tambour (9) agit sur l'autre
chaîne (C2), celle qui est de système Bowden,
avec l'unité fermement fixée à la première glis-
sière,
 - l'unité centrale (A) peut tourner sur un certain
angle (α , α') dans des sens positif ou négatif
par rapport à son axe central (E, E'), cet axe
étant parallèle et équidistant aux deux axes
(E1, E1' - E2, E2') des prises de force des deux
actionnements,
 - l'axe (E, E') de l'unité centrale (A) et les deux
autres axes (E1, E1' - E2, E2') sont compris
dans un même plan théorique, ce plan étant
bissectrice de l'angle total ($\alpha + \alpha'$) formé par le
point d'inflexion (13) des deux brins du câble
d'entrée et de sortie au tambour (8) de la chaîne
simplifiée directe,
 - le point d'inflexion (13) des brins du câble d'en-
trée et de sortie au tambour (8) se trouve à une
extrémité diamétrale de ce dernier opposé et
plus éloigné par rapport à l'axe (E, E') de l'unité
centrale et en alignement sur cet axe,
 - les prises de force des deux tambours de traî-
née (8, 9) s'effectuent par l'encastrement de
ceux-ci sur des fusées striées à pas fin moulées
sur les moyeux (1, 2) des éléments rotatifs ou

couronnes dentées d'actionnement (6, 7).

2. Unité centrale à double actionnement pour lève-
vitres, conformément à la revendication 1, **caracté-
risée par le fait que** l'unité centrale (A) est dotée
d'oreillettes (10, 27) sur lesquelles des boulons (12)
jouent et s'adaptent dans des colis (11) disposés
sur un support de la glissière de la chaîne simplifiée
directe.
3. Unité centrale à double actionnement pour lève-
vitres, conformément à la revendication 1, **caracté-
risée par le fait que** les prises de force (1,8 - 2,9)
se font vers un même côté ou vers une même face
de l'unité centrale (A).
4. Unité centrale à double actionnement pour lève-
vitres, conformément à la revendication 1, **caracté-
risée par le fait que** les prises de force (1,8 - 2,9)
se font vers l'une et l'autre face de l'unité centrale
(A).
5. Unité centrale à double actionnement pour lève-
vitres, conformément à la revendication 1, **caracté-
risée par le fait que** les couronnes dentées (6, 7)
comportent des ressorts spirales (16) en leur inté-
rieur, lesquels se tendent au couple requis au
moyen des couvercles (15) de cette unité centrale.

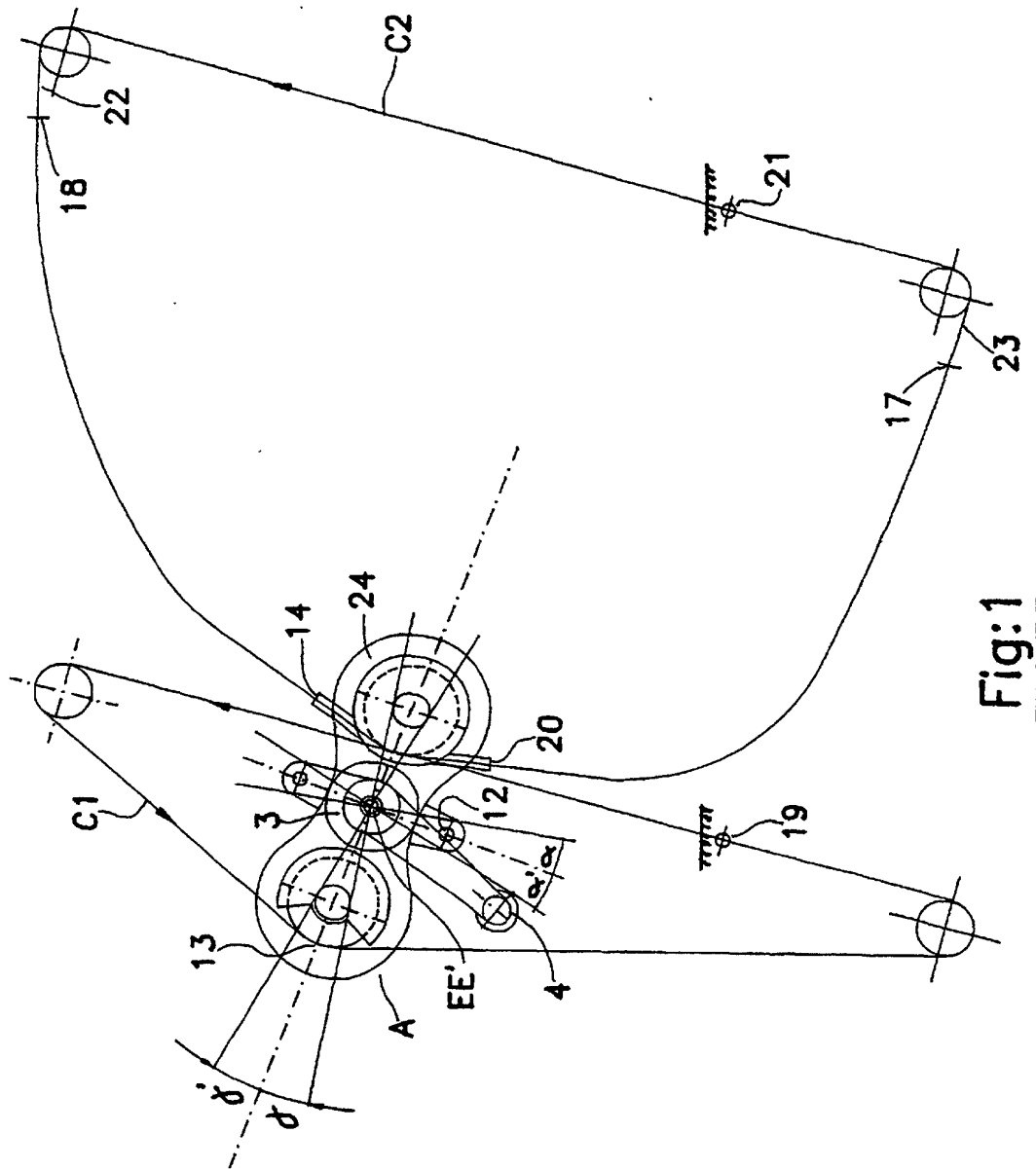
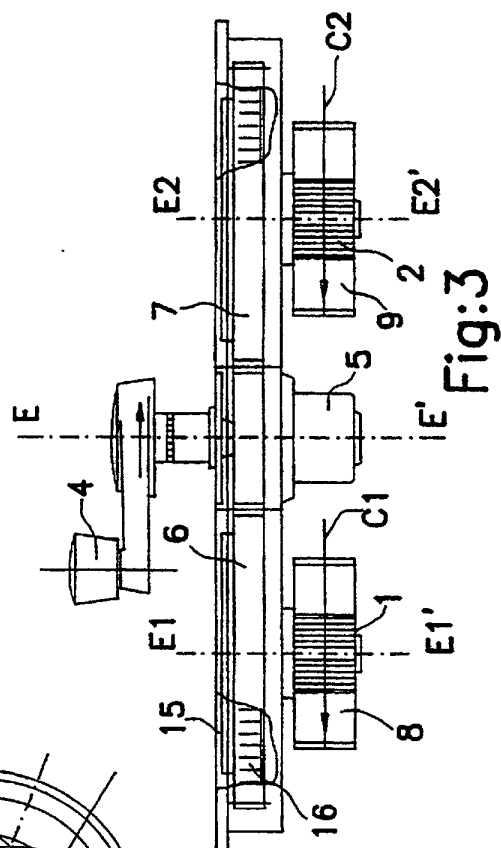
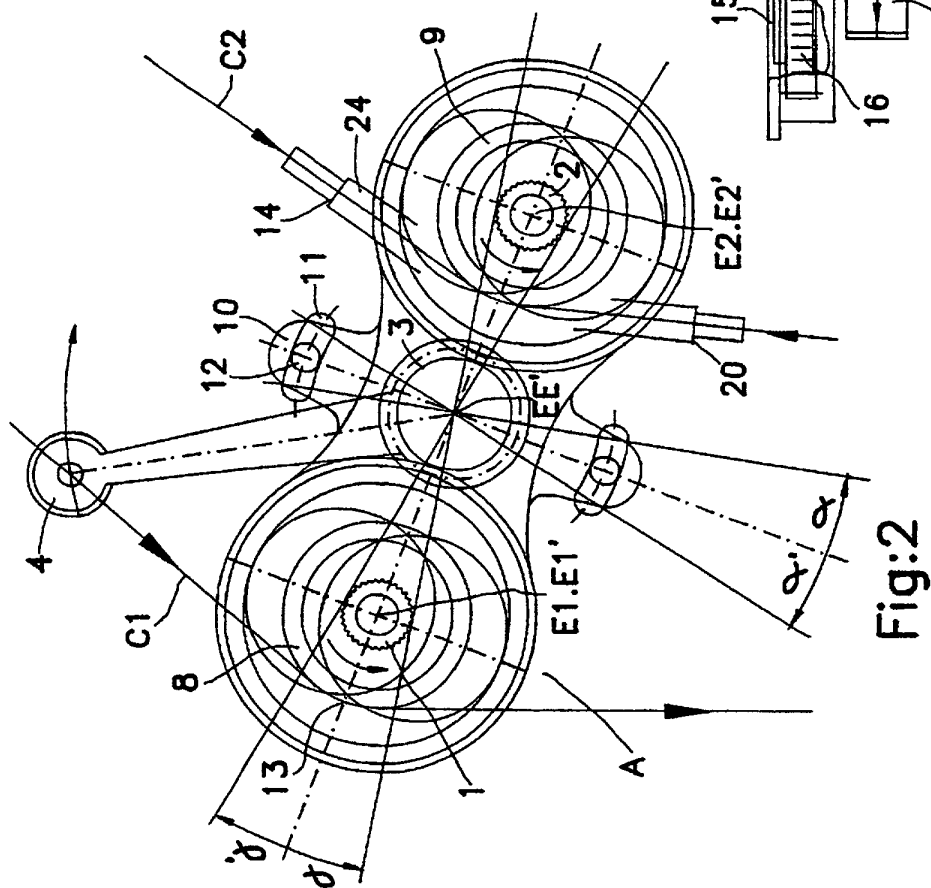
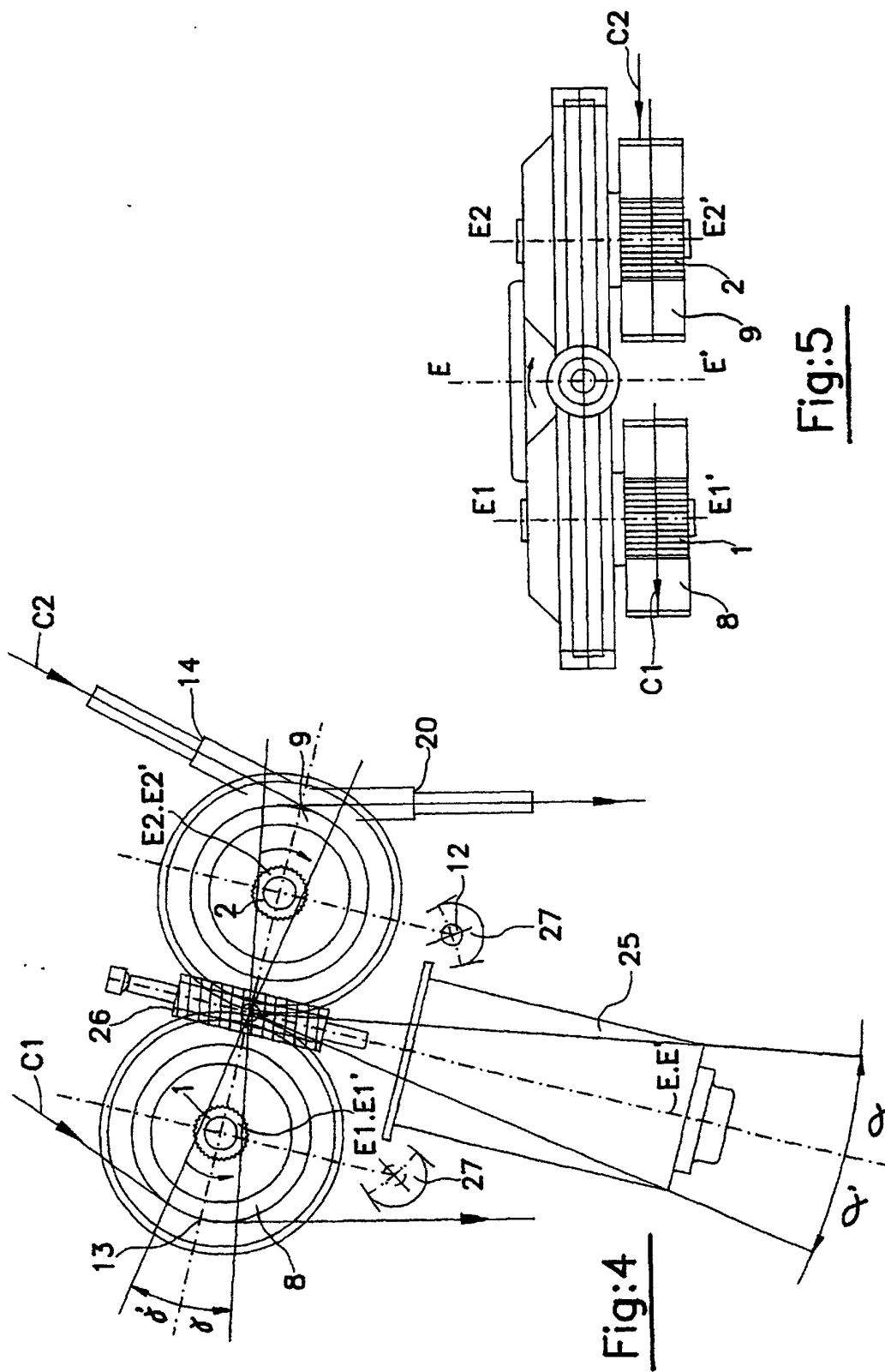
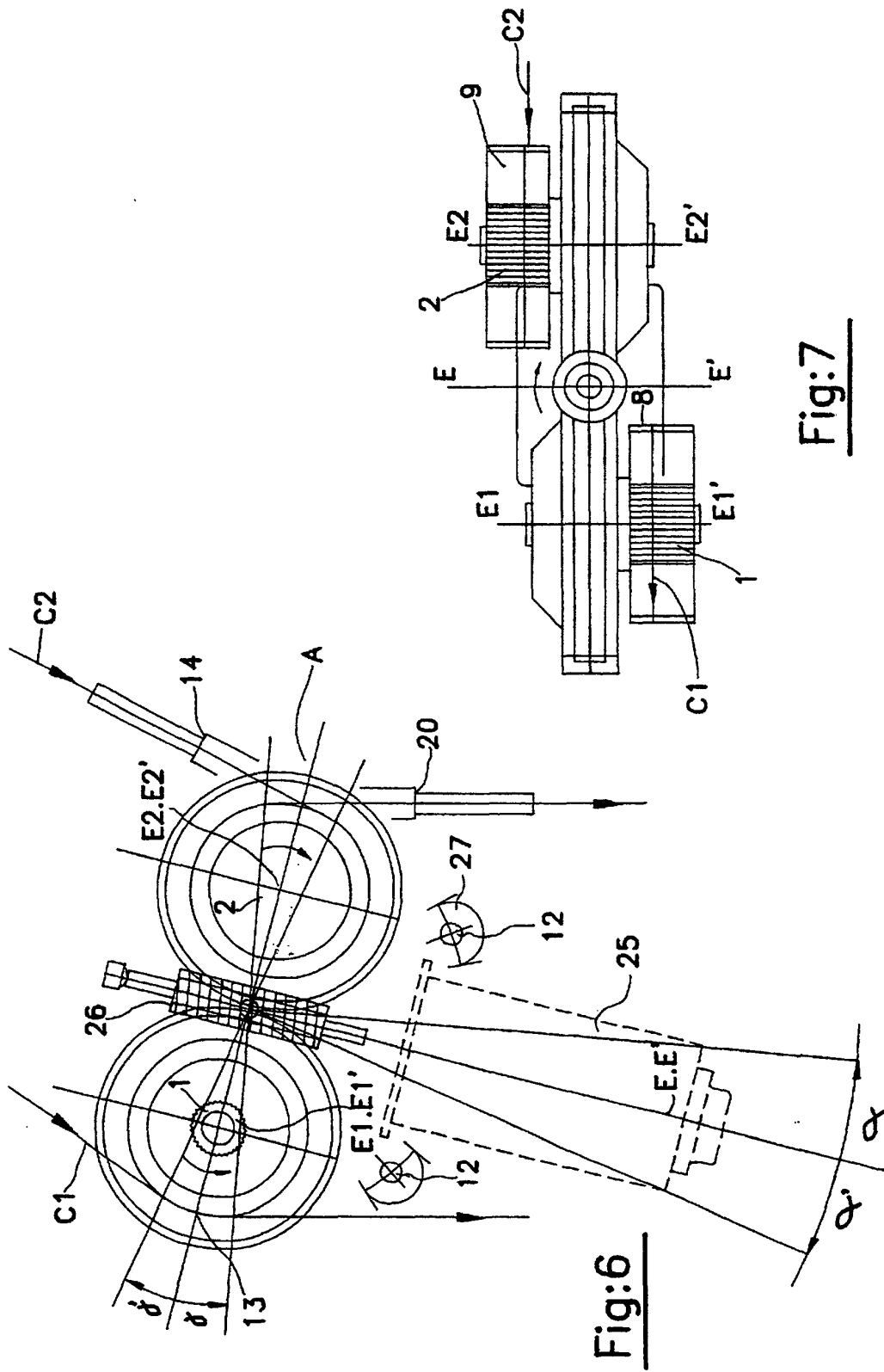


Fig:1







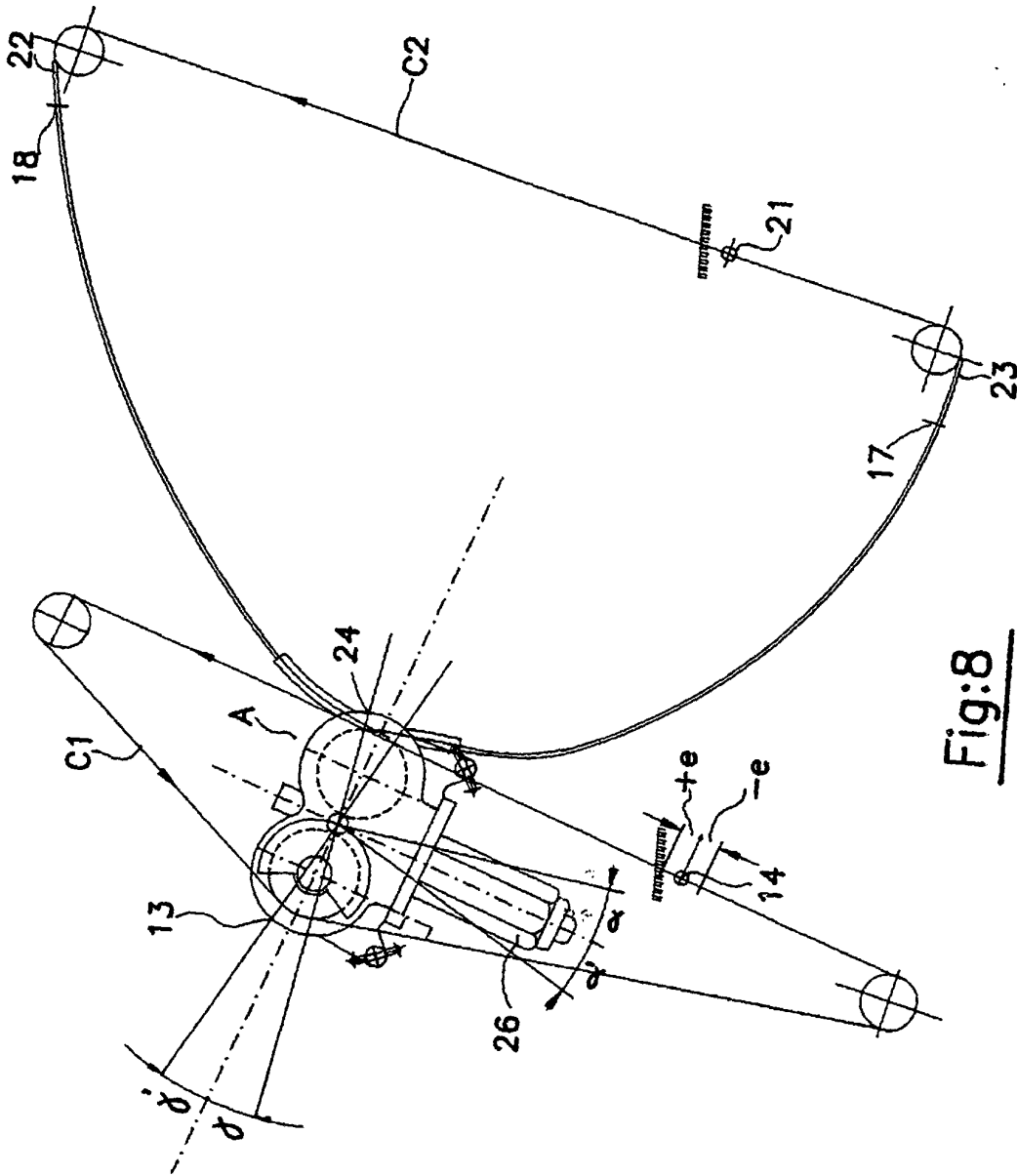


Fig:8