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O. C. DEUTSCHER

1,733,337

VARIABLE CONDENSER

Filed July 19, 1926

2 Sheets-Sheet 1

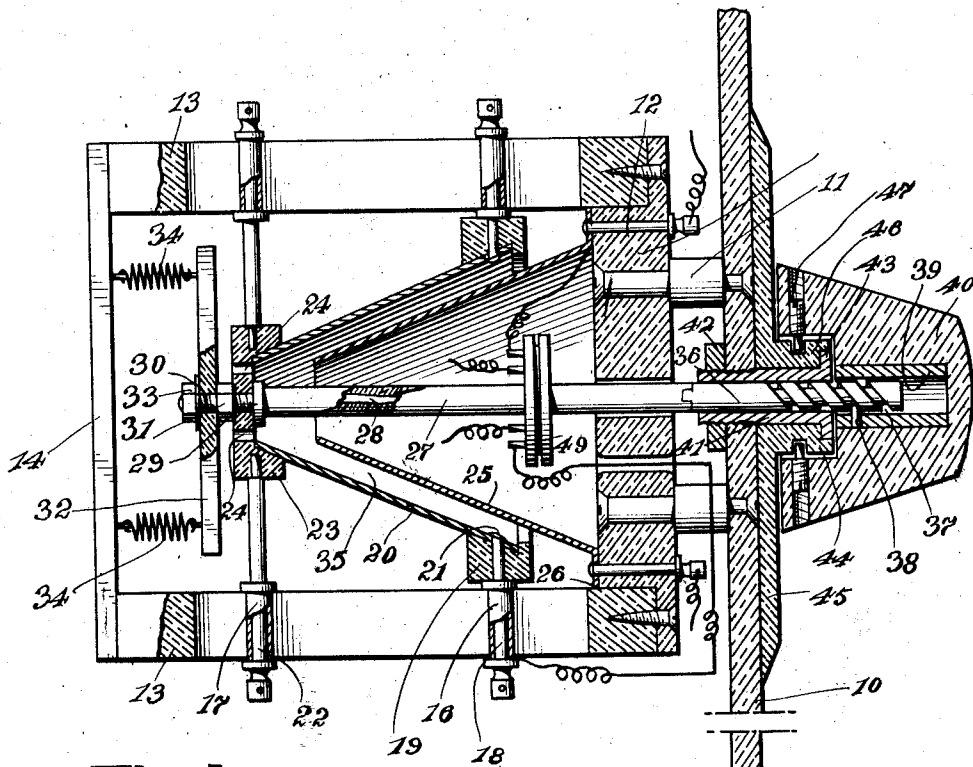


Fig. 1.

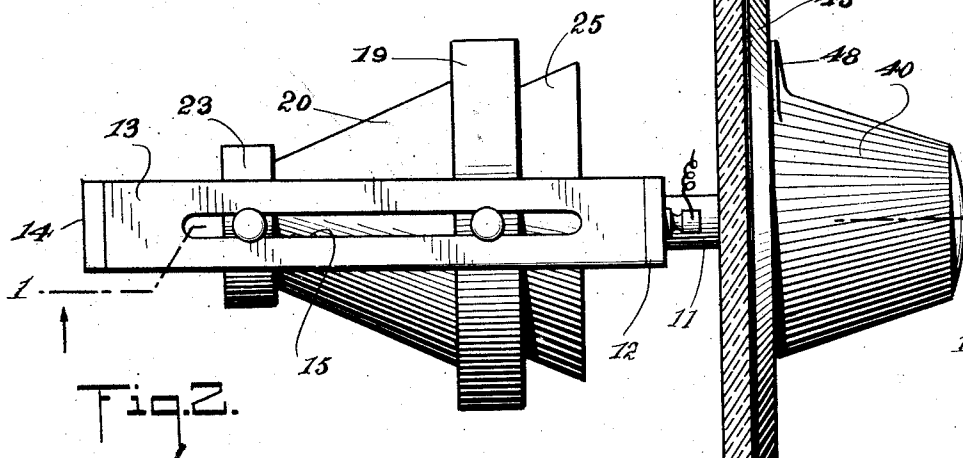


Fig. 2.

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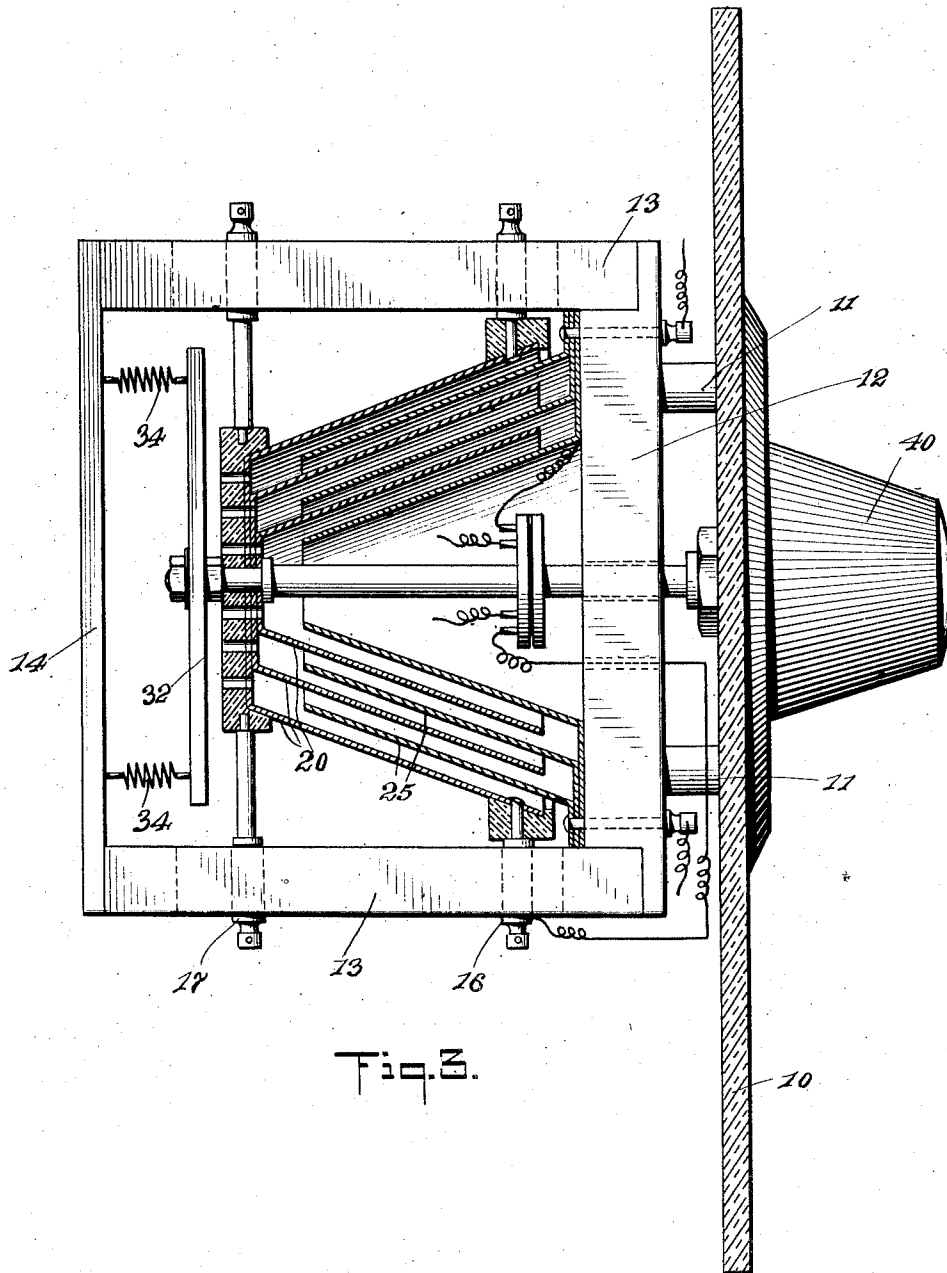


Fig. 3.

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VARIABLE CONDENSER

Application filed July 19, 1926. Serial No. 123,273.

This invention relates to variable tuning elements as used in connection with radio receiving apparatus and has as one of its objects to provide a straight line frequency condenser having an inductance coil concealed and protected within the structure.

A further feature is in the provision of a condenser formed primarily of two conical elements, respectively fixed and movable, by which an air space between the adjacent surfaces of the cones is varied in direct proportion to the active area of the cones, whereby a greater variation in capacity is obtainable than in any other known condenser.

Another purpose is to produce a condenser of extreme simplicity, sensitiveness, compactness and efficiency, the same being actuated by a knob which gives the entire range of capacity during one complete turn.

Other features and advantages will hereinafter appear.

In the accompanying drawings:—

Figure 1, is a longitudinal sectional view of an embodiment of the invention, taken on line 1—1 of Fig. 2.

Figure 2, is a side elevation of the same.

Figure 3, is a top plan view thereof.

Throughout the several views the numeral 10 designates in general a support, such as a conventional panel, having rigidly attached by spacers 11, a bar 12, arranged in parallel at its inner side.

The bar 12 has secured at its ends a pair of frame sides 13 connected by a plate bar 14 at their outer ends and constituting a rigid rectangular nonconducting frame.

The side members 13 are provided with central longitudinal slots 15 in which are slidably contained two pairs of sleeves 16 and 17 having flanges at each end to retain the bodies of the sleeves within the slots.

The pair of sleeves 16, adjacent the bar 12, carry conduction spindles 18, their reduced inner portions supporting an insulating ring 19, conically recessed to receive the base of a

metal cone 20, firmly seated therein and held by riveting the ends of the spindles 18 against its inner surface as 21.

The other sleeves 17 contain in a similar manner another pair of conducting spindles 22, reduced near their points to engage in a disc 23, in which the smaller end of the cone 20 is fixed and a series of perforations 24 formed through the disc 23 admit air to the interior of the cone.

Another cone 25 has a flange 26 at its base which is rigidly secured to the inner side of the bar 12, to extend outwardly concentric with the cone 20.

A circular dielectric rod or tube 27 containing a hollow core 28 passes freely through the outer bar 12, axially of the cones and is provided with a fixed collar 29 impinging against the inner side of the disc 23, through which its reduced threaded portion 30 extends.

A clamp nut 31 draws the collar tightly to the disc and on the outer side of the nut is a yoke bar 32 rigidly held by a washer and clamp nut 33.

Attached at their ends respectively to the yoke bar 32, and plate bar 14, of the frame are a pair of coiled tension springs 34, the same acting to draw the cone 20 and its attachments outwardly away from the inner cone 25 to increase the air gap space 35 between the cones.

Connected by a joint 36 at the outer end of the tube 27, is a spindle 36 having a coarse pitch spiral or thread 37 in its outer portion, in which operates a pin 38 fixed in a sleeve 39 solidly molded into a twirling knob 40 of conventional type.

The spindle 39 rotates within a second sleeve 41 screw threaded at its end projecting through the panel 10 and drawn by a nut 42 to tighten its flange 43 against the outer end of hub 44 formed on a circular index 45 to be held thereby closely against the face of the panel.

The hub 44 contains an annular groove 46 into which enter the points of one or more screws 47 set in the knob 40 and by which it is held to rotate on the hub and index, a pointer 48 being provided on the knob to traverse the index.

As the pitch of the helix 37 is designed to move the outer cone 20, the full limit of its travel at one complete revolution of the knob 40, it will be apparent that the superficial areas of the cones, as opposed one to the other, is under full control of an operator and that the air gap 35 will be varied directly in proportion to the active area of the cone surfaces involved.

It will be apparent that all looseness or black lash is eliminated due to the action of the springs 34, thereby rendering the device instantly and fully responsive to any motion communicated to it by the knob 40.

In addition an inductance coil 49 is mounted on the tube 27 within the fixed cone 25 and in fixed relation to the movable cone 20, the coil being connected in the usual manner and is fully protected by being enclosed within the fixed cone.

Should an apparatus of greater capacity be desirable the cones may be used in multiple, as shown in Fig. 3, the structural features remaining substantially as described.

Thus a variable tuning apparatus of a straight line frequency of unusual merit has been disclosed in the preferred form of its embodiment, but it will be understood that minor changes in construction may be made without departing from the spirit and scope of the appended claim and that parts thereof may be used in place of the whole if found desirable.

Having thus described my invention and set forth the manner of its construction and application, what I claim as new and desire to secure by Letters Patent, is:—

A variable condenser comprising a rigid rectangular non-conducting frame provided with a bar having secured at its ends a pair of frame side members; longitudinal slots formed in said side members, two pairs of sleeves slidably mounted in said slots, one of said pair having flanges on each end to retain the sleeves within the slots, conduction spindles carried by said sleeves adjacent said bar, an insulating ring supported by said conduction spindles, said insulating ring being conically recessed, an outer metal disc cone firmly seated in the conically recessed portion of said ring, other conducting spindles contained in said other pair of sleeves, a disc provided with a plurality of perforations, said perforations being adapted to admit air to the interior of said cone, an inner metallic cone provided with a flange at its base adapted to be rigidly secured to said bar and extended outwardly concentric with said outer cone, a circular dielectric hollow rod adapt-

ed to pass freely through said bar axially of said cones, a yoke rigidly connected to one end of said circular rod, tension springs attached to said yoke and to the end of said frame, said springs being adapted to draw the outer cone away from the inner cone, and means for longitudinally adjusting one cone with respect to the other.

Signed at New York, in the county of Kings, and State of New York, February, 1926.

OSCAR C. DEUTSCHER.

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