

UNITED STATES PATENT OFFICE

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RADIO ANTENNA

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This invention relates to tunable and sectionable antennae for transportable radio sets and particularly for radio sets adapted to be carried on man's back; the antenna of this invention is adapted to be easily and rapidly assembled or erected and dismantled and it is able to be tuned and used for the set operation during transportation of the set and cooperating antenna.

The antenna of this invention includes a plurality of removably interengaged sections which are adapted to be easily interconnected at the time the antenna is assembled, and is provided with inductance control means for tuning it; the antenna sections include each a support member and a transmission member for the operation of the inductance control device, the cooperating parts of the several sections being provided with interfitting and coupling means adapted to interconnect them at the time the antenna is assembled or erected.

A construction of antenna of this invention is illustrated by way of example on the annexed drawings and

Fig. 1 is a general side view thereof with some parts removed and with aerial rods in extended operative position;

Fig. 2 is a central vertical section of the top portion of the antenna, substantially as denoted by 1 in Fig. 1, to an enlarged scale and with a portion removed and the aerial rods in folded position;

Fig. 3 is a central vertical section of the intermediate portion of the antenna, substantially as denoted by 2 in Fig. 1, to an enlarged scale;

Fig. 4 is a central vertical section of the bottom portion of the antenna, substantially as denoted by 3 in Fig. 1, to an enlarged scale;

Fig. 5 is the central section of an intermediate section of the antenna, substantially as denoted by 2 in Figure 1 and 3 at a different scale than Fig. 3;

Fig. 6 is a transverse section on line 6—6 of Fig. 3, and

Fig. 7 is a fragmentary detail side view of the bottom end portion of Fig. 2, as seen from right hand in the direction of the arrow marked 7 in Fig. 2.

As shown in Fig. 1, the antenna of this invention consists of a number of sections 1, 2, 3; the top one of said sections, denoted by 1 in its whole in Figs. 1 and 2, contains an inductance adjusting device enclosed in a head 4 and several radio-waves collecting rods 6 which are pivoted at 5 on said head 4 by collars 14 wherein their

ends are nested, and provide the aerial, they being adapted to be folded along the antenna as shown in Fig. 2 to reduce its overall size when inoperative; the bottom section 3 of the antenna is provided with a manipulating knob 7 for actuating the inductance adjusting device enclosed in the head 4 by means of actuation transmitting means arranged within the antenna sections as hereinafter described.

The sections 1 and 3 of the antenna are interconnected by means of a number of intermediate sections as necessary to impart the desired extent to the antenna when erected, said sections being interconnected by means of socket joints as hereinafter described.

The head 4 of the top section carrying the aerial rods 6, encloses an insulating sleeve 8 fitting within an insulating tube 9 which lines the internal surface of the top end portion of a section of metal tubing 10 providing the tube mast section of the antenna section 1; the sleeve 8 is protected by an outer insulating cover 11 entering a grooved collar 12 which is fastened on the tube mast section 10 and on the internal tube 9. The sleeve 8 and the cover 11 are engaged and aligned by means of a top metal plug 13 in which the pivot pins 5 for the collars 14 carrying the aerial rods 6 are mounted. A resilient spider 16 is fastened on the top of the plug 13 by means of a central screw pin 15, the arms of said spider 16 engaging side flat faces of the collars 14 carrying the rods 6; the resilient arms of the spider 16 thus act to engage the collars 14 and rods 6 in either their folded position along the head 4 (Fig. 2) or their extended operative position perpendicular to their first named position as shown in Fig. 1.

The inductance of the aerial circuit is provided by a coil 17 located on the sleeve 8 and having one of its ends connected by means of the screw 18 with the metal plug 13 and hence and through the metal pivot pins 15 to the rods 6; the opposite end of the coil 17 is connected with the tube mast section 10.

The adjustment of the inductance of the coil 17 is effected by means of a ferromagnetic core 19 arranged to slide within the sleeve 8 in register with the coil 17; the core 19 is shifted longitudinally by means of an appropriate control device as hereinafter described, by the intermediate of a slider 20 to which the core 19 is connected by means of a stem 21; the slider 20 is provided with fingers 22, 23 engaged in a groove 24 and in a slot 25 provided in the insulating tube 9 and through said tube 9 and the tube mast section

respectively, said fingers 22, 23 binding the slider 20 to reciprocate with the stem 21 and the core 19.

The reciprocation of the slider 20 is secured by means of a hollow spindle 26 pertaining to the core actuating device; said hollow spindle 26 embraces the slider 20 and has two spiral slots 27 through which the fingers 22, 23 extend; the spindle 26 is revolved by means of the manipulating knob 7 mounted to rotate on the bottom antenna section 3.

A scale 28 is provided along the slot 25 (Fig. 7) in which the finger 23 moves, to show the position of the core 19 to the operator.

The actuation of the core 19 by the knob 7 is effected by means of a transmission located within the tube mast sections and sectioned in sections corresponding with the respective mast sections of the antenna, said transmission sections being provided with coupling parts for their interengagement at the time the antenna sections are assembled.

The bottom section 3, a portion of which is illustrated in Fig. 4, includes a tube mast section 28 similar to section 10, which encloses the cooperating section 32 of the transmission and carries the manipulating knob 7 therefor.

The intermediate tube mast sections, one of which is shown in Fig. 5 at a reduced scale with respect to Figures 2-4, include each an outer tube mast section 29 and a cooperating section of the transmission for the actuation of the core 19.

The several antenna sections are assembled by means of spigot and socket joints coupling their ends with each other. For connecting the top section 1 with the adjacent intermediate section 2 (Fig. 3) the lower end of the tube mast section 10 of the antenna section 1 provides a socket 10' adapted to receive the end spigot 29'' of the tube mast section 29 of the intermediate antenna section 2; the socket 10' encloses a resilient sleeve 30 (Figures 3 and 5) having a polygon cross-section, which is engaged between an internal annulus 31 and an inward end flange 10a of the socket 10 said sleeve 30 becoming forced intermediate the socket 10' and the spigot 29'' of the interfitting tube mast sections 10 and 29 to couple and frictionally engage them with each other angularly.

A similar arrangement is used to interconnect the several intermediate sections and also for connecting the bottom section 3 with the intermediate section 2 adjacent to it, as shown in Fig. 5 where the intermediate section 2 has a socket 29' at its end opposed to the spigot end 29'' said socket 29' enclosing a resilient sleeve 30 as above described and being adapted to receive the spigot end, similar to 29' of the tube mast section of another intermediate section 2, or a spigot end of the tube mast section 28 of the bottom antenna section 3 (Figs. 1 and 4).

The transmission means located within the antenna and connecting the manipulating knob 7 with the actuating device of the core 19, consists of spindles 26, 32, 33 located inside the tube mast sections 10, 28, 29; said spindles 26, 32, 33 are mounted by means of bearings 34 engaged in the tube mast sections 10, 28, 29 by means of grooves 35 provided therein.

The several spindles 26, 32, 33 are intercoupled by the hereinafter described means. Each of said spindles 26, 32, 33 has a coupling head 36 with a transverse pin 37 at one of its ends in register with the adjacent end of the tube mast section enclosing it, and the opposed end of said spindle has a coupling head 39 provided with a resilient

jaw 38 fast thereon by means of a rivet 41 the tongues 38' of said jaw providing slots which may be entered by the ends of the pin 37 of the adjacent spindle head 36.

The spindles 26, 32, 33 are hollow and their end coupling heads 36, 39 are forced in the spindle ends and fast therein by means of rivets 40; said heads 36, 39 also provide pivots 36', 39' for mounting said spindles in the respective bearings 34 and have shoulders 36'', 39'' which cooperate with end flanges 33', 26' of the spindles 33, 26 to embrace the adjacent bearings 34 to longitudinally position the respective spindle within the outer tube mast section.

Of course joint and coupling means of different nature are provided at the ends of each of the intermediate antenna sections 2 to cooperate with associate joint and coupling means of respectively associate antenna sections; the top section 1 and the bottom section 3 are provided at the respective joint end with joint and coupling means adapted to cooperate with associate means of the respective ends of the adjacent intermediate sections 2.

To make the manipulation of the internal transmission 32, 33, 26 easy, the end of the bottom section 3 carrying the manipulating knob 7 is bent laterally and the interconnection of the knob 7 with the spindle 32 is provided by means of a flexible metal member 42 having one end engaged with the knob 7 by a set screw 43 and its opposite end fast to a head 44 which is engaged with the spindle 32 by means of a rivet 45.

The knob 7 embraces the end of the outer tube mast section 28 of the antenna section 3 and has an internal hub 7' receiving the end of the cable 42; the set screw 43 fastening this cable 42 in the knob 7 may be reached through an aperture 46 provided in the knob and a slot 47 of the wall of the tube mast section 28.

To erect or build-up the antenna the several sections thereof are assembled by fitting the spigot end as 29'' of the tube mast section, as 29, of each of them, in the socket, as 10' or 29', of the associate antenna section as 10 or 29; in this operation also the respective spindles 26, 32, 33 are intercoupled by the engagement of the respective pin 37 intermediate the tongues 38' of the resilient jaw 38 of the other one; said tongues 38' provide a safe interengagement of the cooperating spindles by their spring action.

The antenna inductance is adjusted by manipulating the knob 7 to actuate the transmission provided by the several intercoupled parts 42, 32, 33, 26, the revolution of the spindle 26 with its spiral slots 27 producing as above described such a longitudinal motion of the slider 20 and stem 21 and of the magnetic core 19 with respect to coil 17 as required to adjust the antenna inductance.

To put the antenna in operation the aerial rods 6 are located in extended position as shown in Fig. 1 by moving them about their pivot pins 5, said rods 6 being held in position by the arms of the resilient spider 16 engaging their pivot collars 14.

The described antenna may be dismantled and sectioned by folding the rods 6 along the antenna section 1 carrying them and by pulling the several antenna sections off from each other to separate the tube mast section and spindle as a whole from similar parts of adjacent sections.

What I claim as my invention and desire to secure by United States Letters Patent is:

1. A sectionable antenna for radio sets comprising a top section having radio-wave collect-

ing means and aerial tuning means, a bottom section having manipulating means for said tuning means and intermediate sections releasably interconnecting said top and bottom sections, each of said sections including a mast member and a coextensive transmission member, interfitting joint means on said mast members of said sections and interfitting coupling means on said transmission members of said sections, said joint and coupling means of said antenna sections being adapted to interengage each other respectively on said antenna sections being assembled.

2. A sectionable antenna for radio sets comprising a top section having radio-wave collecting means and aerial tuning means, a bottom section having manipulating means for said tuning means and intermediate sections releasably interconnecting said top and bottom sections, each of said sections including a tube mast member and a coextensive transmission member within said respective mast member, interfitting joint means on said mast members of said sections and interfitting coupling means on said transmission members of said sections, said joint and coupling means of said antenna sections being adapted to interengage each other respectively on said antenna sections being assembled.

3. A sectionable antenna for radio sets comprising a top section having radio-wave collecting means and aerial tuning means, a bottom section having manipulating means for said tuning means and intermediate sections releasably interconnecting said top and bottom sections, each of said sections including a tube mast member and a coextensive transmission member within said respective mast member, interfitting spigot and socket joint means on said mast members of said sections and interfitting coupling means on said transmission members of said sections, said joint and coupling means of said antenna sections being adapted to interengage each other respectively on said antenna sections being assembled.

4. A sectionable antenna for radio sets comprising a top section having radio-wave collecting means and aerial tuning means, a bottom section having manipulating means for said tuning means and intermediate sections releasably interconnecting said top and bottom sections, each of said sections including a tube mast member and a coextensive transmission member within said respective mast member, interfitting spigot and socket joint means on said mast members of said sections, a prismatic resilient sleeve in each of said socket joint means for engagement of said spigot and socket means with each other and interfitting coupling means on said transmission members of said sections, said joint and coupling means of said antenna sections being adapted to interengage each other respectively on said antenna sections being assembled.

5. A sectionable antenna for radio sets comprising a top section having radio-wave collecting means and aerial tuning means, a bottom section having manipulating means for said tuning means and intermediate sections releasably interconnecting said top and bottom sections each of said sections including a tube mast member and a coextensive spindle rotatably mounted within the respective tube mast member and concentric therewith, interfitting joint means on said tube mast members of said sections and interfitting coupling means on said spindles said joint and coupling means of said antenna sections being

adapted to interengage each other respectively on said antenna sections being assembled.

6. A sectionable antenna for radio sets comprising a top section having radio-wave collecting means and aerial tuning means, a bottom section having manipulating means for said tuning means and intermediate sections releasably interconnecting said top and bottom sections each of said sections including a tube mast member, bearings fast in said tube mast member, a hollow spindle within said tube mast member, heads fast in the ends of said spindle and journaled in said bearings, interfitting joint means on said tube mast members of said sections and interfitting coupling means on said spindle heads said joint and coupling means of said antenna sections being adapted to interengage each other respectively on said antenna sections being assembled.

7. A sectionable antenna for radio sets comprising a top section having radio-wave collecting means and aerial tuning means, a bottom section having manipulating means for said tuning means and intermediate sections releasably interconnecting said top and bottom sections each of said sections including a tube mast member, bearings fast in said tube mast member, a hollow spindle within said tube mast member, heads fast in the ends of said spindle and journaled in said bearings, interfitting joint means on said tube mast members of said sections, interfitting jaws having resilient tongues and transverse pins on said spindle heads, said joint means and jaws and pins of said antenna sections being adapted to interengage each other respectively on said antenna sections being assembled.

8. A sectionable antenna for radio sets comprising a top section having radio-wave collecting means and aerial tuning means, a bottom section having manipulating means for said tuning means and intermediate sections releasably interconnecting said top and bottom sections each of said sections including a tube mast member, bearing collars engaged each in a depressed region of said tube mast member and a coextensive spindle rotatably mounted within the respective tube mast member in said bearing collars thereof, interfitting joint means on said tube mast members of said sections and interfitting coupling means on said spindles said joint and coupling means of said antenna sections being adapted to interengage each other respectively on said antenna sections being assembled.

9. A sectionable antenna for radio sets comprising a top tube mast section having radio-wave collecting means and aerial tuning means, an adjustable member in said tuning means, a slider connected with said adjustable member, means on said tube mast section and slider for guiding said slider to reciprocate in said tube mast section, a spiral member mounted to rotate in said tube mast section and engaging said slider to reciprocate it, a bottom tube mast section having manipulating means for rotating said spiral member, intermediate tube mast sections releasably interconnecting said top and bottom sections, a transmission member within and coextensive with each of said intermediate sections, interfitting joint means on said tube mast sections and interfitting coupling means on said transmission members said joint and coupling means being adapted to interengage each other respectively on said antenna sections being assembled.

10. A sectionable antenna for radio sets com-

prising a top tube mast section having radio-wave collecting means and aerial tuning means, an adjustable member in said tuning means, a slider connected with said adjustable member, a hollow spindle in said tube mast section and encircling said slider, said tube mast section providing longitudinal slots and said hollow spindle having spiral slots, fingers on said slider engaging said longitudinal and spiral slots, a bottom tube mast section having manipulating means for rotating said hollow spindle, intermediate tube mast sections releasably interconnecting said top and bottom sections, a transmission member within and coextensive with each of said intermediate sections, interfitting joint means on said tube mast sections and interfitting coupling means on said transmission members said joint and coupling means being adapted to interengage each other respectively on said antenna sections being assembled.

11. A sectionable antenna for radio sets comprising a top tube mast section having radio-wave collecting means and aerial tuning means, an adjustable member in said tuning means, a slider connected with said adjustable member, a hollow spindle in said tube mast section and encircling said slider, said tube mast section providing longitudinal slots and said hollow spindle having spiral slots, fingers on said slider engaging said longitudinal and spiral slots, said tube mast section having a scale on its outside along one of said slots and one of said fingers extending throughout said slot to cooperate as an index with said scale, a bottom tube mast section having manipulating means for rotating said hollow spindle, intermediate tube mast sections releasably interconnecting said top and bottom sections, a transmission member within and coextensive with each of said intermediate sections, interfitting joint means on said tube mast sections and interfitting coupling means on said transmission members said joint and coupling means being adapted to interengage each other respectively on said antenna sections being assembled.

12. A sectionable antenna for radio sets comprising a top conducting tube mast section having radio-wave collecting rods foldably mounted thereon and insulated therefrom, an inductance coil having one end connected with said rods and located within said section said coil having its other end connected with said section, a magnetic core cooperating with said coil, a slider connected with said core, means on said tube mast section and slider for guiding said slider to reciprocate in said tube mast section, a spiral member mounted to rotate in said tube mast section

and engaging said slider to reciprocate it, a bottom conducting tube mast section having manipulating means for rotating said spiral member, intermediate conducting tube mast sections releasably interconnecting said top and bottom sections, a transmission member within and coextensive with each of said intermediate sections, interfitting joint means on said tube mast sections and interfitting coupling means on said transmission members, said joint and coupling means being adapted to interengage each other respectively on said antenna sections being assembled.

13. A sectionable antenna for radio sets comprising a top section having radio-wave collecting means and adjustable aerial tuning means, a bent bottom section and intermediate sections releasably interconnecting said top and bottom sections each of said sections including a tube mast member and a spindle rotatably mounted within the respective tube mast member and concentric therewith, said spindle of said top section actuating said adjustable tuning means, interfitting joint means on said tube mast members of said sections and interfitting coupling means on said spindles said joint and coupling means of said antenna sections being adapted to interengage each other respectively on said antenna sections being assembled, a manipulating member rotatable on the free end of said bottom section and a flexible member operatively connecting said manipulating member and said spindle of said bottom bent member.

14. A sectionable antenna for radio sets comprising a top section having radio-wave collecting means and adjustable aerial tuning means, a bent bottom section and intermediate sections releasably interconnecting said top and bottom sections each of said sections including a tube mast member and a spindle rotatably mounted within the respective tube mast member and concentric therewith, said spindle of said top section actuating said adjustable tuning means, interfitting joint means on said tube mast members of said sections and interfitting coupling means on said spindles said joint and coupling means of said antenna sections being adapted to interengage each other respectively on said antenna sections being assembled, a manipulating member embracing the free end of said bottom section and having a portion extending thereinto and a flexible member operatively connecting said extending portion of said manipulating member and said spindle of said bottom bent member.

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2 Sheets-Sheet 1

Fig. 1

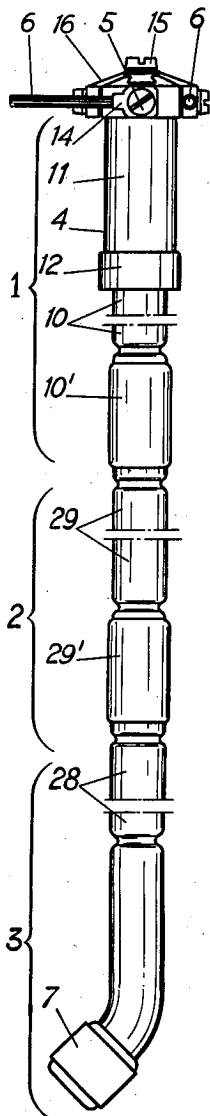


Fig. 2

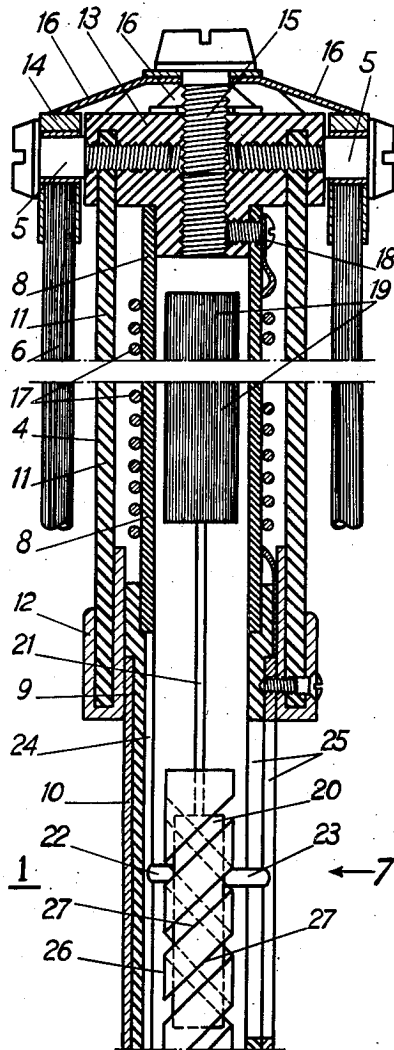
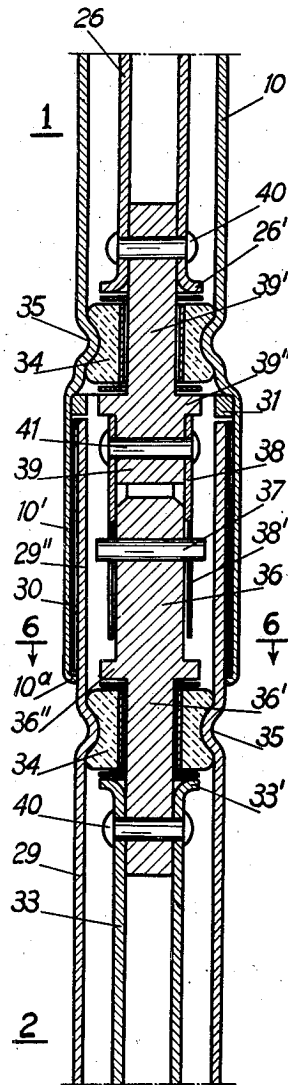


Fig. 3



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2 Sheets-Sheet 2

Fig. 4

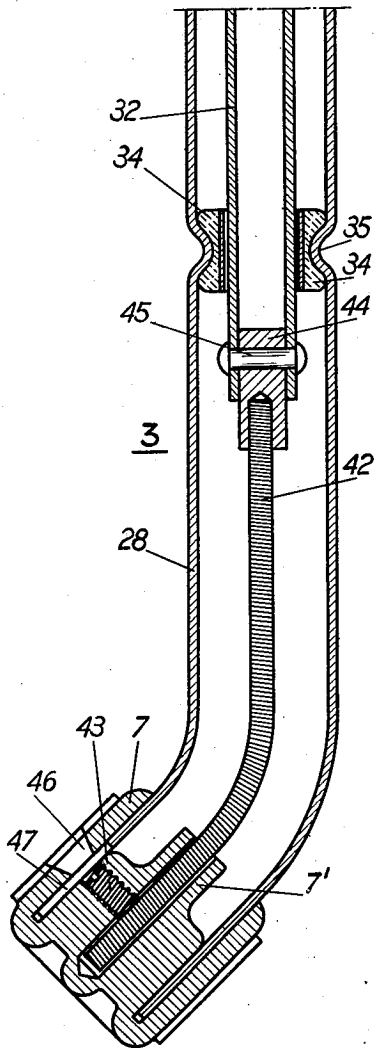


Fig. 5

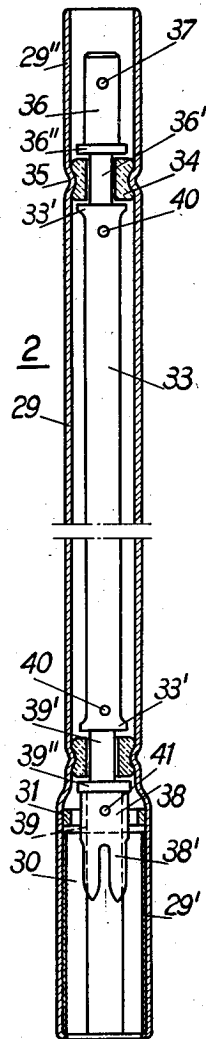


Fig. 6

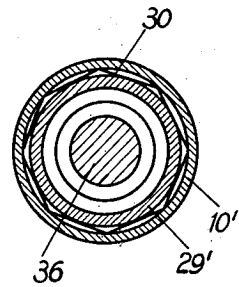
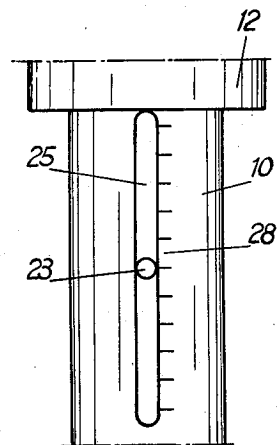


Fig. 7



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