Oct. 28, 1930. M. H. LOUGHRIDGE ET AL 1,779,437

RADIO ANTENNA

Filed July 29, 1926

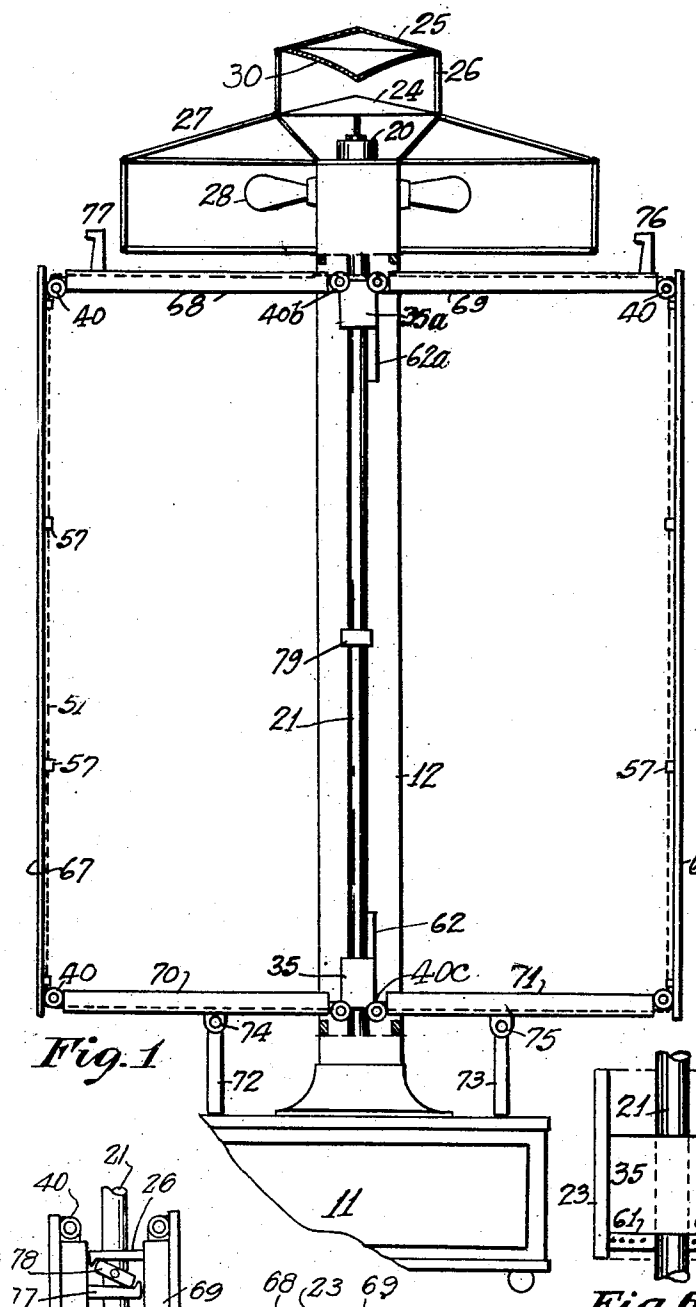

Fig. 1

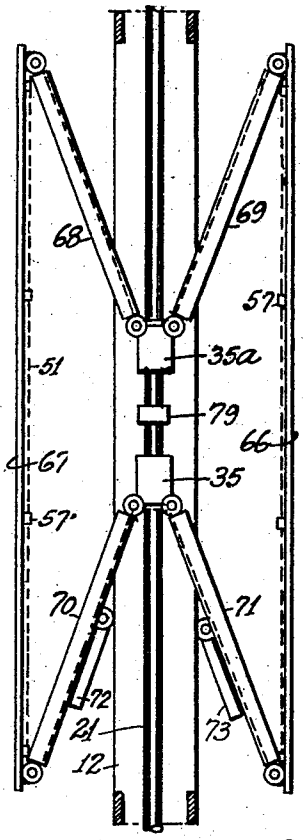

Fig. 2

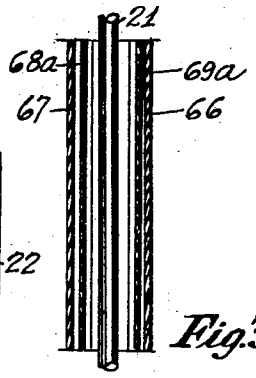

Fig. 3

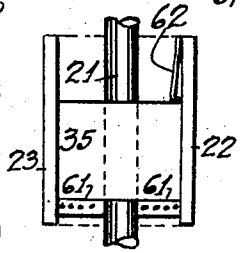

Fig. 6

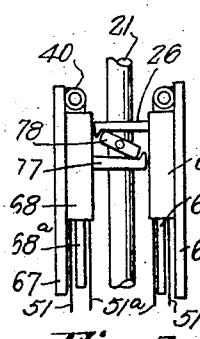

Fig. 5

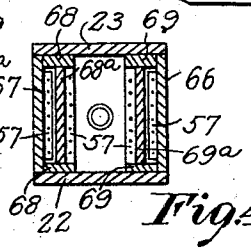

Fig. 4

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UNITED STATES PATENT OFFICE

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RADIO ANTENNA

Application filed July 29, 1926. Serial No. 125,816.

This invention relates to radio antennæ of the loop type and has for an object to provide a loop antenna which is collapsible, which is built in the form of a folding frame with the antenna wires supported by the arms of the frame, which encloses the wires when folded and which provides a spacer between the wires on each of the arms when folded. Other objects of the invention will be understood from the following specification and the accompanying drawings, in which, Fig. 1, is an elevation of a loop antenna constructed according to this invention expanded ready for use, Fig. 2 is an elevation showing the antenna partially folded, Fig. 3 is a section showing the relation of the supporting arms when folded, Fig. 4 is a cross-section of the antenna in the folded position, Fig. 5 is a detail showing one method of latching the arms in the folded position and Fig. 6 is a detail showing the method of latching the arms in the open position.

This invention is disclosed in part in our co-pending application, Serial No. 525,917, filed December 30, 1921 for radio apparatus.

In the application of loop antennæ for radio apparatus, it is well known that the efficiency of this type of antenna increases with its size, the length of the parallel arms etc. A large antenna is inconvenient to handle and generally unsightly and considerable advantage arises from the use of a collapsible antenna which can be folded into small space when not in use and can be expanded into comparatively large dimensions for receiving purposes. Such an antenna may be incorporated into an article of furniture as in the lamp stand here shown, or may be built to fold within a receiving set when not in use. This invention provides for maintaining the wires taut during the process of folding and unfolding so that they cannot become entangled; provides a backing for each row of wires and provides a separator between each row of wires when the antenna is folded.

The present invention comprises a plurality of pivoted arms arranged to expand and fold so that when expanded a complete rectangle is formed and when collapsed the device is condensed to the combined width of the arms and the length of the longest arm. A row of flexible wires are secured by cleats to the arms and lead around the pivoted joints of the arms so that these wires are maintained substantially taut by the arms during the operation of folding and unfolding. Certain of the arms are provided with side bars which project beyond the plane of the wires and thus protects and conceals the wires.

Referring to the drawings, 11 is the base upon which the perpendicular stand 12 is erected having the slide bar 21 in the centre and supporting the wire frame 27 of the lamp shade as shown and the lamp bulbs 28. On top of the stand or pedestal 12 the loud speaker unit 20 is placed which operates the cone type of reproducer 24. Above this reproducer is placed the inverted cone 25 on the fixed supports 26 and around the annular opening between the cones a band of silk corresponding to the shade of the lamp may be provided to produce a finished appearance. The surface of the fixed cone 30 reflects the sound horizontally from the device in an annular band. This surface may be silvered so that if the reproducer 24 is transparent or if provision is made for the light from the bulbs to reach this reflector it will be reflected in a halo around the top of the lamp.

The folding frame supporting the antenna comprises the boards 66 and 67 and the arms 68, 69, 70 and 71. The boards are pivoted at 40 to the arms and the arms 68 and 69 are pivoted at 40^b to the slide 35^a, also, the arms 70 and 71 are pivoted to the slide 35 at 40^c as shown. When the slide 35 is lowered and the slide 35^a is raised the arms are brought to the horizontal position and the frame forms a rectangle. When these slides are moved in the opposite direction towards the centre of the stand as indicated in Fig. 2, the arms are brought together and the sides 66—67 are moved towards the centre to complete the pedestal which encloses the frame when it is collapsed.

When closed, the latch 77 on arm 68 and 76 on arm 69 stand in the relation shown in Fig. 5 and the latching piece 78 may be provided and operated by a handle from the outside of the pedestal to engage the ends of the

latches and hold the frame in the closed position. The frame is latched in the open position as indicated in Figs. 1 and 6 by the spring latch 62 engaging the slide 35 and the spring latch 62ª engaging the slide 35ª. These spring latches are secured to the sides of the pedestal. When expanded as shown in Fig. 1, the weight of the frame is supported by the base 11 through the post 72 pivoted to arm 70 at 74, and through the post 73 pivoted to arm 71 at 75. These posts fold against the arms when collapsed as indicated in Fig. 2.

The antenna wires are supported on the frame as indicated at 51 and are secured in place by cleats 57. These wires are preferably stranded and flexible and are held taut by the cleats on the arms. The wires pass between the horizontal arms over the slides as indicated in Fig. 6. Perforated cleats 61 are provided, secured to the slides through which the wires are directed and kept in place. The rod 21 forms a guide for the slides in the pedestal and insures the easy and uniform operation of the device. A stop 79 is provided on this rod to limit the movements of the slides.

The horizontal arms are preferably constructed of a board or frame having side bars, as at 68 and 69, Fig. 4 which are wider than the frame and thus form a channel for the wires which are cleated in place as indicated at 57. These bars form a channel on both sides of the frame 68ª and 69ª and the outer channel is occupied by the wires on the vertical sides 66 and 67. Thus, as shown in Fig. 5, the antenna wires 51 supported by 67 are separated from the antenna wires 51ª supported by 68ª. The space for the antenna wires between the arms is indicated in the vertical section in Fig. 3. By this arrangement it is impossible for the antenna wires to become entangled during the process of folding and unfolding.

The pedestal is formed of side boards 22 and 23 and is closed or completed by the boards 66—67 of the frame so that when folded a complete box like pedestal is formed with all the mechanism and wires concealed and protected and an attractive stand is produced which can be ornamented as an article of furniture.

Attention is called to the fact that the antenna wires are supported on the inside of the vertical sides 66—67 of the frame and are supported on the outside of the arms 68, 69, 70 and 71 so that when collapsed the wires are separated by the body of the arms.

The lamp structure, of course, is not essential to the antenna or its operation and which may be constructed as here shown independently of the lamp.

Having thus described our invention, we claim:

1. A collapsible antenna comprising a folding frame having a pair of parallel sides, arms pivotally connected to said sides at the corners and hinged intermediate said sides so as to collapse between the inside of said sides and the outside of antenna wires supported by said sides and said arms.

2. A collapsible antenna comprising a folding frame having a pair of parallel sides, arms pivotally connected to said sides at the corners and hinged intermediate said sides so as to collapse between said sides, a guide for said arms and antenna wires supported by said sides and said arms.

3. A collapsible antenna comprising a folding frame having a pair of parallel sides and a vertical slide, arms pivotally connected to said sides at the corners and pivotally connected to said slide intermediate said sides and arranged to collapse between said sides and antenna wires supported by said sides and said arms.

4. A collapsible antenna comprising a multiple sided frame with pivotally connected members and antenna wires supported by said members and arranged to collapse by folding said members together and provide a spacer between the wires on each of the members when folded.

5. A collapsible antenna comprising a folding frame expandible into a rectangular form and collapsible so that the members of each side of the frame are folded together, antenna wires supported by the members of said frame and means for latching said frame in position.

6. A collapsible antenna comprising a multiple sided frame with pivotally connected members and antenna wires supported by said members, alternately, on the inside of one member and on the outside of the adjacent member and arranged to collapse with the antenna wire enclosed by folding said members together.

7. A collapsible antenna comprising a multiple sided frame with pivotally connected members arranged to fold together, said members formed in a channel and antenna wires secured in said channel.

8. A collapsible antenna comprising a folding frame having a pair of parallel sides, arms pivotally connected to said sides at the corners and hinged intermediate said sides so as to collapse between said sides, antenna wires supported by said sides and said arms and means including said sides enclosing said frame on four sides when collapsed.

9. A collapsible antenna comprising a folding frame having a pair of parallel sides, arms pivotally connected to said sides at the corners and hinged intermediate said sides so as to collapse between said sides and antenna wires supported by said sides and said arms, said antenna wires being enclosed by said sides.

10. A collapsible antenna comprising a

folding frame having a pair of parallel sides, arms pivotally connected to said sides at the corners and pivotally connected intermediate said sides to a block and antenna wires supported by said sides and said arms and by said block.

Signed at New York, N. Y., this 16th day of July, 1926.

MATTHEW H. LOUGHRIDGE.

Signed at Wilkinsburg, Pa., this 20th day of July, 1926.

JOHN S. HOLLIDAY, Deceased,
By J. Margaret Holliday, Administratrix.