April 27, 1948. E. A. STORCK 2,440,308

OSCILLATOR STRUCTURE

Filed June 16, 1945

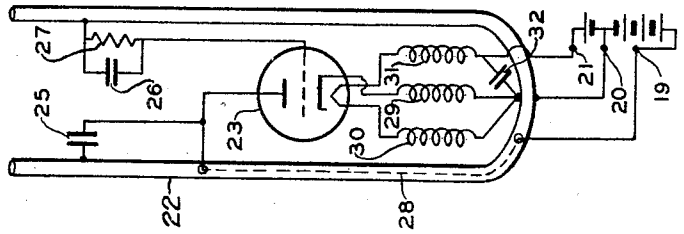


FIG. 4.

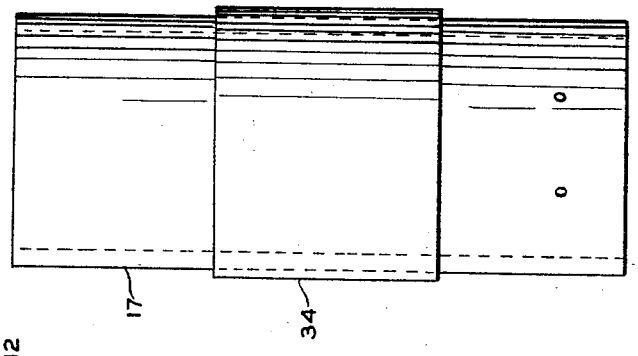


FIG. 3.

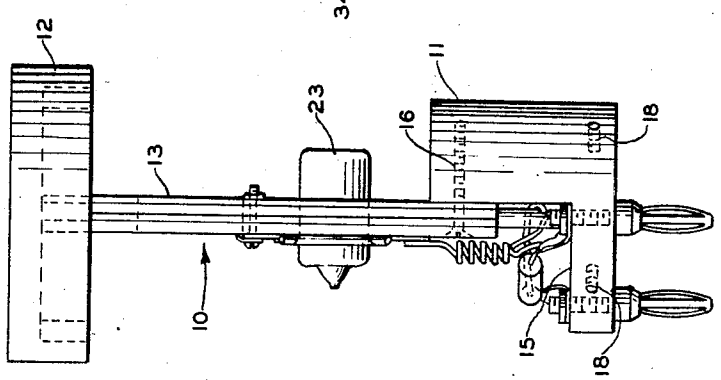


FIG. 2.

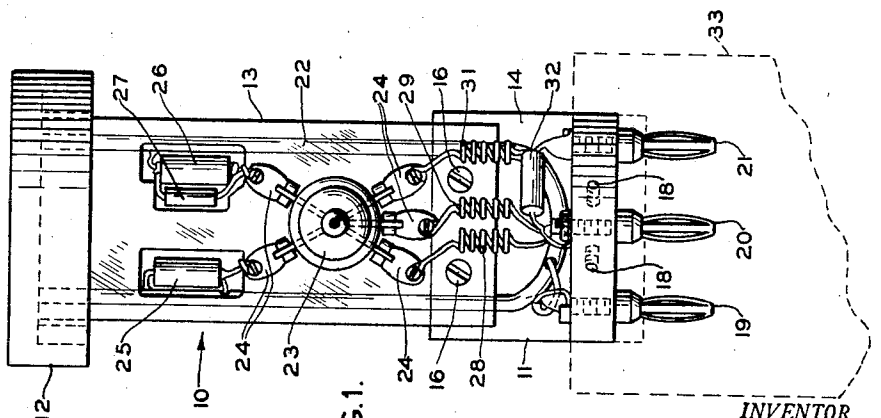


FIG. 1.

INVENTOR.
EDWARD A. STORCK

BY

William D. Hall.

ATTORNEY

Patented Apr. 27, 1948

2,440,308

UNITED STATES PATENT OFFICE

2,440,308

OSCILLATOR STRUCTURE

Edward A. Storck, Manasquan, N. J., assignor to the United States of America as represented by the Secretary of War

Application June 16, 1945, Serial No. 599,945

6 Claims. (Cl. 250—36)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

1

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

The present invention relates to unitary, radio-frequency oscillator structures and is more particularly directed to a compact ultra-high-frequency oscillator assembly incorporating a miniature tube.

Numerous applications exist for portable, self-sufficient oscillator structures of highly compact, sturdy and light weight design. For example, in orientation tests for radio-frequency direction finding apparatus it is necessary to dispose a small transmitter at a known point in the field in order to calibrate the movement of the direction finding loop in terms of azimuth. Likewise, for radio-sonde purposes where a transmitter is borne aloft by a balloon a small reliable oscillator structure is needed. It is also desirable that simple means be provided for the tuning of the transmitter.

With the above requirements in view it is the primary object of this invention to afford a unitary oscillator structure which is completely encased within a plug-in type housing.

It is another object of this invention to provide in a plug-in housing an oscillator of high efficiency having simple and readily adjustable tuning means.

An additional object of this invention is to provide a plug-in housing for an oscillator which is sturdy, weather proof and adapted to inexpensive manufacture.

For a complete understanding of the invention as well as other objects and further features thereof reference is had to the following detailed description to be read in connection with the accompanying drawings wherein like components are designated by like numerals. The scope of the invention will be pointed out in the annexed claims.

In the drawing:

Figure 1 is an elevational view of a preferred embodiment of an oscillator structure in accordance with the present invention.

Figure 2 is a side view thereof,

Figure 3 shows separately the casing and tuning means for said structure, and

Figure 4 is a schematic circuit diagram of the oscillator.

Referring now to the drawing and more particularly to Figures 1 and 2, the oscillator assembly comprises a plug-in support 10 composed of a dielectric material such as Lucite, polystyrene,

2

or any suitable plastic, having a base portion 11, in the form of a cylindrical block, a disc-shaped head 12, and a rectangular mounting plate 13 connecting base 11 with head 12.

Cut into base 11 is a semi-cylindrical recess defining perpendicular plane surfaces 14 and 15. Plate 13 is secured at its lower end to surfaces 14 by means of screws 16 received in threaded bores in base 11. The upper end of plate 13 is forced into a diametrical slot cut into head 12. Enclosing plug-in support 10 is a cylindrical casing 17, shown separately in Figure 3, of dielectric material, whose internal diameter is equal to the outside diameter of base 11. A circular groove is formed in head 12 to snugly receive the upper end of casing 17, and the casing is attached to support 10 by means of screws fitted into threaded bores 18 formed in base 11.

Projecting from the under surface of base 11 are three banana type prongs 19, 20 and 21 which are arranged so that their terminals screws extend through base 11 above surface 15, soldering lugs being secured thereto.

The oscillator components are illustrated physically in Figures 1, 2 and 3 and are shown schematically in Figure 4. The oscillator is of a conventional parallel line type including a U-shaped resonant tubular line 22, and a miniature triode 23. The arms of tube 22 are inserted within parallel passages extending longitudinally through mounting plate 13 with the yolk of line 22 extending from the lower edge of the plate. Triode 23 is of the acorn unbased type such as the 955 vacuum tube and is inserted in a central aperture in plate 13 so that its flange lies against the plate surface. Suitable terminal clips 24 are attached to plate 13 and are disposed about triode 23 so as to receive the electrode pins thereof. The plate of triode 23 is connected through a coupling capacitor 25 to a tap on one arm on line 22 while the grid is connected to a correspondingly positioned tap on the other arm through a capacitor 26 paralleled by a grid leak 27.

The plate of triode 23 is directly connected to prong 19 by a lead 28 inclosed within line 22. The mid point of line 22 is wired to prong 20 and is also connected through a suitable radio frequency choke 29 to one side of the filament of tube 23. The cathode of tube 23 is connected through a radio frequency choke 30 to the mid point of line 22. The other side of the filament is connected through radio frequency choke 31 to prong 21 and connected between said prong

and the mid point of line 22 is a by pass condenser 32.

Capacitor 25 is contained within a recess formed in plate 13, adjacent to one arm of line 22. Similarly, capacitor 26 and grid leak 27 are contained within a recess adjacent to the other arm of line 22. The oscillator assembly operates in conjunction with a battery box indicated by dashed line 33, the filament voltage being applied between prongs 21 and 20 and the plate voltage between prongs 20 and 19.

Slidably received over dielectric casing 17 is a metal collar 34, composed of copper or other suitable non-magnetic material. When the structure is assembled, collar 34 functions as a variable capacitance between the parallel arms of line 22 and by adjusting the position of the collar along casing 17 the frequency of the oscillator is varied.

Because of the dielectric nature of the casing 17 the oscillator has considerable direct radiation, hence in most applications an external antenna and transmission feed thereto is not needed. However, if desired, a dipole (not shown) or other suitable radiator may be mounted directly above head 12 and coupled to line 22 by a small loop or other means permitting the detachment of said head without breaking connections.

When completely assembled the oscillator components are fully protected and weather proofed. Thus there has been shown a simple, compact, self-contained oscillator structure which may be readily replaced in the event of electrical or mechanical defect.

While there has been described what is at present considered a preferred embodiment of the invention it is apparent that many changes and modifications may be made therein without departing from the spirit and scope of the invention as defined in the accompanying claims.

What is claimed is:

1. A unitary oscillator structure comprising a dielectric cylindrical base, a head member in spaced coaxial relation with said base, a dielectric mounting plate attaching said base to said head, a radio-frequency oscillator circuit arranged on said mounting plate, a dielectric cylindrical casing enclosing said base and said mounting plate, and a metal collar slidably received about said casing, said collar being electrically coupled to said oscillator circuit whereby the longitudinal position of said collar on said casing controls the operating frequency of said oscillator circuit.

2. A unitary oscillator structure comprising a dielectric cylindrical base, a head member in spaced coaxial relation with said base, a dielectric mounting plate attaching said base to said head, a radio-frequency oscillator circuit, including resonant means, arranged on said mounting plate, a dielectric cylindrical casing enclosing said base and said mounting plate, and a metal collar slidably received about said casing electrically related to said resonant means whereby the position of said collar on said casing controls the operating frequency of said oscillator.

3. A unitary oscillator structure comprising a dielectric cylindrical base having a plurality of prongs extending longitudinally therefrom, a head member in spaced coaxial relation with said base, a dielectric mounting plate attaching said base to said head, an oscillator circuit, including resonant means, arranged on said mounting plate and having its power terminals connected to said prongs, a dielectric cylindrical casing enclosing said base and said mounting plate, and a metal collar slidably received about said casing and electrically related to said resonant means whereby the position of said collar controls the operating frequency of said oscillator.

4. A unitary oscillator structure comprising a dielectric cylindrical base having a plurality of prongs extending longitudinally therefrom, a head member in spaced coaxial relation with said base, a dielectric mounting plate attaching said base to said head, an oscillator circuit structure arranged on said mounting plate including a U-shaped resonant line longitudinally disposed within said plate, said oscillator having its power terminals connected to said prongs, a dielectric casing enclosing said base and said mounting plate, and a metal collar slidably received over said casing and electrically related to said resonant line whereby the position of said collar on said casing controls the operating frequency of said oscillator.

5. A unitary oscillator structure comprising a dielectric cylindrical base having a plurality of prongs extending longitudinally therefrom, a head member in spaced coaxial relation with said base, a dielectric mounting plate attaching said base to said head, an oscillator circuit arranged on said mounting plate including a U-shaped resonant line longitudinally disposed within said mounting plate and a miniature vacuum tube inserted in an aperture centrally disposed between the arms of said resonant line, said oscillator having its power terminals connected to said prongs, a dielectric cylindrical casing enclosing said base and said mounting plate, and a metal collar slidably received about said casing and electrically related to said resonant line whereby the position of said collar on said casing controls the operating frequency of said oscillator.

6. A unitary oscillator structure comprising a dielectric cylindrical casing, a radio frequency oscillator circuit mounted within said casing, and a metal collar slidably received about said casing, said collar being electrically coupled to said oscillator circuit whereby the longitudinal position of said collar on said casing controls the operating frequency of said oscillator.

EDWARD A. STORCK.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,955,418	Folen	Apr. 17, 1934
2,135,672	Morris et al.	Nov. 8, 1938
2,212,231	Gossel et al.	Aug. 20, 1940
2,281,284	Hammond	Apr. 28, 1942