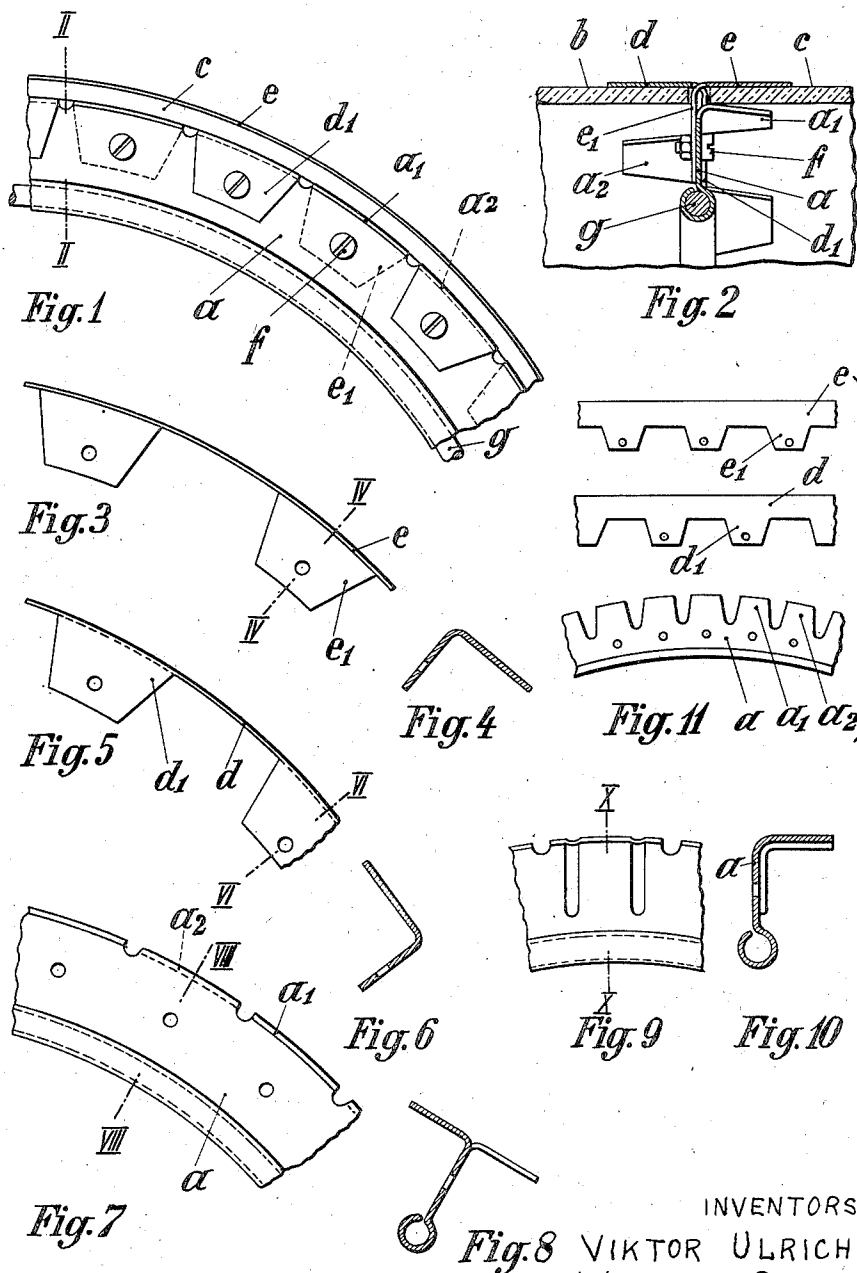


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V. ULRICH ET AL  
GLAZING AND THE LIKE

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## UNITED STATES PATENT OFFICE

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## GLAZING AND THE LIKE

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6 Claims. (Cl. 189-78)

This invention relates to the supporting of panes of material such as glass or the like. An example of the application of the invention is to the transparent covering of the hoods of gun cockpits in aeroplanes.

Hitherto glass has been mounted on the rotatable hoods of aeroplanes by bars on which the panes were secured by screws and nuts. This arrangement is defective firstly owing to the difficulty of giving the bars the correct form to accord with the curvature of the surface of the dome, and secondly because in tightening up the nuts breakage of the panes is liable to occur. Breakage may also result at the point where it is secured from vibration or expansion under heat.

These objections are avoided by this invention which provides an arrangement which supports the panes equally well in all spatial positions of the dome, that is to say even when the load shifts from one part of the supporting means to another. The invention consists in an arrangement in which the panes are supported on the inside by a supporting bar or astragal from which laps project alternately to one side and then the other, the panes being strapped on the outside by strapping bars which are secured to the supporting bar by tongues projecting inwardly between the laps. Thus the panes themselves are relieved of the stresses, which are taken up by the supporting members. Each strapping bar is preferably divided into a number of portions which in the case of a cockpit hood are curved so that a damaged pane can be replaced without difficulty.

The invention is illustrated in the accompanying drawing in which:

Fig. 1 is an elevation and

Fig. 2 a section of a supporting arrangement;

Figs. 3-10 show alternately in elevation and section details of the parts which hold the panes in the joint;

Fig. 11 shows these parts on a small scale before shaping for assembly.

The butt joint comprises a supporting bar *a* which may be ring-shaped as shown and on which laps *a*<sub>1</sub>, *a*<sub>2</sub> bent from or attached to the bar project alternately to the right and to the left of the bar. The laps *a*<sub>1</sub>, *a*<sub>2</sub> are shown directly supporting the inner edges of the glass or like panes *b*, *c* while ring-shaped strapping bars *d*, *e* bear directly on the outer edges of the panes *b*, *c*. The bars *d*, *e* are secured to the supporting bar *a* by tongues *d*<sub>1</sub>, *e*<sub>1</sub> which project inwards and between the laps *a*<sub>1</sub>, *a*<sub>2</sub> and which are fastened to the bar *a* by screws *f*. Each tongue *d*<sub>1</sub>, *e*<sub>1</sub> is screwed on to that side of the supporting bar *a* which faces away from the direction in which the respective strapping bar *d* or *e*, as the case may be, projects from the bar. The opposing edges of

the panes *b*, *c*, therefore, bear on the outer surfaces of the tongues *d*<sub>1</sub>, *e*<sub>1</sub> and are, therefore, prevented from touching one another by the tongues. As can be seen easily in Fig. 2 the panes *b*, *c* can approach one another under the influence of vibration, heat expansion or other causes without any danger as the tongues *d*<sub>1</sub>, *e*<sub>1</sub> are easily constructed to have the necessary degree of flexibility.

In order to strengthen the inner supporting bar *a* a stiffening member *g* can be inserted in a flange formed on the inner edge of the bar *a* for this purpose. The cross-section of the bar *a* may also be strengthened by constrictions or corrugations as shown in Figs. 9 and 10 or by locally increasing the cross-section.

We claim:

1. In hoods, cases or the like constructed essentially by a sensible material such as glass or the like the combination with the material-panes, of supporting bars bearing laps projecting in turn to the right and to the left of the bars and laid against the inside of the panes, and of strapping members laid against the outside of the panes and secured to the supporting bars by tongues projecting inwardly between the laps.

2. In hoods, cases or the like as claimed in claim 1, the arrangement that the inwardly bent tongues on the strapping members are secured to the sides of the supporting bars facing away from the direction in which the laps project.

3. In hoods, cases or the like as claimed in claim 1, the arrangement that the inner edges of the supporting bars are flanged to receive stiffening rods.

4. In hoods, cases or the like as claimed in claim 1, the arrangement that the supporting bars are stiffened by radial ribs.

5. In hoods, cases or the like constructed essentially by a sensible material such as glass or the like the combination with the material-panes, of supporting bars bearing flanges projecting to the right and to the left of the bars and laid against the inside of the panes, and of strapping members laid against the outside of the panes and secured to the supporting bars by tongues projecting inwardly through slots in the flanges of the supporting bars.

6. In hoods, cases or the like constructed essentially of sensible materials such as glass or the like, the combination with adjacent material-panes, a supporting bar having projecting means bearing against the inside of the panes, and a member contacting against the outside of each pane and having tongues projecting through a space between adjacent panes and secured by means of the tongues to the supporting bar.

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