April 7, 1931. E. BELLINI 1,799,208

LOOP ANTENNA

Filed Sept. 29, 1926

Fig. 1

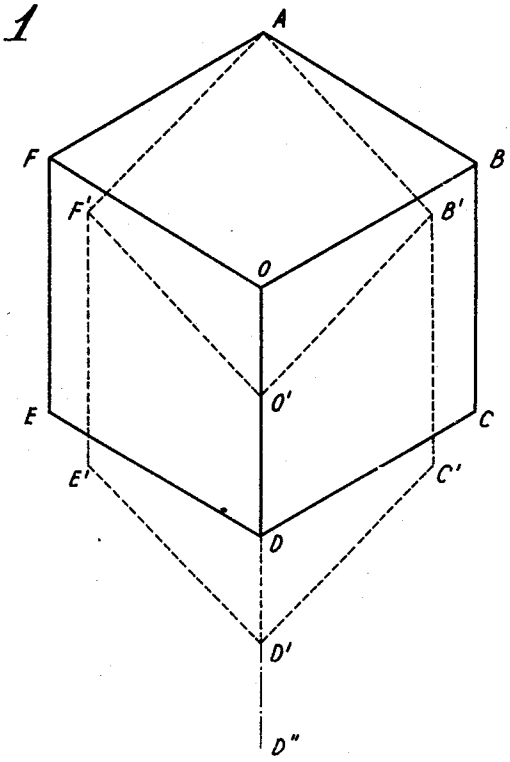


Fig. 2

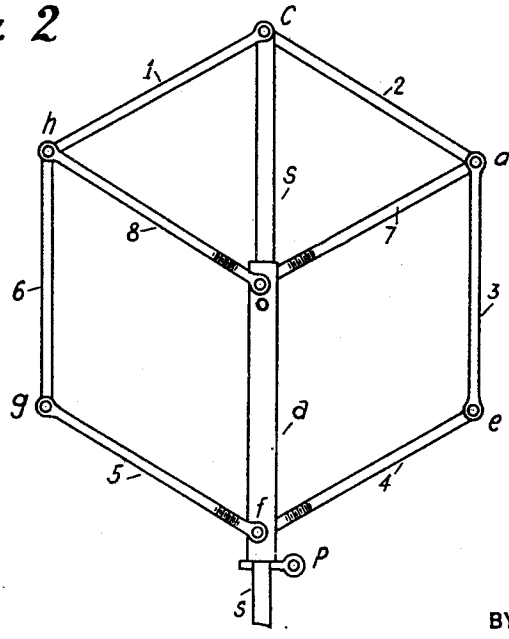
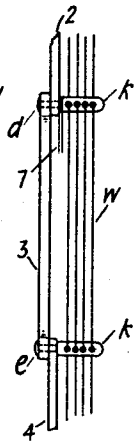


Fig. 3



INVENTOR
ETTORE BELLINI
BY Chas. J. Adams
ATTORNEY

Patented Apr. 7, 1931 1,799,208

UNITED STATES PATENT OFFICE

ETTORE BELLINI, OF PARIS, FRANCE

LOOP ANTENNA

Application filed September 29, 1926, Serial No. 138,359, and in France September 30, 1925.

The present invention relates to loop antennæ and more particularly to collapsible loop antennæ for wireless telegraphy and telephony.

It is an object of this invention to so construct a loop antenna that when in either its upright or knock-down condition, the wires forming the loop winding will always be taut or, in other words, under tension.

Other objects and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a diagrammatic representation of my invention in the form of a hexagon to show the properties thereof.

Figure 2 is a practical embodiment of my invention, and

Figure 3 is a side view of Figure 2 showing the mounting of the wires forming the loop winding.

A great number of foldable or collapsible types of coil or loop antenna adapted for radio reception and radio goniometer work have been evolved, but so far as known all of these different designs involve the drawback that, when in folded or knockdown condition, the wires of the coil are in slack state and are therefore susceptible to be damaged.

To overcome this undesirable feature, the loop forming the subject-matter of the present invention has its constituent wires always in tensioned or tautened condition whether the coil is mounted or folded.

This novel coil is based upon the geometric properties of the hexagon. Let us examine the regular hexagon ABCDEF in Fig. 1. Since all of the sides and the three radial arms OB, OD, OF, are equal, it can, by simply turning or swinging the sides and the arms about points A, B . . . to F and O, be changed into the irregular hexagon A, B′, C′, D′, E′, F′, shown in dotted lines in Figure 1, and even flattened down completely (collapsed) along the straight-line segment AD″. The radial arms OB, OD and OF will also approach the segment AD″. If we assume that the wires of the loop form the sides of the hexagon, they will always be evenly tensioned or stretched, whatever may be the shape of the hexagon, and whether the latter has a regular or irregular form, or it may even be reduced into a straight-line segment.

In practice, this loop can be built as shown by way of example in Fig. 2 to obtain a solenoidal loop.

The shaft S forming the general support of the loop is provided at *c* with articulations or hinges or joints for pivotally mounting the two side pieces 1 and 2. A sleeve *a* adapted to slide on the shaft S is provided at its upper and lower ends with similar hinges or joints *o* and *f*, for pivotally mounting the inner ends of radial arms 7 and 8, and one end of side pieces 4 and 5, respectively. Side pieces 3 and 6 are hinged with side pieces 2, 4 and 1, 5 at hinges or joints *d*, *e* and *h*, *g*, respectively. The radial arms 7 and 8 are also hinged to side pieces 2, 3 and 1, 6 at *d* and *h*, respectively. The distance between *o* and *f* should be the same as that between *c* and *d*, *d* and *e*, etc. A pin P or a clamp screw or any other similar means may be provided to fix the loop in its operating position. The wires *w* forming the loop winding are passed through channels or ducts of insulating pieces *k* fixed perpendicularly at the six apieces *c*, *d* . . . *h*. To fold or demount the loop, the pin P is removed and the loop is then allowed to collapse and fold by action of its own weight.

In the same manner, one could conceive the construction of collapsible loops built in conformity with this invention, but furnished with flat-spiral wires.

The loop could be constructed of metal or wood, or almost entirely of metal; but care should be taken so that no closed metallic circuit exists among the hardware parts.

Having thus described my invention, I claim:

1. In a collapsible loop antenna, in combination, a supporting shaft, a sleeve slidably mounted thereon, a frame having its adjacent sides pivotally mounted to form a hexagon, a pair of adjacent sides forming an apex of said hexagonal frame pivotally mounted on the supporting shaft, another pair of adjacent sides forming an apex diametrically opposite to said first mentioned

apex pivotally mounted on one end of said sleeve, a pair of radial arms pivoted to the other end of said sleeve and to said first mentioned pair of adjacent sides, and means at each apex for supporting wires of a loop winding under tension, the hexagonal frame being capable of assuming an infinite number of positions between upright and knockdown positions, the arrangement being such that the wires of the loop winding will remain taut or under tension in any position.

2. In a collapsible loop antenna, in combination, a supporting shaft, a sleeve slidably mounted thereon, a frame having its adjacent sides pivotally mounted to form a hexagon, a pair of adjacent sides forming an apex of said hexagonal frame pivotally mounted on the supporting shaft, another pair of adjacent sides forming an apex to said first mentioned apex pivotally mounted on one end of said sleeve, a pair of radial arms pivoted to the other end of said sleeve and to said first mentioned pair of adjacent sides, means at each apex for supporting wires of a loop winding under tension, the hexagonal frame being capable of assuming an infinite number of positions between upright and knockdown positions, the arrangement being such that the wires of the loop winding will remain taut or under tension in any position, and means for locking said hexagonal frame in built-up position.

3. A collapsible loop antenna comprising a supporting shaft, a frame composed of a plurality of peripheral members of equal length, means for pivotally connecting adjacent ends of two of said members to each other and to the supporting shaft, a sleeve slidably mounted on said shaft, means for hinging adjacent ends of another pair of said members to each other and to said sleeve, a member connecting the free end of each member of said first named pair of members to the free end of one of said last named pair of members, a third pair of members having adjacent ends hinged to each other and to said sleeve and their free ends hinged to the free ends of said first named pair of members, and an inductance supported by said frame.

ETTORE BELLINI.