

12

EUROPEAN PATENT APPLICATION

21 Application number: **88830072.0**

51 Int. Cl.4: **B 61 D 25/00**
B 61 C 17/04

22 Date of filing: **26.02.88**

30 Priority: **02.03.87 IT 6715287**

43 Date of publication of application:
07.09.88 Bulletin 88/36

84 Designated Contracting States:
AT BE CH DE ES FR GB GR IT LI LU NL SE

71 Applicant: **FIAT FERROVIARIA SAVIGLIANO S.p.A.**
Corso Ferrucci 112
I-10138 Torino (IT)

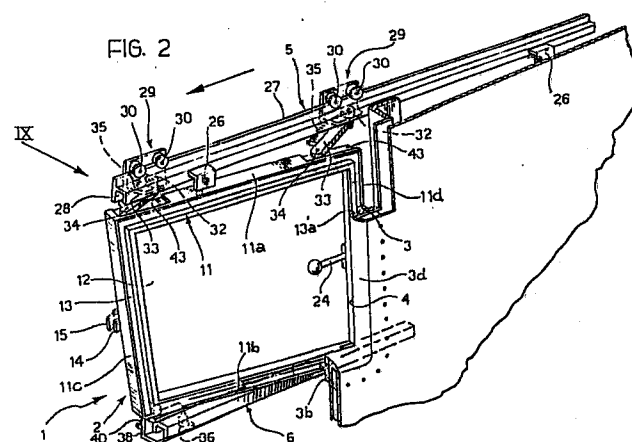
72 Inventor: **Rinaldi, Roberto**
Corso Flume, 16
I-10133 Torino (IT)

Filotto, Gliberto
Strada del Pesco, 13/A
I-10027 Testona (Torino) (IT)

74 Representative: **Buzzi, Franco et al**
c/o Jacobacci-Casetta & Perani S.p.A. Via Alfieri, 17
I-10121 Torino (IT)

54 **Side window unit for high-speed locomotives.**

57 A side window unit for high-speed locomotives (L) comprises a movable window (2), including a support frame (11) and a transparent pane (12), mounted on a pair of horizontal upper and lower guides (5,6) arranged beside an engagement frame (3) and converging towards the front part thereof. The window is slidable along the guides between a forward position in which it is situated in correspondence with the engagement frame and a rearward position, and is pivotable in the forward position between an outer position in which it is arranged parallel to the engagement frame, and an inner position in which it is arranged parallel to the guides. Manual locking means (20) are provided for sealingly closing the support frame of the window against the engagement frame in the outer position, and resilient means (35, 40) are provided for biasing the window from the outer position to the inner position.



Description

Side window unit for high-speed locomotives

The present invention relates in general to high-speed railway locomotives and its particular subject is a side window unit applicable to such locomotives.

The object of the invention is to produce a particularly functional, strong and compact side window unit which, in its closed position, is adapted to ensure effective insulation against aerodynamic noise when the locomotive is in motion.

The side window unit according to the invention is characterised in that it comprises:

- a fixed outer engagement frame defining a window opening,
- a pair of internal horizontal upper and lower guides extending respectively beside the upper part and the lower part of the engagement frame and converging towards the front part thereof,
- a movable window including a support frame and a transparent pane, the support frame having a shape complementary to that of the engagement frame and being able to be sealingly coupled therewith,
- means for sliding the window along the guides between a forward position in which the window is situated in correspondence with the window opening and a position rearward of the window opening,
- articulated connection means between the support frame of the window and the sliding means, adapted to enable the window to pivot, when it is in the forward position, between an outer closed position in which the window is arranged parallel to the engagement frame and an inner open position in which the window is arranged parallel to the guides,
- manual locking means for sealingly clamping the support frame of the window against the engagement frame in the outer closed position of the window, and
- resilient means for biasing the window from the outer position to the inner position.

Preferably, the engagement frame has a hollow receiving member in correspondence with its front part for engagement, in the manner of a hinged articulation, by an appendage projecting from the front part of the support frame when the latter is situated in the forward position, so as to enable it to pivot like a pair of compasses between the outer and inner positions, and a retaining member for preventing the appendage from coming out of the hollow receiving member, the retaining member being manually disengagable to enable the window to be moved into the rearward position.

The above sliding and connection means conveniently comprise:

- a pair of upper carriages, front and rear respectively, which are spaced apart and provided with respective support wheels with horizontal axes and guide wheels with vertical axes, in rolling engagement with the upper guides,
- a pair of pivoting arms which articulate the upper carriages to the upper part of the support frame of the window and with which respective tension springs are associated that tend to rotate the arms

in the sense corresponding to the inner position of the window,

- a lower front carriage provided with a vertical-axis guide wheel engaged for rolling on the lower guide and connected in an articulated manner to the lower part of the support frame of the window, a tension spring being associated with the lower carriage and tending to rotate it in the sense corresponding to the inner position of the window.

Further characteristics of the invention will become clear in the course of the detailed description which follows with reference to the appended drawings, provided purely by way of non-limiting example, in which:

Figure 1 is a schematic perspective view of a high-speed locomotive provided with a side window unit according to the invention,

Figure 2 is a partially-sectioned partial perspective view showing the window unit according to the invention on an enlarged scale,

Figure 3 is a horizontal section taken on the line III-III of Figure 1 on an enlarged scale, with the opening part of the window in the forward and outer closed position,

Figure 4 is a view similar to Figure 3 with the opening part of the window in the rearward position,

Figure 5 is a section taken on the line V-V of Figure 1 on an enlarged scale, with the opening part of the window in the forward and inner position,

Figure 6 is a vertical section taken on the line VI-VI of Figure 1 on an enlarged scale, with the opening part of the window in the forward and outer position,

Figure 7 shows the detail indicated by the arrow VII in Figure 6 on an enlarged scale,

Figure 8 shows the detail indicated by the arrow VIII in Figure 6 on an enlarged scale

Figure 9 is a partial front elevational view on the arrow IX of Figure 2,

Figure 10 is a side elevational view on the arrow X of Figure 9,

Figure 11 is a section taken on the line XI-XI of Figure 9 on an enlarged scale,

Figure 12 is a section taken on the line XII-XII of Figure 9 on an enlarged scale,

Figure 13 is a section taken on the line XIII-XIII of Figure 9 on an enlarged scale, and

Figure 14 is a cross-section taken on the line XIV-XIV of Figure 1 on an enlarged scale.

With reference initially to Figure 1, a high-speed railway locomotive is schematically indicated L and is provided with a side window unit 1 according to the invention.

As can better be seen in Figures 2 to 6, the window unit 1 comprises essentially a movable window 2 fitted between a rectangular engagement frame 3 fixed to the structure of the locomotive L and defining a window opening 4, and a pair of internal horizontal guides, upper 5 and lower 6 respectively,

fixed to the inside of the structure of the locomotive L.

The engagement frame 3 has an upper part 3a facing the upper guide 5, a lower part 3b facing the lower guide 6, a front part 3c and a rear part 3d. A hollow receiving member 7, whose function will be made clear below, is fixed to the inner surface of the central region of the front part 3c (Figures 5 and 13). Furthermore, two hollow check members 8 (Figures 9, 10 and 12), whose cavities have an upper opening 9 with a horizontal axis connected to a lower portion 10 with a vertical axis, are fixed to the inner surface of the rear part 3d.

The window 2 is formed by a rectangular support frame 11 carrying a transparent pane 12 and having a shape complementary to that of the engagement frame 3, with upper, lower, front and rear parts 11a, 11b, 11c, 11d. A perimetral weather strip 13, normally of elastomeric material, is applied to the outer face of the support frame 11 and a second perimetral weather strip 13a, also of elastomeric material, is applied to the structure of the locomotive L near the engagement frame 3.

As can better be seen in Figures 5 and 13, an appendage 14 is fixed to the central region of the front part 11c and is shaped so as to engage in the hollow receiving member 7 in the manner of a hinged articulation, as explained below. In effect, the width of the appendage 14 is less than that of the cavity of the receiving member 7, so as to permit angular movement of the former relative to the latter.

In correspondence with the appendage 14, the part 11c of the support frame 11 carries a manually-operated retaining member 15 articulated centrally to the frame 11 at 16 and having a rear end forming an operating handle 17 and a front end defining a catch 18 adapted frontally to engage the receiving member 7. A helical compression spring 19 tends to hold the retaining member 15 in the locked position illustrated in Figures 5 and 13, while it may be unlocked to disengage the catch 18 from the receiving member 7 by pressing manually on the handle 17.

As can better be seen in Figures 9 to 11, a locking unit, generally indicated 20, is fixed to the rear part 11d of the support frame 11 and includes a support structure 21 within which is slidable a rack bar 22 arranged parallel to the part 11d and meshed with a sprocket wheel 23 rotated by a manual operating lever 24 situated on the inside of the window 2. At its ends, the bar 22 carries two horizontal locking pins 25 which can be moved vertically due to the movement of the rack bar 22 to engage or disengage the two check members 8 fixed to the rear part 3d of the engagement frame 3. In the raised position of the rack bar 22 illustrated in Figures 9 and 12, the two pins 25 are arranged in correspondence with the openings 9 of the two check members 8, so as to enable the window 2 to be disengaged from the frame 3. The lowering of the bar 22 by means of a corresponding rotation of the control lever 24 causes the stop pins 25 to be positioned in correspondence with the lower regions 10 of the cavities of the check members 8, thus preventing the separation of the window 2 from the engagement

frame 3.

Returning now to Figures 2 to 6 and 14, it can be seen that the two guides 5 and 6 extend respectively beside the upper part 3a and the lower part 3b of the engagement frame 3, forming an angle therewith: in effect, the guides 5 and 6 converge relative to the frame 3 towards its front part 3c. With reference in more detail to Figures 6 and 7, the upper guide 5 is fixed to the structure of the locomotive L by means of L-shaped brackets 26 and, in cross-section, has a generally h-shaped profile defining an upper support rail 27 and a lower guide rail 28.

Two spaced-apart carriages 29 are slidable along the guide 5 and each carries a pair of grooved wheels 30 with horizontal axes, arranged to rest and roll on the upper support rail 27, and a guide wheel 31 with a vertical axis, arranged in rolling contact within the guide rail 28.

Articulated about the axis 32 of the guide wheel 31 of each carriage 29 is one end of a pivoting arm 33 whose opposite end is articulated about a vertical pin 34. The two pins 34 are carried on the upper part 11a of the support frame 11 of the window 2 in correspondence with recesses 43 formed near the front part 11c and the rear part 11d of this frame 11, respectively. A respective helical tension spring 35 is anchored between that end of each pivoting arm 33 which is articulated to the frame 11 and the respective carriage 29. The springs 35 tend to rotate the corresponding arms 33 in a clockwise sense with reference to Figures 2 and 3, that is, in the sense corresponding to movement of the window 2 away from the engagement frame 3 or towards the guide 5.

Referring now in greater detail to Figures 6, 8 and 14, the lower guide 6 is slightly offset outwardly relative to the upper guide 5 and has the general shape of an inverted U in cross-section. This lower guide 6 is shorter than the upper guide 5 and slightly longer than the window opening 4. It is fixed to the structure of the locomotive L by means of brackets 37 (Figure 14) and arranged in rolling contact within it is a vertical-axis guide roller 36 carried by a carriage 38 articulated about a vertical pin 39 to the lower part 11b of the support frame 11 of the window 2. A helical tension spring 40 anchored between the carriage 38 and a support 41 fixed to the lower part 11b of the frame 11 tends to rotate the carriage 38 about the axis of the guide roller 36 in a clockwise sense with reference to Figures 2 and 14.

The operation of the window unit 1 according to the invention will now be described with reference to Figures 3 to 6 and 14.

In brief, the window 2 is slidable on the guides 5 and 6, by means of the carriages 29 and 38, between a forward position, illustrated in Figures 3, 5, 6 and in continuous outline in Figure 14, in which it is situated in correspondence with the window opening 4, and a position rearward of this window opening 4, shown in Figure 4 and in broken outline in Figure 14. Furthermore, in the forward position, the window 2 can pivot like a pair of compasses between an outer closed position, illustrated in Figures 3 and 6, in which it is parallel to and in contact with the engagement frame 3, and an inner open position,

illustrated in Figure 5, in which it is parallel to the guides 5 and 6 and the rear part 11d of its support frame 11 is spaced from the corresponding rear part 3d of the engagement frame 3.

In the forward, outer, closed position of Figures 3, 6 and 14 (continuous outline), the window 2 is situated in correspondence with the window opening 4 with the support frame 11 sealingly coupled against the engagement frame 3 by means of the weather strips 13 and 13a. The window 2 is held in this position at the front by means of the engagement of the appendage 14 in the receiving member 7, and at the rear by means of the engagement of the pins 25 in the lower portions 10 of the check members 8.

In order to change from the outer closed position to the partially open inner position illustrated in Figure 5, it is only necessary to unlock the pins 25 by operating the lever 24, positioning them in correspondence with the upper portions 9 of the check members 8. Due to this operation, the resilient action of the springs 35 causes the arms 33 to rotate in a clockwise sense with reference to Figure 3, so as to make the window 2 pivot like a pair of compasses about the hinged articulation constituted by the appendage 14 and the receiving member 7 until it is situated substantially parallel to the guides 5 and 6. In this position, illustrated as stated in Figure 5, the window opening 4 is partially open.

In order to move the window 2 from this position towards the rearward position illustrated in Figure 4 and in broken outline in Figure 14, so as to clear the window opening 4 completely, it is only necessary to unlock the retaining member 15 manually against the action of the spring 19 to disengage the catch 18 from the receiving member 7. Thus, operation of the handle 17 then enables the window 2 to slide along the guides 5 and 6, by means of the carriages 29 and 38, until it reaches the rearward position.

In order to bring the window 2 back to the forward position, it is obviously necessary to move it in the opposite direction until the catch 18 of the retaining member 15 automatically snap-engages the receiving member 7. To return from the inner open position to the forward position in which the window opening 4 is completely closed, it is only necessary to push the rearward side of the window 2 outwardly and then operate the control lever 24 to bring the pins 25 back into the lower portions 10 of the check members 8.

Claims

1. A side window unit for high-speed locomotives, characterised in that it comprises:

- a fixed outer engagement frame (3) defining a window opening (4),
- a pair of internal horizontal upper and lower guides (5,6) extending respectively beside the upper part (3a) and the lower part (3b) of the engagement frame (3) and converging towards the front part (3c) thereof,

- a movable window (2) including a support frame (11) and a transparent pane (12), the support frame (11) having a shape complementary to that of the engagement frame (3) and being able to be sealingly coupled therewith,

- means (29, 38) for sliding the window (2) along the guides (5, 6) between a forward position in which the window (2) is situated in correspondence with the window opening (4) and a position rearward of the window opening (4),

- articulated connection means (32, 33, 34, 38, 39) between the support frame (11) of the window (2) and the sliding means (29, 38), adapted to enable the window (2) to pivot, when it is in the forward position, between an outer closed position in which the window (2) is arranged parallel to the engagement frame (3) and an inner position in which the window is arranged parallel to the guides (5,6),

- manual locking means (20) for sealingly clamping the support frame (11) of the window (2) against the engagement frame (3) in the outer closed position of the window (2), and

- resilient means (35, 40) for biasing the window (2) from the outer closed position to the inner open position.

2. A window unit according to Claim 1, characterised in that the engagement frame (3) has a hollow receiving member (7) in correspondence with its front part (3c) for engagement, in the manner of a hinged articulation, by an appendage (14) projecting from the front part (11c) of the support frame (11) of the window (2) when the latter is situated in the forward position, so as to enable it to pivot like a pair of compasses between the outer and inner positions, and a retaining member (15) for preventing the appendage (14) from coming out of the hollow receiving member (7), the retaining member (15) being manually disengageable to enable the window to be moved into the rearward position.

3. A window unit according to Claim 1, characterised in that the sliding means and the connection means comprise:

- a pair of upper carriages (29), front and rear respectively, which are spaced apart and provided with respective support wheels (30) with horizontal axes and guide wheels (31) with vertical axes, in rolling engagement with the upper guide (5),

- a pair of pivoting arms (33) which articulate the upper carriages (29) to the upper part (11a) of the support frame (11) of the window (2) and with which are associated respective tension springs (35) tending to rotate the arms (33) in the sense corresponding to the inner open position of the window (2),

- a lower front carriage (38) provided with a vertical-axis guide wheel (36) engaged for rolling in the lower guide (6) and connected in an articulated manner to the lower part (11b) of the support frame (11) of the window (2), a tension spring (40) being associated with the lower carriage (38) and tending to rotate it in the

sense corresponding to the inner position of the window (2).

4. A window unit according to Claim 1, characterised in that the manual locking means include a pair of hollow check members (8) fixed to the rear part (3d) of the engagement frame (3), a pair of spaced-apart stop pins (25) movable along the rear part (11d) of the support frame (11) of the window (2) between a position of engagement with and a position of disengagement from the check members (8), the stop pins (25) being carried by a rack bar (22) slidable along the rear part (11d) of the support frame (11) of the window (2) and meshing with a rotatable sprocket wheel (23) rotated by a control lever (24),

5

10

15

20

25

30

35

40

45

50

55

60

65

5

FIG. 3

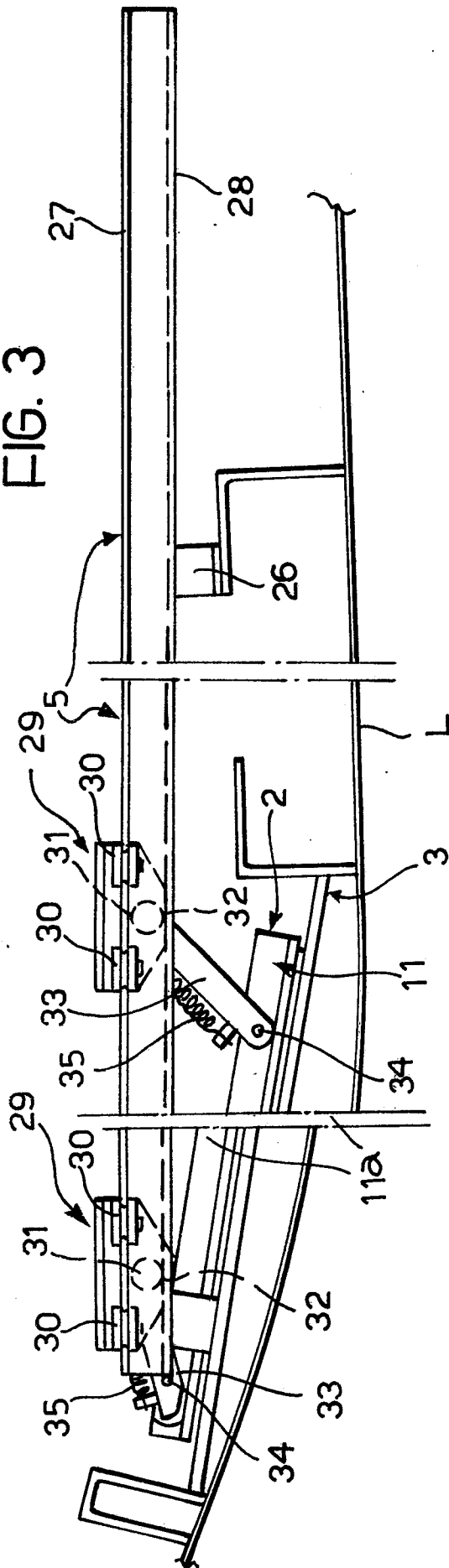


FIG. 4

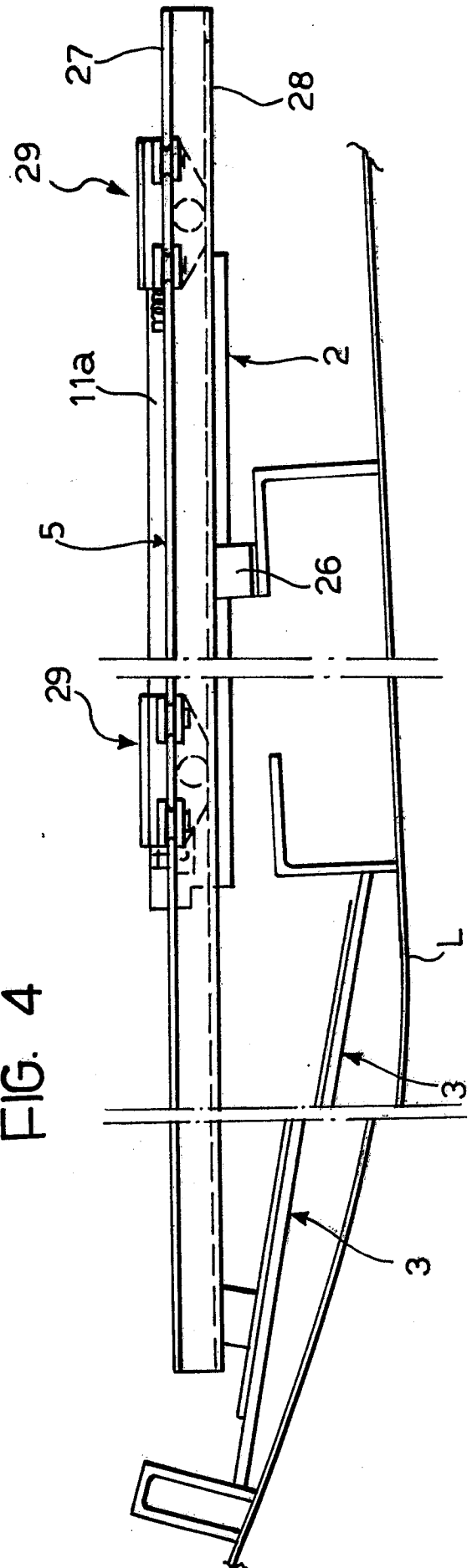


FIG. 5

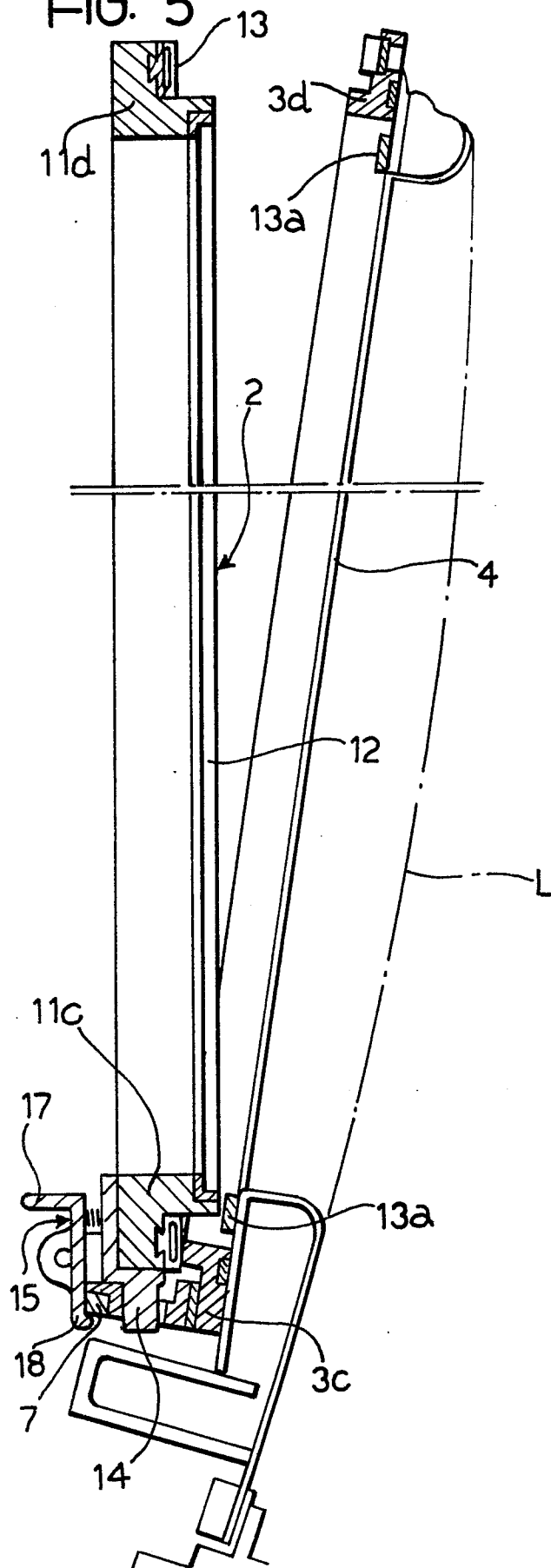
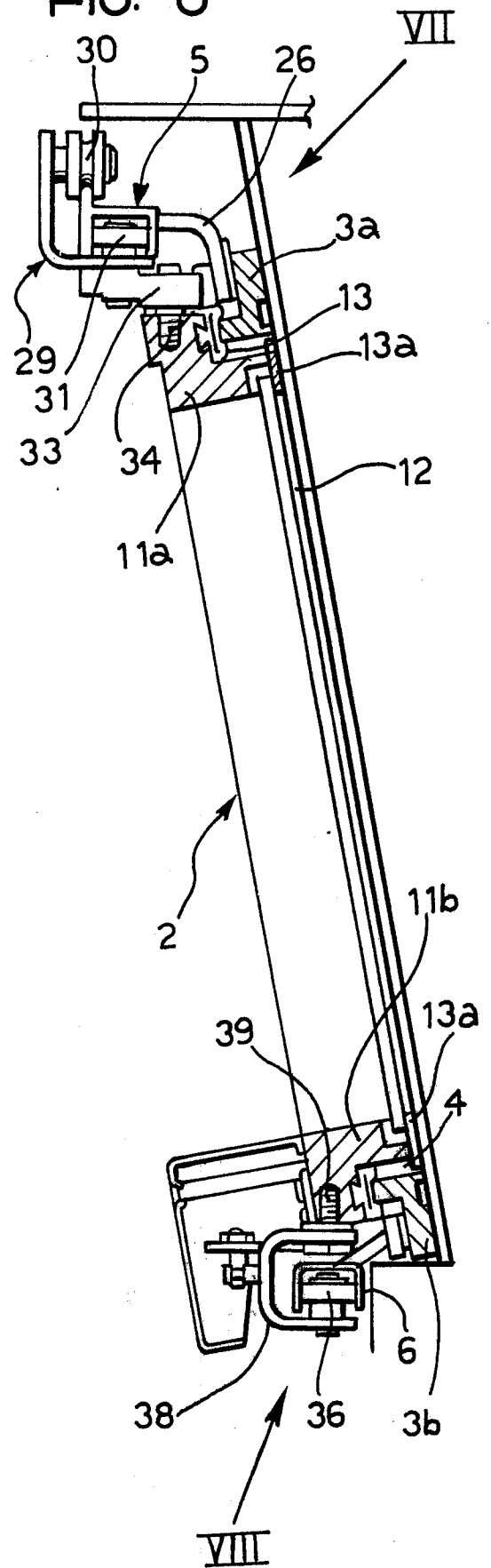
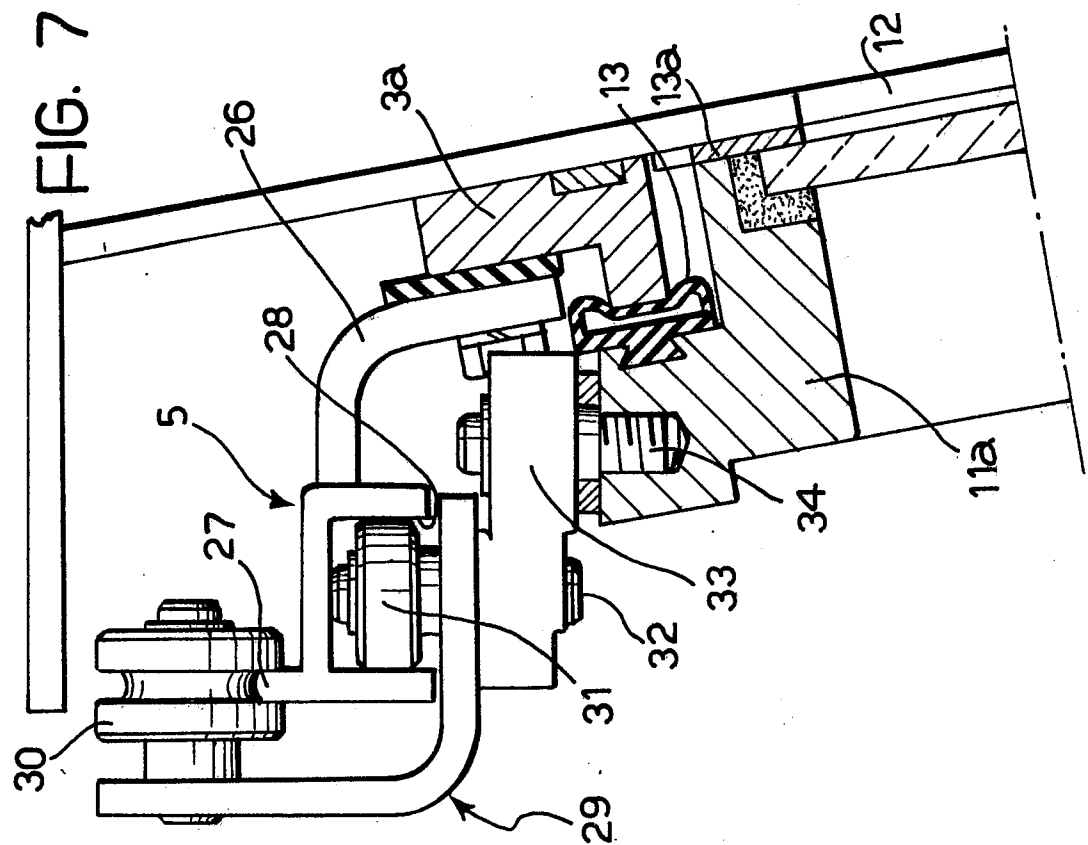
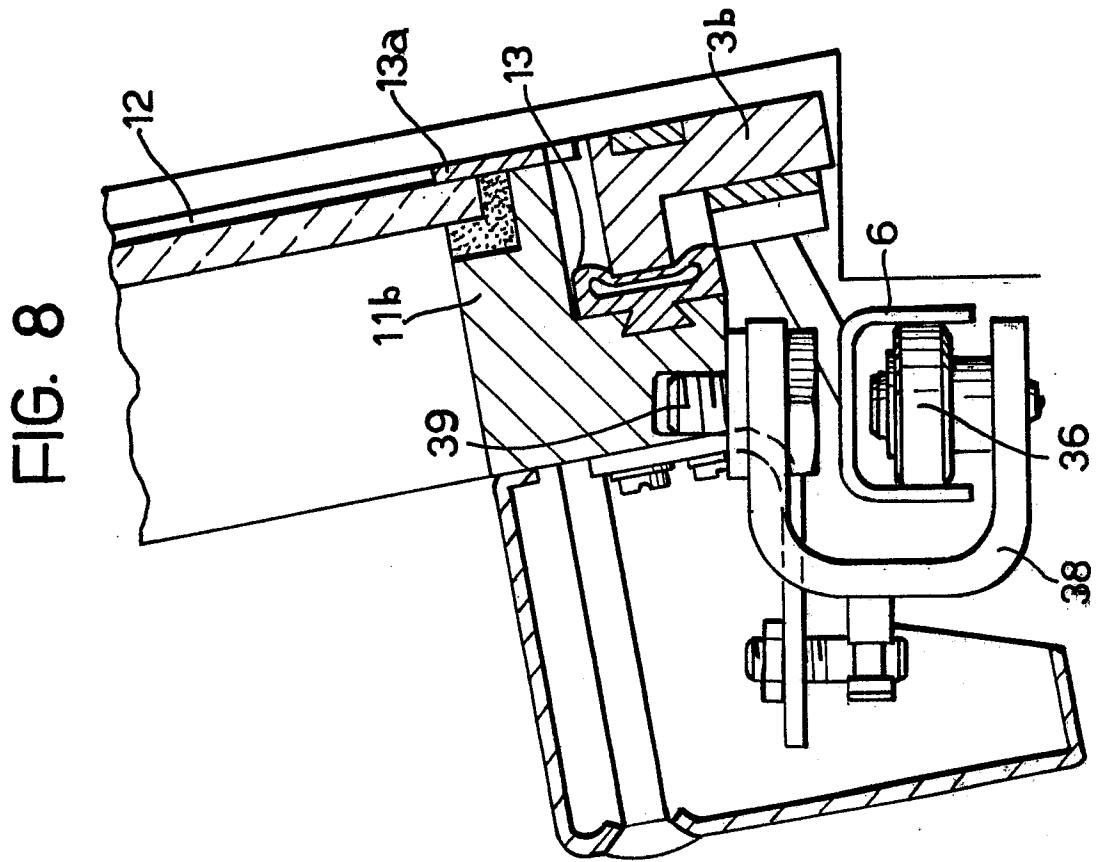


FIG. 6





0281527

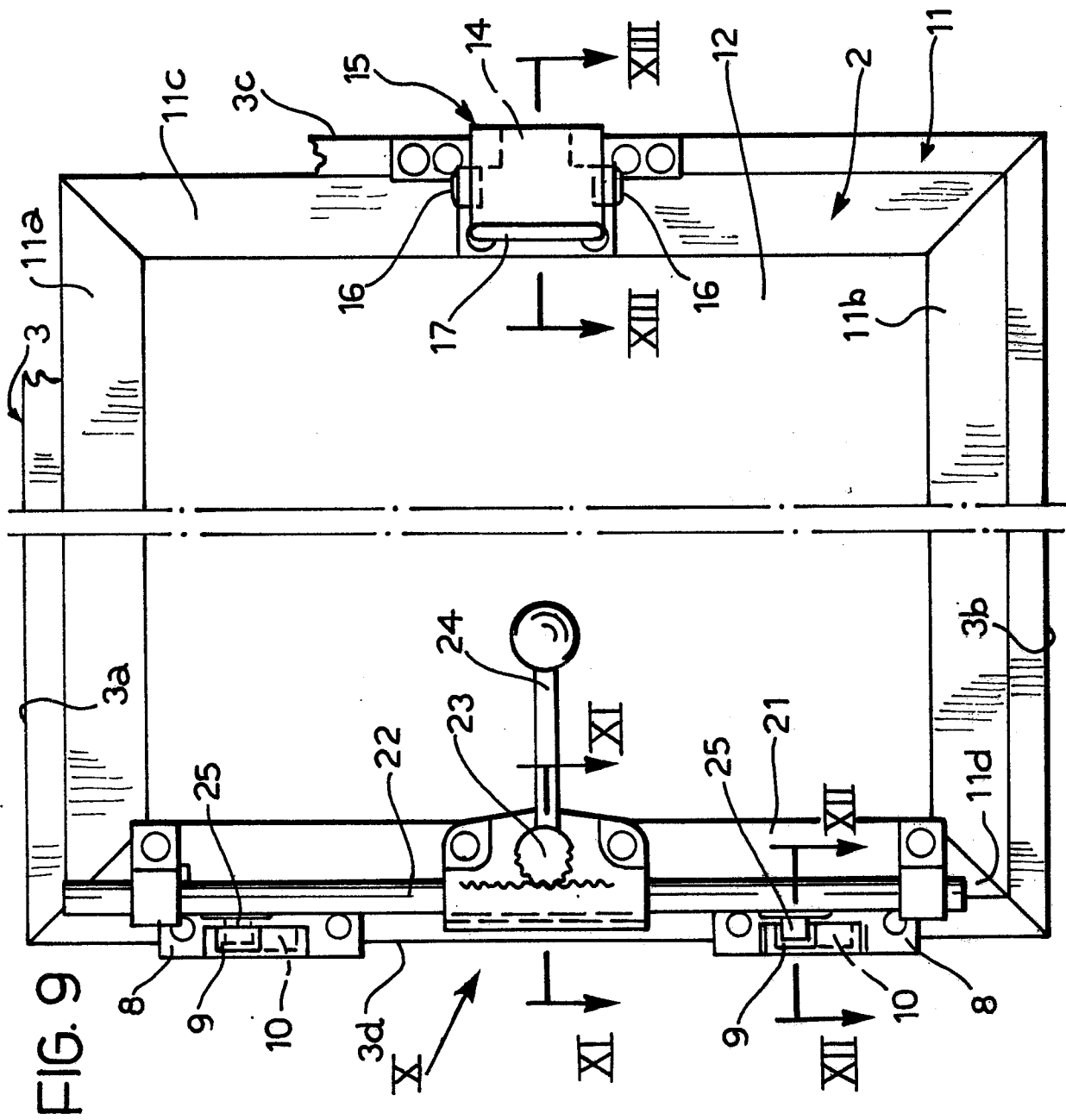
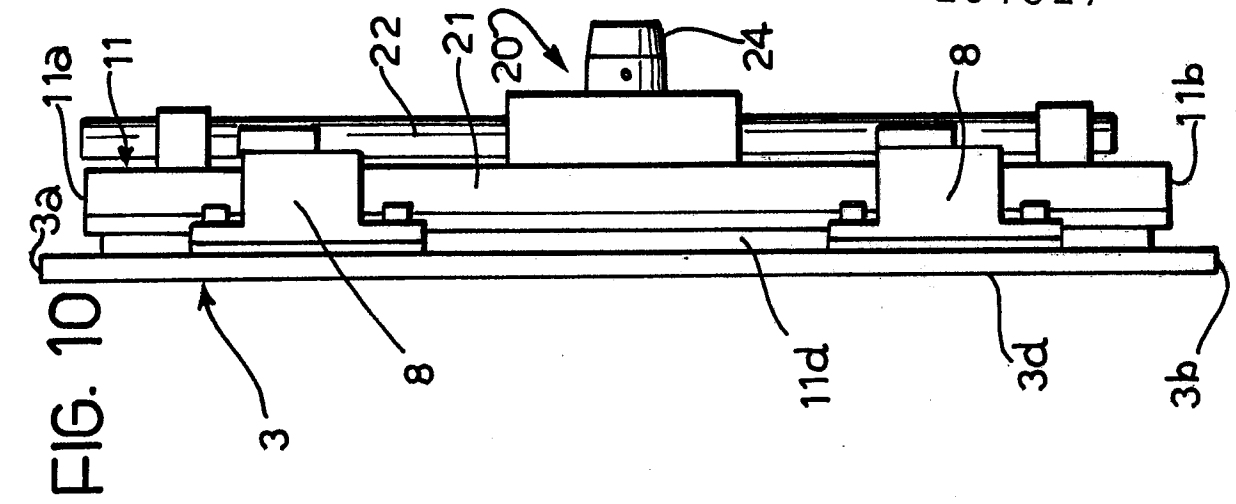


FIG. 11

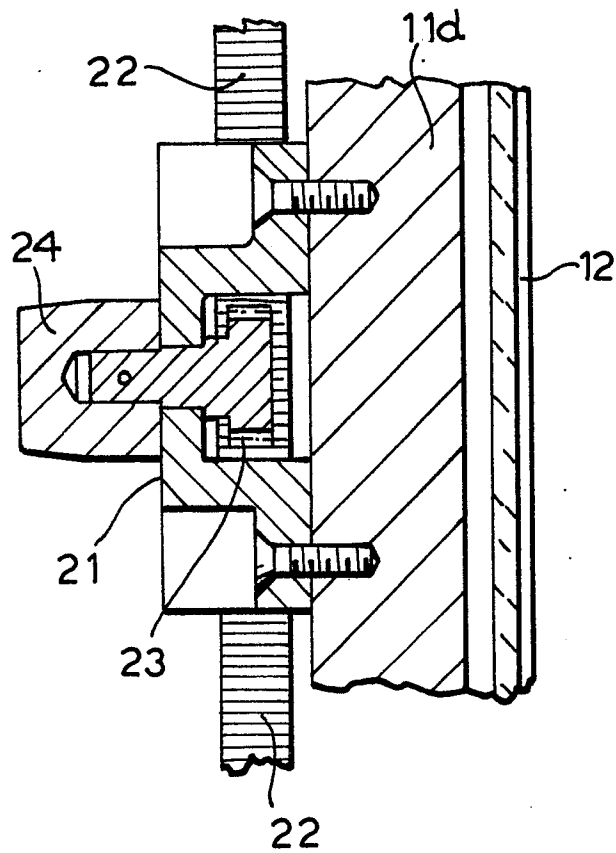


FIG. 12

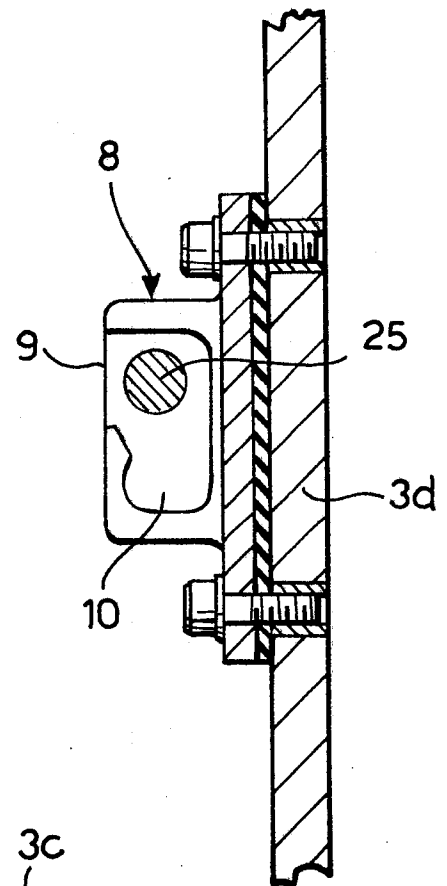


FIG. 13

