

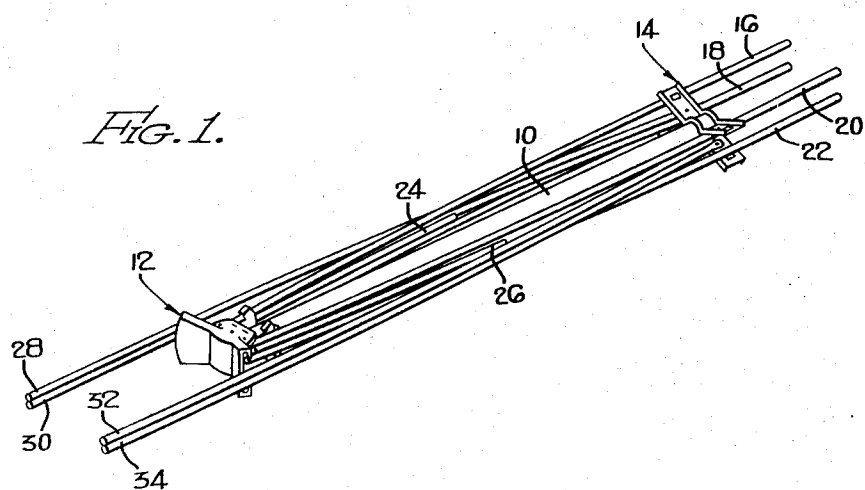
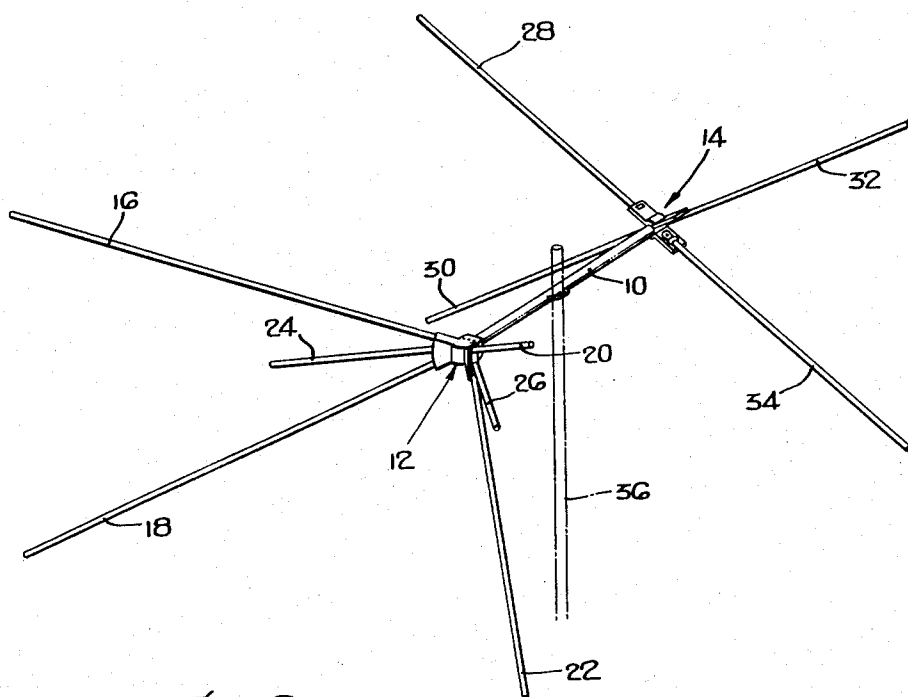
Aug. 12, 1958

H. K. LIEB
ANTENNA SYSTEM

2,847,671

Filed March 27, 1956

4 Sheets-Sheet 1



HARRY K. LIEB,
INVENTOR.

BY *Elmer W. Smith*
ATTORNEY

Aug. 12, 1958

H. K. LIEB
ANTENNA SYSTEM

2,847,671

Filed March 27, 1956

4 Sheets-Sheet 2

FIG. 3.

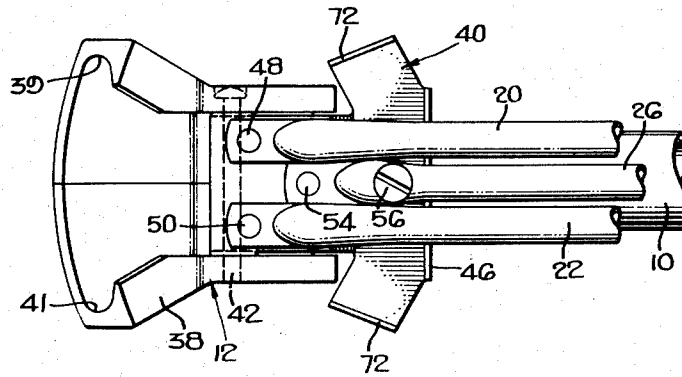
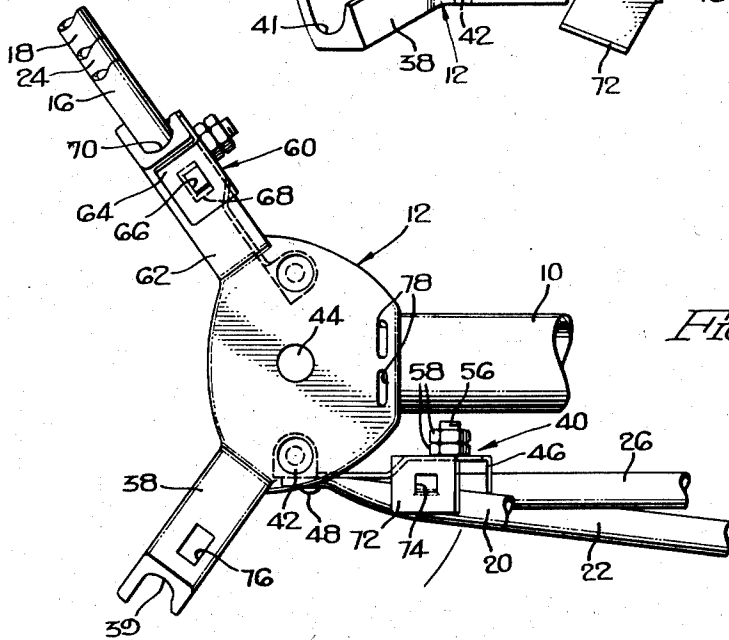
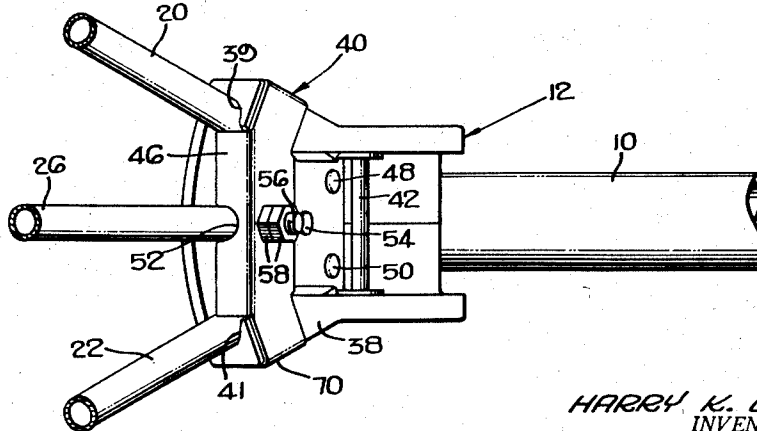


FIG. 4.



HARRY K. LIEB,
INVENTOR.

FIG. 5.

BY *Shroy & Gendrich*
ATTORNEY

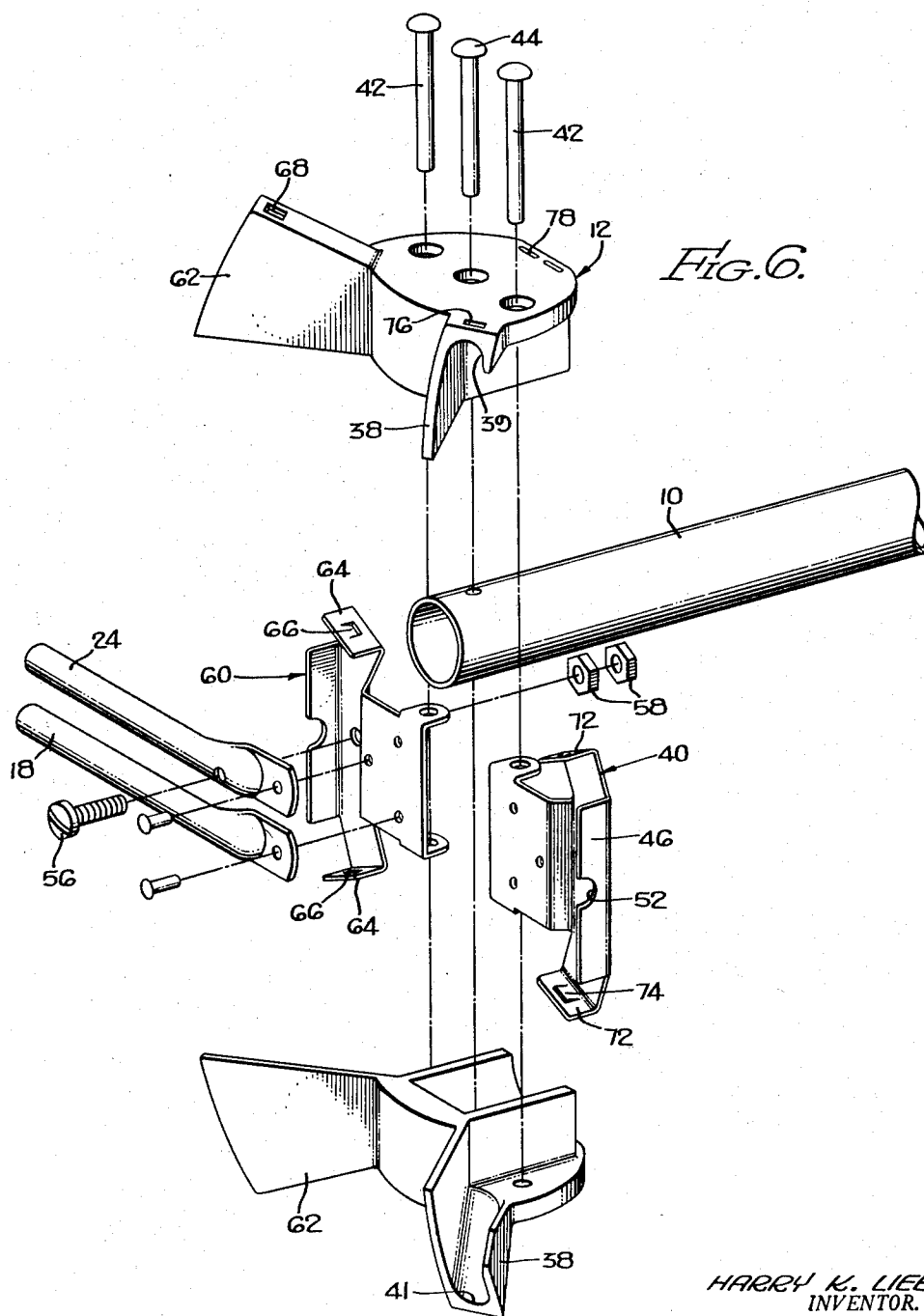
Aug. 12, 1958

H. K. LIEB
ANTENNA SYSTEM

2,847,671

Filed March 27, 1956

4 Sheets-Sheet 3



Aug. 12, 1958

H. K. LIEB
ANTENNA SYSTEM

2,847,671

Filed March 27, 1956

4 Sheets-Sheet 4

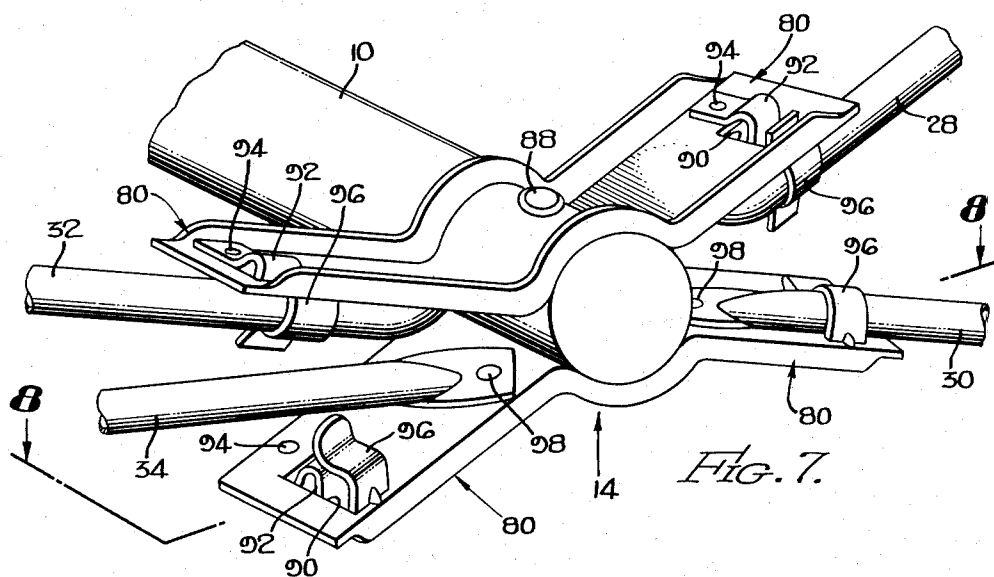
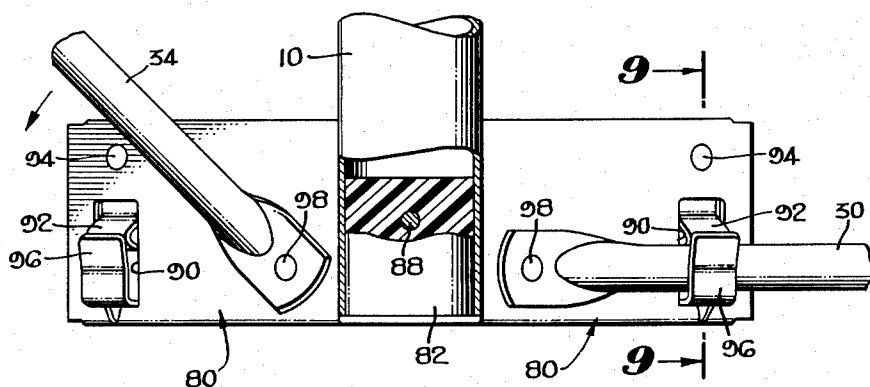


FIG. 8.

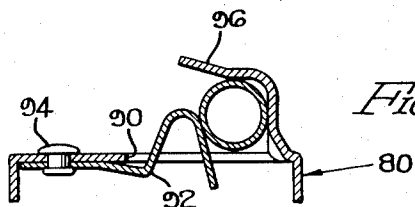


FIG. 9.

HARRY K. LIEB,
INVENTOR.

BY *Shirley K. Lieb*

ATTORNEY

1

2,847,671

ANTENNA SYSTEM

Harry K. Lieb, Canoga Park, Calif., assignor to Clear Beam Antenna Corp., a corporation

Application March 27, 1956, Serial No. 574,189

2 Claims. (Cl. 343—833)

This invention relates to antennas and, more particularly, to television antennas and parasitic directors and/or reflectors employed therewith which are collapsible to a convenient and compact position.

In the past, it has been the practice to manufacture and ship disassembled component parts of television antennas for distribution and sale. This practice is generally disadvantageous to the purchaser for several reasons. In the first place, it may be necessary for the purchaser to be skilled in the art to erect a television antenna even according to printed directions. Secondly, if the purchaser hires a technically trained serviceman, the time required to assemble and to erect the antenna may cause a purchaser a substantial additional expense. Similarly, if the purchaser is able to erect his own antenna, he is required to spend a substantial amount of his own time.

The present invention overcomes these and other disadvantages of the prior art by providing a collapsible antenna system for use with television antennas such as those known as the conical type or V-type, or any type where two conductive arms are disposed at an acute angle with respect to each other and are mounted on a boom and spaced from a parasitic unit, i. e. director and/or reflector, which may also be mounted on the boom. The invention accordingly comprises first releasable means to fix the antenna arms in their respective operative positions, the first means being rotatable in a direction toward the parasitic unit when released, second releasable means to fix the arms of the parasitic unit in their respective operative positions, the parasitic arms being mounted on the second means to rotate toward the antenna when the second means is released.

It is thus seen that the antenna system of the invention need not be assembled piece by piece as those of the prior art but may be easily unfolded and erected in a relatively short time. In addition, the system may actually be assembled at the factory where mass production techniques may be readily utilized. It is also an advantage of the invention that it may be manufactured at reasonable cost and may be shipped fully assembled although collapsed.

According to a feature of the invention, releasable means for the antenna arms may comprise a bracket having a projection on one side thereof, first means loosely and pivotally connecting the conductive arm on the one side of the bracket to permit the arm to swing over the projection, second means forming a trough, third means for rotatably mounting the bracket to the second means, and releasable means for fixing the bracket to the trough with the projection overlying the trough, whereby the conductive arm may be fixed in position in the trough by rotating the bracket toward the trough, swinging the conductive arm into the trough, and operating the releasable means to fix securely the position of the projection over the top of the trough.

According to another feature of the invention, the releasable means for the parasitic unit may include a wing member fixed to the boom, first releasable means to fix the conductive arm in its operative position on the wing

2

member, second means on the wing member rotatably mounting the conductive arm at a point between the first means in the boom, whereby the conductive arm may be rotated or collapsed to a position adjacent to the boom.

It is, therefore, an object of the invention to provide a collapsible television antenna which may be easily and quickly unfolded and erected.

It is another object of the invention to provide a collapsible television antenna which may be easily shipped fully assembled.

It is a further object of the invention to provide novel means to secure both a conical or V-type television antenna and corresponding parasitic units to a supporting boom.

The novel features which are believed to be characteristic of the invention, both as to its organization and method of operation, together with further objects and advantages thereof, will be better understood from the following description considered in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustration and description only, and are not intended as a definition of the limits of the invention.

Fig. 1 is a perspective view of the antenna of the invention as collapsed;

Fig. 2 is a perspective view of the antenna unfolded;

Fig. 3 is a broken away side elevation of an antenna mounting device constructed in accordance with the invention;

Fig. 4 is a plan view of the device shown in Fig. 3;

Fig. 5 is a side elevation of the device shown in Fig. 3 with antenna arms fixed in their operative positions;

Fig. 6 is an exploded perspective view of the device shown in Figs. 3 through 6;

Fig. 7 is a perspective view of releasable means to mount a parasitic unit on the boom of the antenna shown in Figs. 1 and 2;

Fig. 8 is a sectional view taken on the plane 8—8 shown in Fig. 7; and

Fig. 9 is a sectional view of the device shown in Fig. 8 taken on the line 9—9.

In the drawings in Fig. 1, the antenna of the invention is shown collapsed including a boom 10 on the left end of which is mounted antenna releasable means 12. On the opposite end of the boom 10, a parasitic unit is mounted by second releasable means 14. The antenna mounted on the releasable means 12 comprises four conductive antenna arms 16, 18, 20 and 22, the conductive arms 16 and 18 being electrically connected at means 12 and antenna arms 20 and 22 being also electrically connected at means 12. The antenna shown in both Figs. 1 and 2 is a conical antenna; however, the invention may be employed with any of many types of television antennas; such as, for example, V-type antennas or antennas having conductive arms disposed at an acute angle with respect to each other.

It is to be noted that when the arms 16, 18, 20 and 22 are unfolded, the arms 16 and 18 are disposed at an acute angle with respect to each other. Likewise arms 20 and 22 are disposed at an acute angle with respect to each other. All the arms 16, 18, 20 and 22 are folded rearwardly toward the means 14 when the antenna is collapsed. Similarly, a pair of loading bars 24 and 26 are folded rearwardly with the bars 16, 18, 20 and 22 when the antenna is collapsed. Loading bar 24 is disposed between the antenna bars 16 and 18 and loading bar 26 is disposed between the antenna arms 20 and 22. The loading bars 24 and 26 are conventional in the prior art and are generally employed to improve the antenna pattern and the response of the antenna generally to television channels 7 through 13 as established by the Federal Communications Commission.

Means 14 are employed to support four reflector arms 28, 30, 32 and 34. However, it is to be understood that means 12 and means 14 may conveniently be substituted for each other although means 12 is preferably employed to support the antenna arms and means 14 are preferably employed to support the reflector arms. It is also to be noted that means 12 may be employed to support either director or reflector arms depending upon the type of parasitic unit employed with a television antenna. The antenna is shown unfolded in Fig. 2 with all of the antenna and reflector arms fixed in their operative positions by means 12 and 14. Likewise the loading bars 24 and 26 are fixed by means 12 in their operative positions between arms 16, 18 and 20, 22 respectively. The boom 10 is preferably fixed to an upright member 36 which is shown in phantom in Fig. 2.

A side elevation view of means 12 is shown in Fig. 3 with antenna arms 20 and 22 with loading bar 26 disposed substantially parallel to the boom 10 in their collapsed positions respectively. Means 12 includes a member 38 which may be made of plastic or other dielectric material. Member 38 includes means forming troughs 39 and 41 on the upper and lower sides thereof into which the antenna arms 20 and 22 may be fixed in their respective operative positions. Means 12 also includes a bracket 40 which is rotatably mounted toward member 38 on a pin 42 extending through the member 38. Bracket 40 may be made of metal, e. g. steel. Member 38 is preferably fixed to the boom 10 by means of one rivet-type lock means 44 as indicated in Fig. 6. Bracket 40 includes a projection 46 extending from the surface of the bracket 40 toward the rods 20 and 22. This bracket is dimensioned such that it fits into the space between the troughs 39 and 41 and overlies the top of each. Arm 20 is preferably pivotally mounted on bracket 40 by means of a rivet 48. Similarly, arm 22 is pivotally mounted to the bracket 40 by a rivet 50. Preferably rivets 48 and 50 both loosely and pivotally mount rods 20 and 22 respectively so they may be rotated over the projection 46 and between the sides of the troughs 39 and 41. The rods 20 and 22 thus may be rotated on the bracket 40 to a position just above the troughs 39 and 41, then pivoted upwardly and downwardly respectively into the troughs 39 and 41. The projection 46 is cut away at 52 as shown in Fig. 5 for the loading bar 26; however, the projection 46 is preferably not cut away for the antenna arms 20 and 22 since, in accordance with the invention, projection 46 must overlie the upper ends of the troughs 39 and 41 as shown in Fig. 5 to fix the antenna arms 20 and 22 at their respective operative positions on the member 38.

Loading bar 26 may be fixed to the bracket 40 by any convenient means although, according to the invention, a rivet 54 is employed to fix the loading bar 26 at its extreme left end as shown in Fig. 3 to the bracket 40 and at a point spaced to the right from the rivet 54 a bolt 56 is disposed both through the loading bar 26 and the bracket 40. The loading bar 26 is then fixed to the bracket 40 in the cut away portion 52 by means of a pair of nuts 58 as shown in Fig. 5 which may be also used as electrical connections to the antenna. In Fig. 4 antenna arms 16 and 18 with loading bar 24 are shown in their fixed position with a projection on a corresponding bracket 60 on a member 62 substantially identical to member 38 by means of an extension 64 on the bracket 60. The extension 64 is provided with a depression 66. A corresponding depression 68 is provided at the bottom of a trough 70 in the member 62 to releasably fix the antenna arms 16 and 18 and the loading bar 24 in their respective operative positions. Similarly, bracket 40 is provided with a pair of appendages 72 on each side thereof having a depression 74 and member 38 is provided with a pair of corresponding depressions 76. A pair of holes 78 are provided on each side of the com-

bined member 38, 62 to thread electrical wiring there-through along the boom 10 and down the post 36.

An exploded view of the device shown in Figs. 3 through 5 is shown in Fig. 6. However, this exploded perspective does not contain all the components but only those necessary to illustrate the assembly thereof.

Reflector arms 28, 30, 32 and 34 are fixed in position on the opposite end of the boom 10 by means 14 as illustrated in Fig. 7. Each of the reflector arms 28, 30, 32 and 34 are respectively fixed to wing members 80 which are, in turn, fixed to the boom 10 by means of a rivet 88. Each of the wing members 80 are provided with apertures 90 into which bottom leaf springs 92 project, the bottom leaf spring 92 being fixed to the respective wing member, for example, by a rivet 94. Top spring members 96 which may be, in fact, made of the material cut away to provide the apertures 90, is then disposed over the aperture 90 to overlie at least a portion of the springs 92. Each of the reflector arms then are preferably pivotally mounted to the wing members 80 by means of rivets 98 at a point between the springs 92, 96 and the boom 10. The reflector arms thus may be rotated toward the boom 10 in the direction of means 12 to collapse the antenna or rotated in the reverse direction between the springs 92, 96 until they are locked in position thereby as shown with respect to reflector arms 28, 30 and 32. The manner in which the reflector arm 30 is locked into position is better illustrated in Figs. 8 and 9. A dielectric cylinder 82 is disposed in the end of the boom 10 for strength.

The description in specific detail of a selected practice of the invention by way of example and to illustrate the principles involved will, of course, suggest various changes, substitutions, and other departures from the disclosure that properly lie within the spirit and scope of the appended claims.

I claim:

1. In an antenna system, releasable means to fix at least one conductive arm of the system in its operative position, said releasable means comprising: a bracket having a projection on one side thereof, first means loosely and pivotally connecting the conductive arm on said one side of said bracket to permit said arm to swing over said projection, second means forming a trough, third means for rotatably mounting said bracket to said second means, and releasable means for fixing said bracket to said trough with said projection overlying said trough, whereby the conductive arm may be fixed in position in said trough by rotating said bracket toward said trough, swinging the conductive arm into said trough, and operating said releasable means to fix securely the position of said projection over the top of said trough.

2. A television antenna system comprising: a horizontal boom; a conical antenna on said boom having first and second pairs of arms disposed respectively in vertical intersection planes; means forming a pair of facing troughs for each pair of said antenna arms; a bracket having a projection on one side thereof for each pair of said antenna arms, said projections being short enough to travel between, but long enough to overlie each corresponding pair of facing troughs; first means loosely and pivotally connecting each pair of said antenna arms on each side of each bracket to permit each of said antenna arms to swing over their corresponding projections; second means rotatably mounting said bracket on corresponding trough means; and releasably means to fix said brackets to each of said trough means with said projections overlying said troughs, whereby said antenna arms may be fixed in position in said troughs by rotating said brackets toward said troughs, swinging said antenna arms into said troughs and operating said releasable means to fix secure the position of said projections over the tops of said troughs; a parasitic

unit on said boom and spaced from said antenna, said parasitic unit including two collinear pairs of reflector arms disposed at an angle with respect to each other and in a single vertical plane perpendicular to the axis of the boom; four wing members having apertures therein, said wing members being fixed to said boom with one side substantially in a plane passing through the axis of said boom; a top leaf spring connected to said one side of each of said wing members to overlie at least a portion of each corresponding aperture; a bottom leaf spring connected to the other side of each of said wing members but projecting through each corresponding aperture to underlie at least portions of corresponding top leaf springs; means on said members rotatably mount-

ing said reflector arms at points between said apertures and said boom, both of said springs on each wing member being adapted to secure a reflector arm against a corresponding wing member when each reflector arm is forced between its corresponding top and bottom leaf springs.

References Cited in the file of this patent

UNITED STATES PATENTS

2,492,529	Kaplan	Dec. 27, 1949
2,532,094	Gonsett	Nov. 28, 1950
2,680,196	Fox	June 1, 1954
2,819,463	Vail et al.	Jan. 7, 1958