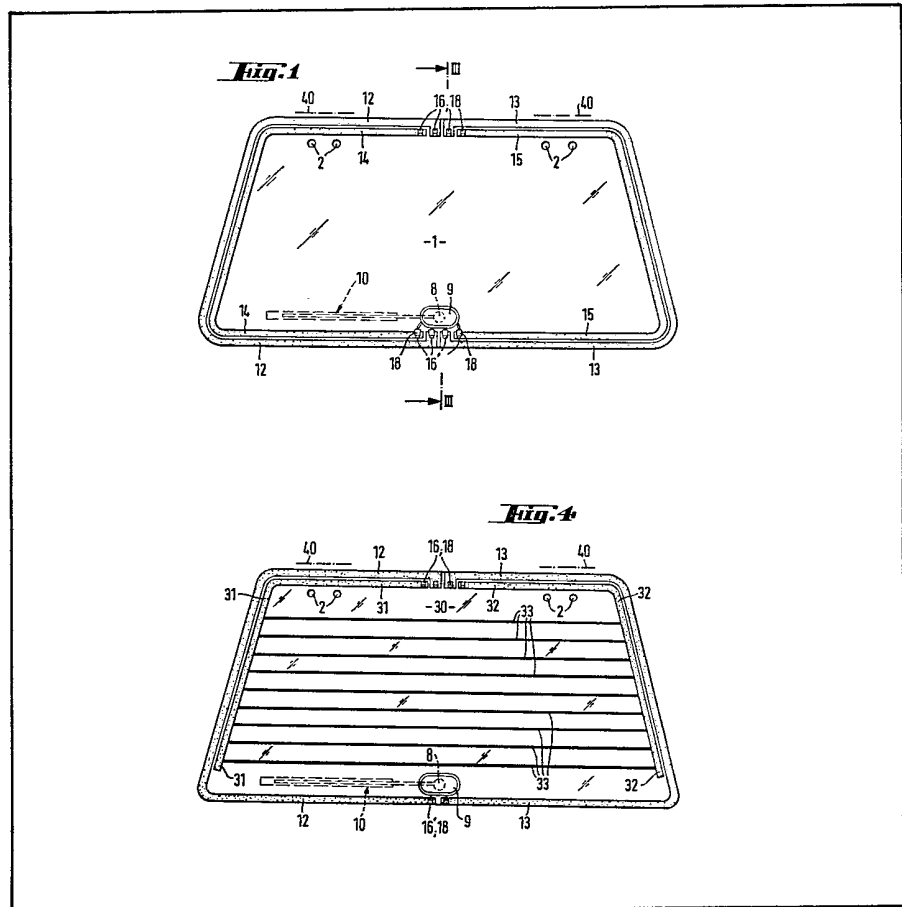
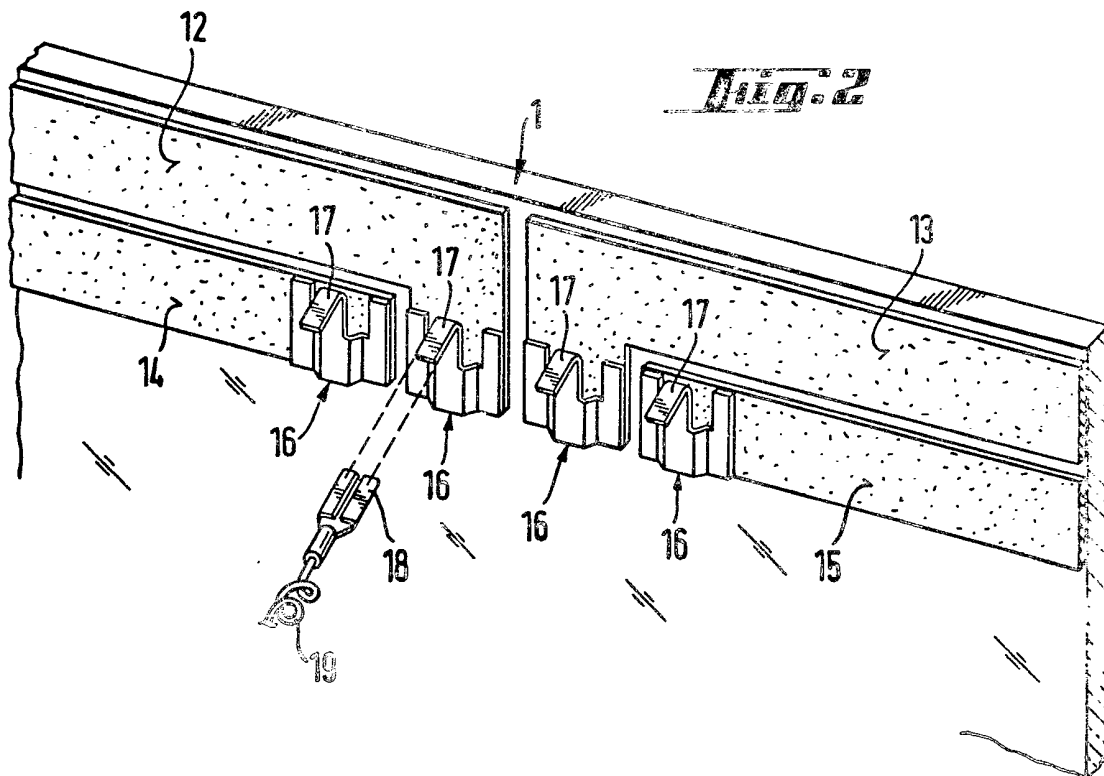
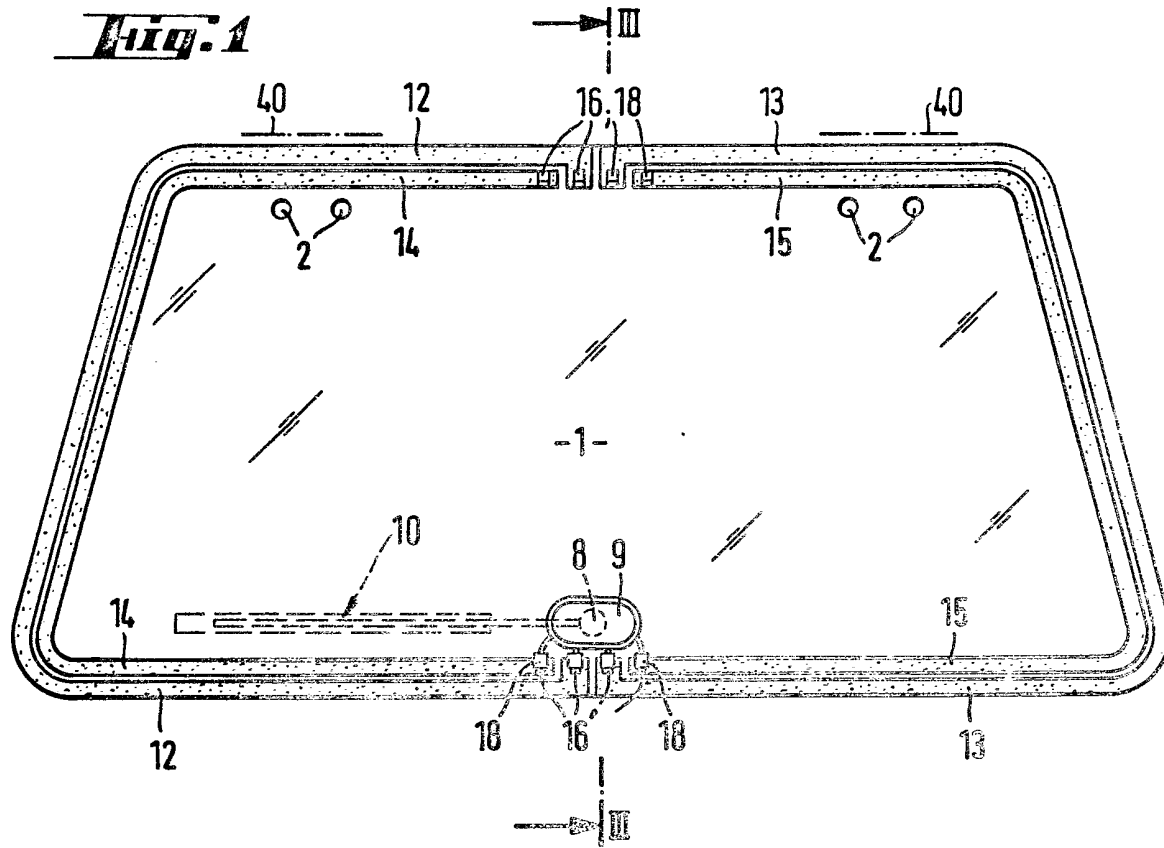


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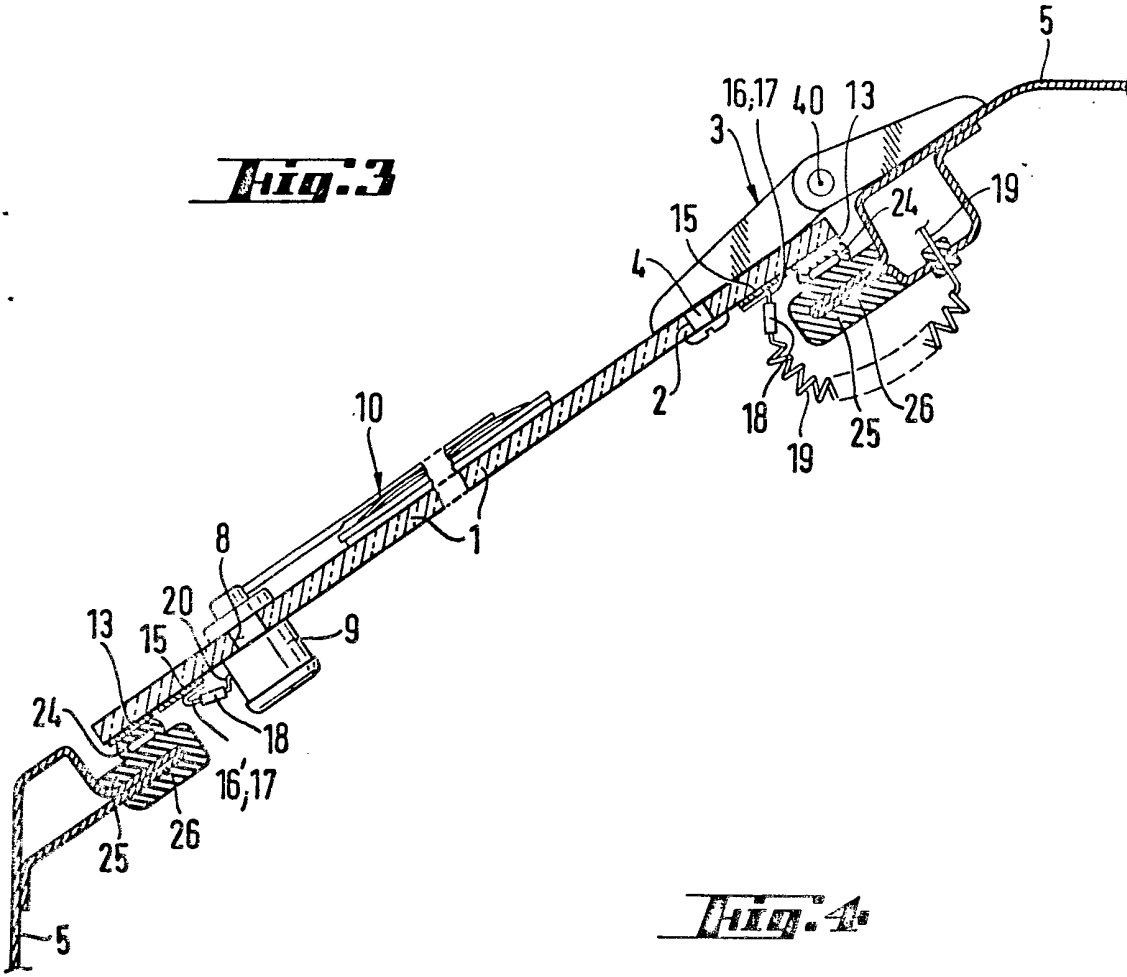
(54) Vehicle windows

(57) A pivoting window 1 for a vehicle having an electrical device such as a windscreen wiper motor 9 placed adjacent its edge remote from the axis of pivoting has conductors for supplying the electrical device in the form of strips 12-15 printed on the glass surface of the window along its edges, the ends of the strips being connected to terminals 16 for connecting them to a power source adjacent the axis of pivoting. The need for separate cables and contacts which are established only when the window is closed is avoided. The window may be a windscreen or a rear window, and may be provided with a heating network 33 formed from similar strips, see Fig. 4.

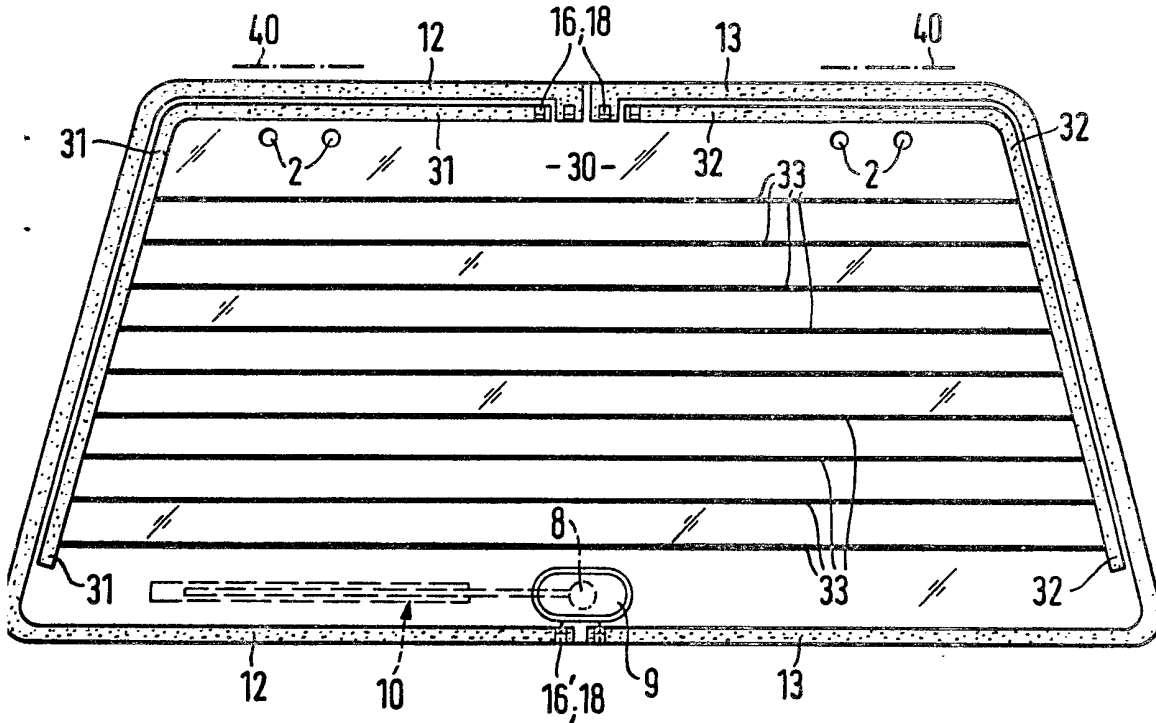




**Fig. 3**



**Fig. 4**



## SPECIFICATION

### Vehicle windows

5 The invention has as its object a pivoting window for an automobile vehicle provided with an electrical device placed on the edge opposite the axis of pivoting. Such pivoting windows are commonly used as rear windows, their upper edge mounted by hinges on the edge of the bodywork of the vehicle. They have other applications and in certain cases are even used as windcreens, for example, in convertible vehicles, cross country vehicles or commercial vehicles. It is then necessary to provide a windscreen wiper, which is also done to an increasing extent for rear windows.

These panes are often provided with a metal frame but it frequently happens that the sheet of glass is bare, in particular on rear windows, and the hinges are fixed directly on the window, as a general rule using perforations inside the window. When a frame exists the windscreen wiper motor is generally mounted on the latter, but if there is no frame it is fixed directly to the glass.

25 On a pivoting window, the feed of current to the motor for the windscreen wiper or any other device using electric current, such as a spotlight mounted in a zone which is remote from the axis of pivoting is not exempt from difficulties. To achieve connection to the source of current, if a frame exists electric wires are normally mounted in the interior of the latter; in the contrary case, up to now they have been run along the edge of the pane and covered with a profile member of U section to fix them to the glass sheet. It is also known to carry out the connection to the source by means of contacts placed close to the edge of the pane opposite the axis of pivoting and which establish a connection when the window is closed.

40 All these solutions have at least the inconvenience, which is considerable, of requiring independent cables, between the connection and the device using the current and mounting of these cables in certain cases requires expense which is not negligible.

The invention has as its object a pivoting window of the above mentioned type of agreeable appearance and in which the connection of the electrical device to the power source, at the edge of the window, is carried out at lower cost, reducing to a minimum the use of separate cables and the bulk of the connecting means.

According to the invention the conductors for feeding current to the electrical device take the form of conducting strips printed on the glass surface along the edge of the glass sheet and their connection to the source is carried out by means of connecting terminals placed on the collectors in a zone close to the axis of pivoting.

60 This structure avoids the disadvantages of contacts for current which are only established on closure of the window and have the advantages of an installation having a fixed connection. Further they avoid all the disadvantages associated with the presence of distinct cables around the pane and thus

considerably simplify the construction of a window.

Windows according to embodiments of the invention will now be described by way of example with reference to the accompanying drawings in which:

70 Figure 1 is a face view of a pane intended for an automobile window according to the invention;

Figure 2 shows in perspective, a detail of part of Figure 1;

75 Figure 3 shows in section in the region of line III-III of Figure 1, the mounting in a vehicle of an automobile window according to the invention;

Figure 4 shows a pane according to another embodiment of the invention.

80 Figure 1 shows a monolithic safety pane, that is to say formed of tempered silicate glass, capable of constituting either a windscreen or a rear window which is heated.

The pane 1 forms the pivoting leaf of an automobile window, a leaf which is not provided with a metal frame, although it is possible to provide it with a profile member having a U section if desired. This profile member which is not shown in the drawings, may be metal or of plastics material; it may serve simultaneously as a waterproof seal and it is thus advantageously made of rubber.

85 The sheet of glass carries, on the upper edge along which the pane is articulated, openings 2 intended to allow fixing of half hinges 3 (Figure 3) by means of traversing bolts 4, the other half of the hinge being screwed onto the edge of the bodywork 5.

90 At its lower part or on its edges there may be placed metal devices allowing opening, closing and locking of the window, which cooperate with corresponding elements mounted on the bodywork of the vehicle. They may comprise closing means which are well known and are not shown in the drawing.

95 At the lower part of the glass sheet there are placed one or, if required, a plurality of perforations 8 which allow fixing of the motor 9 of a windscreen wiper. This motor is positioned on the internal surface of the pane and the axis of the arm 10 of the windscreen wiper passes through the perforation 8. It is possible of course, as is the case with certain vehicles, to provide not one but two windscreen wipers.

100 The feeding of the motor 9 with current is carried out by means of conductors 12, 13, 14 and 15 printed and fixed by heating on a surface of the glass, which run along the edge of the glass sheet 1 on the inside of the vehicle.

105 In the example shown in Figure 1, there exists four conductors, which may be necessary to allow automatic stopping of the motor at the end of the sweeping path of the windscreen wiper.

110 On each side the two parallel strips 12 and 14 or 13 and 15 are spaced by a small distance of the order of 1 to 3 mm and the outer strips 12 and 13 are arranged in the immediate neighbourhood of the edge of the glass sheet.

115 According to the power required for the motor 9, these conducting strips have a width of 1 to 2 cm and a thickness of 10 to 100  $\mu\text{m}$ , advantageously 15 to 20  $\mu\text{m}$ . They are formed by a silver frit incorporated by melting on the surface of the glass and of which the electric conductivity is created by particles of

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silver metal. Such silver frits are known and are used for manufacture of heated electric panes.

If the case requires, the conductors 12 to 15 may then be reinforced by a galvanic deposition of copper, and if required, this assembly may be protected by galvanic deposition of nickel and/or chromium to increase its life.

The connection of the conductors 12 to 15 to the electric circuitry of the vehicle is carried out by means of connecting terminals 16 (Figure 2) placed close to the edge of the glass sheet, at the end of the conductors close to the pivoting axis 40. These connections are welded on the conductors 12 to 15.

They have a connecting tab 17 on which there is mounted a connecting clip 18 placed at the end of cable 19, itself connected to the source of current by a relay.

At the lower part of the pane, the ends of the conductors 12 to 15 also carry connection terminals 16' on the tabs of which are also mounted connectors 18, the latter being connected to a feed cable 20 for the motor 9; it is however possible to avoid the cable 20 if there is incorporated directly in the body of the motor feed terminals intended to receive the connecting tabs, or further spring contacts in direct contact under the pressure of a spring with a corresponding enlarged area placed at the end of the conductors which even avoids the need to weld the connecting terminals at this position.

The water-tightness between the pivoting leaf and the frame of the bodywork is assured by a deformable lip 24 of rubber having a U shaped profile 25 mounted on the edge 26 of the metal work of the body.

Figure 4 shows the pane of a pivoting window according to the invention in which the conductors 12 and 13 placed immediately at the edge of the glass sheet 30 feed a windscreen wiper motor 9, whereas the conductors 31 and 32 which extend inside constitute the collectors of heating network 33.

The heating network 33 is formed of the same material as the conductors 12, 13 and 31, 32; the assembly is deposited on the glass sheet by silver screen printing, in a single operation and fixed on the surface during the curving and/or tempering process.

#### CLAIMS

1. A pivoting window for an automobile vehicle provided with an electrical device placed on the edge of the window remote from the axis of pivoting, in which conductors for feeding electric current to the device are conducting strips printed on the surface of the glass along the edge of a glass sheet forming the window and connecting terminals are placed at the ends of the strips in a zone close to the axis of pivoting of the window for connecting the conductors to a source of current carried by the vehicle.

2. A pivoting window according to Claim 1, in which the printed conductors are formed of an enamel incorporated by fusion on the glass surface, such as a silver frit.

3. A pivoting window according to one of the preceding claims, in which the conductors are reinforced by galvanic deposition, for example by depos-

ition of copper, and optionally nickel or chromium.

4. A pivoting window according to any one of the preceding claims, in which the conductors are arranged in the immediate neighbourhood of the edge of the glass sheet and in that they are covered or in part by a profile member surrounding the sheet.

5. A pivoting window according to any one of the preceding claims, in which the ends of the conductors adjacent the electrical device carry welded connection terminals.

6. A pivoting window according to Claim 5, in which the connecting terminals cooperate directly with connections incorporated in the body of the electric apparatus.

7. A pivoting window according to any one of the preceding claims, having four conducting strips arranged two by two along the edge of the pane.

8. A pivoting window according to any one of the preceding claims, in which the window is formed of a bare sheet of glass carrying hinges for fixing on the edge of the bodywork of the vehicle.

9. A pivoting window according to any one of the preceding claims, in which the glass sheet carries a printed heating network deposited on its surface at the same time as the conductor for feeding the electrical device.

10. A window, substantially as hereinbefore described with reference to Figures 1 to 3 or 4 of the accompanying drawings.

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