Aug. 4, 1953 E. L. BLACKMAN 2,647,790

AUTOMOBILE DOOR CONSTRUCTION

Filed April 9, 1952

FIG. 1

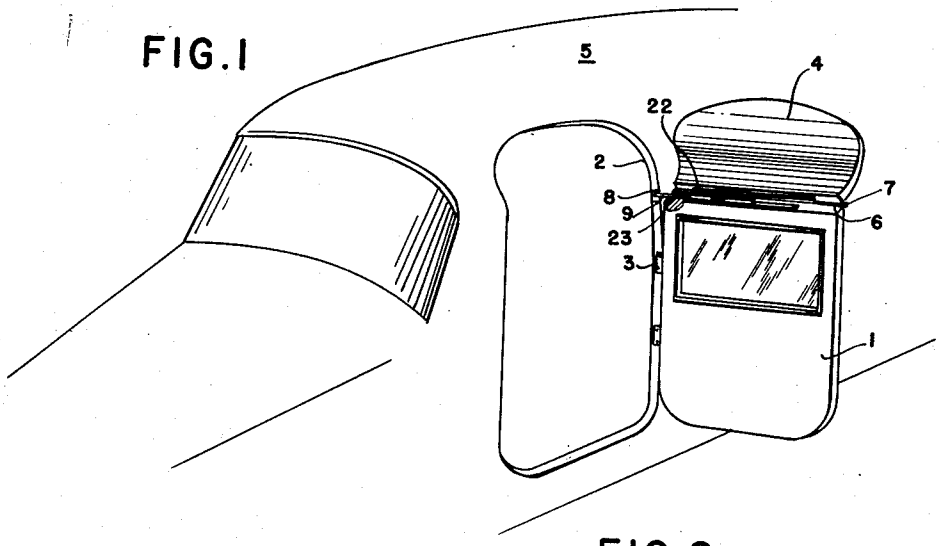


FIG. 2

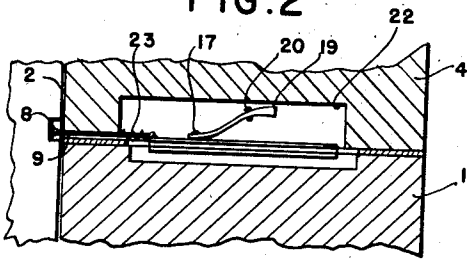


FIG. 3

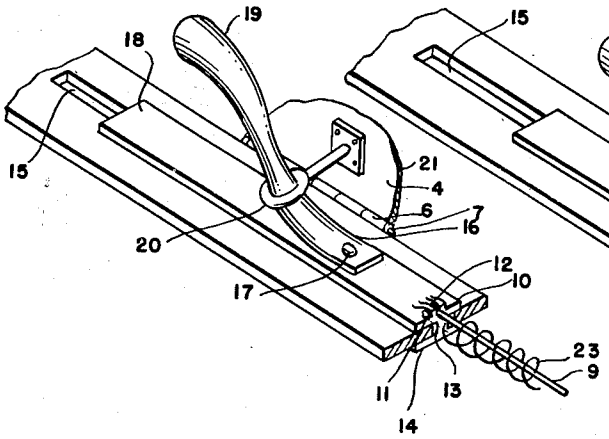
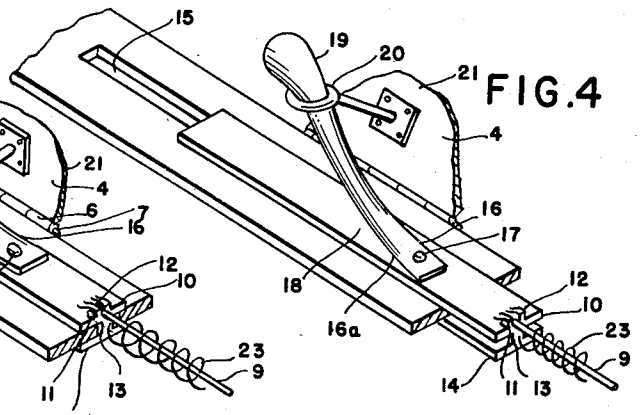


FIG. 4



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AUTOMOBILE DOOR CONSTRUCTION

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Application April 9, 1952, Serial No. 281,384

3 Claims. (Cl. 296—44)

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My invention relates to an improvement in automobile door construction and is an improvement on my Patent Number 2,535,347 issued December 26, 1950, and my application Serial Number 257,867, filed November 23, 1951.

One of the objects of my invention is to provide a simplified mechanism whereby a partial section of the roof of a vehicle may be carried by the door and is so arranged that this section is automatically swung out of the way when the door is opened and swung automatically back into position when the door is closed, thus providing additional headroom for passengers entering and leaving the vehicle.

Another object of my invention is to simplify the connections between the swingable top section and the operating mechanism so that positive opening and closure of the movable top section is effected with a minimum of parts.

Other objects and advantages will be apparent from the specification and drawings, in which—

Fig. 1 is a perspective of the door and swingable top piece showing the opening and closing mechanism with the door in open position;

Fig. 2 is a cutaway section of the top operating mechanism with the door in closed position;

Fig. 3 is an enlarged perspective of the top section operating mechanism with the door in closed position;

Fig. 4 is an enlarged perspective of the top section operating mechanism with the door in partially open position.

Referring to the drawings, 1 is the vehicle door supported on the frame 2 by means of the usual hinge 3. The door 1 has attached to it a cutaway portion 4 of the vehicle top 5 arranged as described in my aforementioned patent, and patent application so that the vehicle top 5 and cutaway portion 4 fit snugly together when the door 1 is closed.

The cutaway portion 4 is swingably supported on the door 1 by means of a hinge 6 of the type commonly referred to as a piano hinge wherein alternate strips of the door 1 and top section 4 are turned over and held in position by an axial rod 7 so that the hinged section 6 rotates freely on the rod 7 when the top section is raised or lowered.

Within a recess 8 in the door frame 2 a cable 9 is attached in any suitable manner such as by an eye bolt affixed to the door frame. The cable 9 is attached at the end away from the door frame to a sliding plate 10 by means of a holding bolt 11 which clamps the cable to projections 12 on the plate 10 as shown in Figs. 3 and 4. It will

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be understood that a solid rod might be substituted in place of the cable 9 although a cable is preferred because of its flexibility.

The plate 10 is constructed in the shape of a double T beam joined at the middle so that there is a top plate 10 middle joinder web 13 and bottom plate 14 arranged so that the web 13 fits with slight tolerance into a slot 15 in the top of the door 1 while the spacing of the plates 10 and 14 is slightly greater than the thickness of the metal forming the top of the door 1 so that the plate 10 may slide in the slot 15 while being at the same time held from vertical movement and in alignment with the slot.

On the plate 10 a cam arm 16 is mounted by means of a swivel pin 17. The cam arm is flattened at 16a but rounded the rest of its length and is in the form of a "lazy S" having an enlarged cross section at 18 and 19 said enlarged sections being approximately but not quite as large as the size of the orifice of a ring bolt 20 attached to the top piece 4 by a spot weld of the plate 21 which is an enlarged part of the ring bolt. The plate 21 may be affixed to the top section 4 by any suitable means but for the purpose I prefer spot welding for a rigid yet relatively cheap construction.

The top piece 4 is hollow in its interior, as is common construction in the automatic field, so that I cut a slot 22 in the base of the top piece to accommodate the raised "lazy S" cam 16 and plate 10 when the top piece 4 and door 1 are in closed position.

Abutting against the double T beam at one end and the edge of the door 1 is a coil spring 23 which surrounds the cable 9 thus having a tendency to force the plate 12 and cam 16 rearwardly when the door is in open position and providing a means of sliding the plate 12 along the slot 15 when the door is closed.

In operation, when the door 1 is opened by a passenger, the cable 9 holds the plate 12 while the door swings outward and away from the frame 2. This causes the plate 12 to slide in the slot 15, and since the plate 12 carries the cam 16, the cam rider or ring bolt 20 is caused to slide up the S surface of the cam and raise the top piece upwards to the position shown in Fig. 1. Since there is a certain amount of displacement from the horizontal, of the top piece when it is raised, the cam 16 is allowed to swivel slightly by means of the swivel pin 17 so that the cam surface is automatically always in contact within the confines of ring bolt 20.

When the top piece is in either open or closed

position, all rattle or play is prevented due to the enlargements 18 and 19 being in close tolerance with the cross section of the "lazy S" cam surfaces at each end.

On closure of the door, the ring bolt 20 is forced down the slope of the surface of the "lazy S" cam 16 by the action of the spring 23 forcing the plate along the slot 15 so that a positive closure of the top section 4 is effected.

I claim:

1. In a device of the character described, in combination with a door, a frame for said door, a hinge on which said door is mounted in said frame, a fixed top having a recess above the door, a top section of the door corresponding to said recess and hingedly mounted on the top of the door near one edge thereof and constructed and arranged to open and close said recess and to swing up and down when the door is opened and closed respectively, a slidable plate mounted on said door carrying a pivotally mounted cam, a contact arm operatively connected with the surface of said cam at one end and rigidly attached to said top section of the door at its other end, means attached to said frame for preventing displacement of said slidable plate when said door is opened whereby said contact arm raises said top section when the door is opened and lowers said top section when the door is closed.

2. In a device of the character described, in combination with a door, a frame for said door, a hinge on which said door is mounted in said frame, a fixed top having a recess above the door, a top section of the door corresponding to said recess and hingedly mounted on the top of the door near one edge thereof and constructed and arranged to open and close said recess and to swing up and down when the door is opened and closed respectively, a slidable plate mounted on said door carrying a pivotally mounted cam, a contact arm operatively connected with the surface of said cam at one end and rigidly attached to said top section of the door at its other end, means attached to said frame for preventing displacement of said slidable plate when said door is opened whereby said contact arm is forced to ride up, the surface of said cam when the door is opened causing said top section to raise, and a spring member which forces said contact arm to ride down said cam when said door is opened causing a lowering of said section.

3. In a device of the character described, in combination with a door, a frame for said door, a hinge on which said door is mounted in said frame, a fixed top having a recess above the door, a top section of the door corresponding to said recess and hingedly mounted on the top of the door near one edge thereof and constructed and arranged to open and close said recess and to swing up and down when the door is opened and closed respectively, a slidable plate mounted on said door carrying a pivotally mounted cam, a contact arm operatively connected with the surface of said cam at one end and rigidly attached to said top section of the door at its other end, a cable attached at one end of said slidable plate and at the other end of said door frame for preventing displacement of said slidable plate when said door is opened whereby said contact arm is forced to ride the surface of said cam when the door is opened causing said top to raise, and a spring member which forces said contact arm to ride down said cam when said door is closed causing the lowering of said top section.

EDWARD L. BLACKMAN.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
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2,535,347	Blackman	Dec. 26, 1950