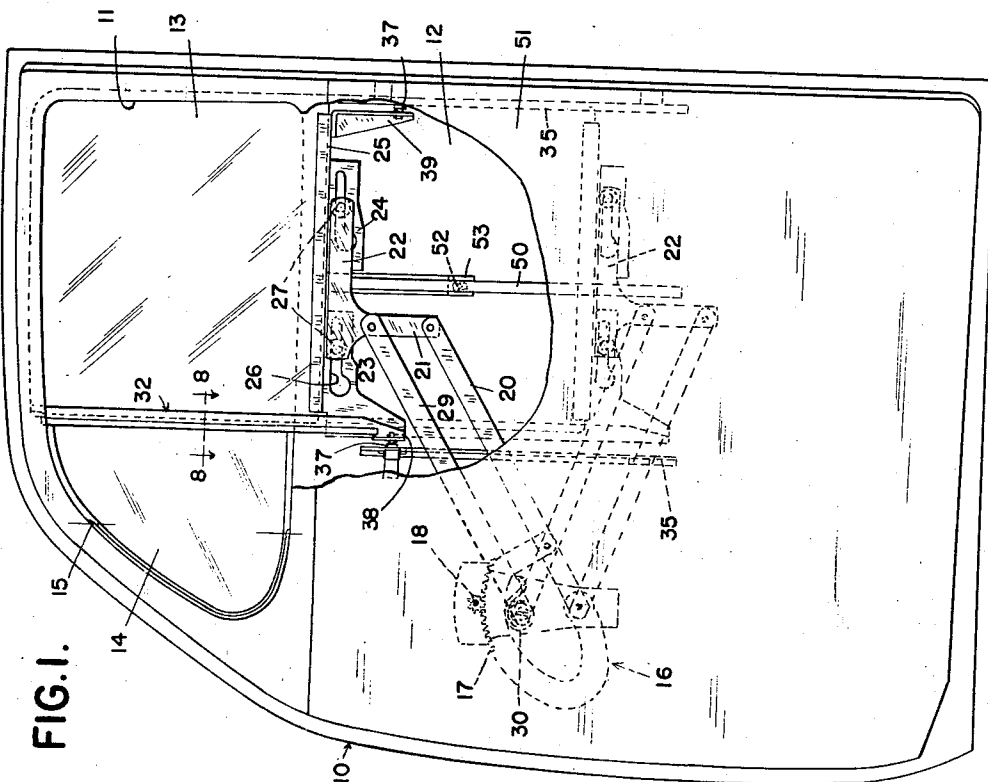
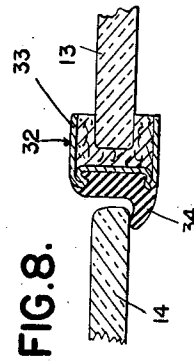
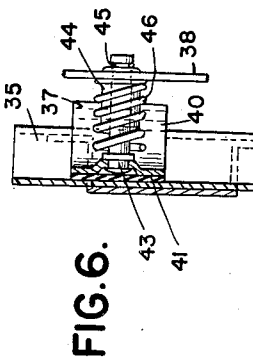
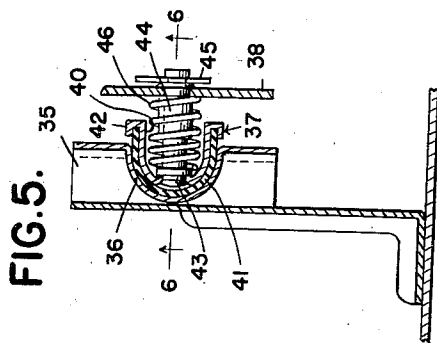


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J. G. JOACHIM
WINDOW REGULATOR
Filed May 27, 1940

2,304,640

2 Sheets-Sheet 1



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WINDOW REGULATOR

Filed May 27, 1940

2 Sheets-Sheet 2

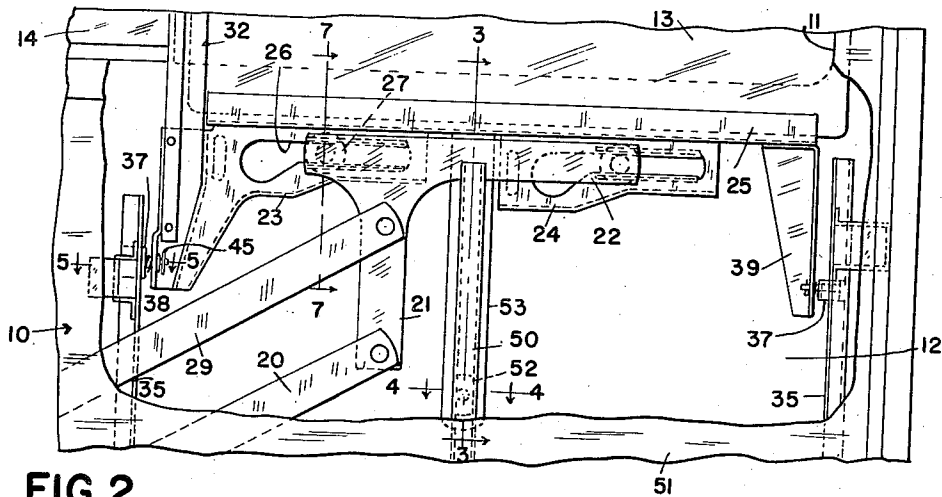


FIG. 2.

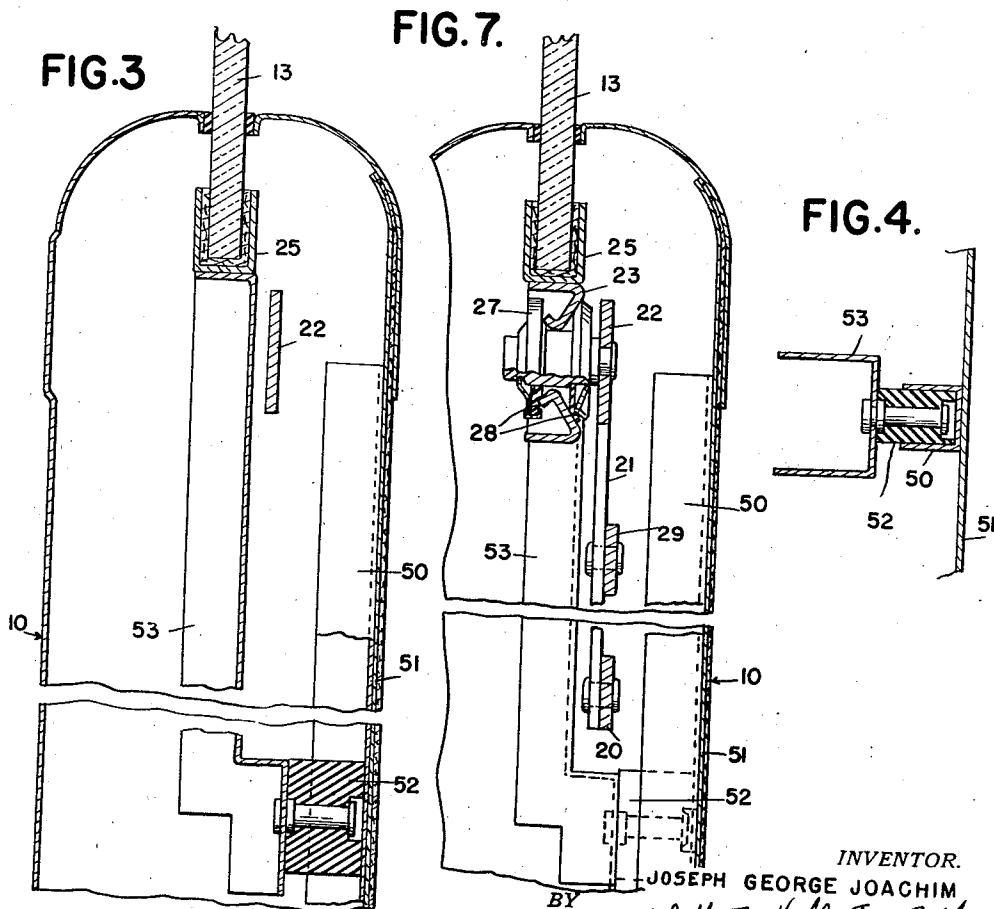


FIG. 3

FIG. 7.

FIG. 4.

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2,304,640

WINDOW REGULATOR

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Application May 27, 1940, Serial No. 337,505

7 Claims. (Cl. 296—44.5)

This invention relates generally to window assemblies for vehicle bodies and refers more particularly to improved guide means for the vertically slidable closure panels of window assemblies.

One of the principal objects of the present invention is to provide guide means for the vertically slidable closure panel rendering it possible to reduce the effort required to effect sliding movement of the panel to a minimum and having provision for insuring free sliding movement of the closure throughout its path of travel regardless of slight manufacturing inaccuracies or irregularities that may be present in the guides.

Another object of this invention resides in the provision of guide means having a pair of vertically extending guides respectively supported adjacent opposite vertical edges of the closure and having shoes carried by the closure in positions to slidably engage the guides throughout the path of travel of the closure.

Another object of this invention which contributes materially to reducing the friction between the guides and shoes consists in insulating the shoes from metallic contact with the guides by means of a lubricant impregnated non-metallic material having a low coefficient of friction. This arrangement not only provides for reducing the friction between the relatively slidable parts, but also insures obtaining quiet operation.

A further object of this invention resides in the provision of guide means of the type set forth above wherein the shoes are mounted on the closure panel for sliding movement toward and away from the guides and wherein yieldable means is provided for normally urging the shoes into frictional engagement with said guides. As a result of this construction, manufacturing inaccuracies and irregularities in the guides are automatically compensated for and binding of the parts during movement of the closure panel is eliminated.

In addition to the foregoing, the present invention contemplates additional guiding means for the closure panel having provision for preventing shifting movement of the closure panel transversely of the path of travel during its vertical sliding movement.

The foregoing, as well as other objects, will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings, wherein:

Figure 1 is an elevational view of the inner side of a door of a vehicle body equipped with a

window assembly constructed in accordance with this invention;

Figure 2 is an enlarged side elevational view of a portion of the window assembly shown in Figure 1;

Figure 3 is a sectional view taken substantially on the plane indicated by the line 3—3 of Figure 2;

Figure 4 is a sectional view taken substantially on the plane indicated by the line 4—4 of Figure 2;

Figure 5 is a cross sectional view taken substantially on the plane indicated by the line 5—5 of Figure 2;

Figure 6 is a sectional view taken on the line 6—6 of Figure 5;

Figure 7 is a sectional view taken on the plane indicated by the line 7—7 of Figure 2;

Figure 8 is a cross sectional view taken on the plane indicated by the line 8—8 of Figure 1.

For the purpose of illustration, I have shown this invention in connection with a ventilating window assembly mounted in a door of a vehicle body, although it will be understood as this description proceeds that certain features of the invention are applicable to window assemblies regardless of whether they are of the window ventilating type and irrespective of whether they are mounted in a door of the vehicle body or some other part of the latter.

With the above in mind, reference is now made to Figure 1 of the drawing wherein the reference character 10 designates a vehicle body door having the usual window opening 11 through the upper end thereof and having a well 12 beneath the window opening. In the present instance, the window opening 11 is closed by a ventilating window assembly comprising a vertically slidable closure panel 13 and a pivoted panel 14. The closure panel 13 is mounted in the rear portion of the window opening 11 for vertical sliding movement from a closed position in the window opening to a position within the well 12 and the panel 14 is pivotally mounted in the front portion of the window opening for swinging movement about a substantially vertical axis 15 located between the front and rear edges of the panel 14.

The two panels are located in a common vertical plane when in their closed positions and cooperate with one another to completely close the window opening 11 in the door 10. Any suitable means (not shown) may be provided for adjusting the pivoted panel 14 about the vertical axis 15 to extend the portion of the panel in advance of the

axis inwardly and to extend the portion of the panel in rear of this axis outwardly. As a result, an exchange of air is obtained between the interior of the vehicle body and the atmosphere exteriorly of the body. The vertically slidable panel 13 is moved relative to the pivoted panel 14 by means of a window regulator 16 mounted on the door structure in advance of the path of travel of the vertically slidable panel 13. Although various different types of window regulator mechanisms may be employed for actuating the vertically slidable panel 13, nevertheless, for the purpose of illustration, I have shown the regulator mechanism as comprising the usual gear segment 17 and actuating pinion 18 meshing with the teeth on the segment. The pinion 18 is rotated by a suitable operating handle (not shown) and the gear segment is connected to the lower edge of the glass panel 13 by means of an operating arm 20.

More particularly, the free end of the arm 20 is pivotally connected to a bracket 21 having a horizontal portion 22 connected to the lower end of the closure panel 13 for sliding movement transversely of the vertical path of travel of the panel. In the present instance, the horizontal portion 22 of the bracket is slidably connected to a pair of plates 23 and 24 secured to the bottom edge of the usual glass retaining channel 25 which, in turn, is secured to the lower edge of the closure 13. Each of the plates 23 and 24 is formed with a horizontal slot 26 therethrough for respectively slidably receiving the stud assemblies 27 secured to opposite ends of the horizontal portion 22 of the bracket 21. The lengths of the slots 26 are predetermined to compensate for the swinging movement of the free end of the regulator arm 20 when the latter is actuated by the gear segment 17 and, accordingly, binding of the parts is prevented during operation of the window regulator mechanism to effect sliding movement of the closure panel 13. In fact, the stud assemblies 27 are shown in Figure 7 as having lubricant impregnated leather washers 28 positioned to engage the adjacent sides of the plates 23 and 24 to reduce the friction to the minimum and thereby facilitate operation of the regulator mechanism to effect sliding movement of the closure panel 13. It may also be pointed out at this time that the weight of the closure assembly is counterbalanced to assist raising the closure by means of a second arm 29 supported in parallel relationship to the arm 20 with the opposite ends respectively pivotally connected to the bracket 21 and to the support for the gear segment 17 of the window regulator mechanism. A suitable counterbalancing spring 30 of the clock type is positioned in operative relationship to the arm 29 tending to raise the closure assembly 13.

Upon reference to Figure 8, it will be noted that the space between the front edge of the vertically slidable panel 13 and the rear edge of the pivoted panel 14 is sealed in the closed position of both panels by means of a division bar 32 secured to the front edge of the closure panel 13. The division bar 32 has a rearwardly opening channel-shaped portion 33 for receiving the forward edge of the closure panel 13 and has a flange 34 projecting forwardly from the base of the channel-shaped portion 34 at the inner side of the window opening. The flange 34 forms an abutment for the swinging edge of the pivoted panel 14 and serves to locate the latter in its closed position in the window opening.

In window assemblies of the type briefly described above, it is desirable to effectively guide

the vertically slidable glass panel 13 throughout its path of travel and to obtain this result without substantially increasing the resistance to sliding movement of the closure. In the present instance, the foregoing is accomplished by securing a pair of vertical guides 35 in the window well 12 of the vehicle body in positions at opposite sides of the path of vertical travel of the closure panel 13. Upon reference to Figure 5, it will be noted that each guide 35 is fashioned with an inwardly opening substantially semi-circular recess 36 extending for substantially the full length of the guide and adapted to receive a shoe 37. The shoe 37 engaging in the recess 36 in the front guide 35 is secured to a downwardly extending projection 38 on the forward end of the plate 23 and the shoe engaging the rear guide 35 is mounted on the lower end of a bracket 39 in alignment with the front shoe. The upper end of the bracket 39 is secured to the glass retaining channel 25 and, accordingly, both shoes are carried by the closure panel 13 for movement as a unit therewith.

Referring again to Figure 5 of the drawing, it will be noted that each shoe comprises a semi-circular body portion 40 adapted to extend into the recess 36 in the adjacent guide 35 and having a strip of non-metallic material 41 secured to the outer surface thereof by crimping the edges 42 of the body over the material. The material 41 on the shoes slidably engages the inner surfaces of the recesses 36 in the guides and this material has a relatively low coefficient of friction. Particularly satisfactory results have been secured by utilizing a lubricant impregnated leather, although, of course, other materials may be employed.

It is important to note that the guides 35 are free from frictional contact with the opposite vertical edges of the closure in all positions of the latter. The guiding function is accomplished solely by the surface engagement between the shoes 37 and the guides 35. Thus, the friction is not only relatively small but is uniform throughout the entire movement of the closure panel 13.

The body portion 40 of each shoe is secured to the outer end of a stud 43 slidably mounted in a bushing 44. The inner end of the stud 43 on each shoe projects beyond the corresponding end of the bushing and is provided with an annular groove for receiving a clip 45 engageable with the outer end of the bushing to limit the extent of inward movement of the stud relative to the bushing. The inner end of the bushing 44, associated with the shoe at the front side of the path of travel of the closure 13, is provided with a reduced portion extending through an opening formed in the bracket 38 and is peened or riveted over the inner side of the bracket to permanently secure the bushing to the bracket. The bushing 44, associated with the shoe at the rear side of the path of travel of the closure 13, is also formed with a reduced portion at the inner end extending through the bracket 39 and riveted over the inner side of this bracket to permanently secure the shoe to the latter bracket.

The body portions 40 of the shoes are yieldably urged in an outward direction to frictionally engage the lining material 41 with the inner surfaces of the recesses 36 in the guides by means of coil springs 46. The coil springs 46 respectively surround the bushings 44 of the shoes and the outer ends of the coil springs extend into the body portions 40 of the shoes in abutting engagement with the inner surfaces of the body portions. The inner ends of the coil

springs respectively about the brackets 33 and 39. As a result, the coil springs maintain the shoes in sliding engagement with the inner surfaces of the semi-circular recesses 36 in the guides 35 and permit limited shifting movement of the closure in the plane of the latter to compensate for any irregularities that may be present in the guides.

In addition to the foregoing, a channel-shaped guide 50 is secured to the inner door panel 51 in a position substantially midway between the guides 35 and has a length approximating the length of the guides 35. As shown in Figure 3, the guide 50 slidably engages a follower 52 secured to the lower end of a bracket 53 having the upper end thereof fixed to the glass retaining channel 25 at a point between the plates 23 and 24. It will be noted from the above figure that the bracket 53 is spaced a sufficient distance laterally outwardly from the channel guide 50 to provide the clearance required for the window regulator arms 20 and 29. The purpose of the guide 50 is to insure a substantially straight line movement of the vertically slidable glass panel 13 throughout its path of travel.

Thus, from the foregoing, it will be observed that I have provided a relatively simple and inexpensive guide means for the vertically movable closure panel of a window assembly. It will also be apparent that my improved guide means effectively controls the path of travel of the closure panel with the minimum amount of friction between the relatively movable parts and without any danger of binding of the parts during movement of the closure. As a result, the closure may be readily moved throughout its path of travel with the minimum amount of effort.

What I claim as my invention is:

1. In a vehicle body having a window opening, a vertically slidable closure panel for the window opening, a well located below the closure panel for receiving the latter when it is lowered from the position thereof in the window opening, a pair of vertically extending guide members located in said well with one member positioned adjacent one vertical edge of the closure and with the other member positioned adjacent the opposite vertical edge of the closure, said guide members being free from frictional contact with the adjacent side edges of the closure in all positions of the latter and a pair of shoes respectively carried by the closure at opposite side edges of the latter in positions adjacent the guides and having a relatively small area slidably engageable with the guide members.

2. In a vehicle body having a window opening, a vertically slidable closure panel for the window opening, a well located below the closure panel for receiving the latter when it is lowered from the position thereof in the window opening, a pair of vertically extending guide members located in said well with one member positioned adjacent one vertical edge of the closure and with the other member positioned adjacent the opposite vertical edge of the closure, said guide members being free from frictional contact with the adjacent side edges of the closure in all positions of the latter and transversely curved to form an arcuate guiding surface, a pair of shoes respectively carried by the closure in positions adjacent the guide members and having transversely curved portions of relatively small area extending into the trans-

versely curved portions of the guide members, and facings of non-metallic material secured to the shoes and slidably engageable with the arcuate guiding surfaces on said members.

3. In a vehicle body having a window opening, a vertically slidable closure panel for the window opening, a well located below the closure panel for receiving the latter when it is lowered from the position thereof in the window opening, a pair of vertically extending guide members located in the well with one member positioned adjacent one vertical edge of the closure and with the other member positioned adjacent the opposite vertical edge of the closure, said guide members being free from frictional contact with the closure panel in all positions of the latter and having inwardly opening longitudinally extending recesses provided with transversely curved guiding surfaces, a pair of shoes respectively carried by the closure in positions adjacent the guide members and having transversely curved portions of relatively small area respectively extending into the recesses in the guide members to cooperate with the latter in guiding the closure panel throughout its vertical movement.

4. In a vehicle body having a window opening, a vertically slidable closure panel for the window opening, a well located below the closure panel for receiving the latter when it is lowered from the position thereof in the window opening, a pair of vertically extending guide members located in the well with one member positioned adjacent one vertical edge of the closure and with the other member positioned adjacent the opposite vertical edge of the closure, said guide members being free from frictional contact with the closure panel in all positions of the latter and having inwardly opening longitudinally extending recesses provided with transversely curved guiding surfaces, a pair of shoes respectively carried by the closure in positions adjacent the guide members and supported for movement toward and away from the guide members, said shoes having transversely curved arcuate portions of relatively small area respectively extending into the recesses in the guide members, a material having a relatively low coefficient of friction secured to the transversely curved portions of the shoes and slidably engageable with the arcuate guiding surfaces on said members, and yieldable means normally urging the shoes in a direction to maintain the material on the shoes in frictional engagement with the guide members.

5. In a vehicle body having a window opening, a vertically slidable closure panel for the window opening, a well located below the closure panel for receiving the latter when it is lowered from the position thereof in the window opening, a pair of vertically extending guide members located in said well with one member positioned adjacent one vertical edge of the closure and with the other member positioned adjacent the opposite vertical edge of the closure, the locations of the guide members relative to the closure being such that the guide members are free from frictional contact with the closure in all positions thereof, a bracket secured to the bottom edge of the closure and having a depending extension, a shoe mounted on the extension and having a relatively small area slidably engageable with the adjacent guide member, a second shoe also carried by the closure and having a relatively small area engage-

able with the other guide member, and window regulator mechanism having an operating arm connected to said bracket.

6. In a vehicle body having a window opening, a vertically slidable closure panel for the window opening, a well located below the closure panel for receiving the latter when it is lowered from the position thereof in the window opening, a pair of vertically extending guide members located in said well with one member positioned adjacent one vertical edge of the closure and with the other member positioned adjacent the opposite vertical edge of the closure, the locations of the guide members relative to the closure being such that the guide members are free from frictional contact with the closure in all positions thereof, a bracket secured to the bottom edge of the closure and having a depending extension, a shoe mounted on the depending extension of the bracket for sliding movement toward and away from one of the guide members, a second shoe also carried by the closure panel for sliding movement toward and away from the other guide member, yield-

able means normally urging the shoes into engagement with their respective guide members, and window regulator mechanism having an operating arm slidably connected to said bracket.

7. In a vehicle body having a window opening, a vertically slidable closure panel for the window opening, a well located below the closure panel for receiving the latter when it is lowered from the position thereof in the window opening, a pair of vertically extending guide members located in said well with one member positioned adjacent one vertical edge of the closure and with the other member positioned adjacent the opposite vertical edge of the closure, the locations of the guide members relative to the side edges of the closure being such that the guide members are free from frictional contact with the side edges of the closure in all positions of the latter, and a pair of shoes spaced below the bottom edge of the closure and carried by the latter in positions adjacent the guide members and having a relatively small area slidably engageable with the guide members.

J. GEORGE JOACHIM.