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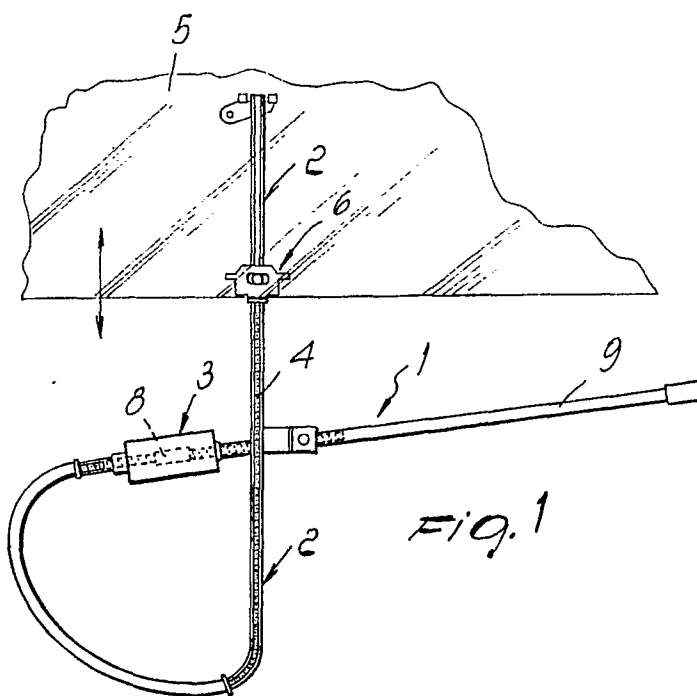
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54 **Drive gear, particularly for operating the glass panes of motor vehicle windows.**

57 The drive gear (1) includes a flexible shaft (4) sliding in a fixed guide (2) and having an end (6) connected to the glass pane (5). The guide (2) includes an internally threaded sleeve (8) adapted to engage the flexible shaft (4), which in turn has an

outer threading (4a) so that a rotation of the sleeve (8) corresponds to an axial translation of the flexible shaft (4), the sleeve (8) being actuated by a motor (3). The flexible shaft (4,6) is monolithically made of plastics by injection molding.



The present invention relates to a drive gear, particularly for operating the glass panes of motor vehicle windows.

The use of power drives to operate the glass panes of windows in motor vehicles is known; said power drives are commonly constituted by an electric motor which operates a drive for the vertical sliding of the glass pane.

A commonly used drive mechanism comprises a flexible shaft slideable in a guide which is rigidly associated with the bodywork; one end of the flexible shaft is fixed to the lower edge of the glass pane.

The flexible shaft is simply a long flexible screw operated by a female thread sleeve which is actuated by the electric motor; the electric motor and the sleeve, which are rigidly associated with the guide, control the translation of the flexible shaft, which cannot rotate inside said guide.

In the known power drives, the flexible shaft is manufactured in the following manner: a strand of steel is co-extruded with plastics so that a plastic layer covers it completely; a steel wire is wound in a helicoid on the plastic-covered strand so that it forms a seat in the plastic layer which thus acts as support.

The plastic support keeps the wire in the set position, so as to not alter the pitch of the helicoid, allowing correct meshing with the fixed sleeve.

This known type of drive operates rather satisfactorily, but it is susceptible to improvements in the execution of the flexible shaft, especially from the point of view of production.

The flexible shaft manufactured in the described manner in fact entails relatively great difficulties and high costs.

It has been furthermore observed in practice that under stress, or in case of malfunction, the coiled wire can be displaced, altering the pitch of the helicoid and not allowing the correct meshing with the control sleeve.

The aim of the present invention is to provide a drive gear simpler than known mechanisms in terms of the number of components and of the manufacturing steps required.

Within the scope of the above described aim, an object of the invention is to provide a gear which is mechanically reliable and has a long life.

Not least object of the invention is to provide a gear which can be obtained with significantly lower production costs with respect to known ones.

This aim, these objects and others which will become apparent hereinafter are achieved by a drive gear, particularly for operating the glass panes of windows in motor vehicles, which comprises a flexible shaft slideable in a fixed guide, said flexible shaft having an end connected to a glass pane of a window, said guide comprising an

internally threaded sleeve adapted to engage said flexible shaft, said flexible shaft having an outer thread so that an axial translation of said flexible shaft corresponds to a rotation of said sleeve, said sleeve being actuated by a motor means, characterized in that said flexible shaft is monolithically made of plastics.

Further characteristics and advantages will become apparent from the description of a preferred but not exclusive embodiment of the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a schematic lateral elevation view of a gear for moving the glass pane of a window;

figure 2 is a perspective view of the flexible shaft according to the invention;

figure 3 is a detail view of the end of the flexible shaft which is connected to the glass pane.

With reference to the above described figures, a drive gear 1 for a window pane 5, of a motor vehicle for example, comprises, in a per se known manner, a guide 2 which is rigidly associated with the bodywork or with the door frame, and comprises a drive unit 3 for the actuation of a flexible shaft 4 which is slideable in the guide 2.

The flexible shaft 4 has an end head 6 fixed to the glass pane 5, so that the sliding of the flexible shaft inside the guide 2 causes the vertical movement of the glass pane 5.

The flexible shaft 4 comprises a flexible elongated threaded body 4a and an end head 6 adapted to be fastened to the glass pane; the head 6 is provided, for this purpose, with engagement means constituted by a pin 7 adapted to be inserted in an adapted hole provided in the glass pane.

The drive unit 3 comprises an electric motor which actuates an internally threaded sleeve 8 adapted to engage the threaded portion 4a of the flexible shaft 4; in this manner a translation of the flexible shaft 4 corresponds to a rotation of the sleeve 8.

A sheath 9 for containing the free portion of the flexible shaft 4 when the glass pane is lowered is furthermore advantageously provided.

According to the invention, the flexible shaft 4 is monolithically made of plastics, including the head 6, for example by injection molding.

The actuation sleeve can also be made of plastics, for example nylon.

In practice it has been observed that the invention achieves the intended aim and objects, allowing to provide a gear which is much simpler and more economical from the point of view of production.

A great advantage of the invention resides in the fact that the flexible shaft is self-lubricating and therefore practically maintenance-free.

Another important advantage is that the gear is

considerably noiseless, because of the particular materials employed: this feature being increasingly required by the automobile industry.

The drive gear according to the invention may have numerous modifications and variations, all within the inventive concept; furthermore, all the details may be substituted with technically equivalent elements.

The materials employed, as well as the dimensions, may be any according to the specific needs and the state of the art.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Drive gear, particularly for operating the glass panes of motor vehicle windows, comprising a fixed guide (2) which slideably accommodates a flexible shaft (4), said flexible shaft having an end (6) connected to a glass pane (5) of a window, said guide comprising an internally threaded sleeve (8) adapted to engage said flexible shaft, said flexible shaft having an outer thread (4a) so that an axial translation of said flexible shaft corresponds to a rotation of said sleeve, said sleeve being actuated by a drive means (3), characterized in that said flexible shaft (4,6) is monolithically made of plastics.

2. Device, according to claim 1, characterized in that said flexible shaft (4) comprises a fastening head (6), at said end, for fastening said shaft to said glass pane.

3. Device, according to claim 1 or 2, characterized in that said flexible shaft (4,6) is manufactured by injection molding.

4. Device, according to one or more of the preceding claims, characterized in that said sleeve (8) is made of plastics.

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