Feb. 2, 1971 L. L. LOCKWOOD 3,560,987

SUPPORT BOOM TO ATTACH PLANAR ARRAY ANTENNA TO MAST

Filed May 27, 1968

FIG. 1

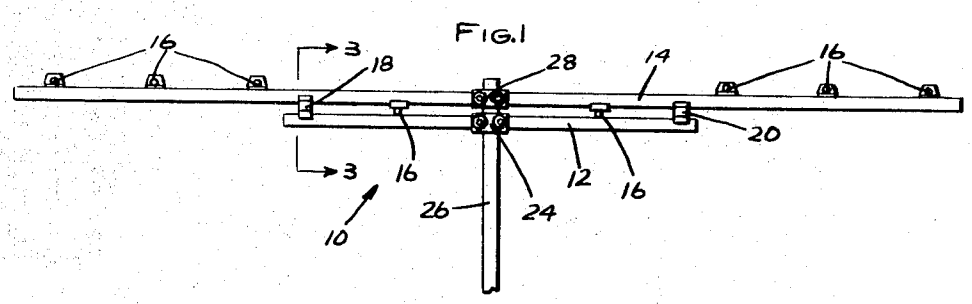


FIG. 3

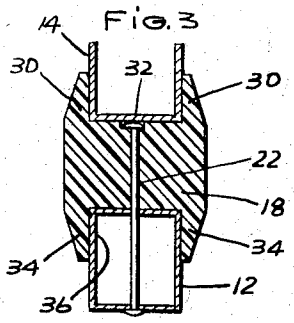


FIG. 2

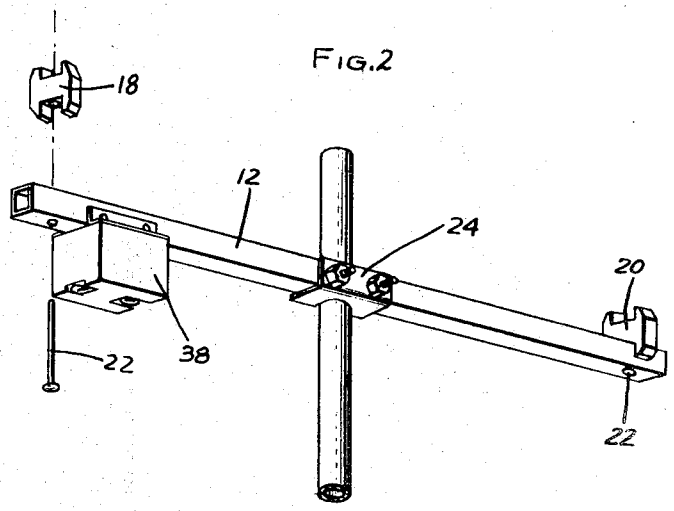
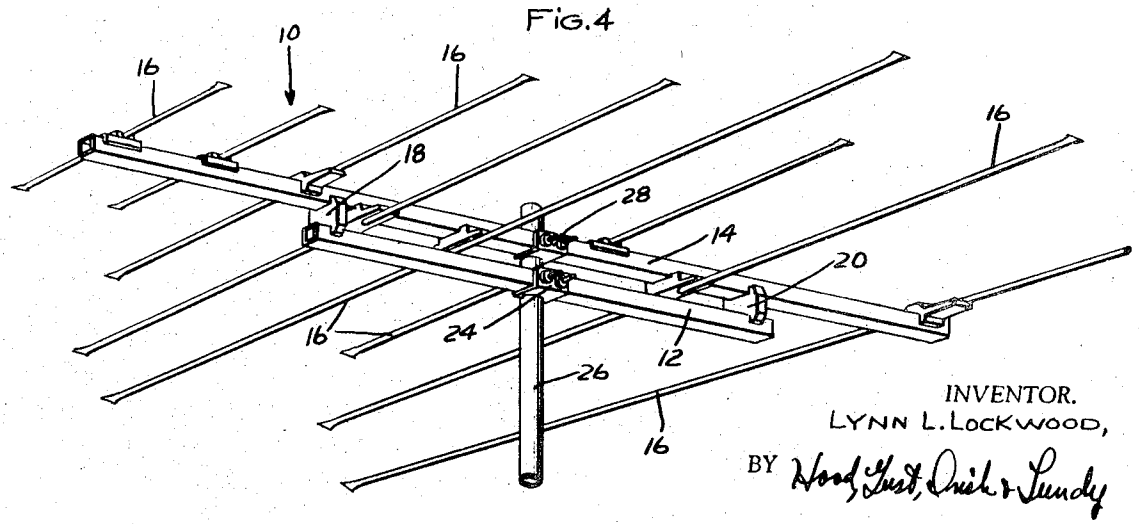


FIG. 4



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SUPPORT BOOM TO ATTACH PLANAR ARRAY ANTENNA TO MAST

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ABSTRACT OF THE DISCLOSURE

An antenna assembly comprising a support boom, means for rigidly clamping the support boom to a mast, support means disposed at each end of the support boom, a main boom, and at least one antenna field element carried by the main boom, the support means being proportioned and designed to support the main boom on the support boom. Means is provided for rigidly clamping the main boom to such a mast while the main boom is supported by the support means. In a preferred embodiment of the invention, each of the support means comprises an insulative, H-shaped member, the lower legs of which are proportioned and designed receivably to engage the support boom and the upper legs of which are proportioned and designed receivably to engage a portion of the main boom. Also, preferably, the support boom and main boom have substantially square, or at least rectangular, cross sections and the lower and upper legs of the H-shaped members snugly engage, respectively, the sides of the support boom and the main boom.

BACKGROUND OF THE INVENTION

Field of the invention

The present invention relates to antenna assemblies of the type which are conventionally mounted on upstanding masts, and more particularly to the provision of an improved antenna assembly which is constructed to be more conveniently mounted on such a mast.

Description of the prior art

Conventionally, antenna assemblies comprise a boom or frame on which a plurality of antenna field elements such as dipoles, directors and reflectors, are mounted and means for rigidly clamping such a boom directly to an upstanding mast. Conventionally, such upstanding masts are usually aluminum or steel pipes which are anchored at their lower end to extend vertically upwardly. The means for clamping the boom to the mast is conventionally a U-bolt assembly.

One problem with such conventional antenna assemblies is that they are difficult for a single person to install. Typically, an installer mounts the mast on a roof so that it extends vertically upwardly and then the installer carries the boom or frame with the antenna field elements mounted thereon upwardly onto the roof and clamps it to the mast. Since the installer must hold the boom with one hand while he installs and tightens the U-bolt assembly with his other hand, he cannot hold on to a support to steady himself. In many cases the booms will be up to ten feet long or longer and the antenna field elements will be, typically, six feet long. In such cases, if the wind is at a high velocity, the boom is difficult to hold with one hand. Of course, in the winter, the installer's problems can also be compounded by the presence of ice on the roof.

The antenna assembly of the present invention solves these installation problems. Specifically, the antenna assembly of the present invention is so constructed that it can be easily and safely installed by one person.

SUMMARY OF THE INVENTION

The present invention is an improved antenna assembly wherein the improvement resides in the provision of a self-supporting frame or support boom which is arranged to be rigidly clamped to a mast and to support a main boom or frame, i.e., the boom on which the antenna field elements are mounted, while it is being clamped to the mast. This support boom, which may typically be thirty inches in length, is relatively easy, because of its small size, to clamp to a mast.

In the preferred embodiment of the present invention, an insulative support means is disposed at each end of the support boom and arranged to support the main boom with supported frame on the support boom with self-supporting frame. Also, preferably, each such insulative support means is fastened to the support boom and provided with an upwardly opening notch for receivably engaging and cradling a portion of the main boom. Further, preferably, the main boom and the support boom have square cross sections and each insulative member is an H-shaped member, the upper and lower legs of which are proportioned and arranged snugly to engage the flat sides, respectively, of the main boom and the support boom.

It is a primary object of the present invention, therefore, to provide an antenna assembly which can be easily installed by one person.

Another object of the present invention is to provide such an antenna assembly which, after it is installed on a conventional mast, will be more securely fastened to the mast.

Other objects and features of the present invention will become apparent as this description proceeds.

The above-mentioned and other features and objects of this invention and the manner of attaining them will become more apparent and the invention itself will be best understood by reference to the following description of an embodiment of the invention taken in conjunction with the accompanying drawings wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of the antenna assembly of the present invention installed on a conventional mast;

FIG. 2 is a fragmentary, exploded perspective view showing the support boom clamped to the mast;

FIG. 3 is an enlarged, sectional view taken from FIG. 1 generally along the line 3—3; and

FIG. 4 is a perspective view of the antenna assembly mounted on the mast.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The antenna assembly of the present invention, indicated generally by the reference numeral **10**, comprises a support boom or self-supporting frame **12**, a main boom or supported frame **14** on which conventional antenna field elements **16** are mounted, a support member **18, 20** securely fastened to each end of the support boom **12** by means such as the illustrated rivets **22**, a U-bolt assembly **24** for clamping the support boom to a conventional mast **26** and another U-bolt assembly **28** for

clamping the main boom to the mast. These U-bolt assemblies **24**, **28** are conventional and need not be discussed, in detail, in this description. Similarly, the elements **16** are conventional and any desired combination of dipoles, directors and reflectors may be mounted on the main boom **14** without departing from the scope of this invention.

In the illustrative embodiment, the support boom **12** and main boom **14** are fabricated from tubular aluminum stock having a substantially square cross section, the advantage of which will be discussed hereinafter.

Each support member or locating element **18**, **20** is preferably an H-shaped member having upwardly extending legs **30** defining an upwardly opening notch **32** and downwardly extending legs **34** defining a downwardly opening notch **36**, these notches having a cross sectional shape such as that illustrated in FIG. 3. Each member **18**, **20** can be a rather inexpensively plastic molded part which will not add, significantly, to the total cost of the antenna assembly **10**.

The lower legs **34** of each member **18**, **20** are spaced apart and arranged snugly to engage respectively the vertical sides of the lower boom **12** such that, when the member is fastened to the boom by a rivet **22**, a rigid locating and support means for the main boom **14** is provided. Similarly, the upper legs **30** defining the notch **32** are arranged respectively to engage the opposite vertical sides of the main boom **14** to hold the main boom against movement relative to the support boom **12**. The snugness with which the main boom **14** is receivably engaged by the notch **32** is such that the main boom can easily be lowered or placed in the notch, but yet sufficiently tight to prevent significant lateral or longitudinal movement of the main boom. In some cases, it may be desirable for the legs **30** snugly to engage the main boom, in which cases, the installer can place the main boom in the notches **32** of the support members **18**, **20** and leave the main boom cradled in these notches while he performs other functions, such as connecting the wiring of the antenna assembly, and before he uses the U-bolt assembly **28** to clamp the main boom to the mast **26**.

An attractive feature of the support boom **12** is that amplifiers, baluns, and other accessories, such as the illustrated television lead connector **38**, may be mounted on the support boom before it is clamped to the mast **26**. All of such accessories can be interconnected before the main boom is carried upwardly onto the roof and placed upon the support boom **12**. Then, the only remaining task is to connect the antenna leads to the connector box **38**.

In summary, it will be apparent that an installer can clamp or fasten the support boom or self-supporting frame **12** to the mast **26** and synchronize it with the antenna rotor supporting the mast, if there is such a rotor, make the necessary electrical connections for the accessories mounted on the support boom, and then set the main boom with supported frame **14** in place on the support members **18** and **20**. The installer is thus free to tighten the U-bolt assembly **28** with one hand while steadying himself with the other hand. If the mast **26** is stationary, i.e., not mounted on a rotor, the support boom **12** and the main boom **14** must be properly oriented about the axis of the mast. That is, the field elements **16** must be properly oriented relative to the transmission station or stations emanating signals to be received by the antenna assembly. In such a case, the main boom **14** can be properly oriented relative to such stations by placing it on the support boom **12** and connecting its leads to a receiver, such as a television receiver, and then, by loosening the U-bolt assembly **24**, adjustably moving the main boom about the axis of the mast **26**. After the main boom **14** is properly oriented, the U-bolt assembly **28** can be tightened firmly to clamp the main boom in its properly oriented position.

As stated previously, conventionally, the boom on which the antenna field elements are mounted is merely clamped by means such as one of the U-bolt assemblies **24**, **28** to a mast. In the present case, the main boom **14** is not only clamped to the mast **26** by the U-bolt assembly **28**, it is supported over a substantial portion of its length by the support boom **12**. Thus, since the U-bolt assemblies **24**, **28** can be snugly tightened and since the support members with locating means **18**, **20**, which are rigidly mounted on the support boom can be made snugly to engage portions of the main boom **14**, the antenna assembly **10** can be very rigidly fastened to the mast **26**. The combination of the two- U-bolt assemblies **24**, **28** and the rigidity of the short length of the support boom **12** will tend to resist pivotal movement of the main boom **14** relative to a horizontal plane.

While there have been illustrated and described a support boom with self-supporting frame **12** and main boom with supported frame **14** having square cross sections, it will be understood that the present invention is not limited to such cross sectional shapes and that booms having circular cross sections may be used. Of course, one of the major problems with a boom having a circular cross section is that it will tend to revolve about its axis. Likewise, booms having non-square or, perhaps, rectangular cross sections may be used in the antenna assembly of the present invention.

While there have been discussed above the principles of this invention in conjunction with specific apparatus, it is to be clearly understood that this description is made by way of example and not as a limitation to the scope of the invention.

What is claimed is:

1. An antenna assembly comprising a self-supporting frame and a supported frame, said supported frame including at least one antenna field element, means for rigidly clamping said self-supporting frame to a mast, a plurality of locating elements carried by one of said frames, said locating elements each having at least one surface for positioning and at least one surface for supporting and positioning one of said frames relative to the other of said frames, means for rigidly clamping said supported frame to a mast while said supported frame is being supported by said self-supporting frame, each of said locating elements comprising an insulator carried by said self-supporting frame, said insulator having an upwardly opening recess therein proportioned to receive a portion of said supported frame in said recess.

2. An antenna assembly comprising a self-supporting frame and a supported frame, said supported frame including at least one antenna field element, means for rigidly clamping said self-supporting frame to a mast, a plurality of locating elements carried by one of said frames, said locating elements each having at least one surface for positioning and at least one surface for supporting and positioning one of said frames relative to the other of said frames, each of said locating elements comprises an insulator carried by said self-supporting frame, said insulator having an upwardly opening recess therein proportioned to receive a portion of said supported frame in said recess, and a downwardly opening recess therein proportioned to receive a portion of said self-supporting frame in said recess, means for rigidly fastening each of said locating elements to one of said frames, and means for rigidly clamping said supported frame to a mast.

3. The antenna assembly of claim **2** in which said self-supporting frame and said supported frame have substantially square cross sections and in which said recesses have oppositely facing upstanding sides proportionately spaced to receive therebetween and snugly engage, respectively, the opposite sides of said self-supporting frame and said supported frame.

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U.S. Cl. X.R.

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