June 13, 1939. A. E. LINGO 2,162,675

MAST FOR RADIO BROADCASTING

Filed Oct. 8, 1937

Fig. 1.

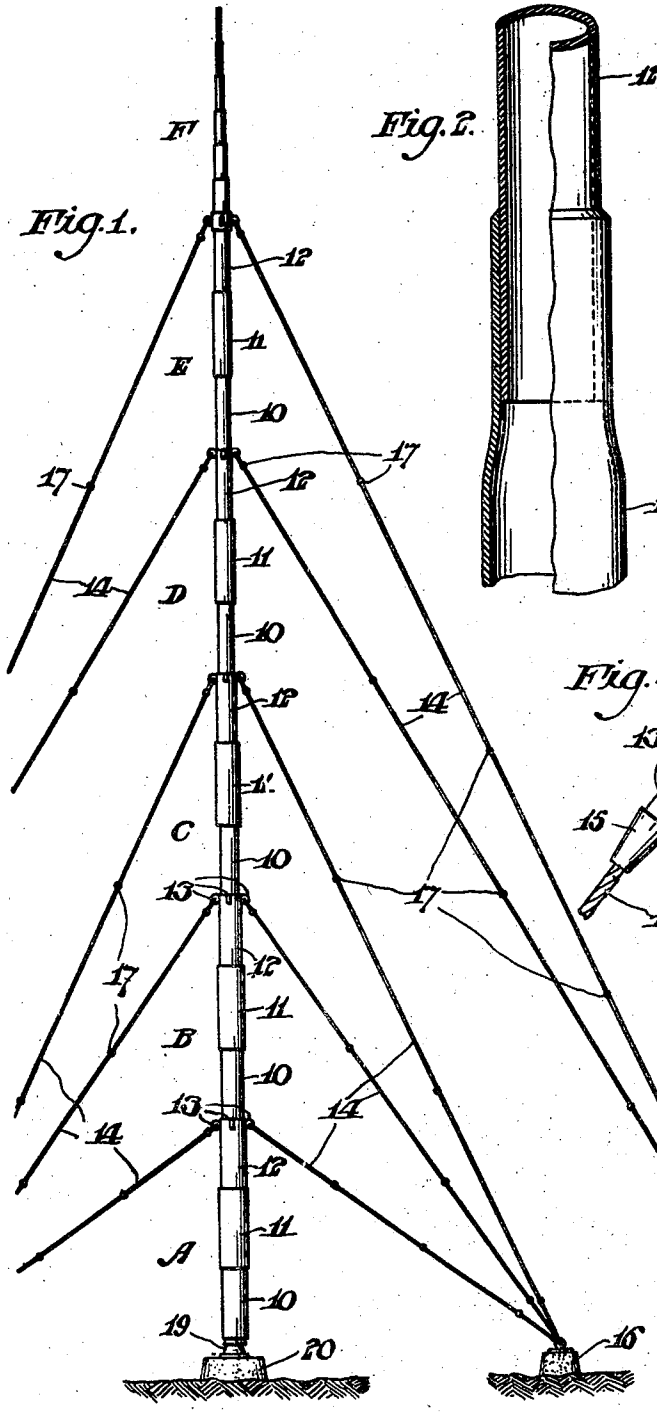


Fig. 2.

Fig. 3.

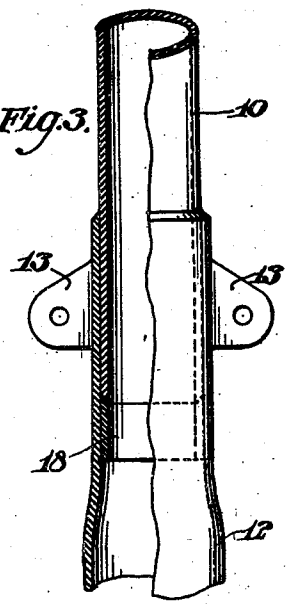
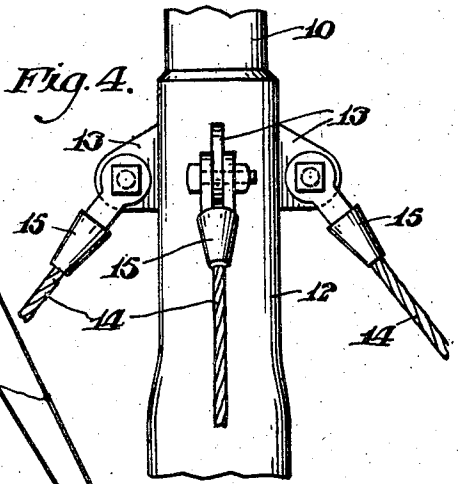


Fig. 4.



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MAST FOR RADIO BROADCASTING

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5 Claims. (Cl. 189—26)

This invention relates to masts for radio broadcasting, and it relates more particularly to a mast, adapted to serve as a wave antenna, which is constructed of pipe sections, and which may be fabricated in the shop in such manner that it may be readily shipped in separate units and conveniently erected at the desired place.

Heretofore, when it was desired to erect radio masts of considerable height, recourse was usually had to structures of the lattice girder type, which structures are quite expensive and difficult to erect. When it was attempted to construct radio masts of tubular or pipe sections, of successively decreased diameter toward the top, certain limitations as to height were imposed, particularly in that, in masts of any great height, the lower sections would be of inordinate diameter, which greatly increased the weight of the structure, and which also involved difficulties of insulation at the base of the mast, so that such structures were impractical above certain limits of height.

The principal object of the present invention is to provide a radio mast made of pipe sections, which, while relatively inexpensive in construction, will be sufficiently rigid for its intended purpose, and which may be made of quite considerable heights if so desired.

A further object of the invention is to provide a radio mast made of pipe sections, which may be readily fabricated in any shop equipped for the making of tubular columns, such as flagpoles or the like made of pipe sections having their ends united by being telescoped into each other.

A further object of the invention is to provide a radio mast made of pipe sections, which may be readily shipped in separate units for subsequent erection at the desired place.

A further object of the invention is to provide a radio mast made of pipe sections, which may be readily and conveniently erected at the desired place.

With the foregoing objects in view, the present invention contemplates the provision of a radio mast made of pipe sections, united to each other to provide a series of superposed columns, stayed or braced by suitable guys, and each of said columns comprising a plurality of pipe sections united to each other, the pipe sections of each of said columns being of smaller diameter at the respective ends thereof and of larger diameter at the central part thereof, and the ends of the superposed columns being united to each other by telescopic joints. The invention further contemplates, in a preferred form thereof, the provision, at the top, of an extension comprising a plurality of telescoped pipes, similar in construction to an ordinary flagpole.

The nature and characteristic features of the present invention will be more readily understood from the following description, taken in connection with the accompanying drawing forming part hereof, in which:

Figure 1 is an elevational view, to a certain extent diagrammatic, illustrating a radio mast embodying the main features of the present invention;

Fig. 2 is a view partly in elevation and partly in section, illustrating the manner of uniting two of the pipe sections to each other, where the same is done in the shop, and ordinarily known as a "shop joint";

Fig. 3 is a similar view illustrating the manner of uniting two of the sections to each other, where the same is done at the time of erection, and which is ordinarily known as a "field joint"; and

Fig. 4 is a fragmentary detail view illustrating a preferred manner of attaching the guys to the mast.

It should, of course, be understood that the description and drawing herein are illustrative merely, and that various modifications and changes may be made in the structure disclosed without departing from the spirit of the invention.

Referring now more particularly to Fig. 1 of the drawing, there is there shown a typical radio mast embodying the main features of the present invention and comprising a plurality of superposed columns, A, B, C, D and E. Owing to the limitations necessarily imposed in illustration by line drawing of the permissible size, the mast proper, illustrated in Figure 1, has been shown with the horizontal scale exaggerated. In actual practice, the masts embodying the present invention are relatively much more slender throughout than as there illustrated.

As there shown, each of said columns comprises three pipe sections 10, 11 and 12 united to each other by shop joints of the type shown in Fig. 2 of the drawing. While each of the columns is shown in the drawing as made up of three sections, of course it will be readily understood the same may be made of any desired number of sections, that is to say, each column may be made up of five, or even seven, pipe sections. In each of the several columns, however, the central section will be of larger diameter than the respective end sections, so that each column is of a sort of "boom" shape, thus affording, in connection with the stays or guys to be hereinafter described, the most efficient form of structure for resistance against bending strains between the points of attachment of the stays or guys.

As the mast is constructed from lengths of standard pipe or tubing, in order to make a proper joint between adjacent sections of a particular column, it will ordinarily be necessary to reduce the diameter of the end portion of the outer tube,

as shown in Figs. 2 and 3, in order that the internal diameter of the same may be brought to the proper diameter to engage the outer surface of the end of the smaller tube which is telescoped therein. This reduction of diameter of the outer tube may be done by the well known swaging operation, the swaging being carried to such point that a proper shrink fit may be made to hold the end portion of the smaller tube within the end portion of the outer tube. This type of joint is well known in the industry, and is commonly used in the construction of tubular columns such as are used for flagpoles and trolley poles, and for other similar purposes. The joint may also be reinforced by welding or otherwise if desired.

Each of the several columns is held in fixed position at its respective ends, and for this purpose the upper end section of each of the several columns may be provided externally with a plurality of radially extending ears or lugs 13 to which the stay or guy wires 14 are attached by means of socket connections 15 of any preferred type. The guy wires 14 extend to suitable anchor blocks 16, which are properly located for the effective stabilizing of the mast. Ordinarily, each of the guy wires 14 will also be provided at various points throughout its length with strain insulators 17 of any preferred type, such as are well known and commonly used for insulating the guys of radio mast structures.

Preferably each of the columns will be so made as to comprise initially a separate unit of convenient length for shipping, and adapted to be joined at its ends to the other sections above and below the same by means of a field joint, such, for example, as is shown in Fig. 3 of the drawing. For the making of this field joint, the outer pipe, which ordinarily will be the top section 12 of one of the columns, is reduced to suitable diameter, by swaging in the shop, and a suitable ring 18 is inserted therein and welded or otherwise permanently secured thereto, being positioned a sufficient distance from the end as shown in Fig. 3 of the drawing, whereby said ring will serve as a stop or seat when the end portion of the lowermost section 10 of one column is inserted in the top portion of the uppermost section 12 of another column.

The lower end of the mast may be supported on a suitable insulator 19 which in turn may be supported on a suitable foundation block 20.

In the erection of the mast, the lowermost section A is first mounted upon the base insulator 19 being positioned vertically thereon; whereupon its set of guys 14 are attached to each of the lugs 13 at the top thereof, thus providing a rigid lower portion into which the next column B may be mounted. The lower end of the lowermost section 10 of the column B is then slipped into the upper end of the uppermost section 12 of the column A until the lower end of the lowermost section of column B rests upon the supporting ring 18, as shown in Fig. 3 of the drawing. Column B is then stayed by its set of guys 14, and thereafter, step by step, each of the other columns is successively positioned with respect to the column immediately below the same. The placing of the columns successively one above the other may be readily accomplished by suitable rigging (not shown), but with which those skilled in the art of erecting flagpoles and the like are quite familiar.

The upper end of the mast may comprise an extending section F made up of a series of pipe sections of successively smaller diameter constructed in a manner similar to the ordinary telescopic pipe type of flagpole, the sections being joined to each other by means of joints such as are illustrated in Fig. 2 of the drawing.

By the foregoing arrangement, there will be provided a radio mast which may be made of considerable height, yet, while being relatively light and inexpensive, will be of sufficient rigidity and strength to withstand the strains to which such structures are ordinarily subjected.

Furthermore, it has been found in practice that radio masts constructed as herein set forth and used for their intended purpose as vertical radiators have been found to have greatly improved radiating efficiency over the structures heretofore used for this purpose.

I claim:

1. A radio mast comprising a plurality of superposed columns, each of said columns comprising a plurality of tubular sections having their ends united by telescopic joints, the sections at each end of each column being smaller in diameter than the section at the middle thereof, the lower section of each column being rigidly joined to the upper section of the column immediately below the same, and means for individually staying the ends of each of the columns.

2. A radio mast comprising a plurality of superposed columns; each of said columns comprising a plurality of tubular sections joined to each other at their respective ends, the sections at each end of each column being smaller in diameter than the section at the middle thereof, the lower section of each column being rigidly joined to the upper section of the column immediately below the same, and means for individually staying the ends of each of the columns.

3. A radio mast comprising a plurality of superposed columns, each of said columns comprising a plurality of tubular sections having their ends united by telescopic joints, the sections at each end of each column being smaller in diameter than the section at the middle thereof, the lower section of each column being telescoped within the upper section of the column immediately below the same, and means for individually staying the ends of each of the columns.

4. A radio mast comprising a plurality of superposed columns, each of said columns comprising a plurality of tubular sections having their ends united by telescopic joints, the sections at each end of each column being smaller in diameter than the section at the middle thereof, the lower section of each column being telescoped within the upper section of the column immediately below the same, and a plurality of sets of guys respectively connected adjacent the upper ends of the respective columns.

5. A radio mast comprising a plurality of superposed columns, each of said columns comprising a plurality of tubular sections joined to each other at their respective ends, the sections at each end of each column being smaller in diameter than the section at the middle thereof, the lower section of each column being rigidly joined to the upper section of the column immediately below the same, a plurality of sets of guys for staying the structure, each set of guys being respectively connected adjacent the upper end of one of the respective columns, and the upper end of the mast comprising an extension made of a plurality of tubular sections of successively decreased diameter.

ARCHIBALD E. LINGO.