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ANTENNA MOUNTING

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Fig.1.

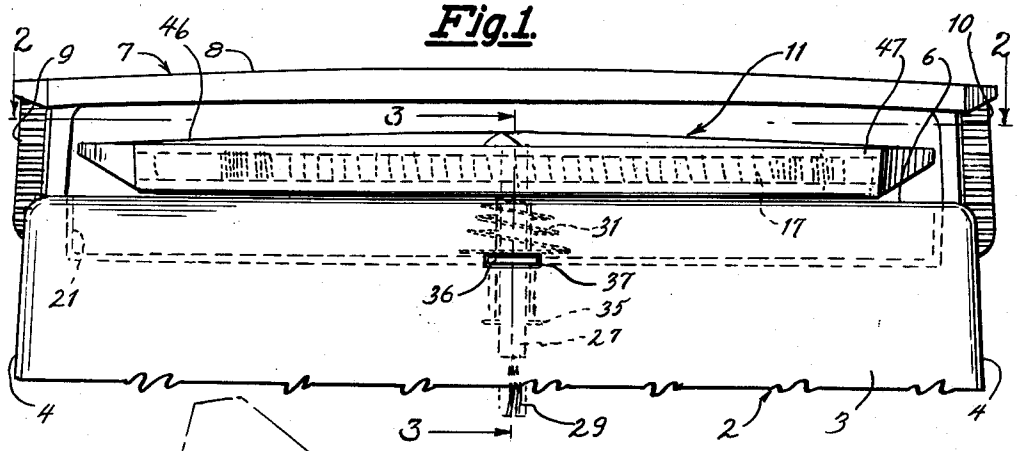


Fig.2.

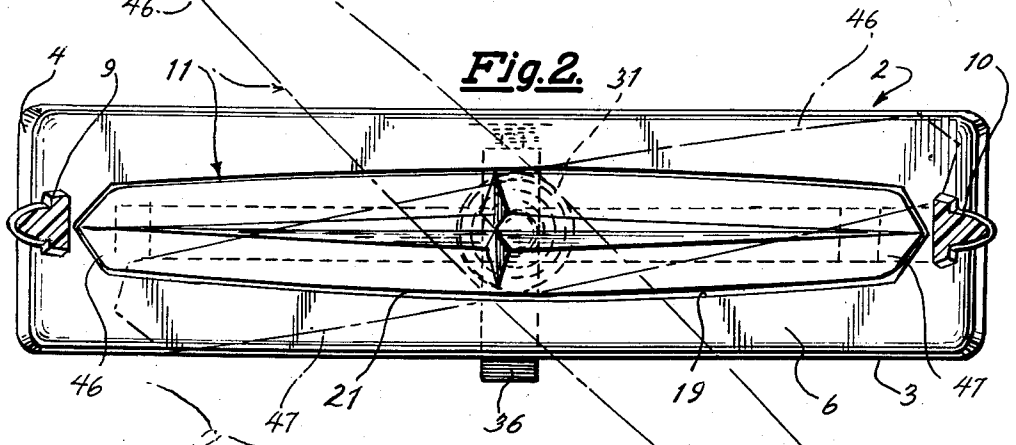


Fig.3.

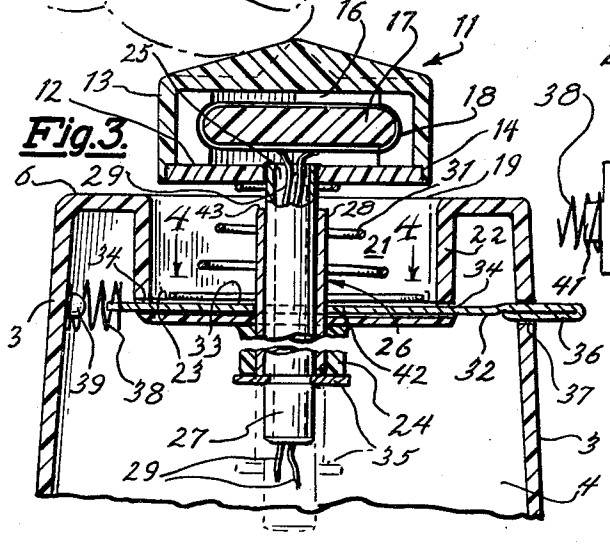
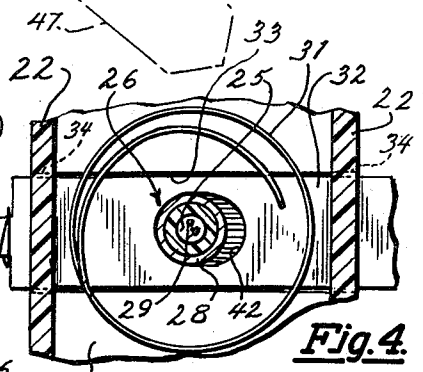


Fig.4.



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ANTENNA MOUNTING

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14 Claims. (Cl. 343—702)

This invention relates to radio receiving apparatus and particularly to an improved antenna mounting for a portable radio receiver.

As is well known to those versed in the art the use of antennas in the cabinets which antennas are of the so-called fixed "loop" type has certain disadvantages among which is the fact that they are directional, making it necessary to orient the receivers in proper relation to the station for best reception of the station. Radio receivers having loop antennas pivotally mounted externally of their cabinets are also known. Usually the mounting on the exterior of the cabinets is of a permanent nature and is undesirable from the standpoint of appearance and portability.

Due to the present invention, it is now possible to provide an atenna in connection with a small, domestic radio receiver which does not call for arranging the entire receiver in accordance with the direction of the signal and does not present superfluous or undesirable antenna structure to view when the radio receiver is in use. It may also be quickly and easily stored in a concealed position when desired.

Briefly, the novel radio apparatus involves a cabinet having a top wall formed with a pocket for receiving an antenna assembly. A support structure is arranged to receive a shaft which is movable axially and angularly in the support and which at its upper end carries an antenna. A latch mechanism is provided, being arranged to cooperate with the shaft for securing the assembly, against spring pressure, in a downward position in the pocket wherein the top of the assembly is substantially flush with the external surface of the top wall. The antenna may fill the pocket. The latch is arranged to be operated manually from the exterior of the cabinet to release the antenna assembly for movement to an extended position above the level of the top wall at which position the assembly may be swung about the axis of the shaft substantially 360° enabling it to be positioned at a point where it may best receive a selected broadcast program. When operation of the apparatus is discontinued the antanna is turned until it is in registration with the opening and pushed down into the pocket where latched cooperation between the shaft and latch mechanism is automatically restored to hold it in the pocket.

An additional feature of the invention includes the means that is provided for preventing breakage of the usual flexible conductors extending from the antenna to the chassis. This involves eccentricity of the shaft relative to the center of the antenna and eccentricity of bearing in which the shaft is journalled so that one of the portions of a handle, above the opening, or a boss at the end of the opening, acts as a stop for the antenna, one of the arms thereof on one side of the shaft being longer than the arm on the other side of the shaft consequently engageable with the handle.

The construction of and manner of operation of the apparatus, as well as certain advantages due to the construction, will become apparent from the following description of an embodiment thereof, the description being illustrated by the accompanying drawings and forming a part of this description.

In the drawings:

Fig. 1 is a side elevational view of the upper portion of a radio receiving apparatus, the bottom portion being broken away;

Fig. 2 is a top plan view thereof taken from a plane indicated by the line 2—2;

Fig. 3 is a vertical section taken on line 3—3 of Fig. 1; and

Fig. 4 is a horizontal section taken on line 4—4 of Fig. 3.

In the drawings there is illustrated the upper part of a domestic radio receiving apparatus which comprises a cabinet indicated in its entirety by the reference character 2. It is preferably made of some suitable injection molded plastic material such as polystyrene and includes side walls 3, end walls 4 and a rectangular top wall 6. It also includes a handle 7 of inverted U-shape which has a grip portion 8 from the ends of which vertical portions 9 extend down to the top wall 6 to which they are fixed at either end thereof. The handle portion 8 is therefore in spaced relation to the top wall so that an antenna or antenna assembly 11 may be pivotally supported in the space between the top wall and portion 8 by means later to be described.

The antenna assembly 11 comprises an elongated support plate 12, Fig. 3, and a cover 13 of generally U-shaped cross-section. Both cover and plate are also of some suitable insulating material. Preferably the cover 13 is undercut at 14 to receive the edges of the plate 12 to which the cover is fixed. The plate and cover thus provide a cavity 16 within which is housed antenna means including a ferrite rod or core 17 on which is wound a multiplicity of turns of wire 18.

The top wall 6 is formed with an opening 19 therein to receive the assembly 11 by which the opening is substantially closed when the antenna is in a retracted position which it occupies when not in use. When in this position the assembly is contained in a pocket 21 defined by side walls 22 extending downward from the edges of the opening 19 to an integral bottom wall 23, spaced slightly from the plate 12.

From the position within the pocket 21, the assembly 11 is movable upward to an extended or operating position above the level of the top wall 6 (Fig. 3). Between these positions the assembly is guided by a bearing 24 on the lower side of the wall 23 and a composite shaft 26 extending normal to the plate 12. Structurally, the shaft 26 includes a tubular member 27 of non-conductive material, having a bore 25, and a metal tubular member 28 in which the member 27 is fixed. A pair of flexible conductors 29 continuing from the respective ends of the antenna wire extend down through the bore 25 and is connected to the chassis, not shown, within the cabinet. The member 27 thus serves to better insulate the leads from the member 28 while the latter adds to the rigidity and strength of the shaft 26. The metal portion 28 of the shaft is journalled in the bearing 24 for both axial and rotary motion so that once the antenna assembly has been moved to its extended position, by sliding the shaft axially of the bearing, the antenna may be swung about its axis.

The antenna assembly 11 is biased toward its operating position by a compression spring 31 coiled about the shaft 26 and confined between the plate 12 and bottom wall 23. To anchor the antenna to the cabinet and still permit rotation thereof, the member 27 bears a C-washer 35 fixed at a point thereon immediately below the member 28 so that as the spring 31 moves the antenna upward

the washer 35 engages the bearing 24 to prevent movement of the antenna beyond its extended position.

The antenna is releasably retained in its lower position in the pocket by a latch mechanism. The latter is arranged to cooperate with the shaft 26 and includes a horizontal slider 32 of metal of uniform width and of less thickness than the depth of a channel or shallow groove 33 in the wall 23 in which the slider is arranged. The slider extends through apertures 34, in the walls 33, at the ends of the groove 33, and one of its ends terminates in a handle 36 extending through an aperture 37 in the side wall 3. One end of the slider is engaged by a compression spring 38 the other end of which seats on a boss 39 on the side of the cabinet. The spring is coiled about a lug 41 on the end slider 32. The slider is further formed with an elongated slot 42 through which the bearing member 28 extends. The ends of the slot act as stops for the slider by resisting pressure of the same at one end of the slot, owing to the force of spring 38. The upper end of the member 28 is spaced from the plate 12, thereby providing a shoulder 43 on the shaft 26. As the antenna is depressed to its retracted position, the shoulder 43 is carried to an elevation slightly below that of the slider 32 so that the spring 38 moves the slider over the shoulder 43 and into engagement with the member 27. Consequently, when pressure for depressing the antenna is relieved, the shoulder 43 is pressed into engagement with the slider which acts as a stop to resist force of the spring 31 and retain the antenna in its retracted position. This status is maintained until the slider is moved against the force of the spring 38 and being thus dislodged from the shoulder 43, the shaft is moved upward by the spring, carrying with it the antenna.

It is essential that the antenna leads 29 be protected from undue twisting and consequent breakage when the antenna is in its operating position. Therefore rotary motion of the antenna is limited to less than a complete turn. For this to be carried out the axis of the bearing 24 is arranged eccentric to the longitudinal center of the top wall 6 and the shaft 26 is arranged in eccentric relation to the center of the plate 12, the eccentricity of both bearing and shaft being equal so that the assembly 11 may close the opening 19. This, of course, provides the assembly 11 with a long arm 46 and a slightly short arm 47. The long arm is thus arranged to engage the handle portion 10 when swung about its axis, thereby to limit the rotation of the antenna.

It is apparent that a boss on the end of the cabinet could be provided for this purpose if desired.

It will therefore be seen that I have provided an improved antenna which, when necessity requires, may be released from its point of concealment within the cabinet and automatically raised to a position where it may be turned to use its directional qualities for better receiving a certain station. It is also apparent that it is very simple to return the antenna to its place of concealment in the pocket. It is also apparent that the turning of the antenna is limited so that the lead wires cannot be stressed to the breaking point.

Having thus described the invention, it will be apparent that numerous and extensive departures can be made therefrom by those versed in the art without departing from the spirit or scope of the invention, as defined in the appended claims.

We claim:

1. In a radio receiver, the combination of a radio cabinet having a top wall, an elongated casing, a hollow post providing a pivotal connection between the top wall and casing, an antenna within the casing, said antenna having a pair of conductors extending therefrom and passing through said post into the interior of the cabinet, and a handle of inverted U-shaped formation having a central portion above the top wall of the casing and vertical end portions fixed to the top wall of said cabinet, said pivotal connection being nearer one end of said casing than the opposite end thereof for the longer end to engage one of the handle end portions when said casing is swung about its pivot for limiting rotation of said casing to less than a complete revolution to preserve the conductors.

2. In a portable radio, the combination of a cabinet having a top wall formed with an antenna pocket having a bottom portion offset inwardly of the top wall, an antenna assembly, pivot means supporting the assembly for rotation with respect to the bottom wall and providing for movement of said assembly axially of the pivot means to a level above the cabinet for rotation thereabove, said assembly having flexible leads extending therefrom at the pivot means into the interior of the cabinet, said pivot means being eccentric of the center of the assembly to provide long and short arms thereof, and an inverted U-shaped handle having a central portion above the level of the assembly when moved axially out of the pocket and end portions fixed to the top wall at either end of the pocket, one of said handle end portions being positioned for engagement by the long arm only thereby to limit rotation of the assembly to less than a complete revolution and thereby avoid undue twisting of the leads.

3. In a radio receiver, the combination of a cabinet having a pocket therein which is open at one wall of the cabinet, a hollow post extending through said pocket into the interior of said cabinet inwardly of the pocket and slidable into and out of said pocket and rotatable with respect to said cabinet, an antenna housing connected to the outer end of said post to move as a unit therewith, said antenna housing being shaped and dimensioned to be received in said pocket when said post is retracted into the pocket, an antenna in said antenna housing, lead-in wires connected to said antenna and extending through said hollow post into the interior of the cabinet inwardly of said pocket, spring means biasing the antenna housing and said post to an extended position in which the antenna housing is disposed outside said pocket, and a releasable latch holding the post and the antenna housing retracted against the bias of said spring means and retaining the antenna housing seated in said pocket.

4. The combination of claim 3, wherein said post presents an outwardly facing shoulder, and said latch comprises a locking member and spring means biasing said locking member against said post for engagement with the top of said shoulder when the post and the antenna housing are retracted into the pocket.

5. In a radio receiver, the combination of a cabinet having a top wall with an elongated pocket therein which is open at said top wall, said pocket having a bottom wall disposed downward from said cabinet top wall, a handle for the cabinet extending lengthwise across the open upper end of said pocket in spaced relation above said top wall of the cabinet and having depending legs at its opposite ends which are connected to the cabinet at opposite ends of said pocket, a hollow post extending vertically into said pocket intermediate the ends of the pocket and down through said bottom wall of the pocket, said hollow post being mounted for sliding movement toward and away from said bottom wall of the pocket and for rotation, an elongated antenna housing connected intermediate its ends to the upper end of said post to move as a unit therewith, said antenna housing being shaped and dimensioned to be received in said pocket when said post is retracted down into the pocket, an antenna in said antenna housing, lead-in wires connected to said antenna and extending down through said hollow post into the interior of the cabinet below said bottom wall of the pocket, a spring seated on said bottom wall of the pocket and bearing against the underside of the antenna housing to bias the antenna housing and the post upward to an extended position in which the antenna housing is disposed completely above said top wall of the cabinet, and

a releasable latch mounted on said cabinet and engageable with said post to hold the post and the antenna housing retracted down into the pocket.

6. The combination of claim 5, wherein said hollow post comprises a hollow inner insulation sleeve and a hollow outer metal sleeve extending around said inner sleeve, and said bottom wall of the pocket carries a sleeve bearing in which said outer sleeve of the post is slidably and rotatably mounted.

7. The combination of claim 6, wherein said bearing is mounted on the underside of said bottom wall of the pocket, and said post carries a transverse collar for engagement with the lower end of said bearing to limit the upward movement of the post.

8. The combination of claim 6, wherein said outer sleeve at its upper end terminates in spaced relation below the antenna housing, and said latch comprises a plate slidable perpendicular to said post and formed with an oblong slot through which said post extends, and spring means biasing said plate to position an edge of said slot against said outer sleeve of the post to overlie the upper end of said outer sleeve when the post and the antenna housing are retracted down into the pocket.

9. The combination of claim 8, wherein said plate is slidably mounted on said bottom wall of the recess and has one end projecting out through a side wall of the cabinet, and said spring means is in the form of a coil spring under compression between the opposite side wall of the cabinet and the opposite end of said plate.

10. The combination of claim 5, wherein said post extends through said bottom wall of the pocket at a location closer to one end of said pocket than to the other end, said antenna housing presents long and short arms of unequal lengths at opposite sides of said post, and the length of said long arm of the antenna housing is greater than the spacing between the post and the opposite depending leg of the handle for engagement of said long arm against said leg when the antenna housing is turned to thereby limit the extent to which the antenna housing may be turned.

11. In a radio receiver, the combination of a cabinet having a top wall and opposite side walls extending down from said top wall, said top wall being formed with an elongated pocket therein which is open at the top of the cabinet and which presents a bottom wall located in spaced relation downward from said top wall of the cabinet, a handle for the cabinet extending lengthwise across the top of said pocket in spaced relation above said top wall of the cabinet and having depending legs at its opposite ends which are connected to the cabinet at opposite ends of said pocket, a sleeve bearing attached to the underside of said bottom wall of the pocket, a hollow post slidably and rotatably supported by said bearing and extending vertically up through said pocket, said post carrying a transverse collar below said bearing for engagement with the lower end of the bearing to limit the upward movement of the post, said post comprising a hollow inner insulation sleeve and a hollow outer metal sleeve surrounding the inner sleeve, an elongated antenna housing connected intermediate its ends to the upper end of said inner sleeve to move as a unit therewith, said antenna housing being shaped and dimensioned to be received in said pocket when said post is retracted downward, an antenna in said antenna housing, lead-in wires connected to said antenna and extending down through said inner sleeve into the interior of the cabinet below said bottom wall of the pocket, a compression coil spring seated on said bottom wall of the pocket and bearing against the underside of the antenna housing to bias the antenna housing and the post upward to an extended position in which the antenna housing is disposed above said top wall of the cabinet, said outer sleeve of the post terminating at its upper end in spaced relation below the underside of the antenna housing, a latch plate slidably mounted on said bottom wall of the pocket and having

one end projecting through one of said side walls of the cabinet for manual actuation thereat, said latch plate being formed with an oblong slot through which said post extends, a spring acting between the opposite side wall of the cabinet and the opposite end of the latch plate to position an edge of said slot bearing against the outer sleeve of the post to overlie the upper end of said outer sleeve when the post and the antenna housing are retracted down into the pocket, said post extending vertically up through said bottom wall of the pocket at a location closer to one end of said pocket than to the other end and said antenna housing presenting long and short arms of unequal lengths at opposite sides of said post, the length of said long arm being greater than the spacing between the post and the opposite depending leg of the handle for engagement of said long arm against said leg when the antenna housing is turned to thereby limit the extent to which the antenna housing may be turned.

12. In a radio receiver, the combination of a cabinet having an elongated pocket therein which is open at one wall of the cabinet, an elongated antenna assembly shaped and dimensioned to be received in said pocket, a post connected to said antenna assembly between the latter's ends, said post being supported for sliding movement into and out of said pocket to selectively position the antenna assembly in or out of said pocket and for rotation with respect to the cabinet to turn the antenna assembly when the latter is out of said pocket, and an elongated handle extending lengthwise across the open side of the pocket in spaced relation thereto and having legs at its opposite ends which are connected to the cabinet at opposite ends of said pocket, one of said legs on the handle being positioned closer to said post than one of the ends of the antenna assembly for engagement by said end of the antenna assembly when the latter is turned, to thereby limit the extent to which the antenna assembly may be turned.

13. In a radio receiver, the combination of a cabinet, an elongated antenna assembly, pivot means supporting the antenna assembly between its ends rotatably on the cabinet, said pivot means being located closer to one end of the antenna assembly than to the other so that the antenna assembly presents long and short arms on opposite sides of said pivot means, and an elongated handle extending lengthwise across the antenna assembly in spaced relation thereto and having spaced legs connected to the cabinet, one of said legs of the handle being located closer to said pivot means than the outer end of said long arm of the antenna assembly for engagement by said long arm to limit rotation of the antenna assembly.

14. In a radio receiver, the combination of a cabinet having an elongated pocket therein which is open at one wall of the cabinet, a hollow post in said pocket slidable into and out of said pocket and rotatable on said cabinet, an elongated antenna housing connected to said post to move therewith, said antenna housing being shaped and dimensioned to be received in said pocket when said post is retracted into the pocket, an antenna in said antenna housing, lead-in wires connected to said antenna and extending through said hollow post into the interior of the cabinet inwardly of said pocket, means for selectively positioning said antenna housing and said post in an extended position in which the antenna housing is disposed outside the pocket or a retracted position in which the antenna housing is seated in said pocket, said antenna housing being connected intermediate its ends to the post to provide arms extending on opposite sides of the post, and a handle for the cabinet which extends lengthwise across the open side of said pocket in spaced relation thereto and which has legs at its opposite ends which are connected to the cabinet at opposite ends of the pocket, one of said legs on the handle being positioned closer to the post than the outer end of one arm of the antenna housing for engagement by said arm when

the antenna housing is turned to limit the extent to which the antenna housing may be turned.

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