Jan. 19, 1943. C. A. BOOKER ET AL 2,309,041

TOWER SUPPORT

Filed July 17, 1940

FIG. 1.

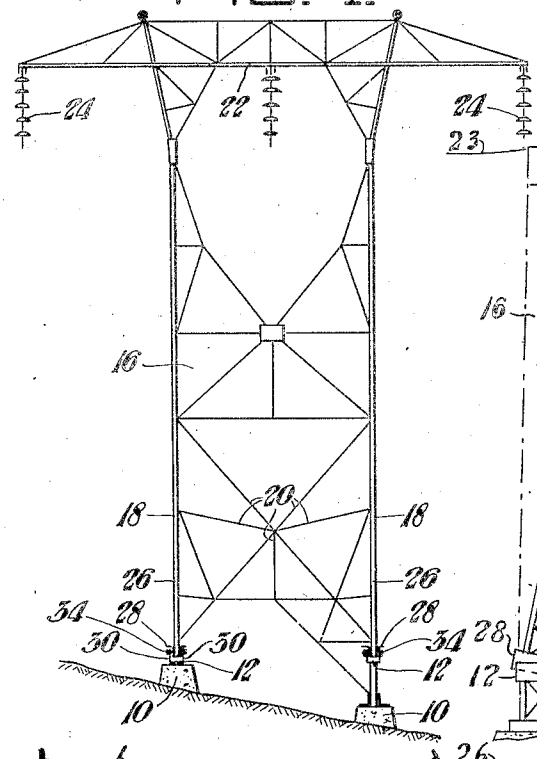
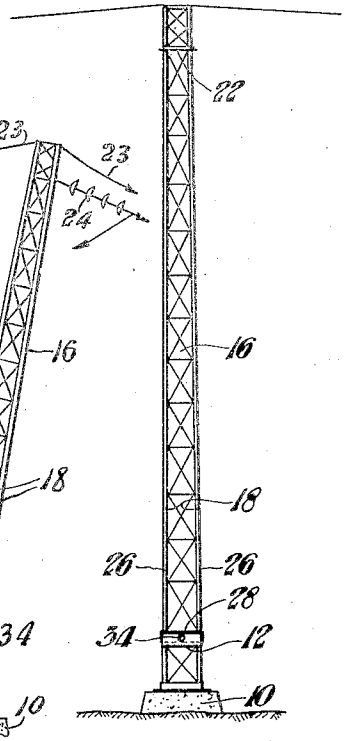


FIG. 2.



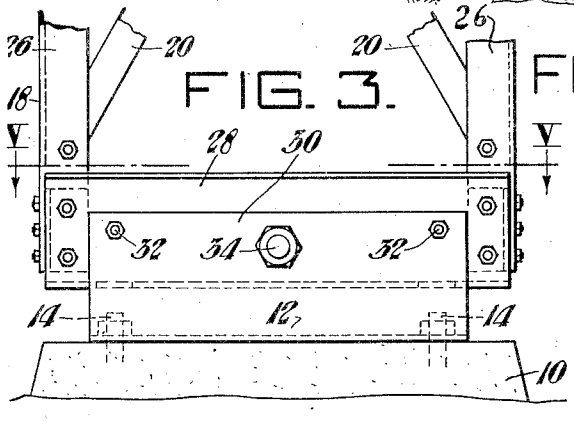


FIG. 3.

FIG. 6.

FIG. 4.

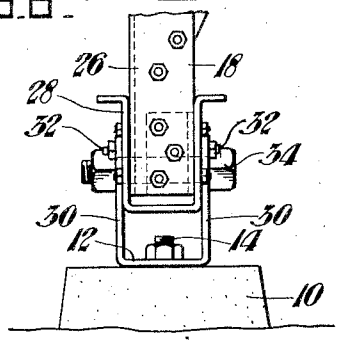
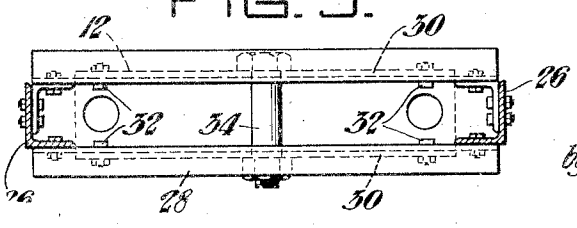


FIG. 5.



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TOWER SUPPORT

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2 Claims. (Cl. 189—22)

This invention relates to towers of great height, such as electric transmission line towers, which are subject to heavy wind loads.

The invention aims particularly to provide a coordinated structure including shearable means normally securing a tower to a fixed base, and pivotal means effective to flexibly support the tower upon failure of the shearable means, all as more fully hereinafter set forth.

The invention will be fully apparent from the following detailed disclosure when read in connection with the accompanying drawing, and will be defined with particularity in the appended claims.

In the drawing, Figure 1 is a front elevation of a transmission line supporting tower embodying the invention;

Figure 2 is a side view thereof;

Figure 3 is an enlarged detail illustrating structural features at the base of the superstructure, showing the improved shearable and pivotal supporting means of the present invention;

Figure 4 is an end view of Figure 3, and

Figure 5 is a horizontal section on line V—V of Figure 3.

Figure 6 is a diagram illustrative of the claimed invention.

As will be pointed out more fully in detail hereinafter, the tower support comprises a hinge modified to restrain it from free action during normal conditions of load, by shear pins which are designed to fail at a predetermined load somewhat below the total capacity of the superstructure. The function of the shear pins is to provide normal conditions for the erection and ordinary functioning of the tower. These pins, however, are proportioned so that any tendency to overload the superstructure in the direction of the line will result in the failure of the shear pins rather than in the failure of the superstructure. Upon failure of the shear pins, one or more hinge pins provides a pivotal support for the base of the tower, thus converting the superstructure from a cantilever fixed in the ground to a simple beam having a pin support at the ground line and a floating support at the top, the ground wires providing such floating support.

Referring in detail to the drawing, 10 represents a suitable rigid foundation which may conveniently be formed of concrete or the like. A base member 12 is secured by anchor bolts 14 to each foundation 10.

The tower indicated generally at 16 includes upright legs 18—18 suitably braced to one another by cross lacing 20. At the top of the tower there is the usual cross-arm 22 for supporting the above mentioned aerial ground wires or cables 23 and strings of suspension insulators 24 which carry the cables and ground cables.

Each leg 18 of the tower includes two upright structural steel angle bars 26. At the lower extremity of the tower these bars 26 are joined by a foot plate 28. As best shown in Figures 3 and 4, each foot plate 28 is substantially U-shaped in cross-section, and is nested between the uprights 30—30 of the similarly shaped base member 12.

A particular feature of the present invention resides in the provision of a shearable connection between the foot plate 28 and the base 12 and the inclusion of pivotal means of sufficient cross-sectional area to flexibly support the base of the tower in the event that a predetermined load causes failure of the shearable connections. In the embodiment of the invention illustrated, each foot plate 28 is secured to the uprights 30—30 of the base by a plurality of pins or bolts 32. These bolts 32, in cooperation with pivot pins 34, normally hold the tower in a predetermined upright position. Before overloading of the tower, however, the pins 32 are designedly intended to be sheared, whereupon the entire load of the tower or superstructure is taken by the pivot pin 34. In order that this pin may properly perform its pivotal supporting function, it is necessarily made of a sufficiently large cross-sectional area to take the entire load at the base of the tower when bolts or shear pins 32 which are of much smaller sectional area fail.

In the described construction, it will be apparent that after the pins 32 have been sheared or otherwise fail, the tower will be flexibly supported with respect to the base, with freedom for limited rocking movement about the pivot pins 34. Hence in the event that the tower is abnormally stressed by a windstorm or hurricane, the unbalancing forces will merely rock the entire tower about the pivotal point until it comes to rest by reason of the fact that the overhead ground wires 23 come into play and support the extreme top of the tower. Thus the line wires will be prevented from falling to the ground, and a repair crew can pull the tower up to proper position and again secure the same in its proper normal position by inserting new shear bolts in a manner which will be readily understood.

While we have described quite precisely cer-



tain specific details of the embodiment of the invention illustrated, it is to be understood that various modifications may be made without departure from the invention as defined in the appended claims.

We claim:

1. A transmission line supporting structure consisting of an overhead cross arm having conductor line-wires and ground-wires attached thereto, a tower to which the cross arm is integrally secured, a fixed masonry foundation having a base member anchored thereto, shearable means designed to fail at a predetermined load below the total capacity of the superstructure securing the tower to the base member, and pivotal means engaging the tower and the base and being of sufficient cross-sectional area to support the entire load at the base of the tower upon failure of said shearable means.

2. A transmission line supporting structure consisting of an overhead cross arm having conductor line-wires and ground-wires attached thereto, a tower to which the cross arm is integrally secured, a fixed masonry foundation having base members with upright legs rigidly anchored thereto, foot members nested between the upright legs of said base members and attached thereto by shearable rivets designed to fail at a predetermined load below the total capacity of the superstructure securing the said foot members to said upright legs of the base members, and pivot pins secured to the legs of said base members and passing through said foot members, said pins being of sufficient cross-sectional area to support the entire load at the base of the tower upon failure of said shearable means.

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