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(54) **Motor and reducer support**

Motor- und Getreibeträger

Support pour moteur et réducteur

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Description

In the Technical world, motorized reducers are known that are made up of an independent motor, which by means, for example, of an elastic coupling, powers a reducer, that means it is necessary to have one housing for the motor and another for the reducer, all of which used to mean that double units had to be manufactured as a consequence of this, with different moulds for the housing and also different assembly tooling, with the peculiarity that to be able to use the motor-reducer in applications with the power outlet on one or the other side, it was necessary for the reducer housing to be symmetrical.

From the patent US.A. 4167834, a mechanism to operate a vehicle window is known, composed of a motor connected to a plate, provided with holes, on which a pinion is situated, and is, in turn, operated by a worm screw that comes from the motor shaft. The pinion engages with a rack on a rail in such a way that the motor-plate unit with the pinion is guided along the rail.

In the same way, the plate is provided with a portion that facilitates the movement of the unit along the said rail.

In this solution, the motor is mobile and circulates freely. i.e. without any type of fixing to any part of the vehicle door.

As opposed to these traditional techniques, the patent provides a small reducer that is made up of one single block or unit which can be used in any position, and in which the motor and the worm screw have a single support to be able to receive the crown with the mechanism to drive the cable drum or pinion which operates another mechanism, for example the window drive system of a vehicle, which are sometimes operated by a pinion and on other occasions by means of a cable drum. The single unit of the patent is symmetrical, so that it can be used equally for one position or side or for the other.

Another advantageous particularity is the special shape of the support that serves as the front housing for the motor, which has a single drill hole for fixing, situated in a protruding part below the hollow of the worm screw and symmetrical with respect to the medium plane of the part, which allows the unit assembly plate to be fitted symmetrically to it, that is, on one side or the other of the side of the motor, as demanded by its situation in the door of the vehicle.

Apart from the above reasons, the inventive idea has been motivated by the more and more pressing need to provide motor vehicles with electrically powered window winding devices of low weight and small size, and in their turn capable of powering any system, whether it be by cable-rack or by an arm with a toothed section.

The assembly of the small-sized reducer is made up of a low-power micromotor, which includes the support for the reducer, and whose power intake is placed directly above the worm screw, which is cut or laminated on the rotor shaft itself, thus allowing the total length of the assembly to be reduced.

The shaft in question has only two spherical supports at its ends, with these preferably being of sintered, selflubricated material. These are some lenticular, coaxial supports responsible for supporting the play and loads of axial thrust, by means of plastic material with high resistance to wear and temperature and a low friction coefficient, which are obviously placed in an adjacent position as regards the said spherical supports.

The same as in Patent US.-A- 4167834, the motor has its own cover or casing and a support for the semireducer, whose axial shaft coincides with that of the motor, with this support having a component in the shape of a circular segment with three drill holes.

In the case of the invention, the motor casing-support part in the shape of a circular segment has the three drill holes regularly distributed throughout the said circular segment, with one of the said drill holes located on the symmetry axis of the other two. The profile or outline of the worm screw helix protrudes through a portion of the said motor casing-support part and the support for the crown wheel, therefore, can be adapted to this part and secured onto the drill holes by means of bolts.

On the other hand, the said cover-support receives, at the end farthest away from the sperical support of the worm screw rotor shaft, and near the motor itself it houses a retainer that is coaxial with the shaft, so that it ensures the oiltightness, watertightness, etc. of the motor, with the help of an elastic joint in the flanging area of the cover-support with the motor housing.

The motor-reducer assembly is fitted to the door of the vehicle by means of an assembly plate, which is a die-cut part of sheet metal, of suitable thickness, which at one end received, through an opening carried out on a right angle fold, the body of the motor and at the other end takes the shape of a "A"-shaped leg, which with its corresponding drill hole is fixed to the drill hole in the protruding part of the motor support by means of a rivet or bolt. This system allows a metallic surface to be left available to back up laterally to the motor, of the shape and dimensions required for bolts or nuts to be fixed to it by welding, so that they coincide with the drill holes determined by the constructor of the vehicle in the door, so that the centre of gravity of the motor-reducer assembly is contained between them; this condition is of great importance so that the dynamic stresses that the mass of this assembly produces when the door is being closed does not cause the tearing away of the sheet metal which is so common.

As a deduction of what has been said, it is important to point out the very small dimensions of the assembly, as the body cover of the semi-reducer motor can be as narrow as the motor itself, and also completely symmetrical with respect to the average axial plane of the assembly, thus being able to admit the support housing of the crown indistinctly at one side or the other, according

to convenience.

All that has been mentioned up to now, together with other details of the invention, is pointed out in relation with the adjoinging pages of drawings, in which they are represented as follows:

- Figure 1 is an elevation of the assembly.
- Figure 2 is a view from the left of the previous figure, shown in cross section.
- Figure 3 is a view of figure 1 seen from the top.
- Figures 4 to 7 show different applications of the invention to different types of window winding mechanisms.

In accordance with figure 1, we can observe the direct current micromotor (1), with the same feed voltage as that used in the vehicle that it is destined for, and with a power intake above the direct worm screw (2) which is cut or laminated on the rotor shaft and turns on two spherical bearings (3) made of suitable sintered material and self-lubricated, with axial supports (4) and (5) made of plastic material with a high resistance to wear and temperature, as they have to resist great alternative axial stresses while, at the same time, their turning friction has to be as low as possible so as to absorb the minimum possible energy, so that practically all the energy of the motor is available at the worm screw-spindle.

On the motor support (6), in the shape of a circular bracket, an oil and damp retaining element is adapted (7), responsible for impeding, if necessary, these elements from passing into the electrical area of the brushes and the rotor collector, where they might be the cause of breakdowns, taking into account that the conditions of dampness and temperature inside the door panel might be very variable at certain moments. This support is preferably made by injection of reinforced fiber glass thermoplastic resin or light metal.

The operation of the cable, in the case of window winding devices of this type, is made up of the toothed crown wheel (8), made of thermoplastic resin with a low friction coefficient, which gears on the worm screw-spindle (2) of the motor (1), and which forming part of the coplanary torque transmitter (9), draws over the drum that is integral to this system the two strands of cable (10 and 11) wound onto it and connected among themselves to the plate or unit for moving the pane of glass, as shown in figures 1,4.

The cable system is supported by the two casing elements (14 and 15), made by injection of reinforced fiber glass thermoplastic resin and with a rotation shaft (16) inserted under pressure with its ends on the corresponding supports of the said housing.

Of the two casings, it is (15) that houses the cable drum and has the outlets (17) directed in the most suitable position within the angles (α) or (β) included within the extreme positions (B-C) or (D-E), or else among the fixed positions (A) and that which is convenient within the angles mentioned previously.

The compensation of the cable, according to whether it works in one direction or the other, is carried out by means of guides (12), made by injection of thermoplastic resin with a low friction coefficient, the cable conductors (26) and the helicoidal springs (13) shown in figure 1, which facilitates its sliding and compensation over the corresponding outlets (17) of the housing (15). Housing (14), which houses the crown wheel (8) and the torque transmitter (9), is connected to housing (15) by the shaft (16) and by the plastic deformation of the sectorial projections (18).

Once that all the elements of this unit have been assembled, it is inserted into the bracket support (6) of the motor like a case, so that the crown wheel (8) will gear on the worm screw (2) and will be fastened to it by means of rivets or bolts, thus shaping the compact motor-reducer that is extremely reduced in both size and weight, with the particular advantage that the motor can be exchanged by simply loosening the fixing elements (19) and then replacing them once that the change has been carried out.

Housing (14) is a single part due to its geometry, so it can be used on one side or the other of the motor-reducer assembly, which means a considerable saving.

This assembly is connected to the door of the vehicle by means of a simple anchoring plate (20), which clamps the motor in its rear part (figures 1 and 2) and is fixed by its front part through the only drill hole that the assembly has in the front support (6) of the motor, by means of a rivet or bolt (21) and its corresponding washer.

The anchoring plate (20) is oversized at its support area on the door, so that the centre of gravity of the motor-reducer assembly falls within the box defined by the fixing elements, usually bolts (23). Like this, it is achieved that the dynamic stress that the system exercises on the door being closed, receives the push centrally and no tearing away of the sheet metal is produced in this area, a circumstance that is often produced in conventional systems which are fixed by one end, that of the head of the reducer, and leave the motor overhanging, even though this is precisely the portion of greatest bulk and causes the previously mentioned tearing away, by moving the centre of gravity of the system outside the fixing area foreseen by the manufacturer of the vehicle.

When dealing with the operation of window winding systems of the cable-rack type, for example the one shown in figure 5, the system is practically the same, with the only difference that the drum (9) is replaced by a pinion of suitable diameter and pitch in conformity with that of the cable-rack, and the casing (15) will have the appropriate housing and outlets for the said pinion and guide of the conductor pipes corresponding to the cable-rack.

In case of operating window winding mechanisms with arm(s) with a toothed sector, as in figures 6 and 7, the drum (9) will be replaced by a pinion which will gear

directly with the toothed sector, by which the housing (15) will be reduced to a simple cover, through which only the abovementioned pinion will appear.

In accordance with what is illustrated in Figure 1, and due to the fact the drill holes for fixing are situated with one of them, on the axis M-M and the other two, symmetrically arranged in relation to the said axis M-M, a single motor-worm screw unit can be used for application to right or left window winding devices, which means a considerable advantage and saving in its use.

Finally, and with regard to figure 4, we should like to point out that the assembly of the patent has been shown in its two possible positions (24) or (24a) in relation with a base unit (25) that uses cable.

In figure 5, the patent (24) is shown with the element (26) that uses cable-rack, and in figures 6 and 7, the patent (24) or (24a) is fitted to devices that use arms (27) or an arm (28).

Claims

1. Motor and reducer support of the type which have a motor (1) with a cover for this motor, a support (6) for the semireducer wherein one single part (6) acts as a cover for the motor and a support for the semireducer, which has its axial shaft coinciding with that of the motor, the part (6) having a component in the shape of a circular segment with three drill holes, wich is characterized by:

   - the three holes (19) are located on a common circle and that one of the holes is located on an axis of symmetry of the two other holes, in that the centre of the circular segment coincides with the centre of the crown whell (8) and in that the power outlet from the crown whell can be placed on one side or the other in relation to the vertical plane of the said circular segment that forms the cover,
   - the shaft (29), whose spiral or worm screw section (2) appears outside the cover through its lower section, holds a leaktight retainer (7) and a elastic joint with the motor casing, with the said cover also having one single drill hole in the section immediately below that of the worm screw,
   - an assembly plate for anchorage to the vehicle door by means of a plate (20) on which the rear portion of the motor (1) is inserted and fixed in its forward position by a single bolt or rivet (21) to the motor front support, providing the necessary surface for the centre of gravity of the assembly to fall within the area defined by the fixing elements for fixing the assembly plate to the door,
   - a casing (15), which form the cover and houses either the crown wheel (8) and the drum, or the crown wheel and the cover of the pinion outlet, is mounted on the part (6) in the manner of a slab or lid and is fixed to it by means of three elements (19), with one of them arranged on the axis (M-M) that passes through the centre of the crown wheel, and the other two symmetrically arranged in relation to the said axis (M-M), allowing a single worm screw motor to be used, when the corresponding power connection is carried out on the right or on the left of the central plane of the motor.

2. Motor and reducer support in accordance with claim 1, characterized in that for mechanisms which have to transmit small torques or which are small in size, the assembly can be constructed by the injection of fiber glass or mineral reinforced thermoplastic resins.

3. Motor and reducer support in accordance with claim 1, characterized in that the input and output directions (17) of the cable or cable-rack can be arranged over a very wide angular range, which facilitates its adaptation to any type of door or the positioning of the mechanism inside it.

Patentansprüche

1. Motor und Halter für Untersetzungsgetriebe der Art, welche aus einem Motor (1) mit einem Laufmantel für diesen Motor und einem Halter (6) für das Halbuntersetzungsgetriebe bestehen, worin ein einzelnes Teil (6) als Laufmantel für den Motor dient und einen Halter für das Halbuntersetzungs-getriebe, dessen axiale Welle mit der des Motors zusammentrifft, wobei das Teil (6) eine Komponente in Form eines kreisrunden Segments mit drei Bohrlöchern aufweist, die durch Folgendes charakterisiert wird:

   - daß die drei Löcher (19) auf einem gemeinsamen Kreis liegen, und daß eines der Löcher sich auf einer Symmetrieachse der anderen beiden Löcher befindet, darin daß die Mitte des kreisrunden Segmentes mit der Mitte des Radkranzes (8) zusammentrifft und darin, daß die von dem Radkranz ausgehende Kraft sowohl auf der einen als auch auf der anderen Seite bezüglich der senkrechten Ebene des besagten kreisrunden Segmentes, das den Laufmantel bildet, gelegt werden kann,
   - daß die welle (29), deren Spirale oder Schnekkenspindel im Schnitt außerhalb des Deckels durch dessen unteren Schnitt erscheint, einen Abdichtring (7) und eine elastische Verbindung mit dem Motorgehäuse hält, wobei der besagte Laufmantel auch über ein einzelnes Bohrloch in dem Bereich unmittelbar unter dem der

Schneckenspindel verfügt,

- daß eine Montageplatte für die Befestigung an der Fahrzeugtür, bestehend aus einer Platte (20), auf der hintere Teil des Motors (1) eingelassen und in seiner vorwärts gerichteten Stellung durch einen einzelnen Bolzen oder Niete (21) an dem vorderen Motorhalter befestigt ist, die notwendige Fläche dafür ergibt, daß die Schwerpunktmitte der Baugruppe in dem durch die Befestigungsmittel für die Befestigung der Baugruppe an der Tür definierten Bereich fällt,
- daß ein Gehäuse (15), das den Laufmantel bildet und entweder den Radkranz (8) und die Walze oder den Radkranz und den Laufmantel für das Antriebsritzel aufnimmt, auf dem Teil (6) in der Art einer Platte oder eines Deckels montiert und darauf mit drei Elementen (19) befestigt ist, wobei sich eines davon auf der Achse (M-M) befindet, die durch die Mitte des Radkranzes geht, und die anderen beiden symmetrisch zu der besagten Achse (M-M) ausgerichtet sind, sodaß ein Motor mit einer einzelnen Antriebsschnecke verwendet werden kann, wenn die entsprechende Antriebsverbindung auf der rechten oder auf der linken Seite der mittleren Ebene des Motors erfolgt ist.

2. Motor und Halter für Untersetzungsgetriebe gemäß Anspruch 1 dadurch gekennzeichnet, daß für Vorrichtungen, die geringe Drehmomente zu übertragen oder kleine Größen haben, die Baugruppe aus gespritzter Glasfaser oder aus thermoplastischen, mineralverstärkten Harzen hergestellt werden kann.

3. Motor und Halter für Untersetzungsgetriebe gemäß Anspruch 1 dadurch gekennzeichnet, daß die Eingangs- und Ausgangsrichtungen (17) des Kabels oder Kabelstranges über einen sehr weiten Winkelbereich angeordnet werden können, was seine Anpassung an jegliche Art von Tür oder die Befestigung der Vorrichtung in der Tür erleichter.

Revendications

1. Moteur et support de réducteur et de moteur du type de ceux qui ont un moteur (1) avec un capot pour ce moteur, un support (6) pour le semi-réducteur dans lequel une seule partie (6) fait office de capot pour le moteur et de support pour le semi-réducteur, dont l'arbre axial coïncidant avec celui du moteur, la partie (6) ayant un composant en forme de segment semi-circulaire avec trois trous d'alésage, se caractérisant par le fait que:

- les trois trous (19) sont placés sur un cercle commun et que l'un des trous est situé sur un axe de symétrie des deux autres trous, dans lequel le centre du segment circulaire coïncide avec le centre de la couronne (8) et que la prise d'alimentation venant de la couronne peut être placé d'un côté ou de l'autre par rapport au plan vertical dudit segment circulaire qui forme le capot,
- l'arbre (29), dont la spirale ou section de vis sans fin (2) apparaît au dehors du capot à travers sa section la plus basse, comporte un reteneur hermétique de fuite (7) et un joint élastique avec la carcasse du moteur, avec ledit capot comportant également un seul trou d'alésage dans la section immédiatement en-dessous de celle de la vis sans fin,
- un plaque de montage pour ancrage à la porte du véhicule au moyen d'une plaque (20) sur laquelle la partie arrière du moteur (1) est insérée et fixée dans sa position avant par un seul goujon ou rivet (21) au support avant du moteur, en offrant la surface nécessaire au centre de gravité de l'assemblage pour tomber à l'intérieur de la zone définie par les éléments de fixation pour fixer la plaque d'assemblage à la porte,
- une carcasse (15), formant le capot et logeant soit la roue couronne (8) et le tambour, ou la roue couronne et le capot de la prise du pignon, est monté sur la partie (6) à la manière d'une grosse plaque ou couvercle et y est fixé au moyen de trois éléments (19), avec l'un d'eux disposé sur l'axe (M-M) qui passe à travers le centre de la roue couronne, et les deux autres symétriquement disposés par rapport à ce même axe (M-M), en permettant l'emploi d'un simple moteur à vis sans fin, lorsque le raccordement d'alimentation correspondant est monté à droite ou à gauche du plan central du moteur.

2. Moteur et support de réducteur conformément à la revendication 1, se caractérisant par le fait que por des mécanismes devant transmettre de petits couples, ou qui sont petits de taille, l'assemblage peut être construit par injection de fibre de verre ou de résines thermoplastiques minérales renforcées.

3. Moteur et réducteur de support conformément à la revendication 1, se caractérisant par le fait que les directions input et output (17) du câble ou du bâti pour câbles peuvent être disposées suivant un éventail angulaire très large, ce qui en facilite aussi bien l'adaptation à n'importe quel type de porte que le positionnement du mécanisme en son intérieur.

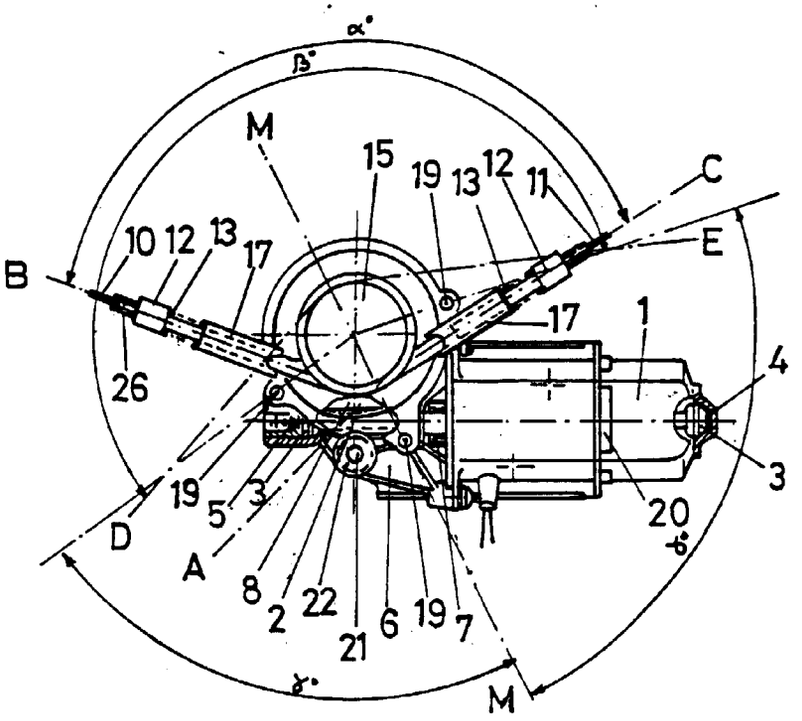


FIG: 1

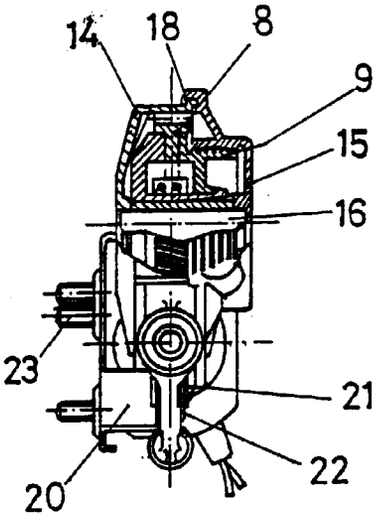


FIG: 2

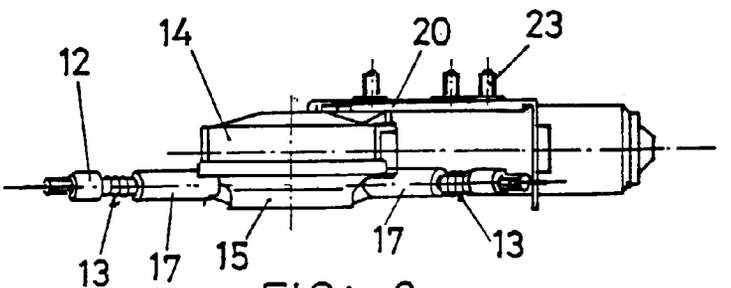


FIG: 3

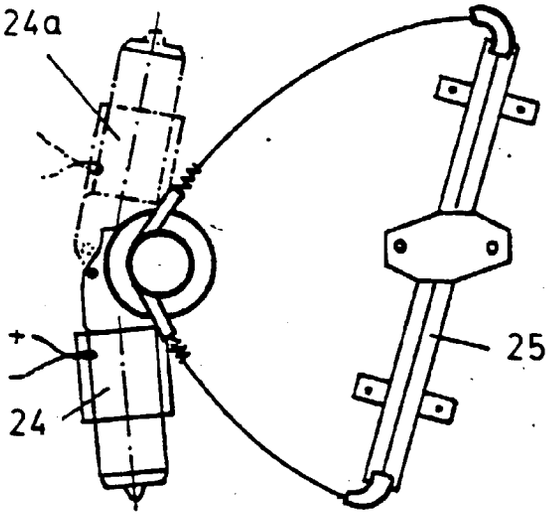


FIG: 4

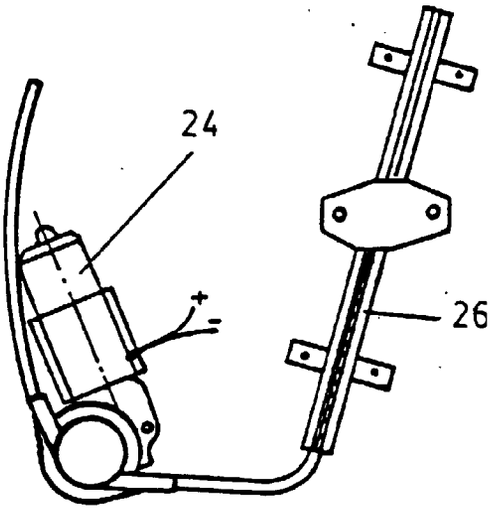


FIG: 5

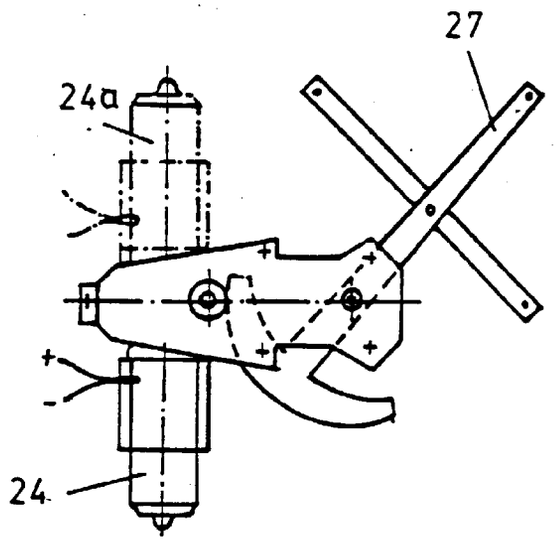


FIG: 6

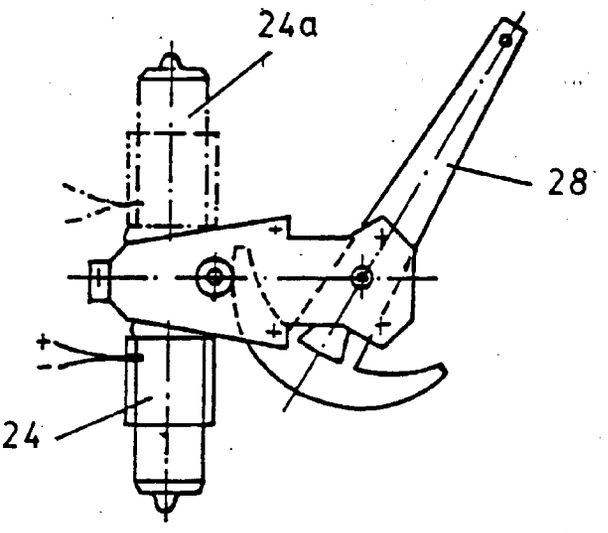


FIG: 7