

Aug. 29, 1933.

O. E. BUCKLEY
SUBMARINE CABLE LOADING COIL

1,924,106

Filed July 25, 1930

FIG. 1

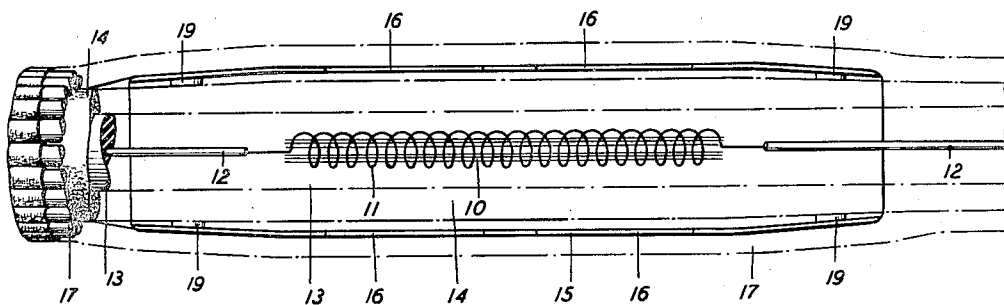
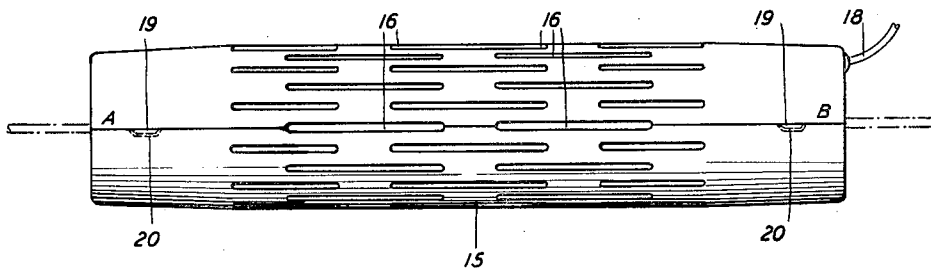


FIG. 2



INVENTOR
O. E. BUCKLEY
BY
J. W. Schmitt
ATTORNEY

UNITED STATES PATENT OFFICE

1,924,106

SUBMARINE CABLE LOADING COIL

Oliver E. Buckley, Maplewood, N. J., assignor
to Bell Telephone Laboratories, Incorporated,
New York, N. Y., a Corporation of New York

Application July 25, 1930. Serial No. 470,648

3 Claims. (Cl. 178—46)

The present invention relates to lump loaded submarine signaling cables and particularly to the construction of the loading coil housings customarily used in such cables.

An object of the invention is to protect the loading coils of submarine signaling cables from mechanical injury without decreasing the efficiency of signal transmission over such cables.

A further object of the invention is to provide a loading coil housing which will permit easy and convenient assembly.

It has heretofore been proposed to enclose submarine cable loading coils in metallic envelopes or housings. When signaling currents are transmitted over loaded cables the loading coils of which are provided with such housings, eddy currents are generated in the metallic housing and a considerable loss of signaling energy ensues. These losses are particularly troublesome when loading coils with windings of the solenoidal type are used, since these coils have an external field of considerable intensity.

In accordance with the present invention, this loss is eliminated or at least minimized to such an extent as to render possible the transmission of voice currents over considerable distances, by providing non-magnetic gaps in the body of the housings, such as rectangular, or otherwise shaped openings or slots. In order to further reduce the tendency to the formation of eddy currents, these openings or slots are arranged in staggered formation.

In the accompanying drawing which shows one embodiment of the present invention:

Fig. 1 represents a longitudinal section through a loading coil housing, the core of magnetic material and the surrounding winding being shown in elevation;

Fig. 2 represents a view in elevation of a loading coil housing in accordance with the invention when applied to a submarine cable of the twin core type.

In Fig. 1 the elongated core of magnetic material 10 is surrounded by an insulated winding 11 which is welded or otherwise securely connected to the conductor 12 as shown. The cable insulation 13 is extended over the winding and is surrounded by a layer of jute 14, which latter forms a bedding for the loading coil housing 15. The housing 15 is formed with non-magnetic gaps 16; the gaps shown have a rectangular form, but any other suitable form may be used. The entire structure is further protected by the armor wires 17 which are covered with jute or a similar material for the purpose of preventing electrolytic

action between them and the loading coil housing.

Fig. 2 represents an elevational view of a loading coil housing in accordance with the invention. The gaps 16 are staggered, as shown. This figure furthermore shows a method of inserting the loading coil housing into a cable of the twin conductor type. The return conductor 18 may be terminated short of the loading coil and the sea water and armor wires relied upon to conduct the signaling current past the space occupied by the loading coil. However, in order to diminish the resistance of this return circuit, the copper return conductor 18 may be connected to the protective housing in the manner shown.

A material which is particularly suitable as a housing in accordance with this invention is copper or copper-clad steel, on account of the corrosion resistance of copper when submerged in sea water, and its high conductivity.

In order to permit easy application of the housing to the combination of coil and adjacent cable core, it is made in two parts, divided either longitudinally or transversely.

In the embodiment described the housing is divided longitudinally along line A—B (Fig. 2). For the purpose of preventing longitudinal or transverse displacements of one half of the housing with respect to the other half, there are provided four lugs 19 on one half of the shell which fit into four corresponding slots 20 of the other half. Sufficient clamping action is exerted by the armor to assure tight contact between the shell halves and to obviate the provision of special clamping means in this particular embodiment of the invention.

What is claimed is:

1. A protective metallic housing for a submarine cable loading coil comprising a material of high electric conductivity and a material having high tensile strength.

2. A loading coil for a submarine signaling system having an outgoing conductor and a return conductor, said coil comprising a housing made of at least two materials, one of said materials having high tensile strength and the other material having high electrical conductivity, said return conductor being conductively connected to said material of high electrical conductivity.

3. A submarine cable including a loading coil comprising a case and having an external magnetic field, said coil and case being adapted to minimize energy losses due to the flow of signaling currents in said coil, said coil comprising a core of magnetic material and a winding sur-

rounding said core, the insulation and fabric of segments having interlocking lugs and de-
covering of the cable being continued over and pressions upon their edges and having staggered
surrounding said winding, said case consisting of non-magnetic longitudinally elongated gaps,
a material having a tensile strength higher than whereby the generation of loss currents in said
5 that of ordinary highly permeable magnetic iron case is minimized.

OLIVER E. BUCKLEY.

10

85

15

90

20

95

25

100

30

105

35

110

40

115

45

120

50

125

55

130

60

135

65

140

70

145

75

150