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S. GOLDBERG

2,391,563

HIGH FREQUENCY COIL

Filed May 18, 1943

Fig. 1.

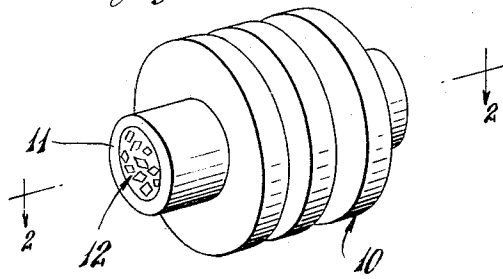


Fig. 2.

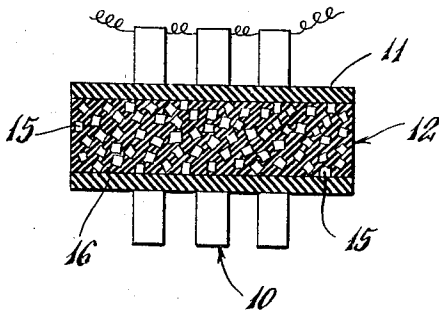


Fig. 3.

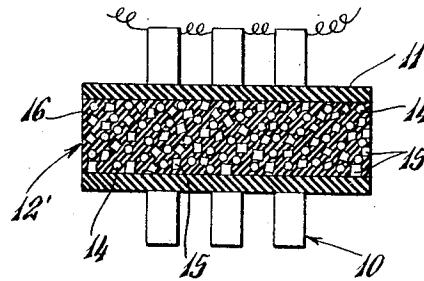
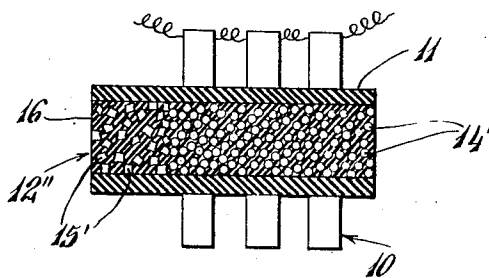


Fig. 4.



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HIGH FREQUENCY COIL

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2 Claims. (Cl. 175-359)

The present invention relates to high frequency coils and more particularly to the control of the inductance thereof, which otherwise would normally vary with change in thermal conditions.

The principal object of this invention is to provide high frequency coils of novel and improved construction which function in such manner that any inductance drift normally caused by temperature variations, is eliminated.

Another object hereof, is to provide high frequency coils with novel and improved means for automatically neutralizing any changes in inductance of the coils which ordinarily occur due to changes in thermal conditions.

A further object hereof, is to provide novel and improved apparatus of the character mentioned, which is cheap to manufacture and efficient in carrying out the purposes for which it is designed.

Other objects and advantages will become manifest as this disclosure proceeds.

In the accompanying drawing forming part of this application, similar characters of reference indicate corresponding parts in all the views.

Fig. 1 is a perspective view of a high frequency coil embodying the teachings of this invention.

Fig. 2 is a section taken at line 2-2 in Fig. 1.

Fig. 3 is a similar section of a modified embodiment.

Fig. 4 is a similar section of another modified embodiment.

In the drawing, the numeral 10 indicates generally a wire coil as used in high frequency circuits as in radio apparatus for example, which coil, if desired may be of several sections connected in electrical series, mounted on a dielectric tubular member 11, within which is a core designated by the numeral 12. This core in the embodiment of Fig. 1, is comprised of magnetite in granular form preferably; each particle being coated or encased in a dielectric plastic substance, and in aggregate pressed in a mould or otherwise, to be fitted, or in any desired manner suitably mounted in said tubular member 11.

It is known that with increase of temperature of the coil 10, as for instance due to thermal change in atmospheric conditions, its inductance will increase, and, with decrease in temperature, its inductance will decrease. This incident is spoken of as the occurrence of inductance drift due to thermal change, and is detrimental to proper operation of sensitive apparatus.

The behavior of magnetite as a core constituent in this respect is, that as the temperature of the coil 10 rises, the inductance of said coil is lowered, and with decrease of temperature, the

inductance would rise. It is to be noted however that mere use of magnetite where ordinary or carbonyl iron particles are employed in core constructions and in like quantity, would not effect the desired neutralization or nullification of the inductance drift in the high frequency coil 10, but would over-compensate the increase or decrease, as the case may be.

Therefore, to effect a condition of constant inductance irrespective of the thermal changes mentioned, the core 12, in the embodiment illustrated in Fig. 2, is made to contain such quantity of magnetite, or said core is partly removed from the coil 10, so that in either instance the effective core is such, that any inductance drift occurring due to change in the thermal conditions of the coil 10, is neutralized by an equal and opposite occurring inductance drift due to the action of the magnetite content in the core structure and its relative position with respect to said coil.

To obtain the advantages of operation incident to the presence of ordinary or carbonyl iron in the core structure, and also of the present invention, the core 12' is made of a mixture of said iron and magnetite particles individually dielectrically coated as aforesaid; the amount of magnetite content, or the relative position of core and coil being such as to accomplish the constant inductance condition of the coil, regardless of thermal changes as previously explained. Or else, the core indicated by the numeral 12'' as in Fig. 4, may be made of two sections in abutment, where one section 14' is composed of ordinary iron, and the other section 15' is composed of magnetite particles coated as mentioned, and the magnetite content being of such quantity or in such relative position to the coil as to effect the desired result of providing a high frequency coil of constant inductance under varying thermal conditions.

For purposes of illustration, magnetite particles have been diagrammatically represented in the drawing by squares 15, and particles of carbonyl iron by circles 14, all of which particles are coated by a Bakelite varnish or other suitable insulating material designated by the numeral 16. Also, it is to be noted that movement of the core out of the coil or partially so, is deemed a change of the relative position of core and coil, but in practice would of course be fixed after proper relative position of same is made to effect the desired neutralization of inductance drift.

This invention is capable of numerous forms

and various applications without departing from the essential features herein disclosed. It is therefore intended and desired that the embodiments shown herein be deemed illustrative and not restrictive, and that the patent shall cover all patentable novelty herein disclosed; reference being had to the following claims rather than to the particular descriptions herein to indicate the scope of this invention.

I claim:

1. In an article of the character described, a core and a coil mounted on the core; said core comprising particles of magnetite and particles of material containing iron; all of said particles being individually dielectrically coated in an as-

sembly to form core structure; said coil being so positioned along the core whereby the inductance drift caused by thermal changes in the coil and the opposite occurring inductance drift caused by said core are substantially identical, whereupon the inductance of the coil is maintained substantially constant during the passage of a high frequency electrical current through the coil.

2. In an article as defined in claim 1, wherein the particles of magnetite are segregated in one section of core and the particles of material containing iron are segregated in another section of core.

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