

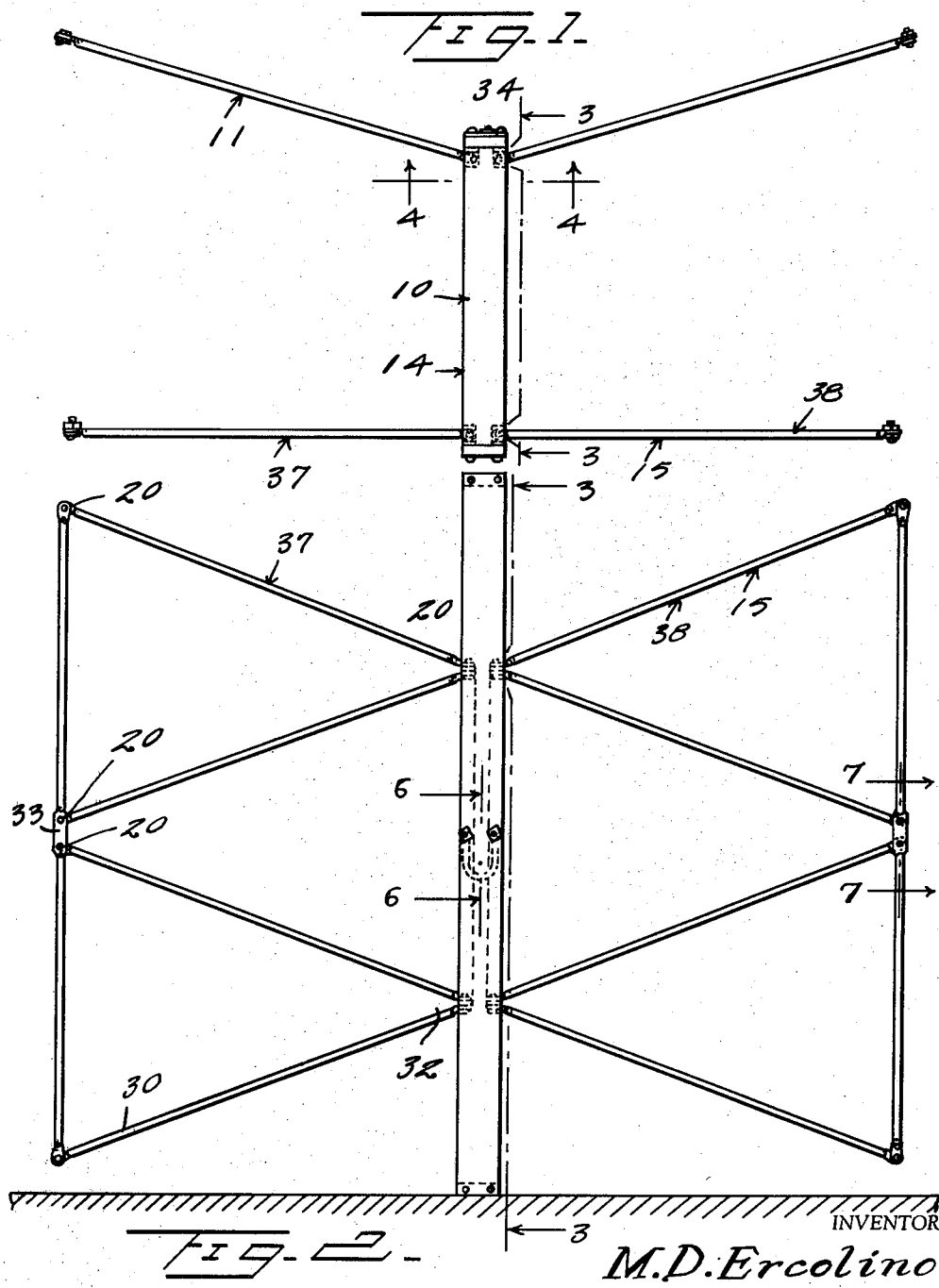
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M. D. ERCOLINO
TELEVISION ANTENNA

2,559,148

Filed May 23, 1950

3 Sheets-Sheet 1



BY *Kimmel & Crowell*
ATTORNEYS

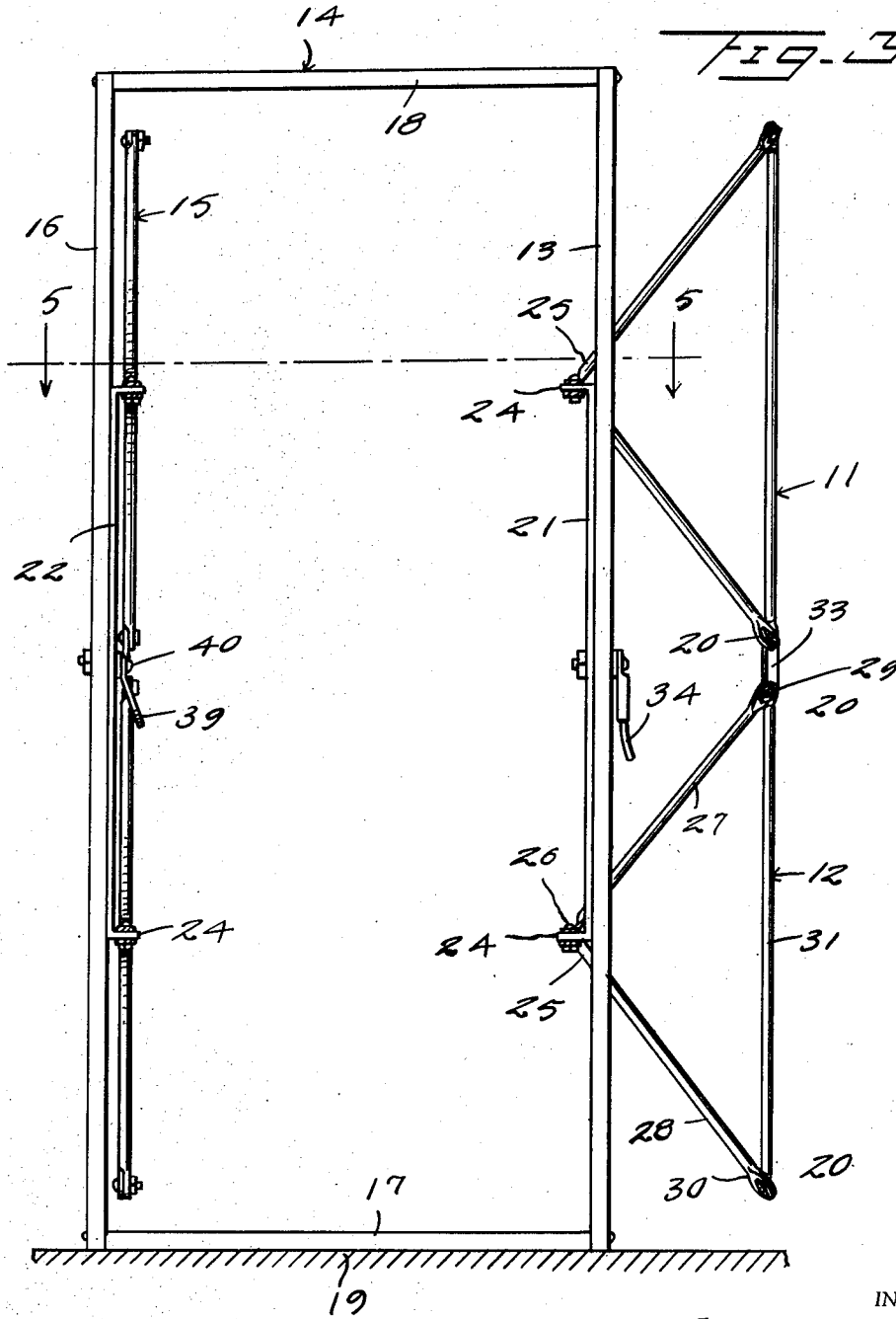
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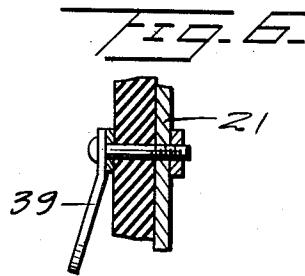
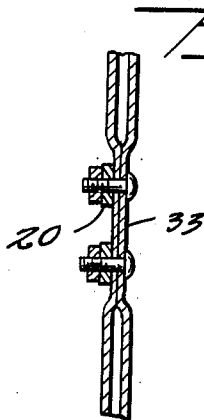
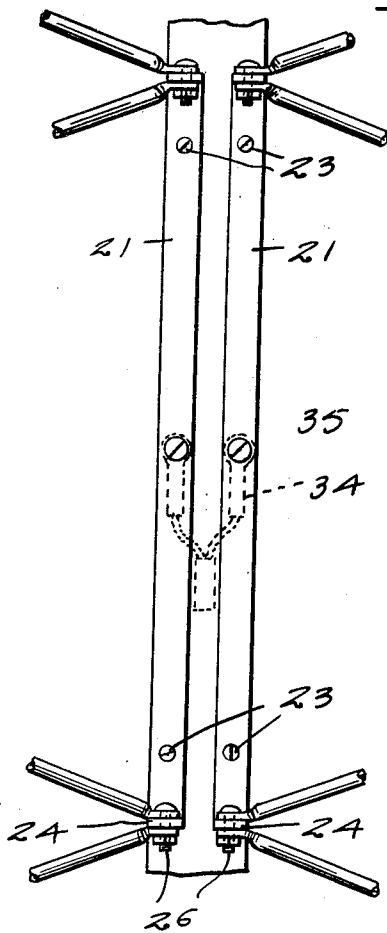
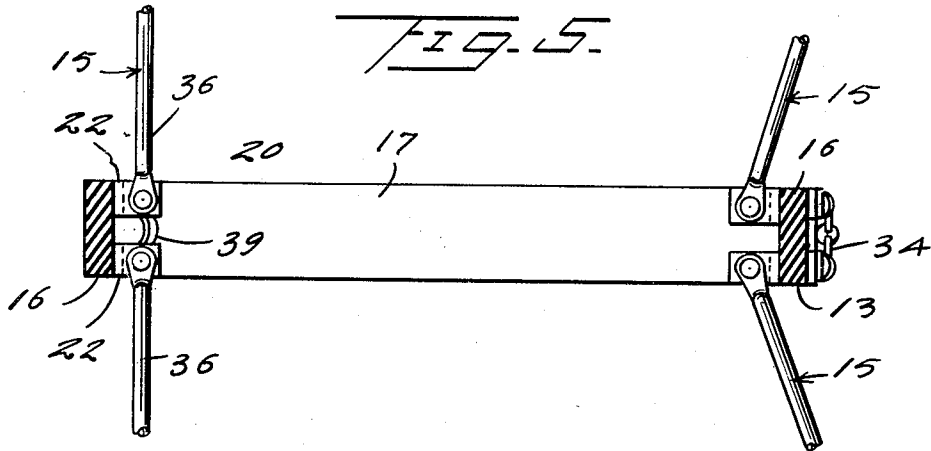
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TELEVISION ANTENNA

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3 Claims. (Cl. 250-33)

1

This invention relates to television antennas and more particularly an antenna of stacked conical construction having closed-ended dipoles with a reflector spaced therefrom and supported by a frame structure having a pair of horizontal wooden spacers.

Antenna systems having stacked dipoles are relatively well known in the art. Such antennas have been developed to provide high gain performances in receiving high frequency electromagnetic waves throughout all the designated television channels extending from 54 to 216 megacycles. These antennas are necessarily highly directive and are usually mounted high above the ground and on the exterior of a building or a like support means. Being thusly exposed to the elements and situated where any physical failure thereof might easily cause serious damage to property or persons it is necessary that such an antenna be not only substantially built with a high safety factor but also securely fixed in place in order to withstand unusual wind velocities and other adverse weather conditions. These physical requirements result in not only costly construction but also costly installation procedure requiring the services of a service crew of skilled television technicians for its installation and fixed orientation as to the different station locations for attainment of the best possible signal from each station with acceptable discrimination, or any reorientating as required. It is also well known that the high frequency waves used to conduct television signals are susceptible to reflection by relatively small objects such as buildings, metal signs, etc. These reflections often result in the production of undesirable duplicate images or "ghosts" on the receiver screen. Reflective conditions are often times subject to quick change, especially in a community subject to rapid growth, and where the reflections from one reflecting object may be offset by the reflective characteristics of a new object. Elimination of these reflections picked up by a fixed antenna therefore becomes a costly and annoying problem in those installations where the antenna is not ready of adjustment which with the high first and installation costs adds greatly to the operation of such antenna.

The present invention solves this problem by providing an inexpensive compact antenna comprised of a spaced dipole and reflector array tuned to the lowest frequency to be received which provides adequate sensitivity, gain and directional properties for all-channel operation because of the broad-band characteristics of the conical

2

dipole and that can also be readily adjusted to overcome the reception of reflected signals as they arise from time to time.

It is accordingly an object of this invention to provide an antenna of demountable construction that has desirable broad-band characteristics and is also capable of being readily adjusted to eliminate undesired signals.

Another object is to provide a stacked conical antenna suitable for installation within a building such as in an attic or a like area.

A further object is to provide an antenna of this type which eliminates the need for special fixed support means.

A still further object is to provide a closed-ended stacked conical antenna highly responsive to a wide range of signal frequencies.

Another object is to provide an adjustable antenna inexpensive of manufacture, and ready of assembly at the point of use without special tools or equipment.

With these and other objects in view that will appear from the following description of my invention, which consists in the novel arrangement of cooperating parts and the combination and details of construction disclosed, when taken in conjunction with the accompanying drawing in which like numerals refer to like parts in the different views.

In the drawings:

Figure 1 is a plan view of the present invention.

Figure 2 is an end elevation.

Figure 3 is a side view taken on line 3-3 of Figure 2.

Figure 4 is a detail of the frame taken on line 4-4 of Figure 1.

Figure 5 is a detail plan view taken with the top frame member removed.

Figure 6 is a detail taken on line 6-6 of Figure 2.

Figure 7 is a detail taken on line 7-7 of Figure 2.

Referring now in details to the drawings in which is illustrated the antenna array 10 generally of this invention which is comprised of a pair 11 and 12 of stacked conical dipoles or "driven" elements swingingly mounted to a vertical upright 13 of a wooden frame 14 spaced forwardly of a reflector means 15 formed of oppositely disposed sides or panels 37 and 38 carried by the same frame. The reflector panels 37 and 38 are angularly adjustable relative to the wood frame 14 and are generally positioned at right angles to the frame. In orienting for certain

3

stations it may be found desirable to angle the reflector panels 37 and 38 rearwardly or away from the "driven" dipoles 11. The construction of frame 14 is preferably that of wood although it is obvious that any other insulating material can be used. The frame 14 consists of a front vertical member 13 spaced forwardly of a rear vertical member 16 joined at the top and bottom by horizontal spacing members 17 and 18. The lengths of spacing members 17 and 18 are preferably selected to provide a one-fourth wavelength operation at the mean frequency at which the antenna is designed to operate as a half wavelength antenna array. In this manner self-support is provided for the antenna array suitable for quick assembly in the attic or similar storage space of the building in which it is to be operated. In the assembled position of the antenna the bottom spacing member 17 is preferably placed on the top surface of the flooring 19 or supported by the joist or like members found in conventional building construction.

The pairs of dipoles 11 and 12 are formed of suitable metal tubing such as aluminum tubing of such diameter to provide the resonance desired. The tubing material of which the dipoles 11 and 12 are constructed is cut into sections of suitable length to provide a resonant array in a conical antenna of this type. Means for mounting the tubing sections is provided by flattening their ends as at 20 which ends are then apertured for bolting together or to the supports. Each of the vertical supports 13 and 16 are provided with pairs 21 and 22 of spaced metal strips extending vertically thereof and attached to the vertical strips by suitable screw means 23. The pairs of strips 21 and 22 are provided with angularly displaced ends 24 arranged as mount points for the inner ends 25 of the dipoles 11 and 12 bolted thereto by suitable bolt means 26 so as to provide for limited angular movement about points 24.

The dipoles 11 and 12 are formed with oppositely displaced arrays formed conical in shape having side tube sections 27 and 28 of uniform length extending outwardly in their assembled positions from the vertical strips 21. The outer ends 29 and 30 of the cones are closed by a vertical tube 31 spaced oppositely from the apexes 32 of the cones situated adjacent the vertical strips 21. The vertical tube 31 can be either formed as one tube as best illustrated in Figure 2 with a flattened midpoint 33 arranged for bolted engagement with the outer ends 29 and 30 of the cones or it can be formed in separate sections closing the ends of the cones. Closing the ends of the conical dipoles enables me to provide a conical configuration wherein the dipoles appear electrically longer in a small compact antenna suitable for use in a relatively small area. I have found it desirable to cut the dipoles for the lowest frequency desired which will then provide for efficient response over all of the television band extending from 54 to 216 megacycles. For instance, the length required for good reception on channel 2 (54-60 megacycles) is approximately 46 inches long on each side of the cone so as to effect a dipole 92 inches in length whereas I attain the same pattern with the closed ended conical dipoles of this invention with cone sides 27 and 28 formed of approximately 36 inches in length.

A conventional twin lead 300 ohm transmission line 34 is joined to midpoints of the pairs of dipoles 11 and 12 by being bonded across the vertical metal strips 21 as at 35.

4

Spaced rearwardly from the dipoles 11 and 12 as previously described is a reflector 15 constructed in similar manner and with similar material as the dipoles. The inner ends 36 of the reflector 15 are similarly bolted to the ends of strips 22 carried by the vertical 16 so as to provide for angular adjustability of the reflector 15 to match the adjustment of the dipoles. The two sides 37 and 38 of the reflector 15 are bonded together by an electrical bond means or flexible metal strip 39 extending across the separated pair of strips 22 and bolted thereto by suitable bolt or like means 40. The bonding strip 39 extending between the reflector panels 37 and 38 is of a predetermined length and functions to make the reflectors electrically longer than the "driven" elements or dipoles 11 while retaining the same physical dimensions laterally of said elements.

This construction provides a unique antenna array inexpensive of manufacture and ready of assemblage by a relatively unskilled person. All that is necessary is to assemble the parts together within the available space in which the antenna is to be located and connect the receiver transmission lead 34 to the dipoles and turn the array as found necessary for orientation of the receiver to the desired sending stations. Discrimination as to stations is readily attained by angular adjustment of the dipoles relative to their pivot mounts 24. Tests of the antenna constructed as described above have shown that they are not only efficient from an electrical standpoint but that they also are highly discriminatory in the elimination of reflected waves. It is obvious that after the antenna dipoles 11 and 12 and the reflector 15 have been once adjusted that no further change will be necessary unless or until there is a structural change in the vicinity sufficient to set up additional double image or ghost producing reflections. If, as and when these conditions arise it then becomes a very simple matter for the user of the antenna to re-adjust the antenna array 10 of this invention to eliminate such undesired reflections.

The form of the invention illustrated and described herein is the preferred embodiment of the present assemblage in the form now commercially manufactured; however, it is to be understood that this embodiment is for illustrative purposes only and it is pointed out that various modifications and alterations may be made within the scope of the appended claims.

I claim:

1. A television antenna comprising a generally rectangular frame, said frame being formed of non-conducting material and adapted for vertical positioning relative to a floor in a building, a pair of spaced conducting strips carried by one side of said frame, said strips having end portions bent at right angles to provide horizontally disposed spaced pivot mounts, a pair of stacked conical dipoles having their apex portions swingingly carried by said spaced pivot mounts, said dipoles having their outer ends closed by vertical members extending therebetween, and a reflector means having reflecting strips swingingly carried by the side of said frame disposed opposite from said one side, said reflecting strips being joined at the ends thereof as a plurality of irregular triangle shaped rod structures with the apexes of said structures electrically bonded together.

2. A television antenna comprising a generally rectangular wooden frame having spaced opposite side members and spaced end members, a pair of

5

stacked closed end conical dipoles swingingly carried by one of said side members, said dipoles having apex ends connected in parallel for connection to a transmission lead, a reflector carried by the other one of said side members, said reflector having oppositely extending reflecting arms having inner ends swingingly attached to said last mentioned side member and outer ends adjustable for parallel positioning relative to said dipoles, and bond means extending between said reflecting arms.

3. A television antenna comprising spaced non-conducting support members, a closed end dipole having oppositely extending poles carried by one of said support members, said poles having inner ends pivotably secured to said support with free ends extended therefrom for independent angular adjustment of said free ends, said inner ends being connected for parallel connection to a twin lead transmission line, and a reflector means carried

6

by another non-conducting support spaced from the first mentioned support, said reflector having a conducting frame formed of oppositely extending half portions adjustable for independent reflective positioning relative to an adjacent pole of the dipole.

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REFERENCES CITED

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

UNITED STATES PATENTS

| Number | Name | Date |
|------------|----------------|---------------|
| D. 156,399 | Baldi ----- | Dec. 13, 1949 |
| 2,175,253 | Carter ----- | Feb. 15, 1938 |
| 2,371,539 | Morch ----- | Mar. 13, 1945 |
| 2,494,665 | Marshall ----- | Jan. 17, 1950 |
| 2,535,049 | De Rosa ----- | Dec. 26, 1950 |