

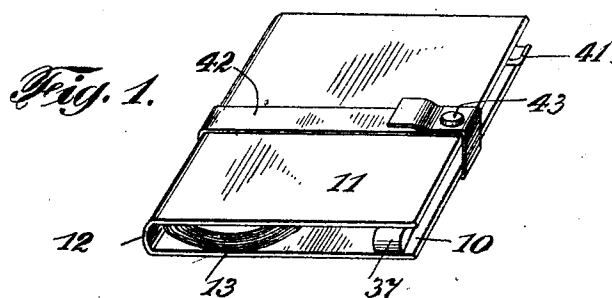
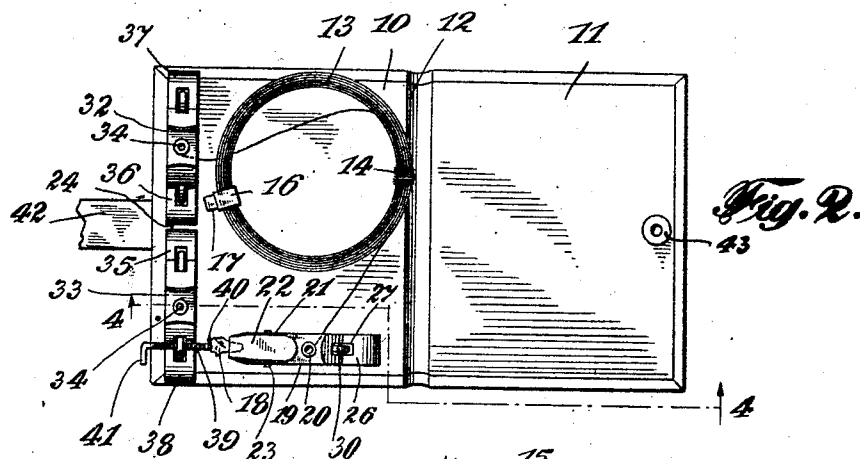
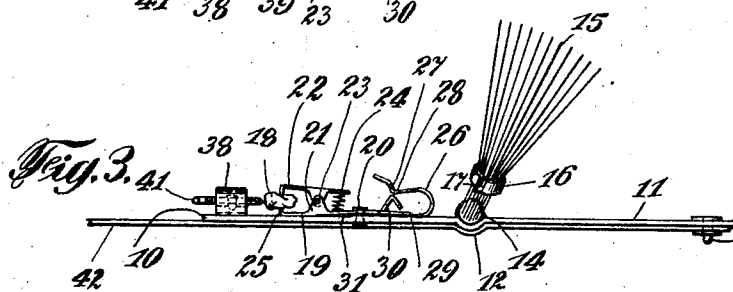
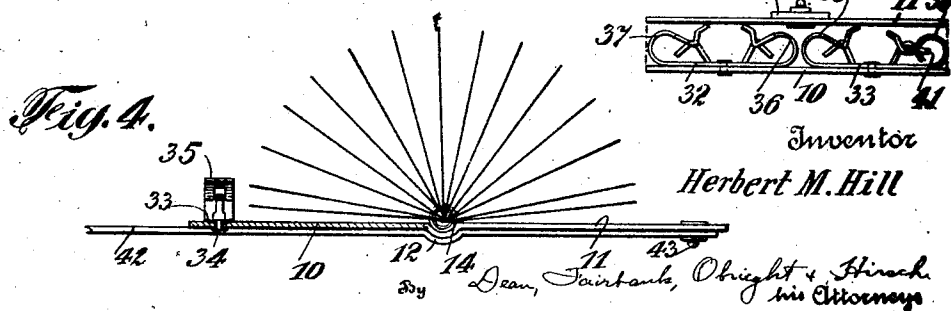
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H. M. HILL

VARIABLE INDUCTANCE

Filed Aug. 22, 1922



Inventor
Herbert M. Hill

12¹⁴ 11 45
By Dean, Fairbanks, Obright & Hirsch
his Attorneys

UNITED STATES PATENT OFFICE.

HERBERT M. HILL, OF LEONIA, NEW JERSEY.

VARIABLE INDUCTANCE.

Application filed August 22, 1922. Serial No. 583,525.

To all whom it may concern:

Be it known that I, HERBERT M. HILL, a citizen of the United States, and resident of Leonia, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Variable Inductances, of which the following is a specification.

My present invention relates in its preferred specific application to radio receiving sets.

It is an object of the invention to provide a radio receiving set of extremely simple and light construction and low cost, which shall be thoroughly serviceable in use.

Another object is to provide a set of the above type, the parts of which may be readily assembled without need for special tools.

Another object is to provide a set of the above type which shall be so compact when in closed position that it may be readily carried in a coat or vest pocket and in which the operating parts shall be protected when thus carried.

Another object is to provide a variable inductance as an element of the radio receiving set and also for more general application, which without switch arms or contacts of any kind shall permit adjustment of inductance to a high degree of precision.

Another object is to provide more particularly for a radio set and also for general application a composite contact clip member, which shall serve by a simple gripping action without need for tightening nuts or soldering to effect electrical connection between two elements.

In the preferred specific embodiment shown in the drawings, my radio receiving set comprises a small folder to the limber central or back portion of which is secured as by a strap, a coil of loosely wound wire constituting the inductance, which is adjusted by simply spreading the convolutions thereof to any extent with respect to the strap as an axis. In the preferred embodiment a slidable adjustment strap encircles the convolutions to assist in maintaining them spread to desired extent.

According to another preferred feature, attachment means is provided on the folder for application of the crystal detector, and of the aerial, ground and telephone wire terminals. The attachment means preferably comprises a plurality of clips extending adjacent one or more edges at the inside

of one of the folder covers and serving moreover as spacer means, when the folder is closed, to protect the crystal against crushing or loss and to prevent distortion of the loose wire inductance coil protected between the covers of the folder when out of use.

According to another feature, the crystal is mounted by clamping between spring gripping jaws near one end of a metallic strap, the other end of which is preferably provided with gripping jaw means for attachment of a conductor.

In the present application, I claim the variable inductance per se. This inductance in combination with one or more other elements making up a radio-receiving set are claimed in my co-pending application Sr. No. 24,497, filed April 20, 1925, which is a continuation in part of the present application and the crystal holding clip assembly is claimed per se in my co-pending application Sr. No. 666,666, filed October 5, 1923, which also constitutes a continuation in part of my present application.

In the accompanying drawings, in which is shown one of various possible embodiments of the several features of my invention, Fig. 1 is a perspective view of the set in collapsed or closed position.

Fig. 2 is a plan view of the device in open position.

Fig. 3 is a side elevation showing the inductance coil in one position of adjustment.

Fig. 4 is a sectional view taken along the line 4-4 of Fig. 2 showing the inductance coil in another position of adjustment; and

Fig. 5 is an edge view of the device in closed condition.

Similar reference characters refer to like parts in the several views of the drawings.

Referring now to the drawings, I have shown a small folder, which may be of cardboard or any other inexpensive material, comprising relatively stiff cover sides 10 and 11 and a limber back or central portion 12 connecting said covers. Upon the inside of said folder are mounted the variable inductance, the crystal detector and the various contact members for connection of the antennae, the ground and telephone wires.

In the preferred embodiment, the variable inductance comprises a loosely wound coil 13 formed of a single length of enameled wire, preferably retained in position by securing to the limber back by means of the strap 14 passing through the convolutions

of the coil and snugly drawing the contiguous portion of the coil convolutions against said limber back. The strap 14 may be formed by merely stitching the coil against

5 the limber back of the folder by a plurality of loops of thread extending about the coils and through the cover, and a drop or two of shellac may be applied thereat to retain the coil against displacement therethrough.
10 It will be seen that the securing strap 14 constitutes a positioning means for the loose convolutions 15 of the coil. The convolutions may be freely spread to adjustable extent with respect to the strap 14 as an axis,
15 as best indicated in Figs. 3 and 4, to adjust the self-inductance of the coil as will be readily understood. Apparently the inductance is a maximum when the coil is in normal collapsed position and is reduced as the
20 convolutions are spread apart, and is apparently a minimum when the coils are symmetrically disposed with respect to the two covers of the folder. The inductance may moreover be changed by varying the distribution of convolutions, making them more
25 compact at one region and spacing them farther from each other in any other region, and obviously further variation may be effected by pressing upon the coils to change
30 their form or shape.

In the preferred embodiment an adjustment strap 16 which may be of fabric, encircles the convolutions of the coil, said strap being preferably provided with an integral
35 handle portion 17, so that, as will be understood, when the strap is diametrically opposite the holding strap the convolutions will be maintained close together, while by displacing the strap about the coil toward the
40 holding strap 14, the coil will automatically spread apart under the pressure exerted against the convolutions by said holding strap, and the amount of spread will vary in accordance with the position of the adjustment strap. When the adjustment strap
45 is brought adjacent the holding strap 14, the coils are substantially free to be spread as far as desired between the covers of the folder, for instance as shown in Fig. 4. It will moreover be apparent that if one of the covers, as for instance cover 13, is secured to a table or support adjacent the edge thereof the other cover 11 may be extended downward below the edge of the table to permit still further spread of the inductance coil through an angle greater than 180 degrees, to further vary the inductance.
50

In the preferred embodiment, the mounting means for the crystal 18 which serves as the detector, is preferably a gripping member, the base 19 of which is riveted as at
60 20 to the cover 10 of the folder and extends parallel to the shorter edge thereof and adjacent thereto.

65 The preferred clip member shown com-

prises integral ears 21 upstanding from the lateral edges of the base 19, the jaw 22 of the clamp being pivoted as at 23 between said ears 21 and urged by spring 24 into coaction with jaw teeth 25 formed at the free end of base 19. The crystal 18 is thus
70 pressed between the jaw teeth of the clamp by the expansion of spring 24. The other end of the base 19 is preferably a conventional so-called Fahnstock clip 26, of well-
75 known construction, for gripping the ground terminal.

Although the base member 19 may be formed as an integral piece extending from the jaw 25 and reversely bent at end 26, I
80 have shown the device in composite construction so as to utilize standard elements on sale. In this embodiment the clip 29 is merely formed with notch 31 near one end thereof, into which extends the upstanding
85 tongue 30 of the Fahnstock clip so that the two base elements 19 and 29 will thereby be maintained against displacement from each other, the securing rivet element 20 extending through both said elements.
90

Adjacent the outer longitudinal edge of the folder cover 10, I provide two double-end Fahnstock clips 32 and 33 of conventional construction, extending substantially the entire length of the cover and spaced
95 from each other as at 24. These clips are preferably secured to the cover by rivets 34 extending through the centers thereof. The contiguous clip elements 35 and 36 are preferably used for clamping the terminals of
100 the telephone wires (not shown). The clip element 37 is used for making the aerial connection and into clip element 38 is clamped the contact pin 39 for coacting with the crystal 18. The contact pin 39 preferably comprises a small threaded hook member of conventional construction, the point
105 40 of which may be brought into delicate contact with the crystal by first depressing the finger piece of the clip element 38 to release the pin and after effecting delicate contact with the crystal, releasing the finger piece to clamp the pin in position. It will be seen that by reason of the threaded construction of the contact pin the same may
110 be shifted inward or outward by rotation of the handle 41 thereof while it is clamped by the clip element to adjust the contact pressure against the crystal.
115

The Fahnstock clips mounted as set forth constitute a re-enforcement for the cover of the folder to prevent flexing thereof, and moreover act as a spacer between the covers when the folder is closed to prevent pressure in handling, in shipping or in carrying in the pocket against the crystal or the crystal securing grip. In particular, the Fahnstock clips 35 and 36, it will be seen, are spread by reason of the fact that they
120 are disconnected from the telephone wires
125
130

as are clip elements 36 and 37. These elements thus spread the closed covers of the folder sufficiently to prevent pressure against the jaws 19—22 which grip the crystal or the holding clip 38 for the contact pin, so that these parts will be securely maintained in place against loss even though pressure is applied to the folder, which is not completely closed at its edges.

Thus no special care is needed in handling, storing or carrying the enclosed folder, since the covers thereof are automatically spaced sufficiently from each other to prevent any possibility of crushing or releasing the crystal or distorting or destroying the inductance coil. Although the inductance coil in use may occupy a substantial space, as shown in Fig. 4, for instance, it can be collapsed to a small flat volume when the device is out of use, as shown in Fig. 1. The folder is preferably provided with a strap 42 having a snap fastener 43 to maintain it closed.

My inductance coil, it will be seen, presents a constant resistance, since the entire length of the coil is at all times in circuit. The need for a sliding contact member or for removing insulation to provide a conducting path therefor, is entirely eliminated, as is the need for any special core or support for the coil. Although the preferred application of the variable inductance is in the relation set forth, it will be understood that my variable inductance is of general application in any of numerous possible relations.

I desire to be understood as claiming broadly a variable inductance, in which the individual convolutions are relatively displaceable or deformable for adjustment of inductance.

It will also be understood that the clip 19 is of more general application. One desirable application is in effecting the connection of the ordinary so-called B battery used in radio receiving sets. For this purpose a gripping jaw such as at 19—22 serves to grip the battery terminal, the wire from the battery to the set being gripped in the Fahnstock clip element 26. Another application of said composite clip is to the ground connection, for which application a gripping such as at 19—22 but of larger proportions, serves to grip a metallic water or steam pipe through which grounding connections are usually established in amateur sets, the wire from the set being gripped by the Fahnstock clip element.

It will thus be seen that there is herein described apparatus in which the several features of this invention are embodied, and which apparatus in its action attains the various objects of the invention and is well

suited to meet the requirements of practical use.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What I claim as new and desire to secure by Letters Patent is:—

1. A variable inductance comprising in combination a coil formed of a plurality of convolutions, each contiguous at one point with adjacent convolutions, a common mounting means maintaining approximate contiguity of such portions, said convolutions being freely displaceable toward and from each other beyond said portions, to adjust the angle between said convolutions.

2. A variable inductance comprising a wire wound into a plurality of convolutions, means strapping the convolutions of said coil in position to limit displacement thereof at one point, whereby the adjustment of inductance may be effected by effecting angular adjustment between consecutive convolutions by spreading the same about said strap means.

3. In a variable inductance in combination, a coil of loosely wound convolutions, a strap extending through said convolutions to attach the same to a support at one point, whereby said convolutions may be displaced from each other angularly with said strap as an axis for adjusting the inductance.

4. A variable inductance comprising in combination a loosely wound coiled wire, a strap extending through said coil and securing the same to a support and slide means coacting with the convolutions of said coil to limit the separation thereof contiguous thereto and displaceable peripherally thereabout to vary the angular separation between successive convolutions about said strap.

5. In a variable inductance in combination a folder, a coil of loosely wound wire, a strap passing through said coil and securing the same to the back or centre of said folder, whereby said coil when out of use will be protected between the closed covers of said folder and when in use the convolutions of said coil may be adjustably spread apart with respect to said strap as an axis to vary the inductance.

Signed at New York in the county of New York and State of New York this 21st day of August, 1922.

HERBERT M. HILL.