April 17, 1928. 1,666,480

A. ZILLGER

MEANS FOR ADJUSTING THE ANTENNA OF RADIO APPARATUS

Filed Dec. 9, 1924

Fig. 1.

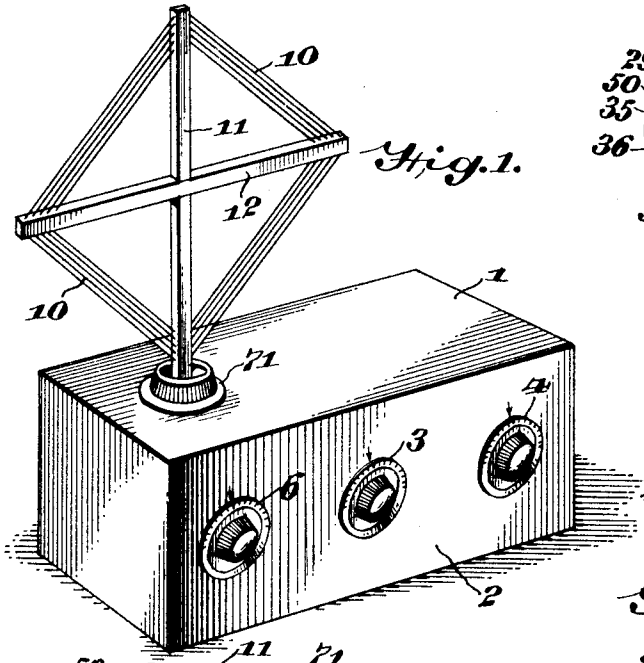


Fig. 3.

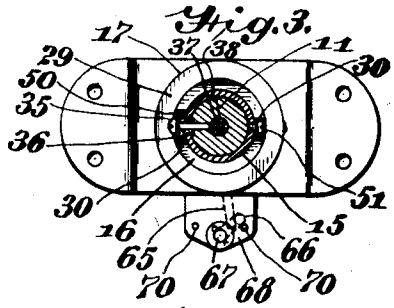


Fig. 4.

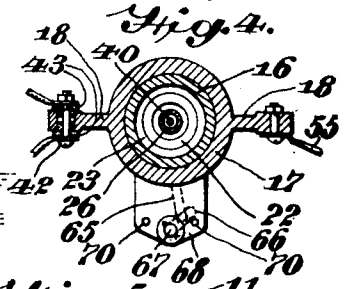


Fig. 5.

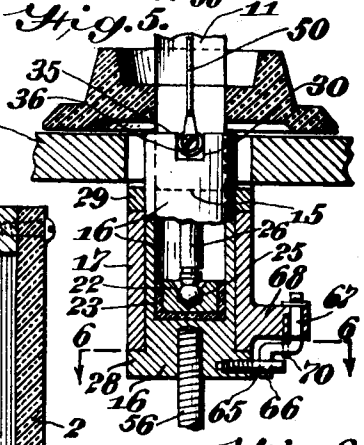


Fig. 2.

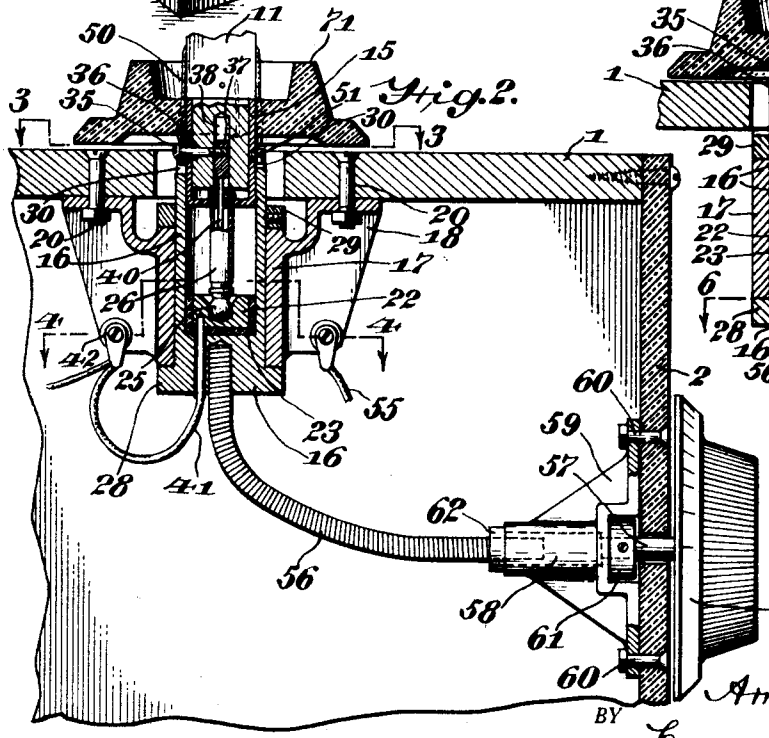
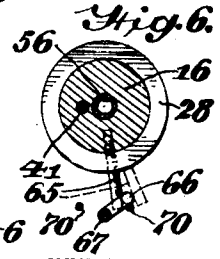


Fig. 6.



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UNITED STATES PATENT OFFICE.

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MEANS FOR ADJUSTING THE ANTENNA OF RADIO APPARATUS.

Application filed December 9, 1924. Serial No. 754,768.

In the use of radio receiving apparatus for receiving electric wave signals from distant stations it is necessary to adjust different parts or elements thereof in order to adapt the said apparatus to the reception of the waves of different or varying frequencies from different stations. The means for effecting such adjustments are generally located upon the front panel of a box structure within which the various elements of the apparatus are located. In the employment of such apparatus provided with loop antenna, it is necessary that such antenna be adjusted about its axis from time to time. Hitherto it has been the practice to take hold of the antenna and directly adjust the same.

The general object of the present invention is to provide novel means whereby the antenna may be adjusted from a more or less distant point, as from and by means of a dial upon the front panel of said box struture, whereby the necessity of taking hold of the antenna itself for the purpose of adjusting the same is obviated.

It is also an object of the invention to provide a novel construction of connection between the antenna and a manually operable device for effecting rotation of the said antenna about the axis thereof.

To these and other ends the invention comprehends the construction and arrangement of parts as hereinafter described in detail, particularly pointed out in the claim, and as illustrated in the drawing in which I have illustrated one form of a convenient mechanical embodiment thereof. However, it will be understood that the invention is susceptible of embodiment in other forms of construction than that shown and that changes in the details of construction may be made within the scope of the claim without departing from the principle of the said invention.

In the drawing:

Fig. 1 is a view in perspective of the cabinet of a radio receiving apparatus, the front side or panel thereof being provided with dials by means of which certain elements of the apparatus are adapted to be adjusted, the said figure also disclosing a loop antenna mounted upon the top of the said cabinet;

Fig. 2 is a vertical transverse sectional view of a portion of the cabinet and including the lower part of the antenna and showing the means for connecting said antenna to a dial upon the front panel of the said cabinet;

Fig. 3 is a horizontal transverse sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a horizontal transverse section taken on line 4—4 of Fig. 2;

Fig. 5 is a vertical sectional view showing a portion of the connecting means between the antenna and the dial for adjusting the same, the said view being taken in a plane at right angles to that in which Fig. 2 is taken; and

Fig. 6 is a horizontal transverse sectional view taken on the line 6—6 of Fig. 5.

Referring to the drawing: 1 designates a cabinet the front side of which consists of a panel 2 of insulating material upon which certain parts of the apparatus are mounted. The dials 3 and 4 are those usually employed in apparatus of this character to adjust certain elements of the apparatus; for example, a variable condenser and a variometer or the like. A third dial 6 is employed in connection with the invention. The said dial 6 is mounted upon the panel 2 in convenient relation to the dials 3 and 4 so that a person operating the latter may conveniently operate the former to effect rotatable adjustment of the loop antenna comprising the loops 10 mounted upon bars 11 and 12 of wood fiber or other suitable material. The lower end of the vertical bar 11 is provided with a metal thimble 15 the lower end of which projects into the upper end of a metal socket member 16 which is rotatably mounted within the sleeve 17 constituting a part of the depending bracket 18 which is secured to the underside of the top of the cabinet 1 by means of bolts 20. A metal block 22 is mounted within the lower end of the metal socket member 16 and is insulated therefrom by means of an insulating line 23. The metal block 22 is provided with a socket in its upper end within which is seated a globular shaped metallic member 25 secured upon the lower end of a tubular member 26 of insulating material the upper end of which is secured to the lower end of the thimble 15. The said tubular connecting member 26 operates to support the antenna upon the rotatably adjustable socket member 16.

It may also be noted that the member 16 is secured to the sleeve 17 by means of a flange 28 upon its lower end which engages the lower edge of the said sleeve and a col-

lar 29 secured to the said socket member a distance below its upper end which collar is adapted to rest upon and contact with the upper edge of the sleeve 17.

In order to compel rotation of the antenna with the rotatably adjustable socket member 16, the latter is provided at its upper end with slots 30 in diametrically opposed relation to each other within one of which the head of a binding post 35 is mounted, the outer portion of the said binding post extending through a flanged sleeve 36 of insulating material which prevents contact of the said binding post with the thimble 15 upon the lower end of the bar 11 of the antenna frame. The inner end of the binding post 35 is in engagement with a metal piece 37 located within an opening 38 in the lower end of the bar 11. A metal wire or rod 40 is connected at its upper end with the metal piece 37 and at its lower end with the globular shaped member 25. An electric conductor 41 is connected at its inner end to the metal block 22 and at its outer end to a binding post 42 upon the bracket 18. The said binding post is insulated from the said bracket by means of insulating sleeves 43. It will be noted that the inner end of the conductor 41 extends through an opening in and is insulated from the lower end portion of the socket member 16. It will also be noted that the portion of the conductor 41 between the lower end of the member 16 and the binding post 42 is looped or slacked so that the said member 16 may be rotated about its vertical axis to an extent slightly greater than 360° as will be hereinafter described.

One end of a conductor 50 having connection with the antenna loops 10 is connected to the binding post 35. The opposite end of the circuit including the antenna is connected by means of a binding post 51 to the thimble 15 upon the lower end of the bar 11 of the frame of the antenna structure. From the said thimble current may pass through the rotatable socket member 16 and from the latter to the sleeve 17, and thence to the conductor 55. The presence of the outer ends or heads of the binding posts 35 and 51 within the slots 30 prevents relative rotation between the antenna structure and the rotatably adjustable socket member 16.

For the purpose of effecting rotative adjustment of the socket member 16 with corresponding adjustment of the antenna structure by the manipulation of the dial 6, I have provided a flexible shaft 56 the outer end of which is connected to a rigid shaft member 57 journaled in a sleeve 58 upon a bracket 59 supported by means of bolts 60 upon the inner side of the front panel 2 of the cabinet 1. For the purpose of preventing longitudinal movement of the shaft member 57 within its bearing 58, I have provided the collars 61 and 62 which are located in contact with the opposite ends of the said bearing. The dial 6 is connected to the outer end of the shaft member 57. The outer end of the flexible shaft 56 is connected to the inner end of the shaft member 57 while the inner end of said flexible shaft is connected to the lower inner end of the socket member 16, previously referred to. It will be understood that upon rotation of the dial 6 corresponding rotation of the flexible shaft 56 is effected which, in turn, causes corresponding rotation of the connecting means between the inner end of the latter and the antenna structure to in turn cause corresponding rotatable adjustment of the latter.

It is desirable that the antenna shall be rotatable to an extent slightly greater than 360° in either direction and in order to permit and limit the rotation in either direction to the extent indicated I have provided upon the lower end of the socket member 16 a laterally extending stud or pin 65 the outer end of which is adapted to engage with the lower offset portion 66 of a stop rod 67 rotatably or pivotally mounted in a vertical opening through an ear or projection 68 which extends laterally from the lower end portion of the sleeve 17. For the purpose of limiting the extent of oscillatory movements of the stop rod 67, I have provided pins 70 which extend downwardly from the lower side of the laterally extending projection 68.

It may be desired at times to adjust the antenna by direct manipulation without the aid or the employment of the dial 6. In order that such direct manipulation may be effected, I have provided upon the bar 11 near the lower end thereof a dial 71 similar to the dial 6.

It will be seen that by my invention I have provided means whereby the antenna of a radio apparatus may be adjusted and positioned by the manipulation of means located a distance therefrom and it will also be seen that the said means is located in convenient relation to the dials upon the front panel of the cabinet of the apparatus which are employed for adjusting other parts of the apparatus such as a variable condenser or a variometer.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

In combination, the cabinet of a radio receiving apparatus, a bracket comprising a bearing sleeve supported upon the inner side of the top of said cabinet which sleeve is provided with a laterally extending projection adjacent its lower end upon which is supported an oscillatable stop device and pins for limiting the extent of oscillation of said device, a socket member rotatably

mounted in said bearing sleeve and having a laterally extending projecting pin adjacent its lower end, an antenna, the lower end of the frame structure of which is mounted within and supported by the said socket member, a rotatable antenna adjusting device supported upon the front panel of the said cabinet, and a flexible shaft connecting the said rotatable device with the said rotatable socket member whereby upon rotation of the said rotatable device in either direction corresponding rotation of the said socket member and of the antenna supported thereon is effected, the extent of such rotation being limited by the contact of the laterally extending pin in the said socket member with the said oscillatable stop device, substantially as described.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 6 day of December, A. D., 1924.

ARNO ZILLGER.