April 22, 1947. E. B. BIGUE 2,419,311

ANTENNA

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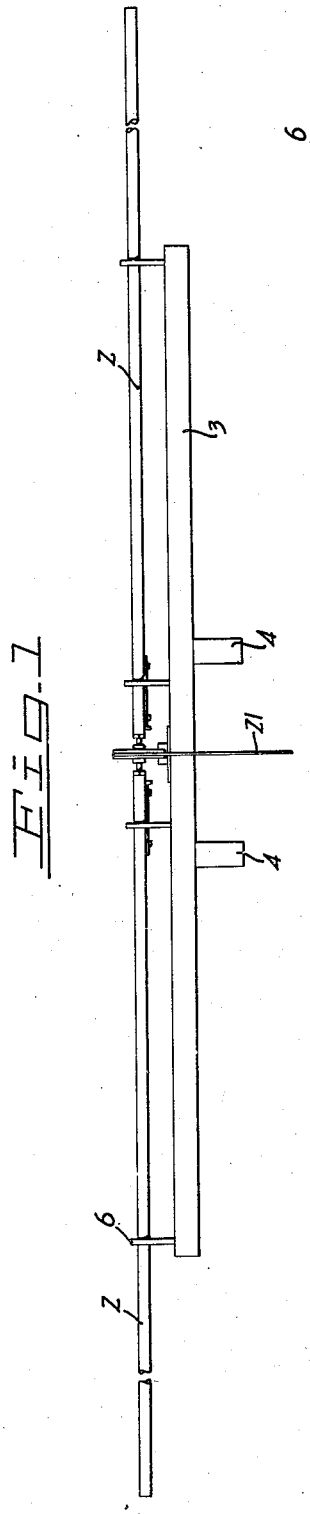


FIG. 1

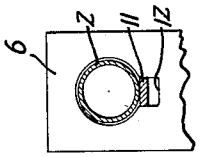


FIG. 3

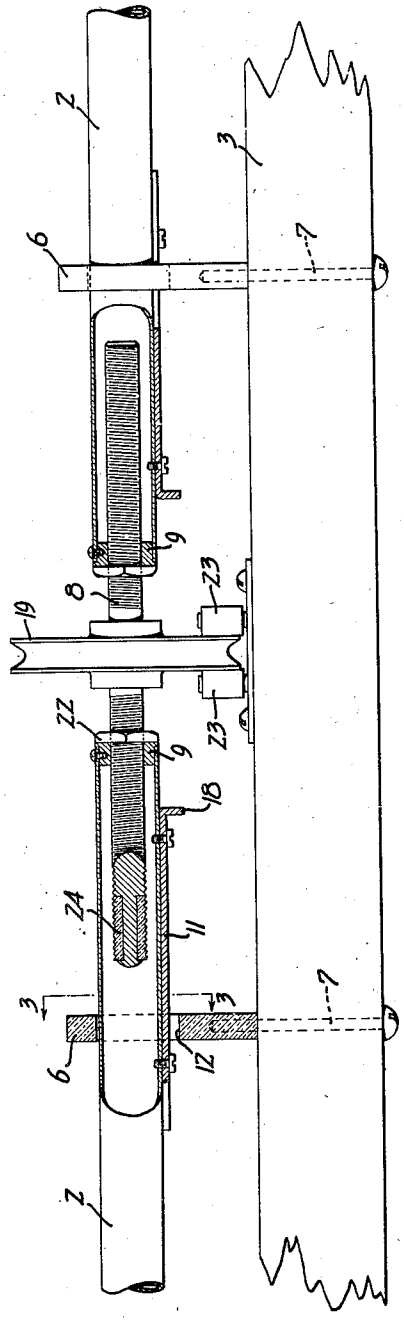


FIG. 2

INVENTOR
EMILE B. BIGUE
BY Charles S. Evans
HIS ATTORNEY

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Emile B. Bigué, Los Angeles, Calif.

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3 Claims. (Cl. 250—33)

1

My invention relates to an antenna system for radio transmission or reception; and more particularly to a system for short wave radiations, in which two or more parallel antenna elements are arranged to function as radiators or parasitic directors or reflectors.

It is among the objects of my invention to provide means for changing the length of an antenna element to alter its electrical properties.

Another object is to provide means for adjusting the length of an antenna element from a remote point while the element is suspended in its operative position.

Another object is to provide means for disrupting the electrical continuity of the element.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of my invention. It is to be understood that I do not limit myself to this disclosure of species of my invention, as I may adopt variant embodiments thereof within the scope of the claims.

Referring to the drawings:

Figure 1 is a side elevational view of an antenna element embodying the improvements of my invention.

Figure 2 is a side view, partly in section and partly in elevation, showing the centrally disposed screw for changing the length of the element; and

Figure 3 is a transverse vertical sectional view taken in a plane indicated by line 3—3 of Figure 2.

In antenna systems for short wave radiations it is the practice to use two or more rigid antenna elements supported intermediate their ends in parallel relationship on the cross-arm of a pole so that the elements project outwardly into free space. These elements are spaced, say one-quarter to one-tenth wave length, and when parasitically excited may function as directors or reflectors depending upon their position with regard to a directly excited radiator.

Such a system of antenna elements has predetermined electrical characteristics determined by their length, spacing, height above the ground, and the presence of surrounding objects such as trees, buildings, guy wires, feed lines, etc. Because of the latter factors, which vary with different locations, it is necessary to use elements of predetermined length and spacing in order to obtain certain electrical properties for a given location. In the past, the desired electrical properties in an antenna system of this kind have been achieved largely by cut and try methods in

2

changing the lengths and spacing of the elements, with the result that accurate adjustment is rarely attained. In my improved system the electrical properties are controlled by changing the length of the antenna element from a remote point, as from the ground, while the elements are suspended in operative position.

In terms of broad inclusion, my antenna system comprises an antenna element, and remotely controlled means interposed in the element and preserving the electrical continuity thereof for changing the length of the element. Means associated with the latter means are also preferably provided for disrupting the electrical continuity.

In greater detail, and referring to the drawings, the antenna system includes an element comprising axially aligned sections 2 projecting outwardly from a central support. These sections are about sixteen to seventeen feet long and are preferably of aluminum tubing for light weight. The support comprises a bar 3 such as wood secured to cross pieces 4 which in turn are mounted in elevated position as on the top of a pole. While I have shown only one element it is understood that two or more are arranged in parallel relationship on cross pieces 4. It is also understood that the elements may be arranged in horizontal or vertical position, or the cross pieces 4 may be pivotally mounted on the pole so as to permit changing the plane of the elements.

Means are provided for axially adjusting sections 2 to change the length of the antenna element. For this purpose sections 2 are slidably mounted for axial movement in pairs of apertured insulating blocks 6 secured to bar 3 as by screws 7. A screw 8 is interposed between the sections and has right and left-hand threads engaging nuts 9 secured at the inner ends of the sections. These nuts and screw are also of an electrical conducting material such as brass or dural so as to preserve the electrical continuity of the antenna element. In order to prevent sections 2 from turning, strips 11 are preferably fastened thereto to slide in notches or ways 12 of blocks 6. Downturned ends 18 of these strips provide stops to limit outward movement.

Means are also provided for turning the screw to effect movement of sections 2. To this end I preferably fix a pulley 19 on the screw, over which a rope 21 may be looped to turn the screw from a remote point as from the ground. After adjustment is made the rope may be removed. If desired, lock nuts 22 may be provided on the

screw to fix the adjustment, although these are usually not necessary. To prevent axial movement of screw 8 a pair of insulating rollers 23 are preferably provided at the sides of pulley 19. Of course other means such as a worm and gear could be employed to turn the screw, but the pulley is preferred because of its simplicity.

When tuning an antenna system of this kind it is sometimes desirable to break an element electrically. Therefore I provide means for disrupting the electrical continuity of the element. This is simply done by an insulating collar 24 on a reduced end of the screw 8, which collar is threaded along with the screw. It is thus seen that the electrical connection between section 2 and screw 8 is broken when collar 24 lies in nut 9.

It is understood that each of the antenna elements in the system is made in a manner similar to that above described, so that each is separately adjustable as to length.

The procedure in adjusting an antenna system embodying my invention is for a person to climb the pole upon which the elements are mounted and loop ropes over the pulleys with the ends of the ropes hanging downwardly to the ground. If lock nuts 22 are provided these are backed off toward pulley 19 to free the screw for turning. The person then returns to the ground and proceeds to vary the lengths of the elements as desired by pulling the ropes on the pulleys to obtain the desired electrical properties in the system. After adjustment the ropes are removed and if lock nuts 22 are used the person reclimbs the pole to tighten them. If during the adjustment it is desired to break an element electrically, all a person needs to do is to turn the screw of that element until feed nut 9 is threaded

out far enough to engage insulated portion 24 of the screw.

I claim:

1. In an antenna system, an antenna element, adjusting means interposed in said element and preserving the electrical continuity thereof for changing the length of the element, and insulating means upon the adjusting means for disrupting the electrical continuity of said element.

2. In an antenna system, an antenna element comprising a pair of axially aligned sections, and means including a screw interposed between the sections for axially moving the latter to change the length of said element, said screw having an insulated portion.

3. In an antenna system, an antenna element comprising a pair of axially aligned sections, and a screw having right and left hand threads engaging the inner ends of the sections, an end of said screw formed of insulating material.

EMILE B. BIGUÉ.

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