March 13, 1962 L. PÉRAS 3,024,489

WINDOW BALANCING DEVICE

Filed Nov. 17, 1958

Fig.2

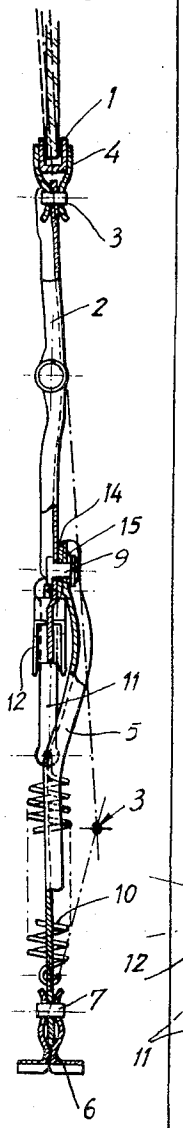
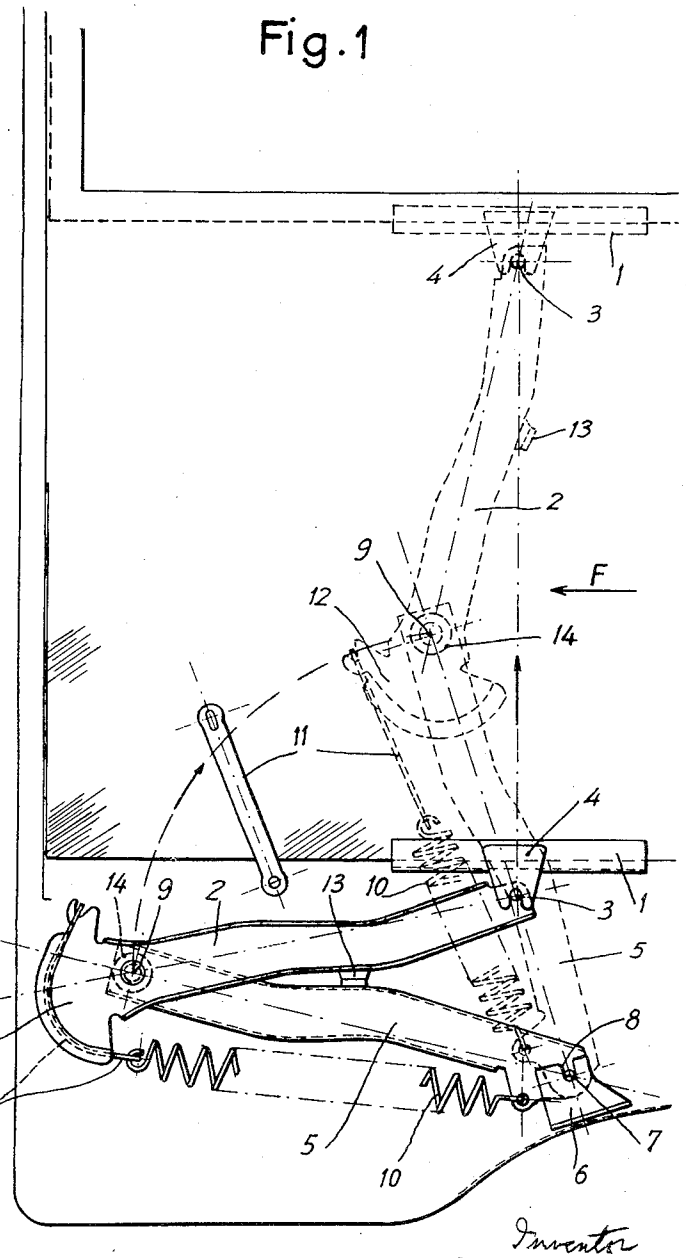


Fig.1



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3,024,489
WINDOW BALANCING DEVICE

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1 Claim. (Cl. 16—200)

This invention relates to a device for balancing glass windows which is applicable more particularly to the glass windows of automotive vehicles.

The balancing device according to this invention consists essentially of two pivotally interconnected arms one of which is pivoted on the support carrying the glass pane, the other arm being also pivoted but on the door or like frame structure in which the window is guided for vertical movement, a spring attached to one of these arms acting through the medium of a spring extension on a cam having a suitably designed variable contour which is carried by the other arm.

The purpose of the spring extension is to engage the cam contour and constantly apply the spring force tangentially to this cam; on the other hand, the cam contour is so designed that in spite of the variation occurring in the spring tension as the window is moved, the lever arm through which the spring pulling action is exerted on the cam-carrying arm being variable, the vertical force applied by the balancing device to the window remains substantially constant.

In order to afford a clearer understanding of this invention and of the manner in which the same may be carried out in the practice, reference will now be made to the accompanying drawing forming part of this specification and illustrating diagrammatically by way of example a typical form of embodiment of the invention.

In the drawing:

FIGURE 1 is an elevational and diagrammatic view showing the balancing device according to this invention; the dotted lines illustrate the position occupied by the different component elements of the device when the window is closed, the thick lines showing the folded device in its open-window position; and

FIGURE 2 is a view of the enfolded device as seen from the right-hand side of FIG. 1, that is, in the direction of the arrow F.

Referring to the drawing, the balancing device illustrated therein comprises a glass pane support **1** in which the glass pane of the window is fitted, a suitable insulating rubber lining (not shown) being interposed between the glass and the metal support. An upper arm **2** of the device carries at its upper end a transverse stud or pin **3** engaging a double yoke member **4** solid with the support **1**. A lower arm **5** of the device is supported in the same manner by the door or like body element of the automotive vehicle, that is, here by means of a stud or pin **7** engaging the notches of a double yoke-forming portion **8** of a support **6**, as shown. With this mounting the window can be assembled very quickly in the door or like body element to permit the expansion and contraction of the mechanism in the plane of FIG. 1, as well as the deflection or tilting of the assembly in the plane of FIG. 2 (see point **3**, FIG. 2) since the plane of the glass pane is at an angle relative to the plane in which the component elements of the balancing device are mounted, this last-mentioned plane varying furthermore during the operation of the device.

The upper and lower arms **2**, **5** are pivotally interconnected at **9**. A tension spring **10** has one end anchored to the lower end of the lower arm **5** and its other end attached to one end of a flexible spring extension member **11** transmitting the effort to the upper arm **2**.

This flexible extension member has its upper end attached in turn to a suitable hook-shaped portion of a variable-contour cam **12** solid with the upper arm **2**, as clearly shown in the drawing. A stop **13** secured on the upper arm **2** is adapted to engage a corresponding projection of the lower arm **5** to limit the downward stroke of the glass pane.

From the foregoing and as clearly shown in the drawing it is apparent that the flexible spring extension **11**, by passing over a grooved portion of the cam, will constantly apply the spring effort tangentially to this cam, the cam contour being such that, as the lever arm through which the spring tension acts upon the cam-carrying arm is variable, the vertical effort exerted by the balancing device will remain constant irrespective of variations in the tension which may occur during the glass travel.

As the glass pane is practically balanced in all its vertical positions, it is not necessary to provide some device for locking the glass pane in position, the frictional engagement between the glass surface and the external weather strip usually provided on the door or like body element for sealing the joint between these elements being sufficient to resist any movements likely to be originated by jolts and vibration during the operation of the vehicle. However, an additional friction device consisting of a washer **14** of nylon or like material, associated with a spring washer **15** for exerting a complementary braking action in the pivotal connection **9**, may be provided.

Of course, two devices not within the scope of this invention (and therefore omitted from the drawing) should preferably be provided, that is, on the one hand, a locking system to prevent a thief from lowering the window from the outside when the window is closed completely, and on the other hand a window control button or lug to be secured on the upper portion of the window by cementing or by means of a screw passing through the glass pane.

It will readily occur to anybody conversant with the art that many modifications may be brought to the form of embodiment shown and described herein without departing from the spirit and scope of the invention as set forth in the appended claim.

I claim:

A device for statically balancing a glass pane slidably supported in an automotive vehicle body by a pane supporting member fixed to the lower edge of said glass pane, said device comprising a first double yoke member fixed to said supporting member, an upper arm having at its upper end a transverse pin engaging said yoke member, to form a pivot therebetween with relative lateral movement of said upper arm with respect to said yoke member, a variable-contour cam provided on the lower end of said upper arm, a second double yoke member fixed to the vehicle body in a plane offset from the plane of the glass pane, a lower arm having at its lower end a transverse pin engaging said second yoke member, to form a pivot therebetween with relative lateral movement of said lower arm with respect to said second yoke member, the lower end of said upper arm and the upper end of said lower arm pivotally interconnected at a common pivot point having friction means operatively coupled thereto, to thereby exert a braking action at the common pivot point, a tension spring having one end anchored to the lower end of said lower arm and the other end attached to said variable-contour cam to apply a constant balancing effort on said glass pane in all its vertical positions the resultant of the forces of said arms being applied approximately on the vertical of the center of gravity of the glass pane.

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