Oct. 25, 1949. S. B. PICKLES 2,485,654

ANTENNA

Filed May 28, 1946

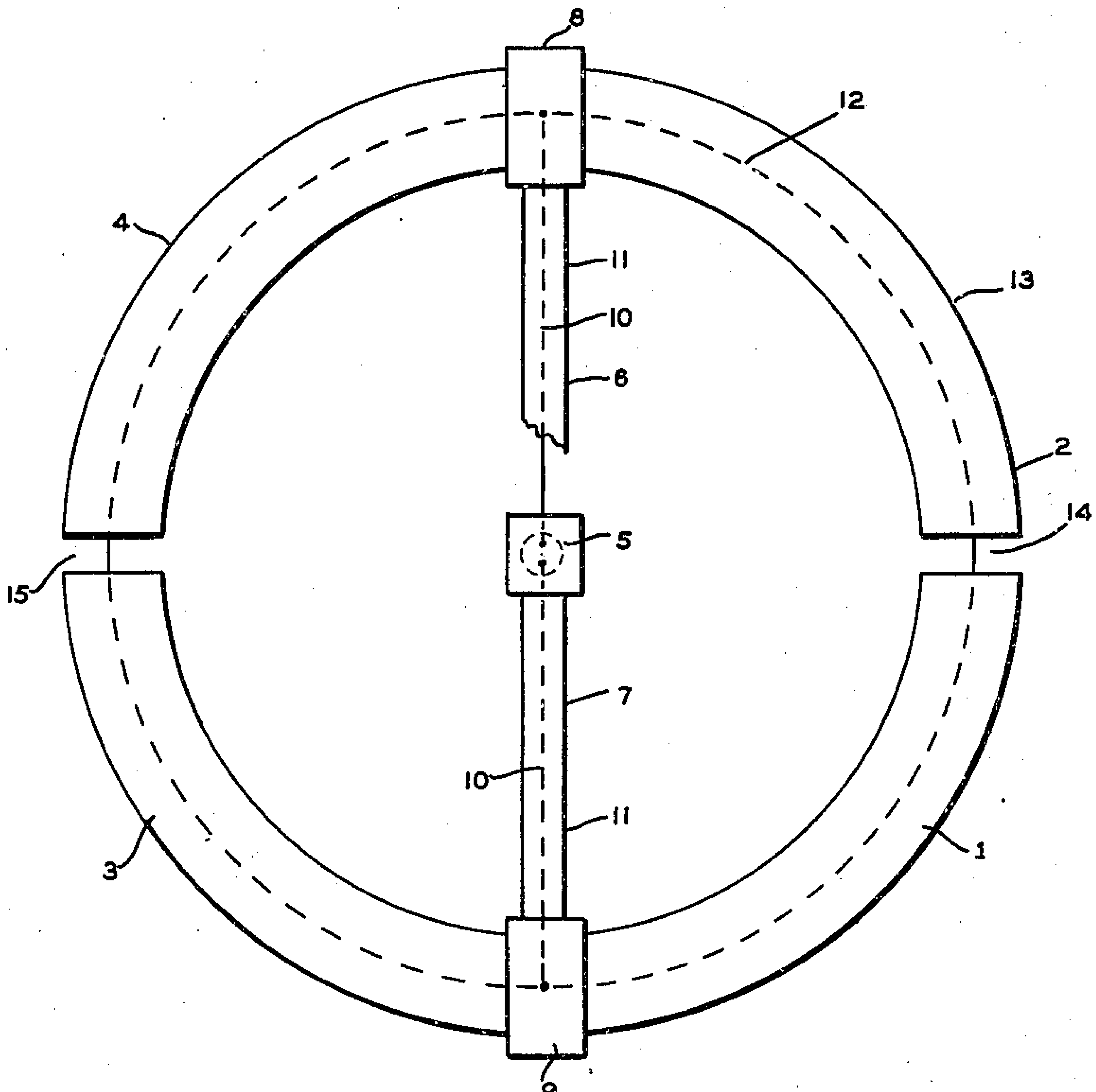


FIG. 1

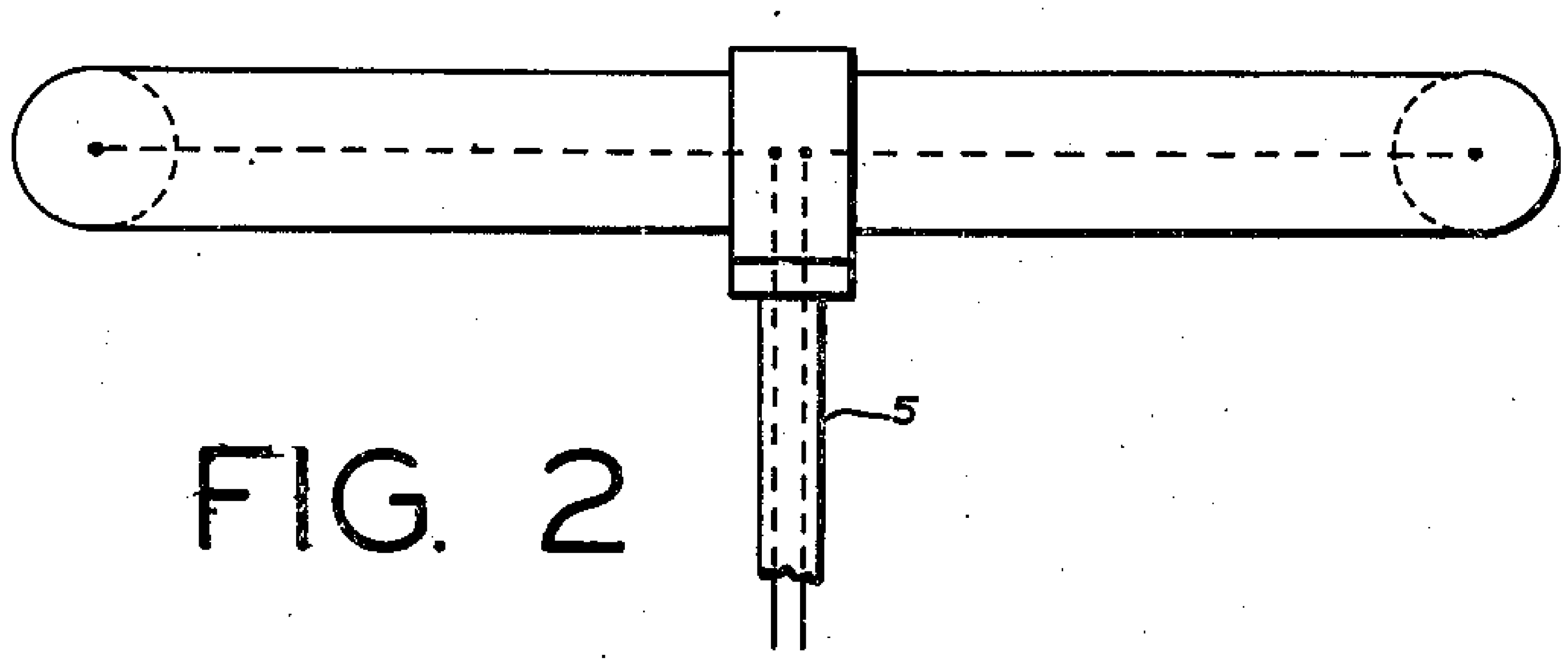
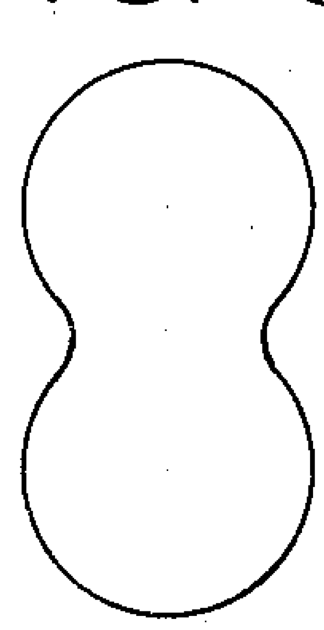


FIG. 2

FIG. 3



INVENTOR.
SIDNEY B. PICKLES

BY

R.P. Morris
ATTORNEY

Patented Oct. 25, 1949

2,485,654

UNITED STATES PATENT OFFICE

2,485,654

ANTENNA

Sidney B. Pickles, Jackson Heights, N. Y., assignor to Federal Telephone and Radio Corporation, New York, N. Y., a corporation of Delaware

Application May 28, 1946, Serial No. 672,747

5 Claims. (Cl. 250—33.67)

1

The present invention relates to antennas and more particularly to those of the shielded-loop type.

It is an object of the present invention to provide an antenna for handling ultra high frequency signals which is characterized by a symmetrically polarized radiation pattern.

It is another object to provide an antenna which will be responsive to balanced currents only.

A further object of the invention is to provide a shielded-loop antenna which may be connected to a dual transmission line, in impedance matching relation.

A still further object is to provide an antenna which results in substantially a figure 8 radiation pattern.

In accordance with the invention I provide two semi-circular loops each of which is connected to one side, respectively, of a dual transmission line. The loops are disposed in correspondingly formed shields which act as radiators and are positioned such as to provide spacing slots at the points of high radio frequency potential. The loop conductors which are exposed at these slots may be provided with plastic protectors as a shield against the weather so that a completely shielded radiator is obtained.

These and other features and objects of the invention will be best understood from the following description of an embodiment thereof, reference being had to the drawings, in which:

Fig. 1 is a diagram in schematic form of a plan view of the antenna in accordance with my invention;

Fig. 2 is a view in elevation of the antenna of Fig. 1; and

Fig. 3 is a diagrammatic representation of the radiation pattern of the antenna of Fig. 1.

Referring to the drawings, the antenna may be considered as consisting of two symmetrical loops comprised of portions 1 and 2, and portions 3 and 4, respectively, which are each fed from a dual transmission line indicated at 5. The dual transmission line which, as shown in Fig. 2, comprises a vertical two-conductor shielded line is arranged to feed coaxial feeding line branches 6 and 7 leading to junction points 8 and 9 of the two loops respectively. The arrangement is such that the two-conductor line 5 is branched into two directions from the junction with the two branches 6 and 7. These lines or branches 6 and 7, as already stated, are of the coaxial type including a central or axial conductor 10 within a tubular shielding conductor

2

11. The conductors 10 feed into respective semicircular loop portions 1 and 2, 3 and 4, which also comprise an inner coaxial conductor 12 shielded by correspondingly-shaped tubular members 13. The tubular members 13 which are joined together at one end by means of the junctions 8 and 9 are spaced at their other ends to form respective gaps 14 and 15 exposing the axial conductor 12 at those points. The gaps 14 and 15 may be provided with plastic and non-conducting shielding portions whereby weather influences on the axial conductors may be eliminated.

The adjustment in the width of the gaps 14 and 15 governs the desired current distribution in the respective loop portions 1, 2, 3 and 4, a representative distribution of such currents forming a figure 8 being shown in Fig. 3. The relative indentation of the figure 8 will be determined by these gaps. Likewise, by suitably choosing the diameter of the inner conductor 12 of the loop, the impedance of each sector may be chosen so as to present a real impedance to the line 5. This will be clear when it is considered that each of these loop portions 1, 2, 3 and 4 is substantially a quarter wave length line. By making the supporting or feeding members 6 and 7 of a relatively small diameter with respect to those of portions 1, 2, 3 and 4, the voltage on the supporting mast will be reduced to a sufficiently low value so as to permit satisfactory operation in view of the fact that the connections across the arms 6 and 7 are not voltage nodes.

While I have described above the principles of my invention in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation on the scope of my invention.

I claim:

1. A radio antenna comprising two open loop conductors joined at their ends to form a closed periphery, a shield for each of said conductors, each said shield having two tubular portions the free ends of which extend toward one another to provide a gap therebetween and the other ends of which are joined to the corresponding ends of the portions of the shield of the other loop conductor, each said loop conductor being coaxially disposed within said portions of its shield whereby it is shielded along the lengths of the portions and exposed at said gap, said portions being of an electrical length of substantially one quarter wave length of the current to be translated, a dual transmission line for feeding said loop con-

ductors, and coaxial branch lines connecting one conductor of said transmission line and each joined end of said loop conductors.

2. An antenna according to claim 1, wherein said loop conductors are of semi-circular shape and said closed periphery comprises a circle.

3. An antenna according to claim 1, further including junction means between said two loops.

4. An antenna according to claim 1, wherein said dual line comprises a supporting member and the diameter of said coaxial branch lines is small in relation to that of said loop portions, whereby the resulting voltage on said supporting member is held to a non-objectionable value.

5. An antenna comprising a plurality of quarter wave length hollow radiating conductors of a given diameter arranged to provide a substantially closed periphery having gaps at equal distances from one another, a continuous conductor mounted within said hollow conductors, and shielded coaxial lines extending inwardly from points midway between said gaps, the outer conductor of said feed lines being directly connected to said radiators, the inner conductors of said coaxial lines being connected to said continuous conductor, a dual transmission line coupled to the inner ends of said coaxial lines, the outer conductors of said coaxial lines being of small diameter relative to said radiators, whereby said radiating sectors present substantially real impedance to said dual line.

SIDNEY B. PICKLES.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,391,026	McGuigan	Dec. 18, 1945
2,393,981	Fuchs	Feb. 5, 1946

FOREIGN PATENTS

Number	Country	Date
419,783	Great Britain	Nov. 19, 1934