

March 8, 1932.

R. M. C. GREENIDGE

1,848,169

ADJUSTABLE INDUCTANCE

Filed July 7, 1930

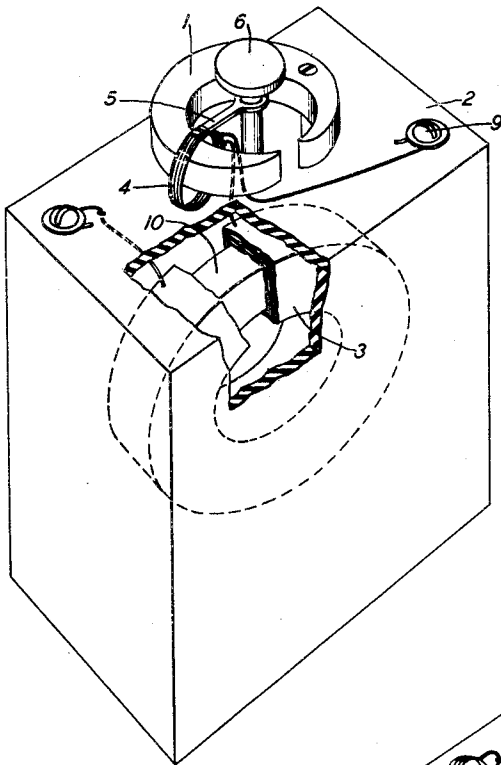
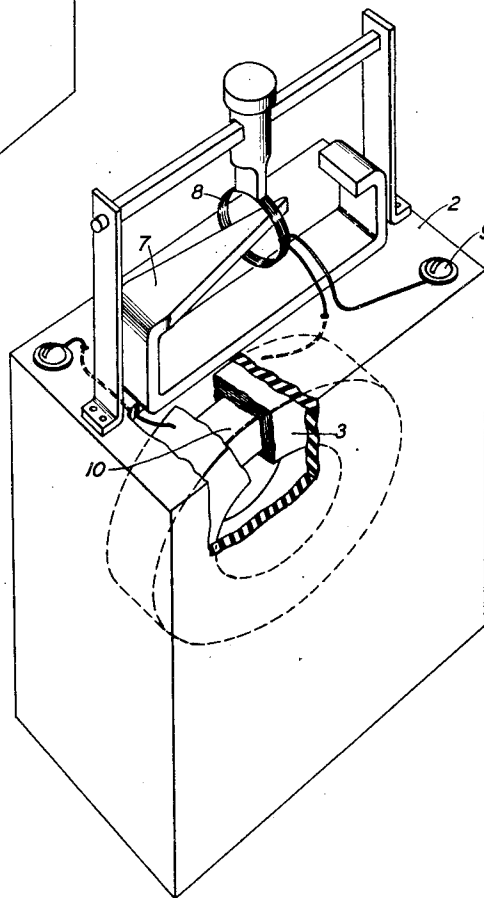


FIG. 1

FIG. 2



INVENTOR  
R. M. C. GREENIDGE  
BY *H. A. Burgess*  
ATTORNEY

## UNITED STATES PATENT OFFICE

RALPH M. C. GREENIDGE, OF CHATHAM, NEW JERSEY, ASSIGNOR TO BELL TELEPHONE LABORATORIES, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

## ADJUSTABLE INDUCTANCE

Application filed July 7, 1930. Serial No. 466,072.

This invention relates to adjustable inductances and more particularly to toroidal coils the inductance of which may be varied.

The advantage of toroidal coils as loading or filter coils, transformers, etc. has long been recognized. The use of such coils in wave filters, etc. has been limited because of the difficulty in adjusting them to the accurate value of inductance required for such use. The delicacy of adjustment may be appreciated when it is realized that it has been found that merely encasing such a coil in a metallic container with insulating material has changed the value of its inductance to a disturbing degree when extreme accuracy is required.

The present invention has as an object a toroidal coil whose inductance may be varied after it has been permanently encased for commercial use.

Another object of this invention is a toroidal coil whose inductance may be very accurately fixed.

The above objects are realized in one form of the invention by providing an auxiliary magnetic circuit with which is associated a solenoidal coil or winding arranged to be movable over a part of said magnetic circuit which has varying magnetic reluctances.

The invention will be better understood from the following descriptions together with the attached drawings forming a part thereof, Fig. 1 of which is a perspective view of one form the invention may take, while Fig. 2 is a perspective view of another form of the invention.

Referring now to Fig. 1, a crescent shaped core 1, of magnetic material, is mounted in any convenient manner on the top of case 2 enclosing a toroidal inductance, indicated with dotted lines at 3, wound upon a core 10 of magnetic material. A solenoidal winding 4 adapted to move along core 1 is supported by arm 5 which may be moved by knob 6. Winding 4 may be in series with one of the windings of toroidal coil 3.

As winding 4 is moved by arm 5 by means of knob 6 the thickness of the portion of core 1 embraced by the winding varies as will readily be seen. The reluctance of the mag-

netic circuit of winding 4 will vary accordingly and the inductance of the winding will also vary. The inductance of the combination consisting of the toroidal coil 3 and adjusting coil 4 will therefore be changed and when the value of inductance desired has been reached the coil 4 may be held in a position relative to core 1 in any desired manner.

The structure and operation of the embodiment of the invention shown in Fig. 2 is very similar to that of Fig. 1. In Fig. 2 it will be noticed that the part of the magnetic circuit 7 upon which the solenoidal coil 8 is movable is tapered, becoming thinner near the gap. Hence, as coil 8 is moved along this tapered portion the reluctance of its magnetic circuit varies with the attendant variation in inductance in the coil 8 itself and in the inductance unit as a whole.

As is well understood a moisture proofing and insulating compound fills the space inside of case 2 which is not occupied by the coil structure. The degree to which this compound impregnates the coil winding depends upon the process of manufacture.

Terminals 9 are provided on the outside of the case to facilitate connecting the coil to a working circuit. While only two terminals have been shown on the case in each figure the number of terminals will depend upon the number of separate windings in the structure.

What is claimed is:

1. A nominally fixed inductance capable of a correcting adjustment comprising a main inductance portion of fixed inductance value and an auxiliary inductance of a small order of magnitude compared to said main inductance and connected in series therewith, said auxiliary inductance comprising a winding, and an auxiliary core of tapered cross section, said winding being movable with respect to said core whereby relative movement between said winding and core provides a fine adjustment of the total inductance of the combination.

2. A nominally fixed inductance capable of a correcting adjustment comprising a main inductance permanently encased and an auxiliary inductance fixedly mounted with respect to said main inductance but readily ac-

cessible for purposes of adjustment and connected in series with said main inductance, said auxiliary inductance comprising a winding of few turns compared to that of said main inductance, and a core of variable cross section, and means to move said auxiliary inductance relatively to said core of variable cross section whereby a delicate adjustment may be made of said inductance combination.

10 In witness whereof, I hereunto subscribe my name this 28th day of June, 1930.

RALPH M. C. GREENIDGE.

15

20

25

30

35

40

45

50

55

60

65