

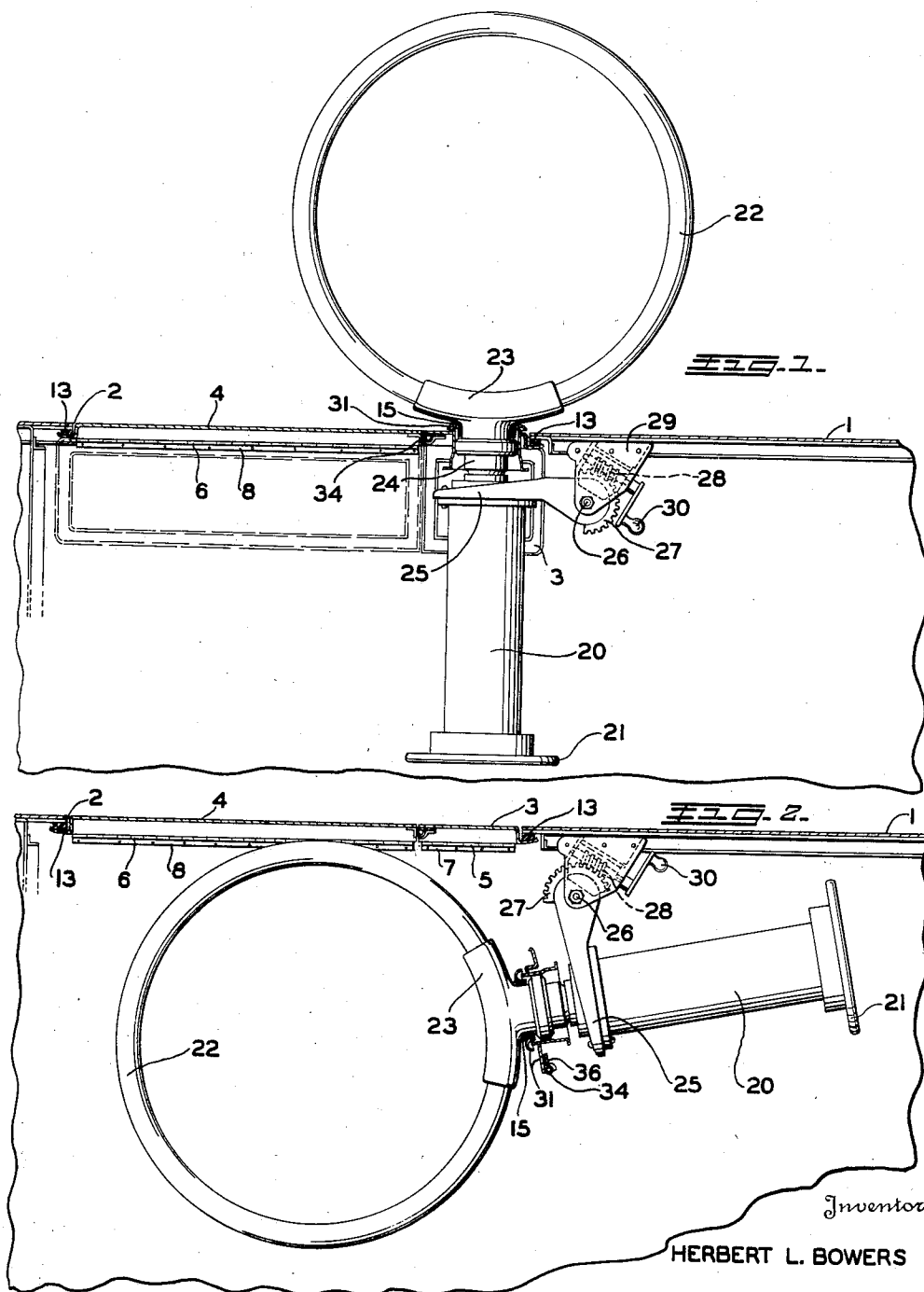
July 9, 1940.

H. L. BOWERS
RETRACTABLE ANTENNA

2,207,084

Filed Jan. 26, 1939

2 Sheets-Sheet 1



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FIG. 3.

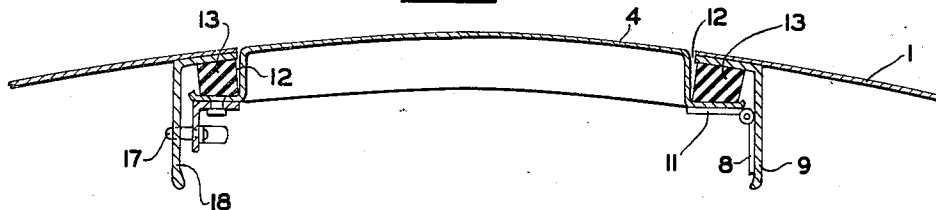


FIG. 4.

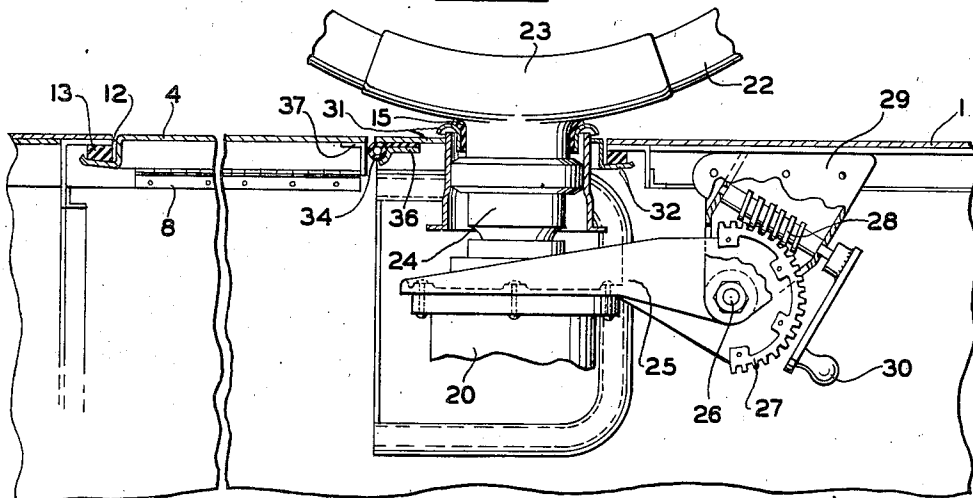
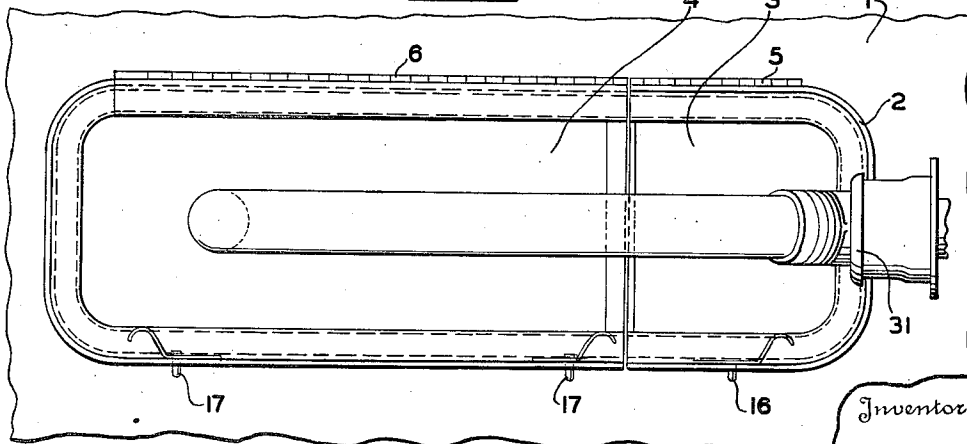


FIG. 5.



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RETRACTABLE ANTENNA

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Application January 26, 1939, Serial No. 253,014

6 Claims. (Cl. 250—33)

My invention relates to retractable antennae, and more particularly for retractable antennae of the loop type, such as may be adapted for use in aircraft.

It is often desirable in aircraft to have an antenna which is readily retractable. Particularly, loop antenna is useful in connection with radio, compass and direction finder arrangements. Here, where the loop antenna is projected beyond the confines of the fuselage of the airplane, it produces considerable drag. It therefore becomes desirable to retract the loop antenna when it is not actually in use.

It is an object of my invention to provide a retractable antenna which, when housed within the body of the fuselage, produces but little drag.

It is a further object of my invention to provide a construction which is strong and sturdy, and easy to repair and replace.

Yet another object of the invention is to provide a construction of loop antenna which permits it to be positively and readily placed in operative position, and rotated in any desired direction in that position.

A still further object of the invention is to provide an antenna which can be quickly brought into either operative or inoperative positions, and when in such positions, the surface of the fuselage will be closed and flush.

With these and other objects in view, which may be incident to my improvements, the invention consists in the parts and combinations to be hereinafter set forth and claimed, with the understanding that the several necessary elements comprising my invention may be varied in construction, proportions and arrangements, without departing from the spirit and scope of the appended claims.

In order to make my invention more clearly understood, I have shown in the accompanying drawings means for carrying the same into practical effect without limiting the improvements in their useful applications to the particular constructions which, for the purpose of explanation, have been made the subject of illustration.

In the drawings:

Figure 1 is a view partly in section showing my loop antenna in the out or operative position, one of the doors through which it has been swung being shown in the open position and the other door showing its open positions by dotted lines;

Fig. 2 is a sectional view showing my loop antenna housed within the fuselage;

Fig. 3 is a sectional view showing the position of the parts when the main door is closed;

Fig. 4 is a sectional view showing the details of construction of the antenna mounting;

Fig. 5 is a bottom plan view of my construction with the doors closed.

Referring to the drawings I have shown an airplane fuselage 1 having an opening 2 therein. In this opening are hingedly mounted doors 3 and 4 on hinges 5 and 6, respectively. The hinges 5 and 6 have their plates 7 and 8 riveted to a downwardly projecting bracket 9. The other plates are attached to the doors 3 and 4, respectively, as exemplified with respect to door 4, at 11, in Fig. 3.

Door 4 carries, adjacent its periphery, an offset recess 12 formed therein. A resilient cushion 13 is attached to the inner surface of the fuselage adjacent the opening 2. This resilient cushion 13 is adapted to contact against the peripheral recess 12 and cause a tight fit. The outer surfaces of each of the doors 3 and 4 are adapted to follow the curve of the fuselage, as indicated in Figure 3. Door 3 has a similar offset recess 12 which is adapted, in the closed position, to bear against the cushion 13 to make a tight fit. Both doors 3 and 4 are provided with downwardly projecting brackets in which are adapted to slide spring pin latches 15 and 17, respectively, which latch into apertures formed in a bracket 18, attached on the inside of the fuselage 1 near the edge of the doors opposite the hinges.

The swinging loop antenna construction comprises a housing 20 having a rotating head 21 at the bottom for rotating a swinging loop antenna 22. The swinging loop antenna 22 is held in a mounting 23 which may be integrally formed with a shaft construction, indicated generally by the numeral 24, which is rotatable in the housing 20. The shaft construction 24 is adapted to be rotated by means of the rotating head 21. The housing 20 is supported by means of a support arm 25, one end of which is pivoted at 26.

Integrally formed with the support arm 25 is a gear sector 27 which meshes with a worm 28 which is mounted in a bracket 29, attached to the inside of the fuselage 1. To rotate the worm 28 I have provided a rotating handle 30.

When both doors 3 and 4 are opened, by rotating the handle 30, the loop antenna may be swung out into the position 22. Door 4 may then be shut and latched in position, door 3 remaining in the down position.

Mounted on the upper end of the casing 20 is a closure 31 (see Figs. 2 and 4). This comprises

on three sides an offset recess 32 which is adapted to engage the resilient strip 13 carried on the inside of the fuselage 1 adjacent the door opening. On the other side the closure 31 is provided with a resilient member 34 which is held clamped in position by means of a strip 36. This member 34 bears against the projecting side of a bracket 37, which is carried by the door 4.

Thus in the position shown in Figures 1 and 4 where the antenna is in out position, the door 4 is closed and held in place by the spring pin latches; the door 3 is in the down position but the closure means 31 causes a substantially leak-proof fit around the aperture through which the loop antenna 22 projects.

In the position shown in Figures 1 and 4, the loop antenna 22 can be turned by means of the operating end or disk 21 into any desired position, yet the fuselage presents a relatively smooth surface to the air stream passing thereover.

By opening the door 4 and revolving the handle 30 in the proper direction the antenna may be swung downwardly in the position shown in Figure 2, in which case the door 3 is closed and held by means of the spring pin latch 16, and the door 4 is closed after having been opened to admit the antenna, this last door, as previously explained, being held by spring pin latch 17.

The housing is strong and sturdy. When the antenna is within the fuselage the surface of the fuselage is substantially unbroken (see Figure 2). Even in the out position, as shown in Figures 1 and 4, the drag is minimized by reason of the relatively smooth surface presented by the fuselage adjacent the point of egress of the loop antenna. The loop antenna in the out position of course in itself presents a considerable drag, but after use it may be quickly and easily moved back into inoperative position.

While I have shown and described the preferred embodiment of my invention, I wish it to be understood that I do not confine myself to the precise details of construction herein set forth by way of illustration, as it is apparent that many changes and variations may be made therein, by those skilled in the art, without departing from the spirit of the invention, or exceeding the scope of the appended claims.

I claim:

1. In a retractable antenna construction, a housing, an antenna mounted therein, a base for the antenna, means to move the antenna to a point outside of the housing, said means being situated within the housing, two doors mounted in the housing, one through which the antenna proper is adapted to move and the other through which the base of the antenna is adapted to move, means to hold the first mentioned door closed when the antenna is outside of the housing, said second mentioned door remaining open until the antenna is withdrawn into the housing, resilient means between the doors and the housing to insure a tight fit, and a closure member associated with the antenna which closes the aperture left in the housing when the second mentioned door is open, said closure member being provided with a flanged edge which engages the resilient means, thereby aiding the closure member to tightly close the aperture left by the open door when the antenna is in a position outside the housing.

2. In a retractable antenna construction, a housing, an antenna mounted therein, a base for the antenna, means to move the antenna to a point outside of the housing, said means being

situated within the housing, two doors mounted in the housing, one through which the antenna proper is adapted to move and the other through which the base of the antenna is adapted to move, means to hold the first mentioned door closed when the antenna is outside of the housing, a bracket for said door, said second mentioned door remaining open until the antenna is withdrawn into the housing, resilient means between the doors and the housing to insure a tight fit, and a closure member associated with the antenna which closes the aperture left in the housing when the second mentioned door is open, three sides of said closure member being provided with a flanged edge which engages the resilient means, and the fourth side being provided with a resilient member which bears against the said door bracket, thereby aiding the closure member to tightly close the aperture left by the open door when the antenna is in a position outside the door.

3. In a retractable antenna construction, a housing, an antenna provided with a base, a casing in which the antenna is mounted, a support for said casing, a mount within the housing on which the support is pivotally mounted, means to transmit a swinging movement to the said support thereby causing an arcuate movement of the antenna to a point outside of the housing, two doors mounted in the housing, one through which the antenna proper is adapted to move and the other through which the means for supporting the antenna is adapted to move, means to hold the first mentioned door closed when the antenna is outside of the housing, said second mentioned door remaining open until the antenna is withdrawn into the housing, resilient means between the doors and the housing to insure a tight fit, and a closure member mounted on the casing which closes the aperture left in the housing when the second mentioned door is open, said closure member being provided with a flanged edge which engages the resilient means, thereby aiding the closure member to tightly close the aperture left by the open door when the antenna is in a position outside the housing.

4. In a retractable antenna construction, a housing, an antenna provided with a base, a casing in which the antenna is mounted, a support for said casing, a mount within the housing on which the support is pivotally mounted, means to transmit a swinging movement to the said support thereby causing an arcuate movement of the antenna to a point outside of the housing, two doors mounted in the housing, one through which the antenna proper is adapted to move and the other through which the means for supporting the antenna is adapted to move, means to hold the first mentioned door closed when the antenna is outside of the housing, a bracket for said door, said second mentioned door remaining open until the antenna is withdrawn into the housing, resilient means between the doors and the housing to insure a tight fit, and a closure member mounted on the casing which closes the aperture left in the housing when the second mentioned door is open, three sides of said closure member being provided with a flanged edge which engages the resilient means, and the fourth side being provided with a resilient member which bears against the said door bracket, thereby aiding the closure member to tightly close the aperture left by the open door when the antenna is in a position outside the door.

5. A retractable antenna construction com-

prising a housing, an antenna provided with a base, a casing in which the base of the antenna is journaled for rotative movement, a support for said casing, a mount within the housing on which the support is pivotally mounted, means associated with said mount to transmit a swinging movement to the said support, thereby causing an arcuate movement of the antenna to a point outside of the housing, two doors mounted in the housing, one through which the antenna proper is adapted to move and the other through which the means for supporting the antenna is adapted to move, means to hold the first mentioned door closed when the antenna is outside the housing, said second mentioned door remaining open until the antenna is withdrawn into the housing, resilient means between the doors and the housing to insure a tight fit, and a closure member mounted on the casing which closes the aperture left in the housing when the second mentioned door is open, said closure member being provided with a flanged edge which engages the resilient means, thereby aiding the closure member to tightly close the aperture left by the open door when the antenna is in a position outside the housing.

6. A retractable antenna construction comprising a housing, an antenna provided with a base, a casing in which the base of the antenna

is journaled for rotative movement, a support for said casing, a mount within the housing on which the support is pivotally mounted, means associated with said mount to transmit a swinging movement to the said support, thereby causing an arcuate movement of the antenna to a point outside of the housing, two doors mounted in the housing, one through which the antenna proper is adapted to move and the other through which the means for supporting the antenna is adapted to move, means to hold the first mentioned door closed when the antenna is outside the housing, a bracket for said door, said second mentioned door remaining open until the antenna is withdrawn into the housing, resilient means between the doors and the housing to insure a tight fit, and a closure member mounted on the casing which closes the aperture left in the housing when the second mentioned door is open, three sides of said closure member being provided with a flanged edge which engages the resilient means, and the fourth side being provided with a resilient member which bears against the said door bracket, thereby aiding the closure member to tightly close the aperture left by the open door when the antenna is in a position outside the door.

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