

C. D. HERROLD.  
CONICAL HELIX.  
APPLICATION FILED JUNE 2, 1913.

1,145,366.

Patented July 6, 1915.

Fig. 1.

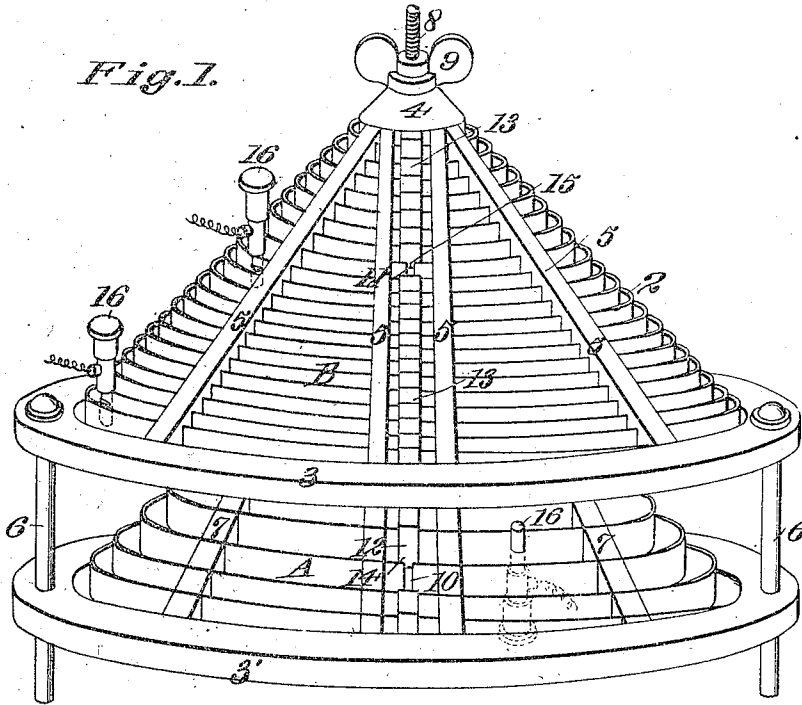


Fig. 2.

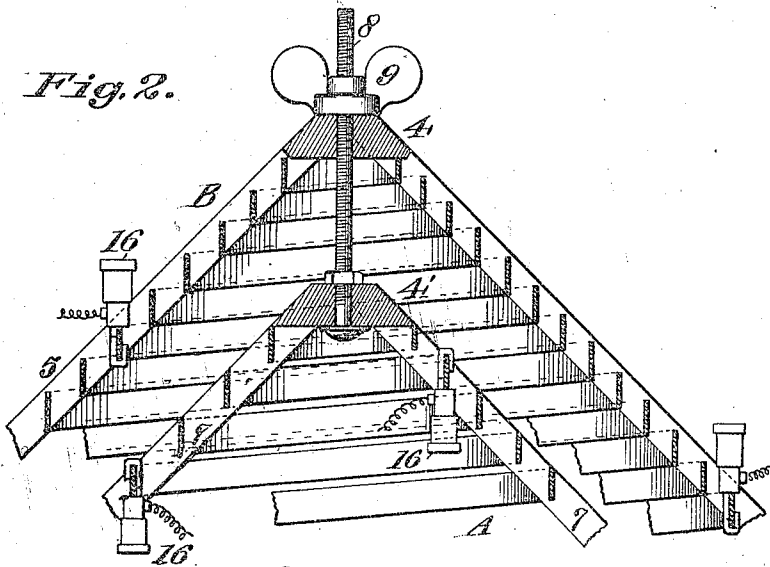
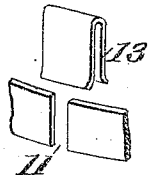


Fig. 3.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## CONICAL HELIX.

1,145,366.

Specification of Letters Patent.

Patented July 6, 1915.

Application filed June 2, 1913. Serial No. 771,242.

*To all whom it may concern:*

Be it known that I, CHARLES D. HERROLD, a citizen of the United States, residing at San Jose, in the county of Santa Clara and State of California, have invented new and useful Improvements in Conical Helixes, of which the following is a specification.

This invention relates to a conical-shaped inductive coupling.

The object of the invention is to provide a simple, efficient, easily adjusted, inductive coupling of a conical shape, having separate primary and secondary windings adjustable with relation to each other, which are so positioned that the winding surfaces will at all times be parallel, and which may be given the greatest range of coupling, and in which the loosest coupling may be accomplished with the maximum transfer of energy.

Another object of the invention is to provide conical-shaped winding-supported frames which are so constructed that various forms of the windings may be applied, such as ribbon or separately insulated stranded windings, which may be so positioned that electrostatic self-induction may be reduced to a minimum.

A further object of the invention is to provide means for cutting out the dead ends of the windings after the coupler has been adjusted, thus preventing any needless radiation and waste of energy in the inactive ends of the primary and secondary windings.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a perspective view of the conical-shaped inductive coupling or helix. Fig. 2 is a partial section of same. Fig. 3 is a perspective view of the connecting clips applied to the windings of the primary and secondary inductors.

Referring to Figs. 1 and 2 of the drawings, it will be seen that an inductive coupling is provided having primary and secondary windings A and B of a conical shape; the secondary winding of which is carried by a conical-shaped skeleton frame, generally indicated at 2, consisting of a flange-shaped ring 3 and a head portion 4, which are connected together by radially disposed arms 5, provided for the purpose

of supporting the conductor B, which is here shown as consisting of a ribbon-shaped spiral-formed winding having its largest diameter at the base, the cores gradually decreasing in circumference until the minimum is reached at the upper end, near the head 4, of the supporting frame. The frame as a whole may be supported on stanchions 6, secured upon a suitable base or support, not here shown. The primary winding A is carried by a similarly-shaped and constructed frame 7, adjustably supported with relation to the frame 2, the lower flange 3' is slidably mounted and guided on the stanchions 6, while the upper portion or head 4' is secured to an adjusting screw 8 slidably mounted in the head 4 of the frame 2; the position of the frame or primary winding A with relation to the upper frame 2 and secondary winding B being adjusted by a winged-nut 9. Two conical-shaped spiral windings are thus produced which are adjustable with relation to each other, being always movable in the line common to their axes. The winding surfaces will thus remain parallel at all times, and may be adjusted to give the greatest range of coupling, with uniform transfer of energy.

By referring to Fig. 1, it will be seen that each coil of the primary and secondary windings is separated at a point, indicated at 10 in the primary and at 11 in the secondary, the separated ends of each turn being connected by clips 12 and 13. The radially-disposed supporting arms are closely spaced at this point to prevent any displacement of the separated turns at this point. The primary and secondary windings, separated as indicated at 11 and 12, have proven highly efficient, as it becomes possible to disconnect the inactive ends of the primary and secondary coils by simply removing the clips below and above the point of tuning, as indicated at 14 and 15. It thus becomes possible to cut out the dead ends and prevent the useless radiation and waste of energy which would otherwise take place. The adjusting mechanism interposed between the primary and secondary windings permits the greatest range of coupling, and at the same time insures parallelism between the coacting surfaces. The position of the ribbon-shaped windings with relation to each other produces the highest efficiency possible, as the lines of force or magnetic flux radiating

from the primary winding will be intercepted or cut at all points by the secondary winding. A further adjustment or tuning may be secured by providing the sliding circuit terminal connections, indicated at 16; these may be moved from one position to another upon the ribbon-shaped bands to secure the desired adjustment.

The radially-disposed arms, which are provided for the purpose of supporting the windings, are preferably constructed of a suitable form of insulating material, and may be slotted in different ways to receive various types of conductors, such as a separately insulated stranded conductor, or the ribbon type.

I wish it understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims, and that I do not wish to limit myself to the specific design and construction here shown.

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

1. In an inductive coupling, the combination of conical-shaped spirally-wound primary and secondary windings, separated and insulated from each other, removable U-shaped pinch clips connecting the turns in each winding, and means for separating the windings with relation to each other on the line of their common axis.

2. A loose-coupled oscillating transformer, comprising a primary and secondary winding of conical shape, means for breaking the circuit between the individual turns in each winding, and means for varying the distance between the windings.

3. A loose-coupled oscillating transformer, comprising a primary and secondary winding of conical shape, means for breaking the circuit between the individual turns in each winding, means for varying the distance between the windings, means for connecting one conical winding to a receptor of radio-energy, and the other conical winding to the detector system, and means for adjusting the position of said connections on the conical windings.

4. In an inductive coupling, the combination of conical-shaped spirally-wound primary and secondary windings concentrically mounted, means for separating the windings on the line of their common axis to vary the number of actively opposed windings, and means to cut out the unopposed windings at the dead ends.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES D. HERROLD.

Witnesses:

MARGARET LEAL,  
LURLINE CAMEO.