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Improvements relating to a magnetic loop antenna

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Additional Fields
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FIG 1

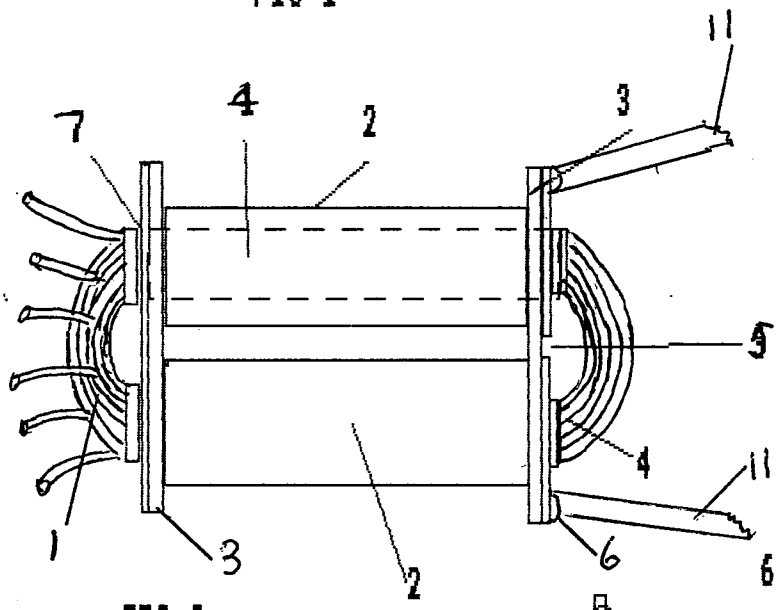


FIG 2

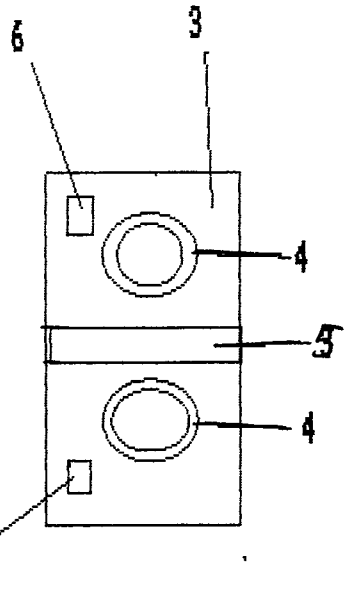
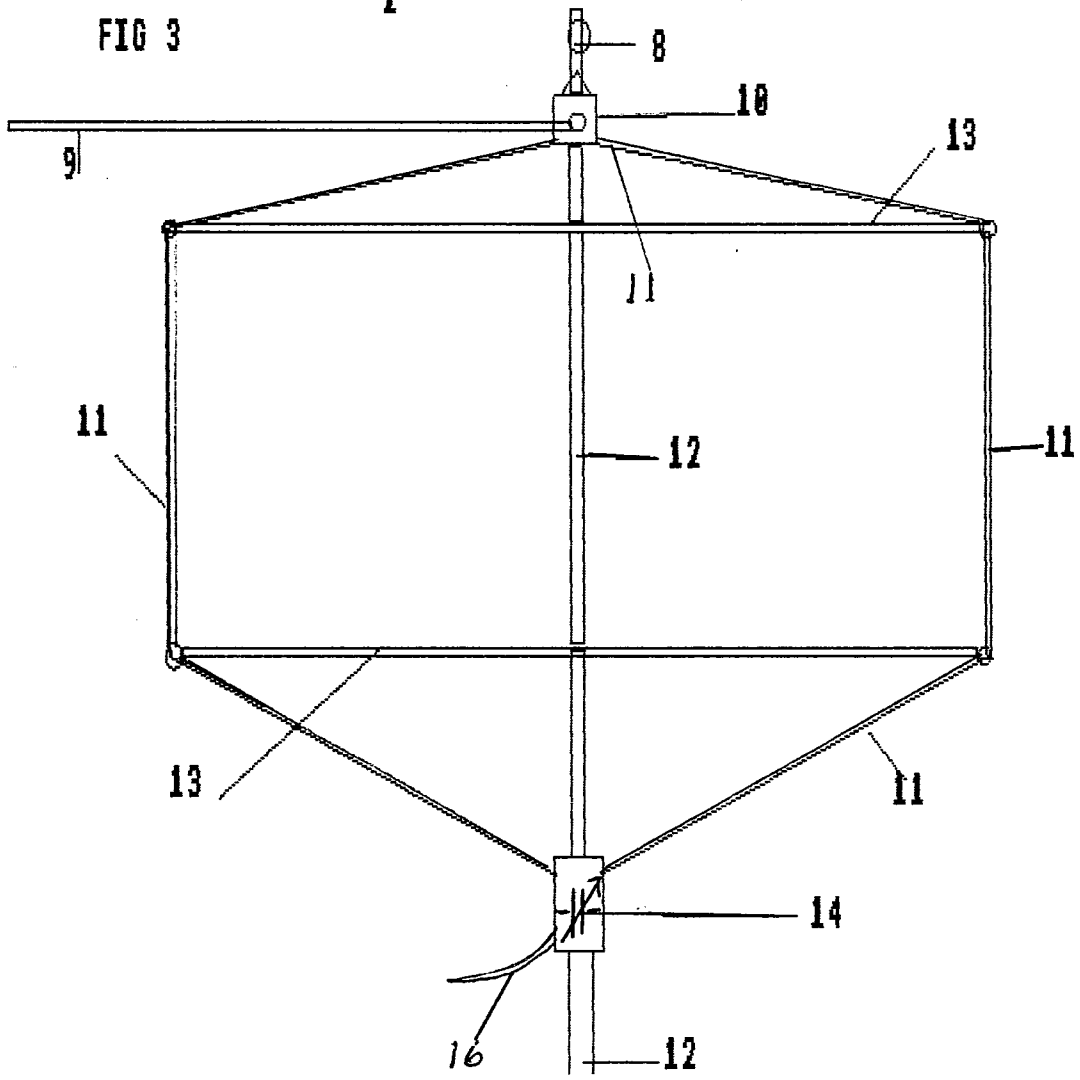


FIG 3



" IMPROVEMENTS RELATING TO A MAGNETIC LOOP ANTENNA "

This invention relates to a Magnetic Loop Antenna as used with Radio transmitters and receivers where it is not convenient to erect a full sized antenna.

The Magnetic Loop Antenna is usually constructed of metal tubing which is formed into a Hoop. At the top of this hoop is placed a variable capacitor which is used to tune it to resonance, and at the bottom there is a single turn coupling coil to which the transmission feeder is connected.

The Hoop being formed from tubing is awkward to handle and is also difficult to store and transport.

The coupling Coil is not a very efficient way of transfering R.F. power to the hoop and can not be adjusted when changing bands causing more loss of power.

According to the present invention the improvements have been achieved by first changing the rigid tubular Hoop for multi core flexible wire loop 11,which can be formed into any convenient shape by putting in spreading canes 13, suspending the loop from a mast 12, with the aid of a Lanyard which allows the loop to be quickly erected or taken down.

A variable tuning capacitor 14 is placed at the top of the loop 11. along with the transformer or at the bottom of the loop and attached to the mast an electric motor is attached to the capacitor which can then be used to remotely tune the the loop from the radio station by hand or with the use of a computer or microprocessor and where required additional fixed capacitors may be switched in to change to other bands.

The R.F. Power is fed to the wire loop using a Ferromagnetic Transformer constructed as shown in fig,1, using two ferrite tubes 2, through which copper tubes 4, are placed.

The copper tubes are soldered to two copper clad end plates 3, one of which fig 2, the copper laminate is cut through 5, to form the single turn winding which is connected to the two halves of the wire that is used to make the Loop 11.

Insulated wire is wound through the tubes to make another winding no.1, which is tapped at each turn.

Relays can be used to remotely switch the tappings to provide a suitable matched input to the Magnetic Loop allowing the impedance of the Magnetic Loop 11, to be correctly matched to the

feeder 9, coming from the Tranceiver which also removes the need for a ground plain or good earth.

The transformer housing 10, has an eylet at its top to allow it to be attached to a Lanyard so that it can be pulled to the top of a mast 12, when in use.

Nylon lines can also be used to spread out the Loop the ends being fastened to stakes buildings or trees.

By using flexible wire for the Loop 11, it is possible to make very large loops for the lower frequencys, but the length of the wire must be no more than one quarter wave length in total for the highest frequency that it will have to tune to this will be considered the priority band although other smaller loops may be arranged within the main priority loop which may be switched into use when required.

A specific embodiment of the invention will now be described by way of example only with reference to the accompanying drawing in which.

Figure 1 shows the Ferromagnetic Transformer assembly with the tapped winding.

Figure 2 illustrates the cut in the copper cladding.

Figure 3 shows the Improved Magnetic Loop Antenna raised to the top of a mast..

Referring to the drawing the magnetic loop antenna comprise a flexible wire 11, a ferromagnetic transformer Fig 1, and a variable capacitor 14,

It is constructed using a Feromagnetic Coupling Transformer fig 1. and situated at the top of the Loop 11 in a case 10 which also contains the switching device when switching is required..

This transformer is used to match the impedance of the feeder end to the wire loop at its lowest point of impedance the half way point and gives a maximum transfer of R.F. power both on Transmitted and Received signals.

The Loop is tuned to resonance with a Variable Capacitor no.14 fig 3 across the ends of the wire loop this capacitor is clipped to the base of the Mast no.12 fig 3. and can be motorised and remote controlled using a control box connected to wire 16..

The feromagnetic transformer fig 1, is wound with insulated wire and tapped at intervals of one turn these tappings are used to make the impedence of the input adjustable when changing bands, and can also be remotely switched by relays 1n casing 10..

The transformer casing 10 has an eyelet at its top to allow it to be attached to a Lanyard so that it can be pulled to the top of a mast no 12, Fig 3, when in use.

The loop can be formed into any convenient shape by the use of spreading canes no,13 fig 3, or ropes can be attached to the loop to pull it open and form the loop.

In its present form the wire used for the Loop is multi stranded multi cored wire and this improves the efficiency of the Magnetic Loop antenna by increasing the surface area.

-CLAIMS -

1 A magnetic loop antenna comprizing a flexible wire loop which can be suspended from mast or other support and formed into any convenient shape by putting in spreading canes, a variable capacitor attached next to a transformer at the top or to the mast at the bottom of the loop and tuned remotely, the R.F. Power is fed to the wire loop using a Ferromagnetic Transformer with a tapped secondary winding so that relays can be used to remotely switch the tappings and provide a suitable input impedance to the Loop allowing the impedance of the Loop to be correctly matched to the feeder from a Tranceiver.

2 A Magnetic Loop Antenna as claimed in 1 wherin by using multi core cable for the loop an improved efficiency can be achieved.

3 A Magnetic Loop Antenna as claimed in 1 and 2 wherin the loop can be erected on a Boat Ship or Vehicle for Amateur or Commercial use.

4 A Magnetic Loop Antenna as claimed in 1 and 3 that can be remotely tuned using a motorised Variable Capacitor and controller.

5 A Magnetic Loop Antenna as claimed in 1 or 2, or 3 that can be automatically tuned by a Computer or microprocessor.

6 A portable Magnetic Loop Antenna as Claimed in 1,to 5, that can be used in a position where a ground plain or good earth is not available.

7 A Magnetic loop Antenna as Claimed in 1 or 3 that has an adjustable input impedance and does not require an additional tuning unit although one can sometimes be used with advantage.

8 A portable Magnetic Loop Antenna as claimed in 1 to 7 ,that can be easily disassemble and packed away for transportation or storage.

9 A Magnetic Loop Antenna as claimed in 1 or 3 or 6 or 8 that is constructed with multi core wire supported from a frame or mast with a variable capacitor at the top and a ferromagnetic transformer at the bottom

10 A Magnetic Loop Antenna as claimed in 1 to 9 in which the size of loop can be altered to give the best results for a given priority band.

11 A Magnetic Loop Antenna as claimed in 1 to 9 that can contain additional flexible wire loops that can be switched in to operation when required.

12 A Magnetic Loop Antenna as claimed in 1 that can be changed to different bands by switching in fixed capacitors of selected values.

13 An improved magnetic loop antenna substantially as described herin with reference to Figure 1-3 of the accompanying drawing.