Jan. 9, 1951 M. FRITTS 2,537,822

SPIRAL SCANNING MECHANISM

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FIG. 1.

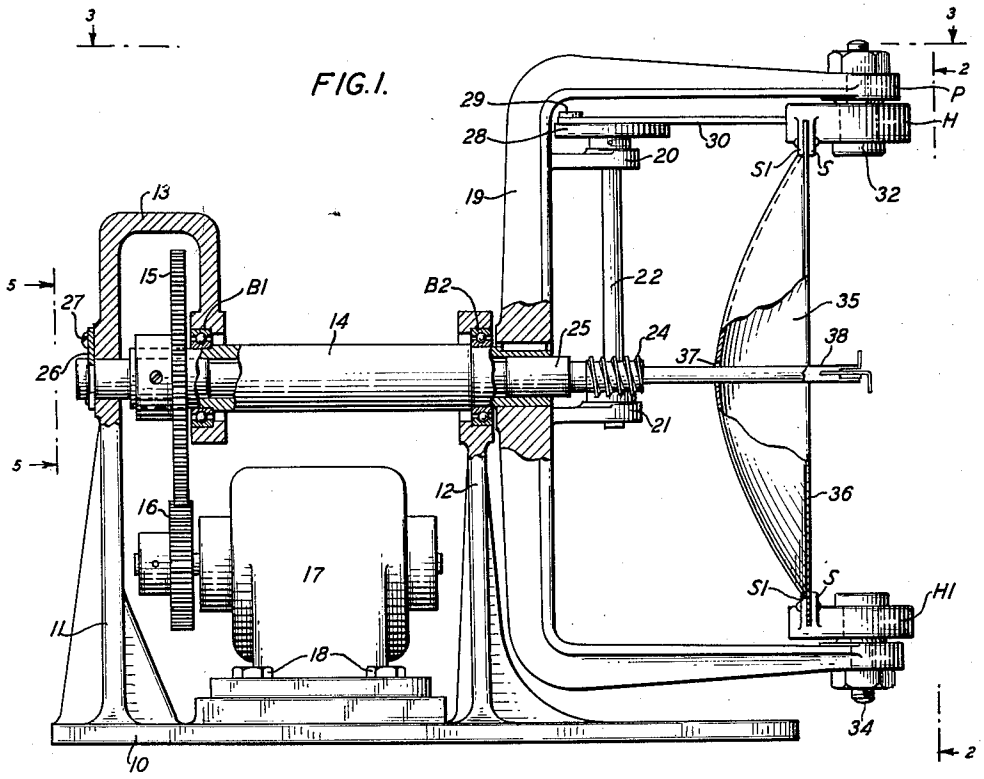

FIG. 2.

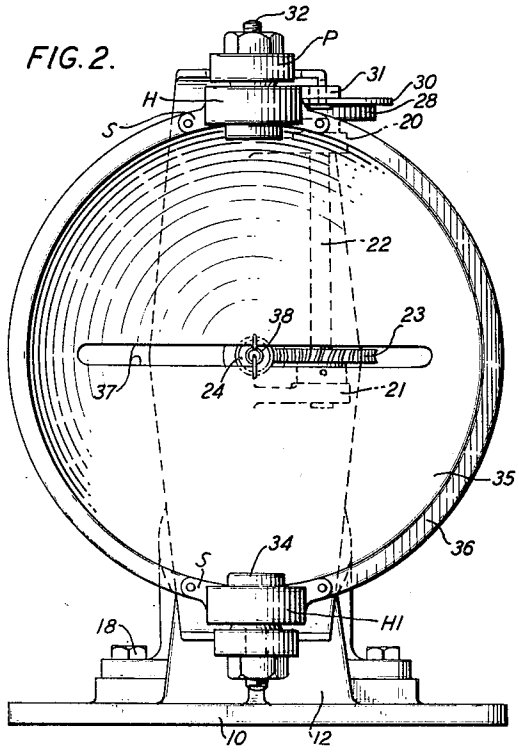

FIG. 6.

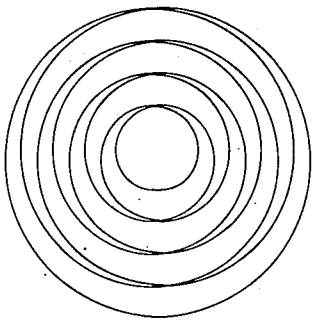

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FIG.3.

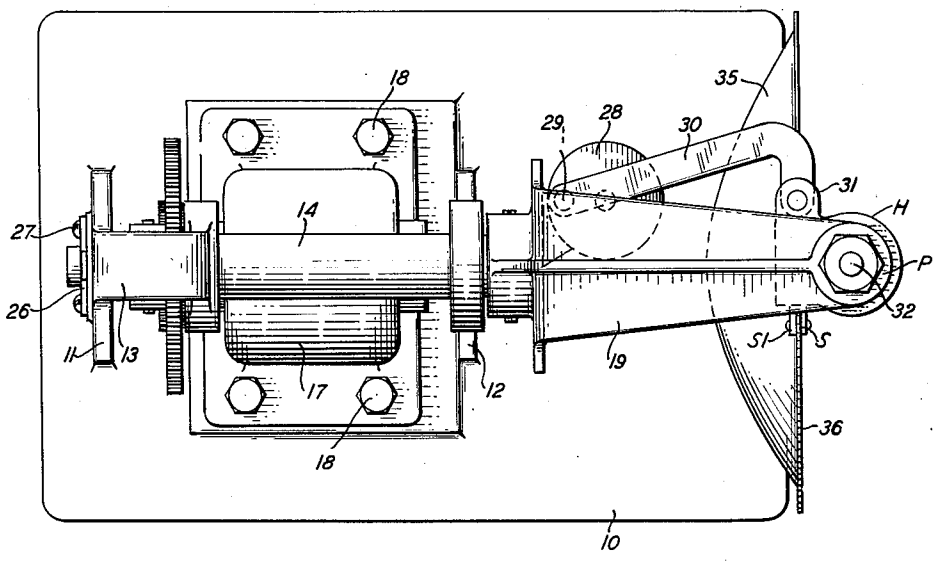


FIG.5.

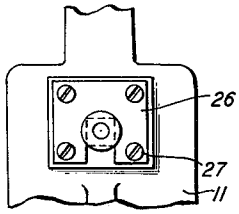
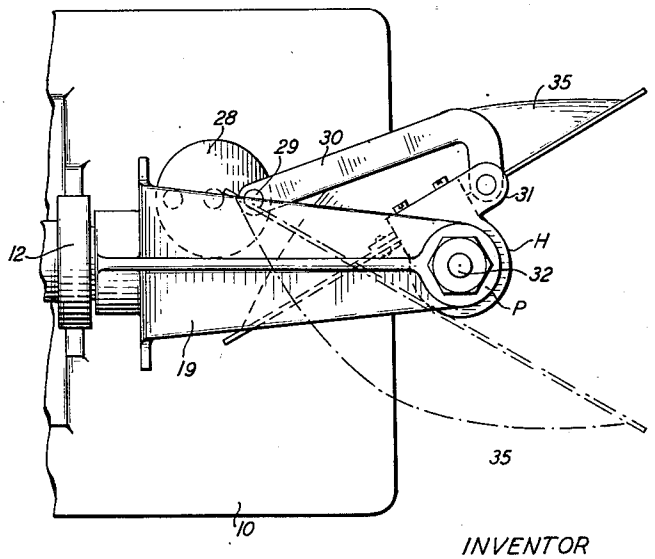


FIG.4.



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SPIRAL SCANNING MECHANISM

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Application December 24, 1945, Serial No. 637,125

1 Claim. (Cl. 250—33.65)

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This invention relates to radio signaling apparatus and more specifically to a scanning mechanism for use in such apparatus.

The object of this invention is the provision of a scanning mechanism of the type above referred to which will be simple and in which a directive element is operated in a manner to generate a scanning field determined by the operation of two shafts relative to each other.

In the drawing:

Fig. 1 is an elevational view shown with a number of operating parts in vertical section;

Fig. 2 is a front elevational view;

Fig. 3 is a top view;

Fig. 4 is a partial top view shown with the directive element or reflector in an operated position;

Fig. 5 is a detail view looking in the direction indicated by the arrows on line 5—5 of Fig. 1; and

Fig. 6 is a diagrammatic view of the scanning field obtained by the movement of the reflector.

As shown in the drawing, the scanning mechanism of this invention consists of a base 10 formed with two upright supports 11 and 12, upright support 11 having an inverted U-shaped portion 13 at its free end serving in cooperation with upright support 12 for rotatably mounting as on ball bearings B1 and B2, a hollow shaft 14 best seen in Figs. 1 and 3.

On one end of hollow shaft 14 is keyed a gear 15 meshing with a pinion 16 keyed on the armature shaft of a motor 17 secured to the base 10 as by a number of bolts 18, while on the opposite end of hollow shaft 14 is keyed a fork-shaped member 19, the shaft 14 and member 19 being rotated through the operation of motor 17, pinion 16 and gear 15 keyed as above mentioned on hollow shaft 14.

The fork-shaped member 19 is formed with a pair of arms 20 and 21 extending laterally therefrom and having bearing portions in which is journaled a shaft 22. On one end of shaft 22 is keyed a worm gear 23 best seen in Fig. 2, meshing with a worm 24 carried or formed at one end of a hollow shaft 25 mounted in position concentric to hollow shaft 14 and supported at one end by support 11, shaft 25 being held from rotation by a plate 26 secured to upright supports 11, as by a number of screws 27, best seen in Figs. 1, 3 and 5, and having a fork-shaped portion fitted over two opposite sides of a square-shaped portion formed at the end of shaft 25 for preventing its rotation as would be imparted by friction between this shaft and the shaft 14 and the friction between the worm 24 and the worm gear 23 while in operation.

To the end of shaft 22, opposite the worm gear 23, there is securely mounted a disc member 28 provided with a crank pin 29 serving for pivotally mounting a bell crank 30, the opposite end of which is pivoted to an arm 31, best seen in Figs. 2, 3 and 4, formed with a head-piece H in turn pivoted on a spindle 32 secured to the prong P of the fork-shaped member 19. Head-piece H

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in cooperation with a head-piece H1, pivoted on a spindle 34, secured to the other prong of fork-shaped member 19, serves for mounting a parabolic reflector 35 having a rim portion 36 clamped between similarly shaped projections S and S1 formed with the head-pieces H and H1 while the reflector 35 is formed with an oblong-shaped opening 37 through which projects the so-called emitter or antenna 38 connecting with a coaxial line (not shown) in the hollow shaft 25.

In the operation of the scanning mechanism of this invention, the operation of motor 17 is effective to rotate the hollow shaft 14 and the fork-shaped member 19 carried thereby through the engagement of pinion 16 with gear 15 keyed to the hollow shaft 14. The rotation of fork-shaped member 19 is effective to rotate the parabolic reflector 35, while causing the rotation of shaft 22 through the engagement of worm 23 carried by the shaft 22 with the worm 24 carried by the hollow shaft 25, which is held against rotary movement by the forked plate 26. Rotation of shaft 22, and that of the crank formed by disc 28 and the pin 29 which connects with the bell crank 30, is effective to impart reciprocating movements to the head-piece H and thereby to the reflector from the position shown in full line, to the position shown in dotted line in Fig. 4 for each complete turn of the shaft 22 to cause the reflector 35 to generate a scanning field representing a spiral, as shown in Fig. 6, the pitch of which is dependent upon the speed ratio between the worm 24 and worm gear 23 for any given speed at which the parabolic reflector may be rotated.

What is claimed is:

A mechanical driving apparatus comprising a support, a first hollow shaft rotatably supported in said support, a yoke secured to said hollow shaft, a fixed hollow shaft extending from within said first hollow shaft and into the space between the arms of said yoke, a worm gear on said fixed shaft, a counter-shaft rotatably supported in said yoke, a worm wheel secured to said counter-shaft and in mesh with said worm gear, spaced levers pivotally supported on arms of said yoke and cooperating to support a paraboloid movable member having a transverse slot therein, a rigid member extending through said fixed hollow shaft and through said slot, and a crank and lever system forming a mechanical driving connection between said counter-shaft and at least one of said spaced levers.

MORRIS FRITTS.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,083,242	Runge	June 8, 1937
2,231,929	Lyman	Feb. 18, 1941
2,407,305	Langstroth et al.	Sept. 10, 1946
2,410,831	Maybarduk et al.	Nov. 12, 1946