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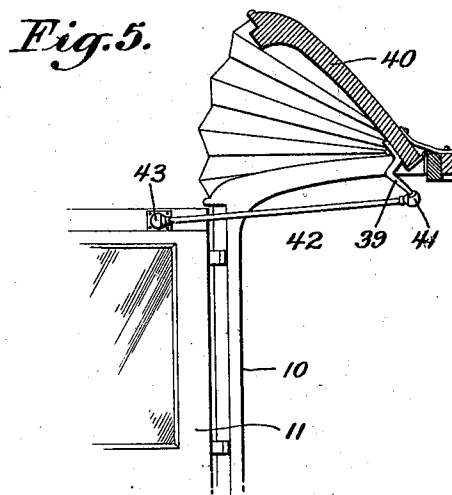
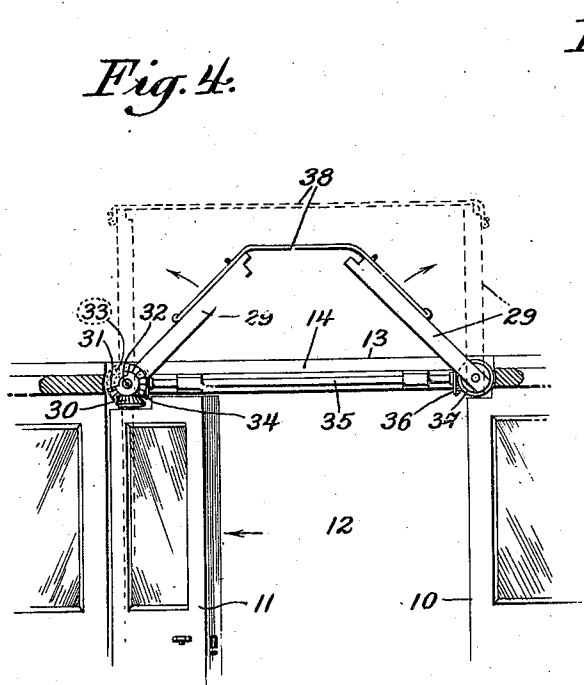
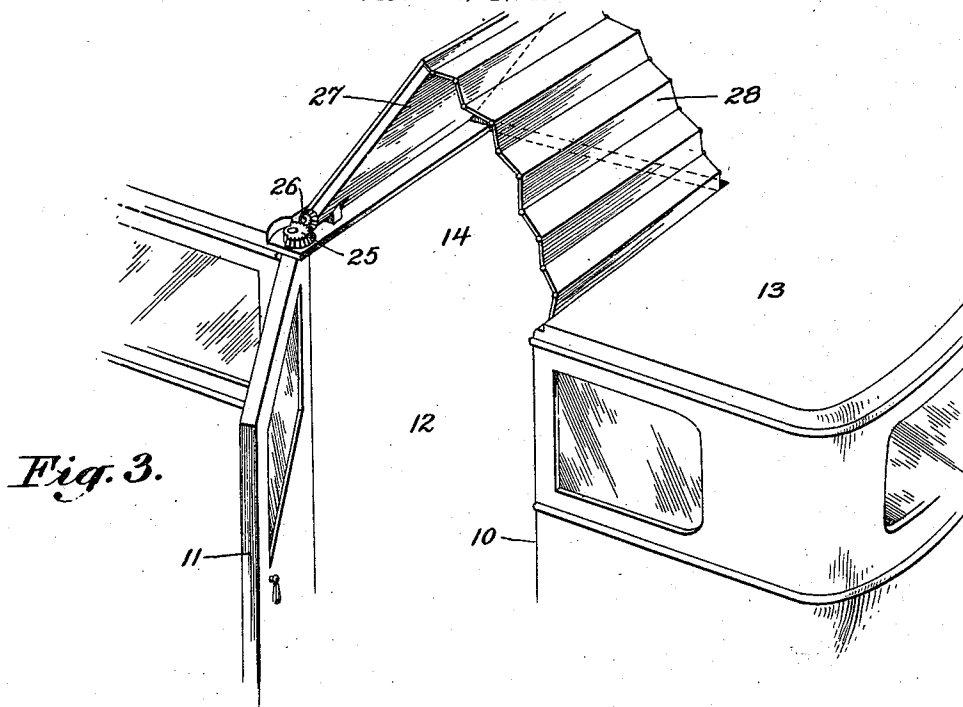
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DOOR OPERATING DEVICE

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2 Sheets-Sheet 2



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DOOR-OPERATING DEVICE.

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This invention relates to door operating devices and has particular reference to an automatic head door for automobiles of the closed type.

5 The principal object of the invention resides in a door adapted to be arranged in the top of a body of an automobile adjacent the side door and which top door is automatically operated upon the actuation of the side door to provide ample head room for persons entering and leaving the interior of the automobile.

15 Another object is to provide an automatic top door for motor vehicles which allows ample head room at the entrance and exit of the same, and which excludes the weather from the interior of the vehicle when the door is in an open position.

20 A further object is to provide an automatic head door for automobiles which is simple in construction and which does not detract from the attractive appearance of the automobile.

25 With these and other objects in view, the invention resides in certain novel construction and combination and arrangement of parts, the essential features of which are hereinafter fully described, are particularly pointed out in the appended claims; and are illustrated in the accompanying drawing, in which:—

Figure 1 is a perspective view of a portion of the body of an automobile with my invention installed therein.

35 Figure 2 is a transverse sectional view on the line 2—2 of Figure 1.

Figures 3, 4 and 5 are detail views of the several modifications of my invention.

Referring more particularly to the drawings, and especially to Figures 1 and 2, the reference numeral 10 designates a portion of the body of an automobile of the closed type having hinged side doors 11 for closing the entrance and exit openings 12. The top 13 of the body is provided with head openings 14 in alignment with the openings 12 and are closed by the top doors 15. The top doors are hinged to the top 13 as at 16 and when closed, the same co-act with the doors 11 to provide an enclosed body.

55 In order to actuate the top door 15 on each side of the body simultaneously with its respective side door, there is provided an individual top door actuating mechanism 17,

Each mechanism includes a lazy-tong 18, the links at one end being pivoted on a common point to one side of the top door as at 19, while one of the links at the other end is pivoted to the top 13 as at 20. An operating arm 21 has one end secured to the inside of the side door by means of a ball and socket connection 22, while the other end of the arm is connected with the remaining end link of the lazy-tong by a similar ball and socket joint 23.

In practice, the lazy-tong 18 is normally collapsed as shown at the right in Figure 2 of the drawing but as the side door 12 is moved outward about its hinge, the same will move the arm 21 causing a pull to be exerted upon the lazy-tong thereby extending the same which moves the top door about its hinge to a position shown at the left in Figure 2. The universal connections between the door 11 and the arm, and between the arm and the lazy-tong allows the arm to swing on an arc when the side door is opened without causing the parts to jam. The weight of the door when swinging to an open position beyond 90° will support the top door in an open position. As the side door is closed, the top door is simultaneously moved to a closed position as will be readily understood.

To prevent the elements of the weather from entering the interior of the body when the top door is elevated, I provide flexible collapsible walls 24 which extend from the top door to the top 13 of the body. These walls are automatically extended as the door 15 is raised, and collapsed upon the closing of the door. The hinged joint 16 is also covered by a flexible weather strip to prevent leakage of rain water at this point.

From the foregoing description, it will be readily appreciated that persons may enter and leave the interior of an automobile without fear of striking their heads against the top.

100 In Figure 3 of the drawing, I have shown a slightly modified form which includes a gear segment 25 secured to the top of the door 11 and having its axis in alignment with the pivot of the door. A gear 26 is mounted in the top door 27 and meshes with the gear segment. It will be seen that as the side door 11 is moved about its pivot, motion will be transmitted to the top door through the segment 25 and gear 26 for 110

raising and lowering the same. A suitable folding weather screen 28 is also provided for excluding the elements.

In Figure 4 of the drawings there is shown a further modification which is somewhat similar to the form shown in Figure 3, but in this form I provide a pair of top doors 29 which are simultaneously operated by the movement of the side door. A segment 30 is mounted on the top of the side door and is similar to the segment 25 shown in the above form which meshes with a gear 31 keyed to the end of the shaft 32 which carries one of the door sections 29. A gear 33 is keyed to the other end of the shaft 32 and co-acts with a gear 34 on the end of the shaft 35 mounted at right angle to the axis of the shaft 32. The other end of the shaft 35 supports a gear 36 for mesh with a similar gear 37 secured to the other door section 29. It will therefore be seen that motion will be transmitted from the side door to both of the top door sections for simultaneous operation. A flexible weather strip 38 is attached to the meeting ends of the door sections for closing the space therebetween when the doors are in an open position.

In Figure 5, I have shown a still further modification which is somewhat similar to the preferred form of my invention but in which the lazy-tong structure is dispensed with. In this form, a tail or lever 39 extends beyond the pivot of the top door 40 and is connected by a ball and socket joint 41 to one end of an arm 42, the other end of the arm being connected to the side door by a ball and socket joint 43. As the side door moves to an open position, the arm 42 will pull the tail of the top door thereby swinging the same about its pivot. The op-

posite motion is transmitted to the tail when the side door is moved to a closed position.

While I have described what I deem to be the most desirable embodiment of my invention, it is obvious that many of the details may be varied without in any way departing from the spirit of my invention, and I therefore do not limit myself to the exact details of construction herein set forth nor to anything less than the whole of my invention limited only by the appended claims.

What is claimed as new is:—

1. In combination with a pair of swingingly mounted closure members having their axes of rotation disposed at right angle to each other, a lazy-tong having one pair of its end links connected with one of said closure members, while one of the end links of the other end is secured to a stationary structure and the other end link operatively connected with the other closure member, whereby movement of said last mentioned closure member will be correspondingly transmitted to said other closure member.

2. In combination with a pair of swingingly mounted closure members having their axes of rotation disposed at right angles to each other, a lazy-tong having one pair of its end links connected with one of said closure members, while one of the end links of the other end is secured to a stationary structure and the other end link operatively connected with the other closure member by a rod having universal movement with said end link and said closure member whereby movement of said last mentioned closure member will be correspondingly transmitted to said other closure member.

In testimony whereof I have affixed my signature.

MILTON ABORN.