March 18, 1958 H. P. ROUNSEFELL 2,827,629

ANTENNA SUPPORTING STRUCTURE AND METHOD OF ASSEMBLY

Filed April 8, 1954 3 Sheets-Sheet 1

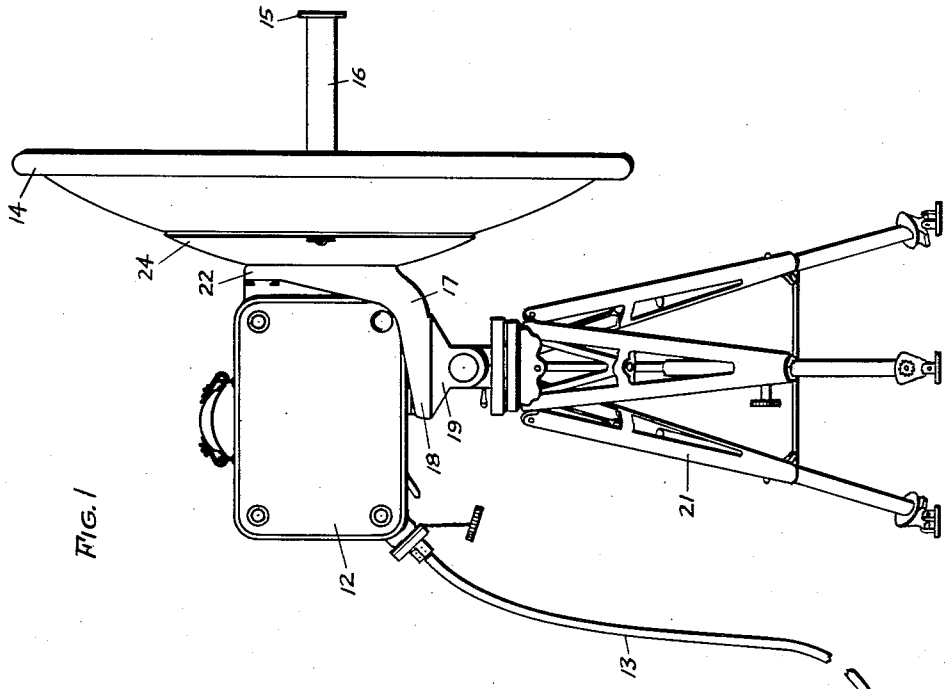


FIG. 1

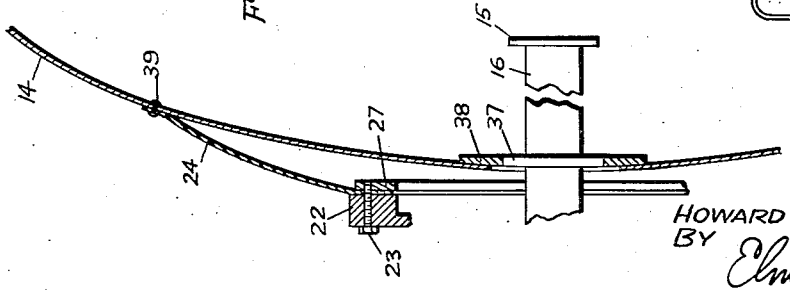


FIG. 8

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ANTENNA SUPPORTING STRUCTURE AND METHOD OF ASSEMBLY

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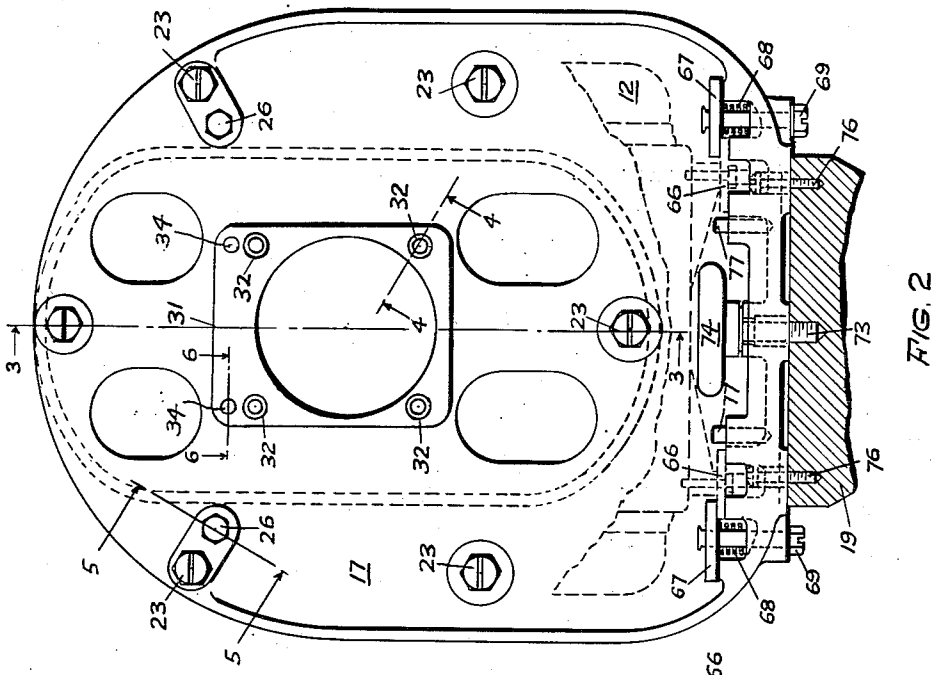


FIG. 2

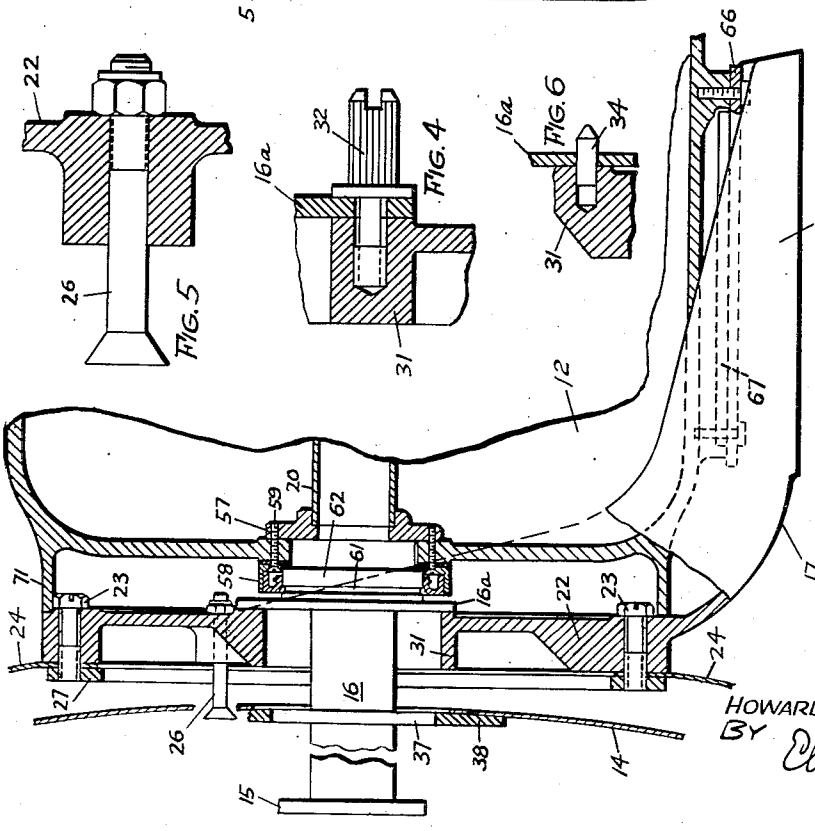


FIG. 3

FIG. 5

FIG. 4

FIG. 6

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ANTENNA SUPPORTING STRUCTURE AND METHOD OF ASSEMBLY

Filed April 8, 1954 3 Sheets-Sheet 3

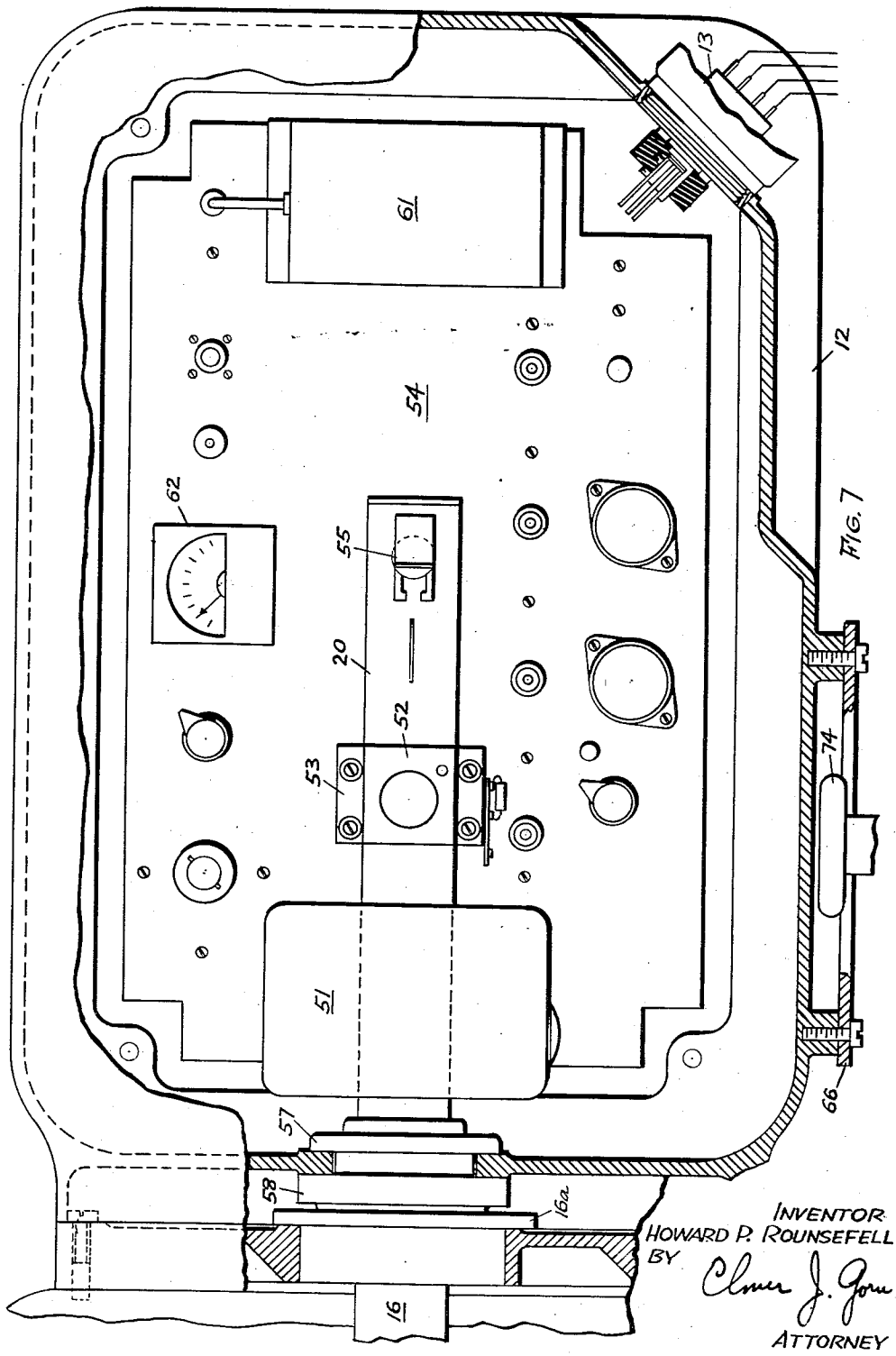


FIG. 7

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ANTENNA SUPPORTING STRUCTURE AND METHOD OF ASSEMBLY

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Application April 8, 1954, Serial No. 421,759

9 Claims. (Cl. 343—878)

This invention relates to microwave systems, and particularly to structure for supporting microwave antenna assemblies for use in transmitting and receiving radiant energy of megacycle frequencies.

While not confined to such use, the apparatus herein disclosed lends itself to use in delivering to a television transmitting station electronic signals representing both the pictorial and sound components of a program originating at a point some miles away from the normal transmitting station. Such a system, as disclosed and claimed in United States patent application No. 421,757, filed by Paul J. Pontecorvo and Sidney Topol on even date herewith, may operate to consolidate picture and sound signals in a single carrier wave of super-high frequency, and to radiate this S. H. F. carrier wave form an antenna assembly, beaming the energy directly toward a receiving antenna assembly located on the roof or other outstanding exterior surface of the building which houses the permanently installed telecasting and transmitting equipment. Such a system may employ a series of readily portable cases housing the electronic equipment, and the present invention is applicable to such an arrangement by providing a single bracket element serving as a common central support for retaining an antenna assembly, including a parabolic reflector and one of such portable cases, in operative position upon the pedestal of a folding tripod temporarily set up at the point of program origin. A duplicate of such antenna assembly may be set up on the roof of the television studio, to serve as the receiving half of such a system.

The present invention resides partly in the method of assembly of the components comprising a complete antenna apparatus, and partly in the resulting apparatus itself. As herein illustrated, the method of assembly involves the step of effecting interlocking engagement between a pair of retainer clamps on the above-described central bracket and a pair of keeper rails suspended below the under surface of the portable case containing the electronic components constituting the transmitter or receiver half of a microwave system, the physical relationships being substantially the same for either half of such a system. A prior step of the assembly is to place the antenna reflector in such relation to the central bracket as to cause a centrally disposed hub portion of the reflector to rest temporarily upon one or more supporting pins extending horizontally from the central bracket and then to rotate the antenna reflector about its axis until it arrives at a position of registry with captive fastening screws carried by and projecting from the central bracket. A further prior step is to pass the antenna feed conduit longitudinally through the aligned central openings in the bracket and antenna reflector until the correct longitudinal relationship is automatically established as between the outboard end of the feed conduit and the antenna reflector "dish," and then to secure said feed conduit to the central bracket. The final step of installing the portable case (above described) also includes the establishing of moisture-sealing interlocking of the wave guide tube with the above-described antenna feed, in end-to-end alignment, the said wave guide being first attached to the portable case, in position to align and interlock with said antenna feed. It will be noted that this method of assembly involves a minimum of operations and has the additional advantage of relieving the assembler of the burden of manually supporting the weight of the antenna reflector during the operation of securing alignment with the mounting screws of the supporting bracket.

As heretofore noted, the invention also resides in structural relationships facilitating execution of the assembling method above described. In this connection, a feature of the structure is the arrangement of the interlocking retainer clamps and keeper rails above referred to. Other features are the structural interrelationships facilitating the successive mounting of the antenna reflector and antenna feed conduit on the vertically disposed wall of the central bracket element, in accordance with the above-indicated method of assembly.

Other and further advantages of this invention will be apparent as the description thereof progresses, reference being had to the accompanying drawings, wherein:

Fig. 1 is a view in elevation of an antenna assembly embodying the invention;

Fig. 2 is a view in elevation of the supporting bracket constituting part of the assembly shown in Fig. 1;

Fig. 3 is a transverse sectional view along the line 3—3 of Fig. 2;

Figs. 4, 5, and 6 are sectional views along the line 4—4, 5—5, 6—6, respectively, of Fig. 2;

Fig. 7 is a sectional view of the portable case; and

Fig. 8 is a sectional view of the antenna reflector and hub.

In the drawings, reference numerals 11 and 12 designate two similar portable cases adapted to be electrically connected by a cable 13 enclosing conductor-carrying video and audio signal currents picked up by television camera and microphone components, respectively, for transmission by microwave radiation from antenna reflector 14 to a similar antenna assembly located on the rof or other outstanding structure of a television transmitting station in a manner more sufficiently described and claimed in United States application No. 421,757, filed by Paul J. Pontecorvo and Sidney Topol on even date herewith.

The antenna reflector 14 receives the energy reflected thereto from antenna terminal 15 at the outer end of antenna feed 16, the inner end of the antenna feed being supported by means hereinafter described.

The method of assembly constituting part of the present invention involves the step of interposing between the case 12 and the reflector 14 an L-shaped bracket 17 whose horizontally disposed portion 18 is adapted to rest upon a pedestal 19 mounted upon a tripod assembly 21, the vertically disposed portion 22 of the bracket being centrally apertured to permit the inner end of the antenna feed 16 to extend therethrough for alignment with wave guide 20 in case 12, and being also provided with a series of angularly distributed fastening screws 23 adapted to engage and retain a circular element 24 serving as the hub portion of the antenna reflector 14. The bracket portion 22 is also provided with one or more projecting pins 26 of sufficient length to constitute cantilever supports permitting the reflector hub ring 27 to rest thereon while the person assembling the parts rotates the reflector to the proper position angularly, whereupon the fastening screws 23 may be secured to retain said reflector in its angularly adjusted position.

The antenna feed conduit 16 is insertable through the

aligned openings in the antenna reflector 14 and the bracket, insertion being from right to left as viewed in Fig. 3. When the insertion has proceeded to the point where flange 16*a* is flush with the surface of mounting pad 31, the matching flange 37 on the antenna feed will be in co-planar relation to the collar 38 on antenna reflector 14, thus completing the reflecting circle. As flange 16*a* approaches mounting pad 31 of the bracket, the pins 34 on the mounting pad will enter corresponding holes (not shown) in flange 16*a*, to serve as temporary holding and positioning means for the antenna feed conduit during the operation of tightening the captive screws 32, which operation completes the assembly of the conduit upon the bracket.

Wave guide 20 carries a transmitting oscillator (klystron or the equivalent) within a heat regulating oven 51, also a reference cavity block 52 whose flange 53 receives screws for securing the cavity and wave guide assembly (including crystal assembly 55) to the panel 54 which serves as a mounting wall for power pack 61, meter 62 and other electronic components to be housed in the portable case 12, as explained more fully in the Pontecorvo-Topol application above identified. The wave guide 20 has a flange 57 supported by screws 59 upon the end wall of the case 12, along with moisture-sealing coupling assembly 58 whose resilient peripheral rim engages within a circular groove of antenna feed conduit nose assembly 62, this engagement occurring automatically as the rail-shoes 66 of case 12 are slid (in a leftward direction) along and under the clamping rails 67 provided upon bracket 17 and urged upwardly by springs 68 to facilitate such under-sliding of shoes 66. Springs 68 are compressed in the subsequent operation of clamping the assembly together by tightening the nuts 69. As the case "sliding-in" operation is completed, coupling 58 will engage with the retaining groove 61 in feed conduit nose 62, and case rim 71 will rest upon the registering edge of bracket 17, to provide coverage at that particular joint of the assembly.

Bracket 17 is piloted in pedestal 19 by the shank 73 of knob 74, and locked thereon by screws 76. Pins 77 serve as guide-pins during the case "sliding-in" operation.

This invention is not limited to the particular details of construction, materials and processes described, as many equivalents will suggest themselves to those skilled in the art. It is, accordingly, desired that the appended claims be given a broad interpretation commensurate with the scope of the invention within the art.

What is claimed is:

1. In an antenna assembly, an L-shaped bracket having a pair of adjustable retainer clamps extending in parallelism with one surface of said bracket, an electronic power translation unit having interlocking engagement with said retainer clamps, and means carried by the other surface of said bracket for receiving and supporting the antenna reflector element in operating relationship to said power translation unit.

2. In an assembly including an antenna reflector, a wave guide structure terminating in an antenna electrode disposed centrally of said reflector, a portable case containing power generating and control circuits adapted to cooperate with said wave guide structure, and means including a single supporting element interposed between said case and said reflector to hold the latter in operative relationship to said wave guide structure.

3. Apparatus as defined in claim 2, wherein said case and said single supporting element have interengageable locking components facilitating rapid assembly.

4. In an antenna assembly including a substantially rectangular case having a wave guide structure extending therefrom at one end thereof, an antenna reflector surrounding said wave guide structure, and means including a bracket having one surface parallel with said wave guide structure for interlocking engagment with said case, and a second surface forming a right angle with said first-named surface, said second surface having a series of fastening means at angularly spaced points thereon for supporting said antenna reflector.

5. In an antenna assembly including a substantially rectangular case having a wave guide structure extending therefrom at one end thereof, an antenna reflector surrounding said wave guide structure, means including a bracket having one surface parallel with said wave guide structure for interlocking engagement with said case, a second surface forming a right angle with said first-named surface, said second surface having means thereon for supporting said reflector, and means manipulable from the case-receiving side of said bracket for securing said wave guide structure and reflector in operative relationship to each other.

6. An antenna assembly comprising a bracket having a vertically disposed wall and a horizontally disposed shelf-like portion, an antenna feed tube having a flanged end for attachment to said wall, a waveguide alignable in end-to-end relation to said antenna feed tube, a case having an end wall supporting said waveguide, said case being slidable along said shelf-like portion of said bracket to position said waveguide in said end-to-end relation to said antenna feed tube, and means carried by said case end wall for establishing moisture-proof relationship between the adjacent ends of said antenna feed tube and waveguide when said case assumes a preestablished position upon said shelf-like portion of said bracket.

7. An antenna assembly as defined in claim 6, including an antenna reflector, and means for mounting said reflector upon said bracket wall in concentric relation to said antenna feed tube, and in a manner permitting independent attachment and removal of said antenna feed tube.

8. An antenna assembly comprising a bracket having a vertically disposed wall and a horizontally disposed shelf-like portion, an antenna reflector having a hub portion attachable to said wall, a waveguide-containing case slidable along the shelf-like portion of said bracket to position the waveguide in relation to said reflector, means accessible from the shelf side of said wall for securing said antenna reflector hub portion to the opposite side of said wall, and cantilever means carried by said wall for supporting said reflector during the application of said securing means thereto.

9. An antenna assembly comprising a vertically disposed wall, an antenna reflector having a hub portion fixedly attachable to said wall, means accessible from one side of said wall for securing said antenna reflector hub portion to the other side of said wall, and means carried by said wall for supporting said reflector during the application of said securing means thereto.

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