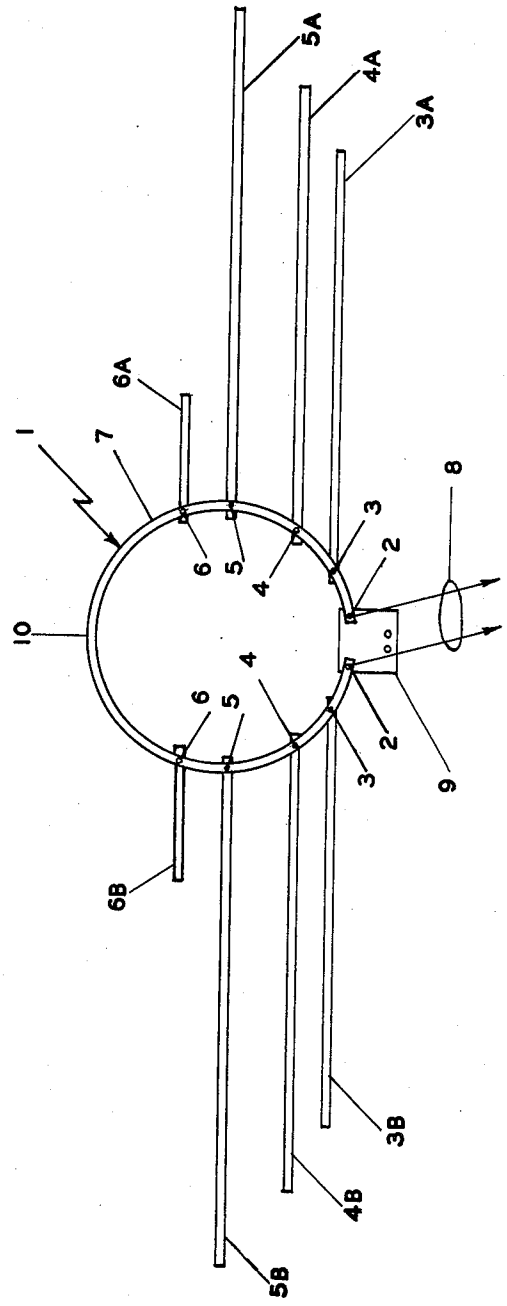
May 15, 1962 T. A. MARSHALL 3,035,266

BROAD BAND ACTIVE ELEMENT FOR TELEVISION ARRAYS

Filed May 23, 1958



INVENTOR.

Thomas A. Marshall

BY

United States Patent Office

3,035,266
Patented May 15, 1962

1

3,035,266

BROAD BAND ACTIVE ELEMENT FOR TELEVISION ARRAYS

Thomas Albert Marshall, 5243 E. Falls View Drive, San Diego, Calif.

Filed May 23, 1958, Ser. No. 737,452
1 Claim. (Cl. 343—799)

The herein disclosed invention relates to an active element having wide band performance, particularly for use in television antenna arrays.

A principal object of my invention is to provide a new and improved active element having uniform gain over the present television channels.

It is well known that a folded dipole has a loss in gain for reception of frequencies above and below the resonant frequency. Thus, a resonant folded dipole for channel 2 has a loss of 3 decibels for channel 5. In recently developed television arrays, two folded dipoles of unequal lengths are used to reduce this serious loss. Horizontally arranged dipoles for low television band are very poor collectors for the high band channels unless they are V-shaped or folded for a given length at the center or at the quarter points to eliminate the clover leaf pattern. The present invention eliminates the foregoing disadvantages because part of the length of each collector is included in the circular part which acts in the same way as for folding a portion of the dipole to eliminate the clover leaf effect.

The FIGURE is a vertical cross sectional view of an improved television antenna constructed in accordance with the invention.

Referring to the drawing, the complete assembly is designated generally at **1**. **7** is a circular part, having a circumference of 63¾ inches, being the length around the circumference from feed points **2—2**. The circular part is open circuited at **2—2** to provide feed points for connecting a transmission line **8**. The active element should be mounted vertically.

3A to **6A** and **3B** to **6B** inclusive are collector arms extending outwardly on each side with their inner ends being connected to the circular part.

The arms of the various collector elements are unequal in lengths. **3A** and **3B** are resonant to channels 5—6, **4A** and **4B** are resonant to channel 4, **5A** and **5B** are resonant to channel 2, while **6A** and **6B** are resonant to the mean center of the high television band. This is a significant feature of the invention. The longer collector arms are also resonant on the third harmonics of the high frequency television channels.

The lengths from **2** to **3** plus **3A** being equal to a quarter wave length for channel 5. The lengths from **2** to **3** plus **3B** being also equal to a quarter wave length for channel 5. The arms **3A** and **3B** together with the included lengths along the circular part from **2** to **3** form a half wave length collector which is resonant to channel 5. The length being short enough to be a resonant collector for channel 6. **2—4—4A** and **2—4—4B** form a resonant half wave length collector for channel 4. **2—5—5A** and **2—5—5B** form a resonant half wave collector for channel 2. **2—6—6A** and **2—6—6B** form a full wave collector resonant at the mean frequency of the high television band.

2

Table of Element Lengths

Lower Rods	Second Rods	Third Rods	Fourth Rods
3A and 3B 32″	4A and 4B 34″	5A and 5B 38½″	6A and 6B 9½″
2–3 5″	2–4 10″	2–5 15½″	2–6 18½″

Feed point spacing **2—2** is one inch.

9 is an insulator which may also serve as a mounting support for securing the active element to a boom. Point **10** is at zero potential and may be connected to a boom. **8** is a 300 ohm line.

Parasitic elements are most effective when placed in line with feed points **2—2**.

It will also be apparent that various modifications may be made to the construction of the active element utilizing the principles of my invention. It is therefore to be understood that within the scope of the appended claim the invention may be practiced otherwise than as specifically described.

What is claimed is:

A broad-band television active element comprising a circular part disposed in a vertical plane and having an open circulated feed point at the lower part of the said circular part and a plurality of arms extending outwardly on each side of said circular part with their inner ends being connected to the said circular part, the lower right and left hand rods of said arms are connected to corresponding positions from the feed point of said circular part to form a one-half wave length resonant at the extreme edge of the high frequency side of the low television band, the second right and left-hand rods of said arms are connected to corresponding positions from the feed point of said circular part to form a one-half wave length resonant at the center of the low frequency side of the low television band, the third right and left hand rods of said arms are connected to corresponding positions from the feed point of said circular part to form a one-half wave length resonant at the extreme edge of the low frequency side of the low television band, the fourth right and left hand rods of said arms are connected to corresponding positions from the feed point of said circular part to form one wave length resonant at the mean frequency of the high frequency television band, and signal means connected to feed points of said circular part to receive signals therefrom.

References Cited in the file of this patent

UNITED STATES PATENTS

1,933,941	Taylor	Nov. 7, 1933
2,192,187	Gordon	Mar. 5, 1940
2,192,532	Katzin	Mar. 5, 1940
2,227,088	Hollmann	Dec. 31, 1940
2,657,312	Saranga	Oct. 27, 1953
2,658,144	Kearse	Nov. 3, 1953

FOREIGN PATENTS

520,849	Great Britain	May 6, 1940