Aug. 27, 1963 I. H. BOUCHARD 3,102,267

PIVOTED SNAP LOCK TO SPACE ANTENNA FROM REFLECTOR

Filed July 13, 1961 4 Sheets-Sheet 1

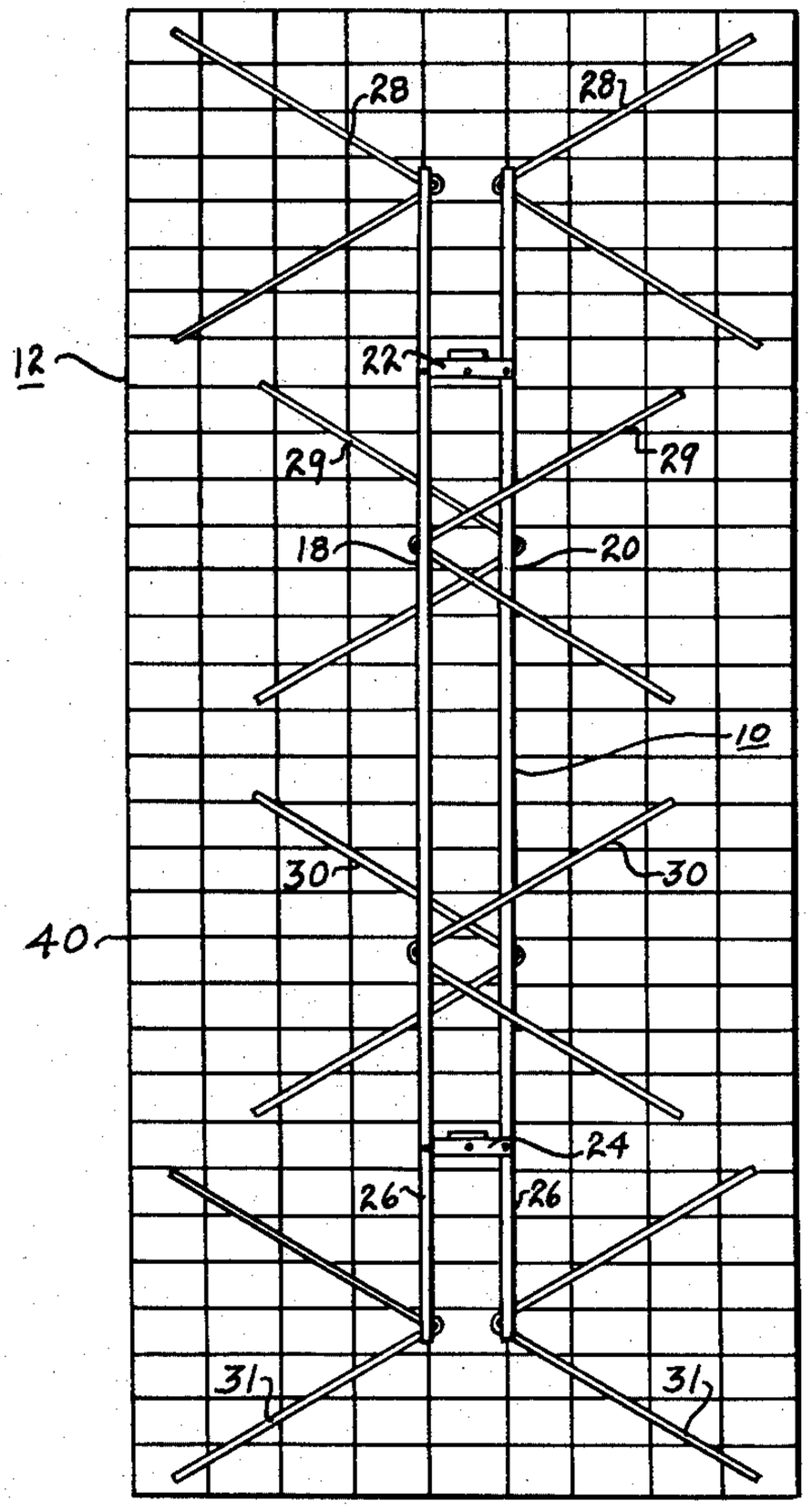

FIG. 1

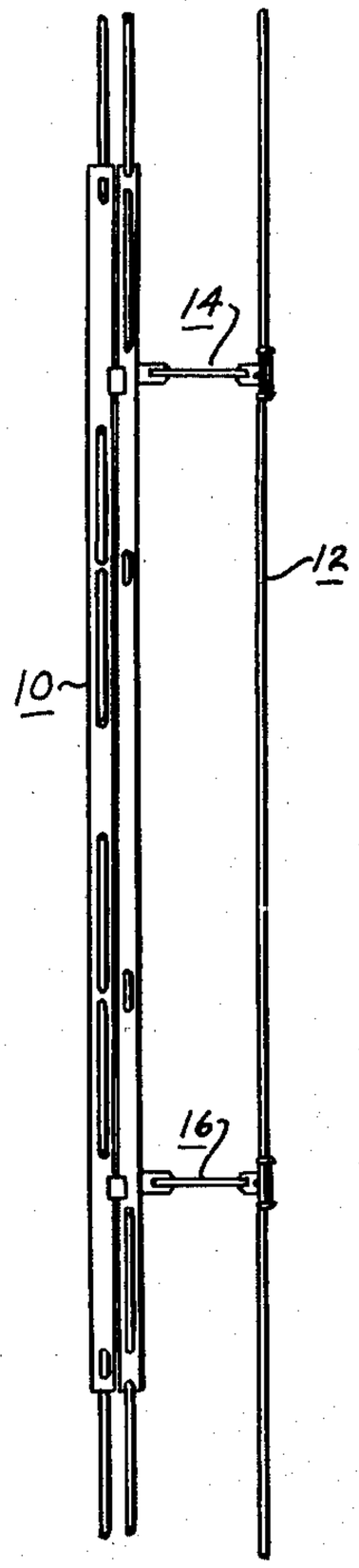

FIG. 2

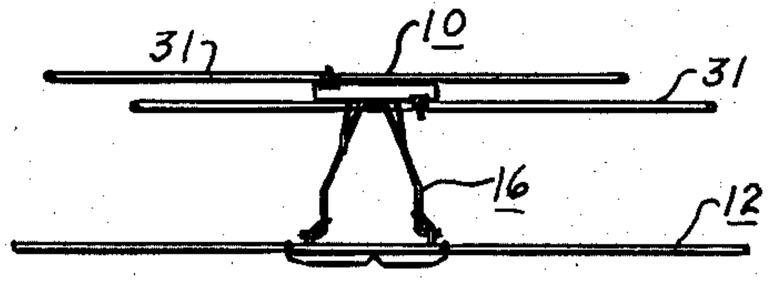

FIG. 3

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PIVOTED SNAP LOCK TO SPACE ANTENNA FROM REFLECTOR

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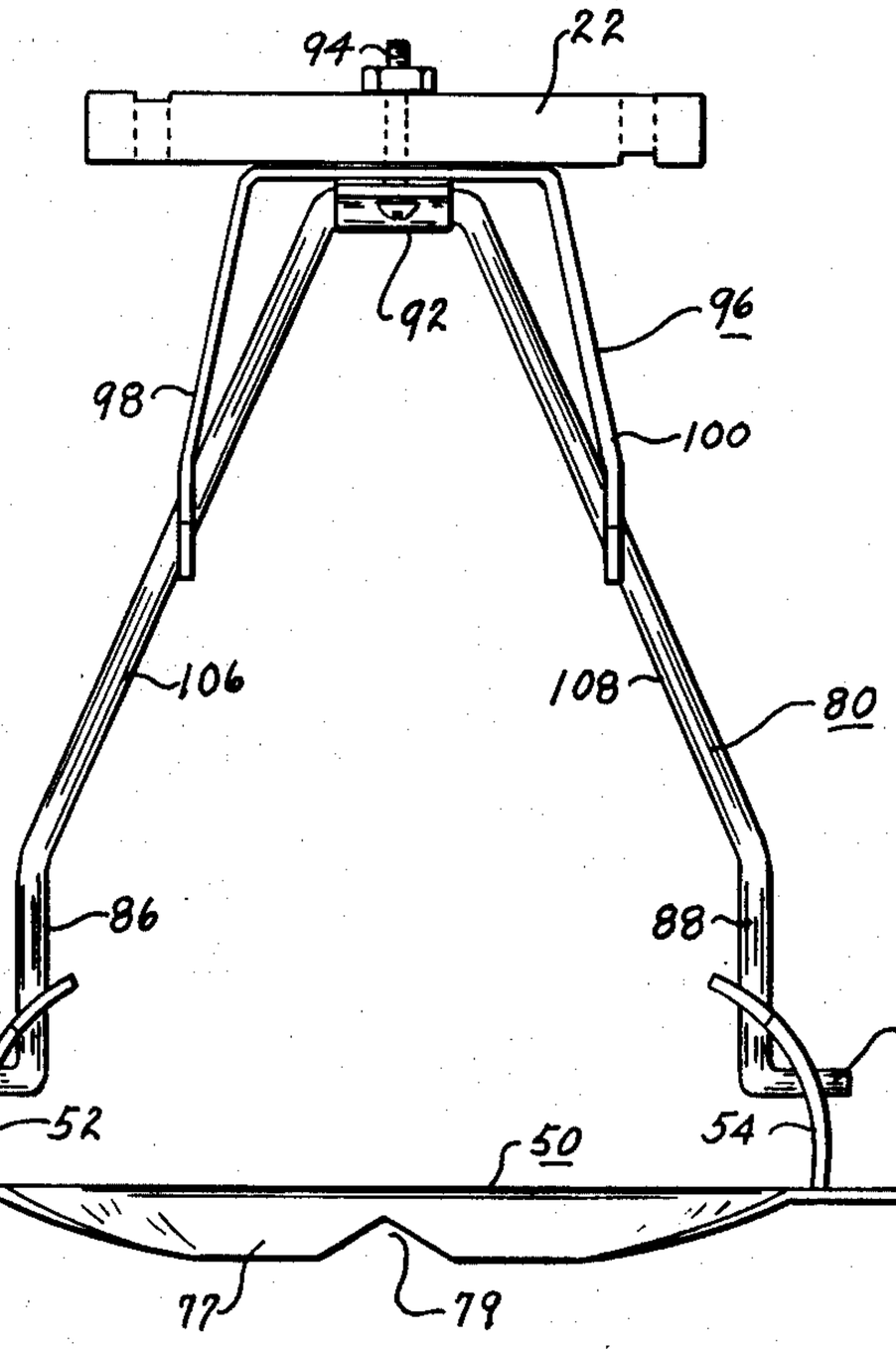
FIG. 4



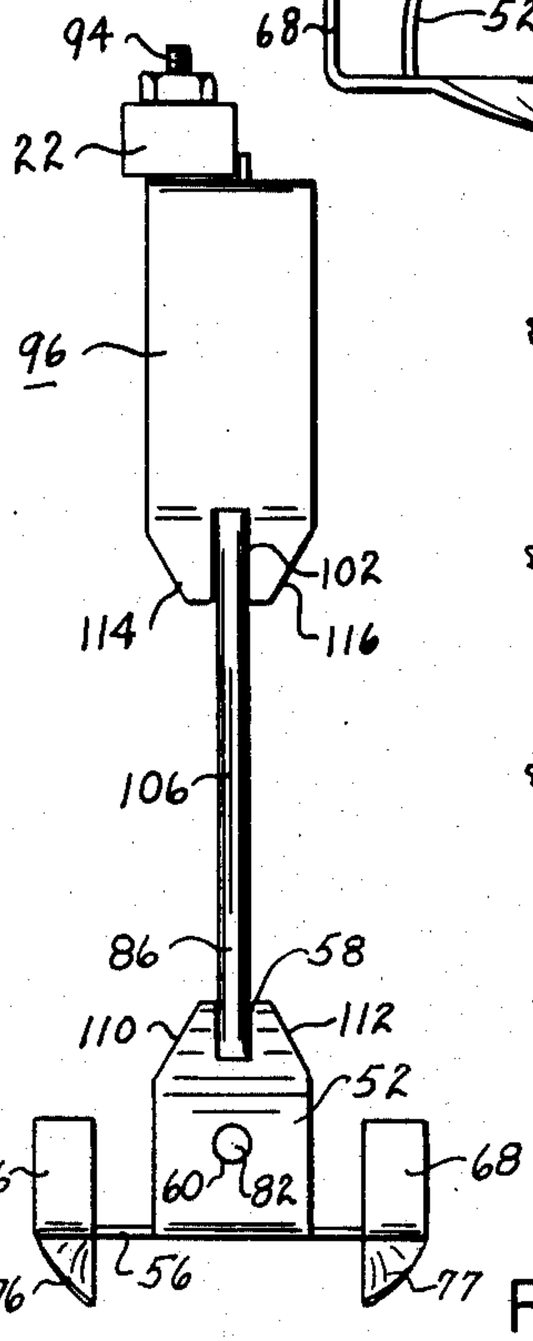


FIG. 5

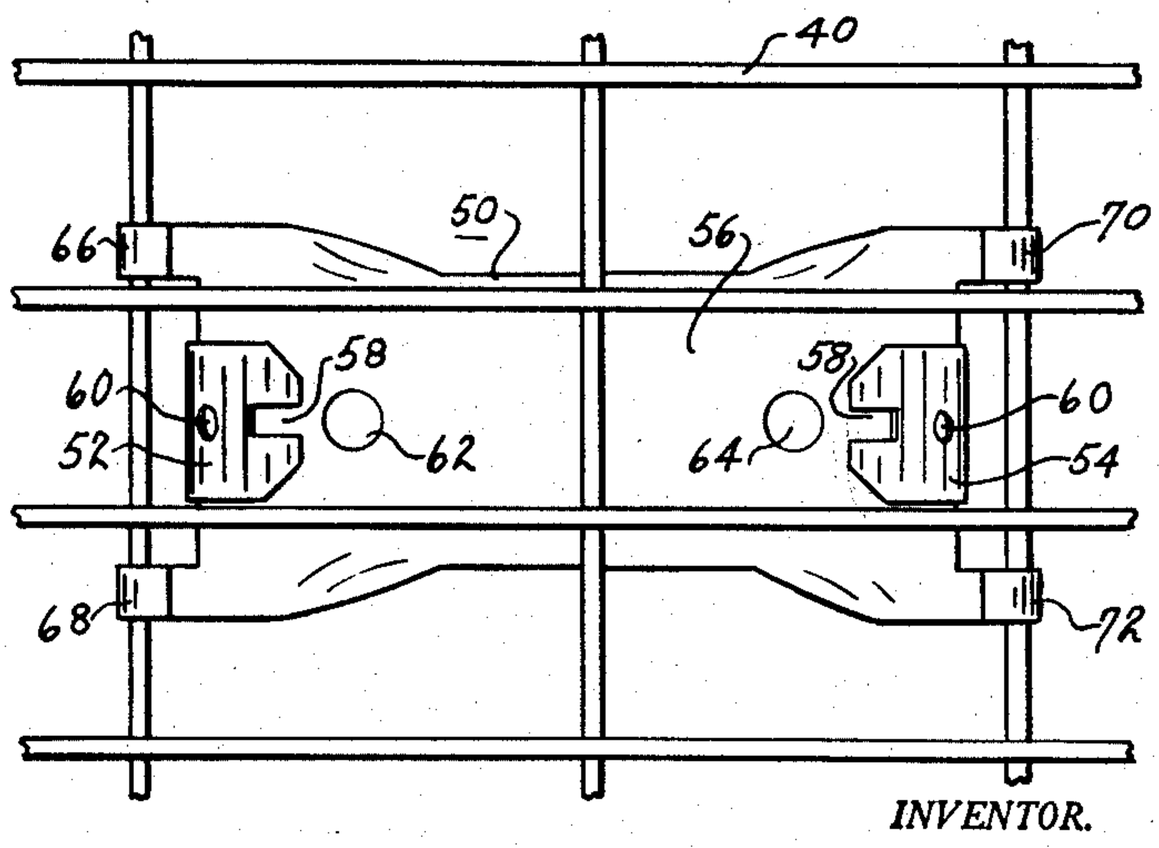


FIG. 10

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PIVOTED SNAP LOCK TO SPACE ANTENNA FROM REFLECTOR

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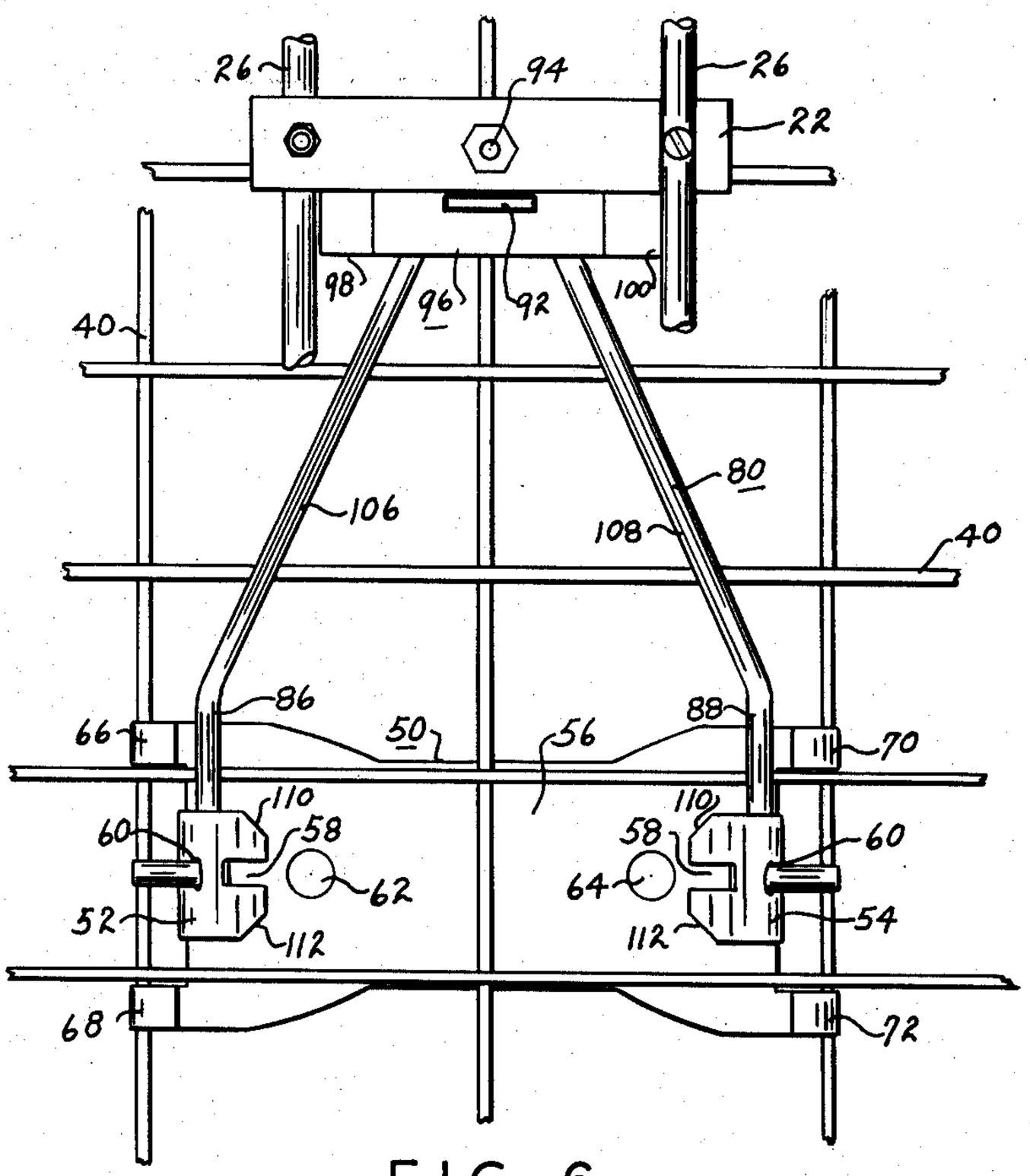

FIG. 6

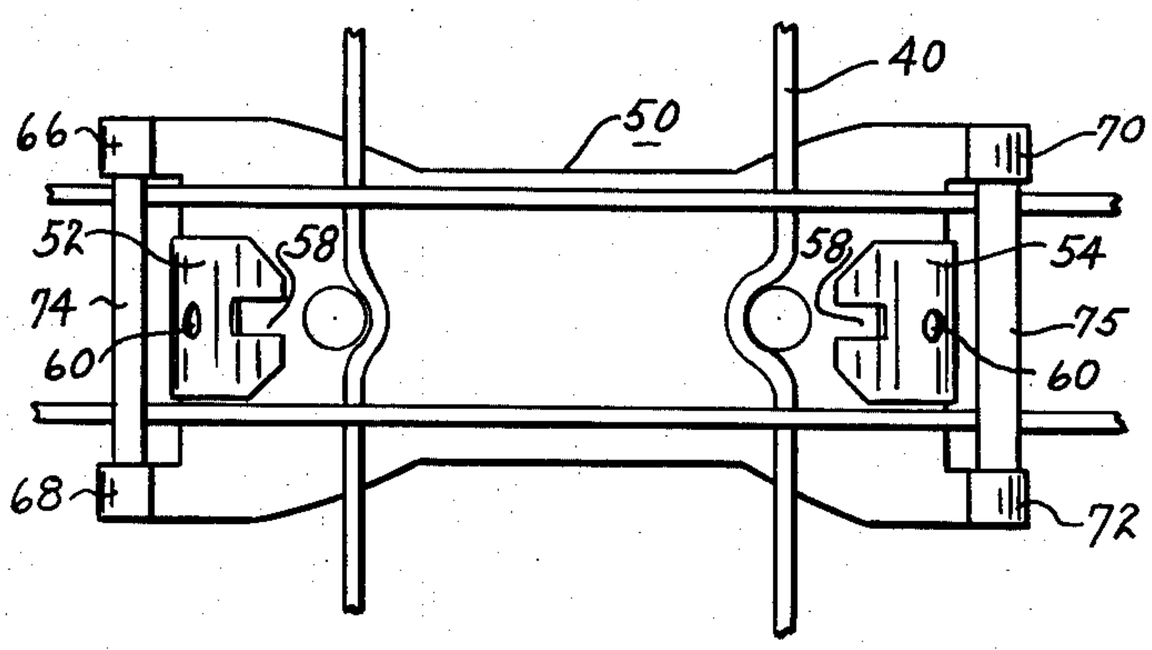

FIG. 9

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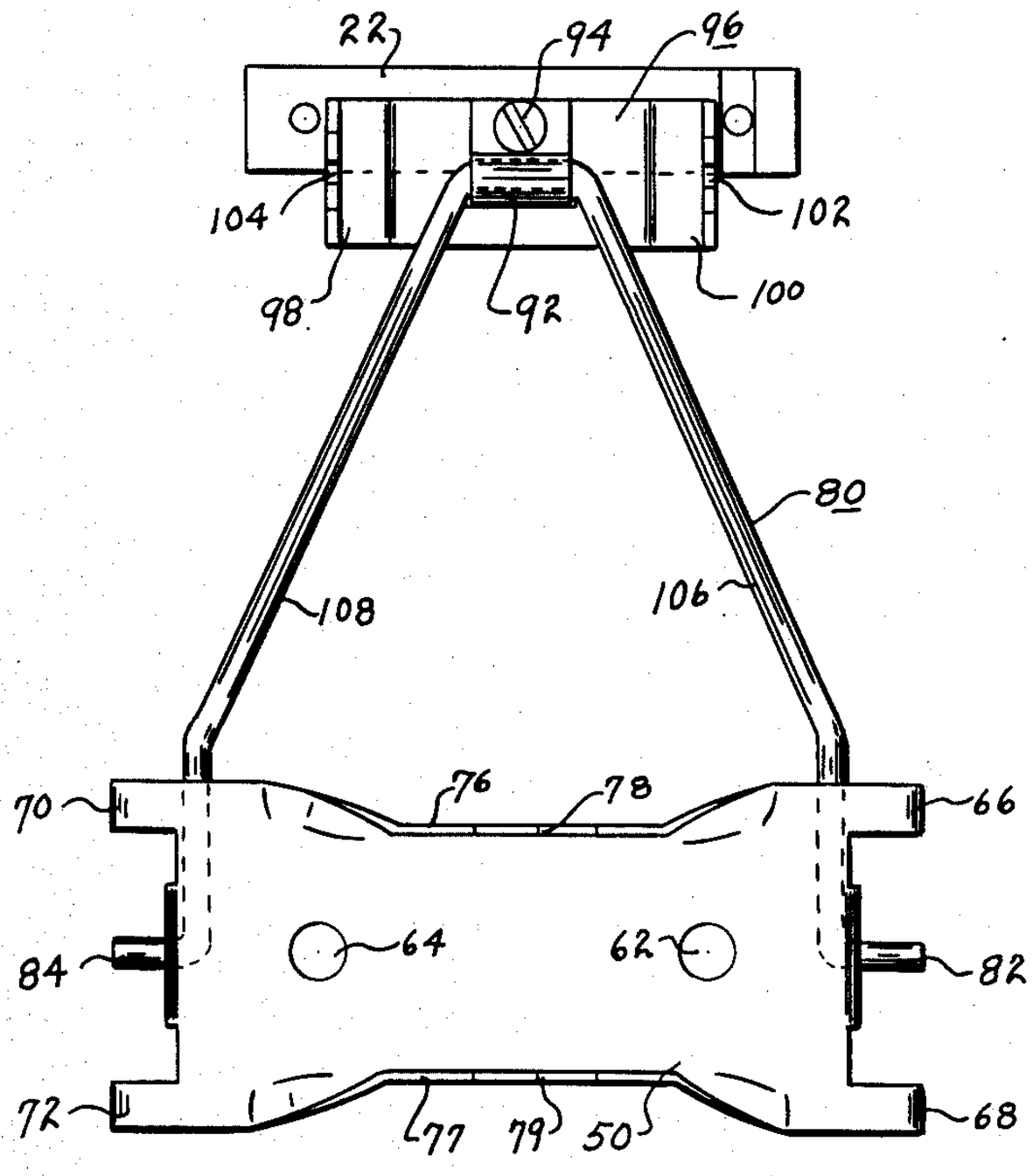

FIG. 7

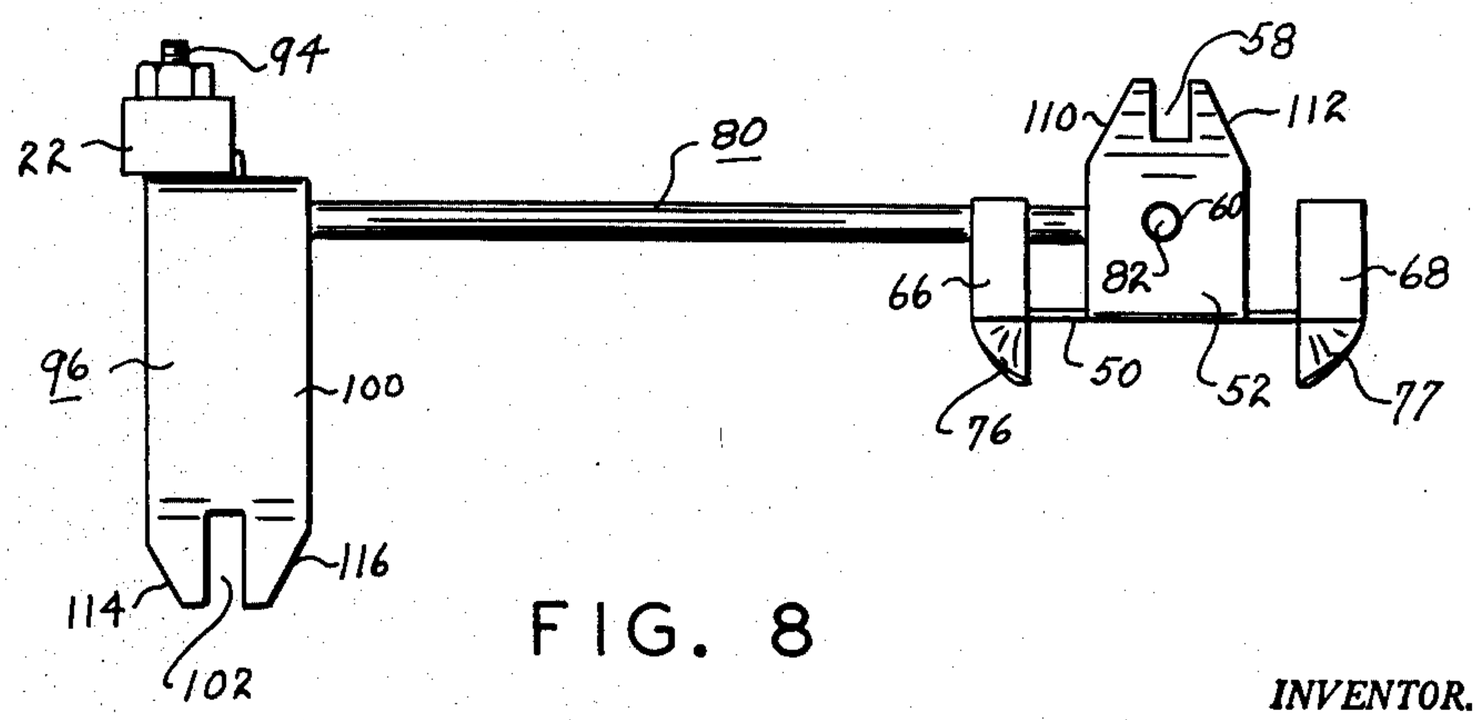

FIG. 8

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United States Patent Office

3,102,267
Patented Aug. 27, 1963

3,102,267

PIVOTED SNAP LOCK TO SPACE ANTENNA FROM REFLECTOR

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Filed July 13, 1961, Ser. No. 123,732
6 Claims. (Cl. 343—881)

The present invention relates to antennas and more particularly to a collapsible antenna of the type used with television receivers, primarily for outdoor installations.

Television sales service for home receivers is a highly competitive field in which little time can be devoted profitably to installation of the sets, antennas and lead-in wires. This, for practical reasons, precludes assembling the antennas and electrical connection therefor at the place of installation, while bulk or size precludes delivering the fully assembled antennas ready for final installation. Further, training or finding service personnel capable of efficiently and correctly assembling the antennas in the field or in the service shop from a number of relatively small parts is not only difficult, but this assembly operation is too time consuming and costly for most sales and service organizations in this competitive field. It is therefore one of the principal objects of the present invention to provide an antenna which can be economically produced, assembled and shipped, and which can be readily placed in condition for final installation without the use of any tools or equipment and without any special training or skill.

Another object of the invention is to provide an antenna for use with television receivers which is shipped and stored in a collapsed or folded condition, providing a relatively flat, easily handled and stacked carton or package, and which can be readily and easily unfolded and expanded to its operating position at the place of final installation.

Still another object of the invention is to provide a collapsible antenna of the aforesaid type which can easily be pulled from its folded position to its operating position, and which effectively locks in its operating position and becomes a rigid structure capable of withstanding all operating and weather conditions during service.

A further object is to provide an antenna having a front assembly or driven element and a relatively flat rear or reflector assembly connected by one or more pivoted fixtures which permit the front element to collapse or fold against the assembly, forming a thin structure for shipping and storing and which permit the front element to be expanded or moved from the rear assembly and held rigidly in place without the use of any additional parts, elements or fixtures.

Another object of the invention is to provide a structure for connecting the front element to and supporting it on the rear assembly in both collapsed and extended positions which can be readily, effectively and permanently attached to the respective antenna members using only relatively simple and well known assembly procedures and parts.

Another object of the invention is to provide a fixture for connecting the front element and rear assembly of an antenna, which can be fabricated from readily available material using relatively simple fabricating operations and equipment, and which can be assembled before incorporation in the fully constructed antenna structure.

Still a further object is to provide a fixture of the aforesaid type which will rigidly retain the front element in its operating position, but which can be easily

manipulated to collapse the antenna in order to permit easy handling and repeated demonstrations thereof.

Additional objects and advantages will become apparent from the following description and accompanying drawings, wherein:

FIGURE 1 is a front elevational view of a television antenna embodying my invention;

FIGURE 2 is a side elevational view of the antenna shown in FIGURE 1;

FIGURE 3 is a bottom view of the antenna shown in FIGURE 1;

FIGURE 4 is an enlarged elevational view of one of the fixtures connecting the front element to the rear assembly, showing the fixture in its extended position;

FIGURE 5 is a side elevational view of the fixture shown in FIGURE 4 with the fixture being shown in its extended position;

FIGURE 6 is a plan view of the fixture shown in FIGURES 4 and 5 with the fixture being shown in its folded or collapsed position, the rear assembly being shown as a fragmentary elevational view;

FIGURE 7 is a plan view of the fixture shown in the preceding figures, removed from the front element and rear assembly, showing the fixture in its folded position;

FIGURE 8 is a side elevational view of the fixture shown in FIGURE 7, the fixture being shown in its folded position;

FIGURE 9 is a plan view of the base portion of the fixture shown in the preceding figures, showing one means of attaching the base to the rear assembly; and

FIGURE 10 is the base assembly shown in FIGURE 9, showing a different means for securing it to the rear assembly.

Referring more specifically to the drawings, FIGURES 1 through 3 show an assembled television receiver antenna in position ready for mounting on a mast, consisting of front assembly or driven element **10**, rear or reflector assembly **12** and connecting supports **14** and **16** for holding said assemblies in a predetermined spaced relation. The antenna shown is adapted for all UHF channel reception but can be adjusted to obtain optimum reception of any selected channel.

The front assembly consists of subassemblies **18** and **20** mounted on insulating cross members **22** and **24**. These subassemblies are identical in construction and interchangeable and consist of a tube or bar **26** having four equally spaced bays, groups of dipole or whisker elements **28**, **29**, **30** and **31**, the groups **28** and **31** mounted on the ends of tubes **26** extending outwardly from each other and the groups **29** and **30** mounted in the intermediate portion of the tubes extending inwardly toward each other. Whisker groups **29** and **30** of one tube overlap the corresponding groups of the other tube, but the groups of one tube are on a different plane than those of the other tube, as shown clearly in FIGURES 2 and 3. In this arrangement the driven elements of a single subassembly are on the same vertical plane and the plane of one subassembly is parallel with the plane of the other subassembly and with the reflector. This construction in phasing, i.e. using a transposed arrangement for driven elements **29** and **30** made possible by the slight off-set in the planes of the subassemblies, in lieu of the conventional cross-over or transposition of the phasing bars, lowers the "Q" of the antenna and consequently broadens its resonance characteristics. Further, the present construction combines in the subassemblies both good electrical and mechanical strength. Although the two center bays or groups **29** and **30** overlap each other at their electrical centers, voltage or current phasing is in no way adversely affected. The foregoing structure is covered by my U.S. Patent No. 2,869,125.

The rear assembly is substantially the same as that shown in my previously mentioned patent, and will not be described in detail herein, the assembly consisting generally of an open and coarse mesh screen **40** of welded or soldered wire construction. Various spacing of the vertical and horizontal wires may be used for different antennas, and as far as the present invention is concerned, basically different types of front elements and rear assemblies may be used.

The front and rear assemblies are held in predetermined spaced relation by supports **14** and **16**, the two supports shown in the drawings being identical in construction and operation, and normally rigidly and permanently secured to the front element and rear assembly in the manner more fully described hereinafter. Since the two fixtures **14** and **16** are identical, only one will be described in detail herein. Referring to FIGURES 4 through 8, the present fixture consists of a metal base **50** having two forwardly extending arcuate projections **52** and **54** integrally attached to the ends of plate **56** of the base, each containing a forwardly extending slot **58** and a hole **60** in line with but spaced from slot **58**. The two extensions are relatively rigid and are preferably stamped from the material from which the base is constructed. The base contains two spaced holes **62** and **64** for receiving U-bolts or other types of means for attaching the antenna to a mast or support bar (not shown). Disposed at the four corners of base **50** are ears **66**, **68**, **70** and **72**, projecting outwardly therefrom and adapted to be formed around the vertical wires of the rear assembly in the manner illustrated in FIGURES 6 and 10, or to grip and hold intermediate bars **74** and **75** as illustrated in FIGURE 9, the latter arrangement being used when the base is positioned on the rear assembly at a point not permitting the ears to engage the vertical wires of the rear assembly. When the base has been mounted on the rear assembly, it forms a rigid structure therewith and is normally not removed therefrom while assemblying the antenna or installing it on location. Rearwardly extending flanges **76** and **77** contain notches **78** and **79** for a mast or other support member.

The foregoing base supports a generally V-shaped member **80** of resilient heavy wire construction having outwardly extending projections **82** and **84** seating in holes **60** of extensions **52** and **54**, and straight sections **86** and **88** for slipping into and seating in slots **58** of the extensions, respectively. The forward end of member **80** is connected to cross member **22** or **24** of the front element by a clamp **92** secured to the cross member by a bolt **94**. The bolt also clamps and rigidly holds a U-shaped metal member **96** having two rearwardly extending arms **98** and **100**, the free ends of which have rearwardly facing slots **102** and **104** for receiving diagonal sections **106** and **108** of V-shaped member **80**. Extensions **52** and **54** are provided with tapered edges **110** and **112**, which form slide or guide portions for sections **86** and **88** as member **80** is moved from its folded position shown in FIGURES 7 and 8 to its unfolded position shown in FIGURES 4 and 5. As the member is lifted, sections **86** and **88** engage either surface **110** or **112**, thereby forcing the two sections inwardly along the ends of the two extensions to reach slots **58**. The two sections then snap into the slot and are held rigidly therein by the inherent resiliency of member **80**. Likewise, the ends of arms **98** and **100** are provided with tapered surfaces **114** and **116**, so that as the front element is moved outwardly and member **80** pivoted in holes **60** from its folded position to its extended position, sections **106** and **108** slide on either surface **114** or **116** of each arm, pressing the two arms outwardly until the two sections can pass along the end of the arms and snap into slots **102** and **104** of the arms.

It is thus seen that once the fixture is moved from its collapsed or folded position as shown in FIGURES 7 and 8 to the position shown in FIGURES 4 and 5, V-shaped member **80** is held in its extended position by the seating

of sections **86** and **88** in slots **58**, and the seating of sections **106** and **108** in slots **102** and **104** of member **96**.

One of the advantages of the present fixture is its versatility, both with respect to a particular type of antenna and to the variety of antennas on which it can be used. On the type of antennas shown in the drawings, only one fixture may be used if desired, thus, for example, eliminating fixture **16** and substituting therefor merely a pivoted lever of the same height as the fixture so that when the fixture is moved from its folded to its extended position, the lever will be moved from its folded to its extended position. The front element is held in rigid spaced relation from the rear assembly by the seating of V-shaped member **80** in slots **58** and **102** and **104** of one fixture, as previously described. Further, in an economy-type fixture, either U-shaped member **96** or extensions **52** and **54** may be omitted, since either part **96** or the two extensions are capable of holding the V-shaped member **80** in its extended position when two fixtures are used on the antenna. Further, in the smaller antennas only one fixture is required. However, when one fixture is used, at least one arm of the U-shaped member **96** and one extension **52** or **54** are required in order to give the antenna structure adequate rigidity, and to prevent pivoting of the front element with respect to the rear assembly.

While only one embodiment of the present invention has been described in detail herein, various changes and modifications in addition to those suggested above may be made without departing from the scope of the present invention.

I claim:

1. An antenna comprising a front element having a pair of spaced cross members, a reflector assembly, a pair of fixtures connected at one end to said cross members and at the other end to said assembly, each fixture including a relatively flat base, ears adjacent the end of said base for securing said base to the reflector assembly, two forwardly extending arcuately shaped projections spaced laterally on said base near the ends thereof, each having a slot in the forward end and a hole spaced inwardly from said slot and edges tapered toward said slot, a generally V-shaped resilient member having an outwardly extending projection at each end pivotally seated in the hole of the respective extension, a means pivotally connecting said V-shaped member to said cross member of said front element, and a U-shaped bracket facing the same direction as said V-shaped member having a slot in the end and edges tapered toward said slot.

2. An antenna comprising a front element and a rear assembly, a pair of fixtures connecting said element and assembly, each fixture including a base, means adjacent the end of said base for securing said base to the rear assembly, two forwardly extending projections spaced laterally on said base, each having a slot in the forward end, a hole spaced inwardly from said slot and edges tapered toward said slot, a generally V-shaped resilient member having an outwardly extending projection at each end pivotally seated in the hole of the respective extension, a means connecting said V-shaped member to said front element, and a resilient U-shaped bracket facing the same direction as said V-shaped member having a slot in the end and edges tapered toward said slot.

3. An antenna comprising a front element and a rear assembly, a pair of fixtures connecting said element and assembly, each fixture including a base, means for securing said base to the rear assembly, two forwardly extending projections spaced laterally on said base, each having a slot in the forward end and edges tapered toward said slot, a generally V-shaped member having an outwardly extending projection at each end pivotally connected to said projections, a means connecting said V-shaped member to said front element, and a resilient arm extending in the same direction as said V-shaped member having a slot in the end and edges tapered toward said slot.

4. An antenna comprising a front element and a rear assembly, a pair of fixtures connecting said element and

assembly, each fixture including a base, means for securing said base to the rear assembly, two forwardly extending projections spaced laterally on said base, each having a slot in the forward end and edges tapered toward said slot, and a generally V-shaped member having an outwardly extending projection at each end pivotally connected to said base and movable from a position parallel to said rear assembly to a position perpendicular thereto for supporting said front element.

5. In an antenna: a front element and a rear assembly, a fixture connecting said element and assembly and including a base, means for securing said base to the rear assembly, two forwardly extending projections spaced laterally on said base, each having a slot in the forward end and a hole spaced inwardly from said slot and edges tapered toward said slot, a generally V-shaped resilient member having an outwardly extending projection at each end pivotally connected to said base in the hole of the respective extension, a means connecting said V-shaped member to said front element, and a resilient U-shaped bracket facing the same direction as said V-shaped member having a slot in the end and edges tapered toward said slot.

6. For use with an antenna having a front element and a rear assembly: a fixture including a base, means for securing said base to the rear assembly, two forwardly extending projections spaced laterally on said base, each having a slot in the forward end and edges tapered toward said slot, a generally V-shaped member having an outwardly extending projection at each end pivotally mounted on said base, a means connecting said V-shaped member to said front element, and a resilient arm facing the same direction as said V-shaped member having a slot in the end and edges tapered toward said slot.

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