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54 **Masts or beams.**

57 A mast or beam construction including a plurality of similar components 22, each comprising a web with one side having a portion 24 defining a recess 25 of C-shaped

extending uniformly lengthwise of the component and the opposite side having an enlargement 28 to fit into the recess 25, the mast being made up of interengaged components.

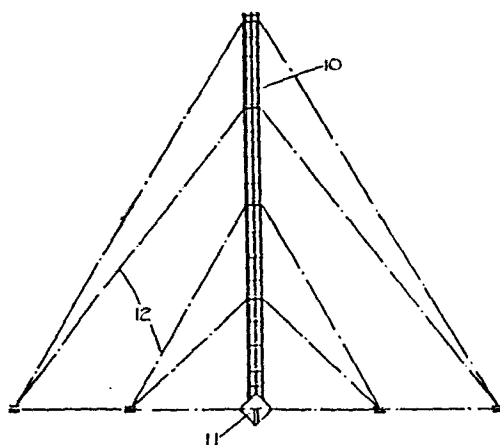


FIG. 1.

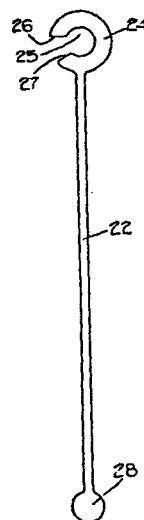


FIG. 4.

- 1 -

"Masts or beams"

This invention relates to masts or beams for use for various structural purposes, including supporting antennae, cables or the like.

5 Tall masts are built up from pre-fabricated sections and conventionally, these are secured together by bolting or by the use of other fasteners. Erection of such masts therefore necessitates the carrying of supplies, not only of the main mast components, but of the fasteners.

10 In cold or other adverse conditions, the fastening of bolts and other manipulations can be difficult and when working at a height, such difficult working can be dangerous.

Masts must, however, be strong and securely assembled if they are to withstand wind pressure and other

15 conditions although a degree of flexibility is also sometimes desirable. In known masts the strength requirement usually results in the use of heavy components which, again, make erection more difficult.

It is the object of this invention to provide a

20 mast or beam construction which is simple to assemble but which is strong and secure in use.

In accordance with the present invention, there is provided a mast or beam construction including a plurality of similar components, each of which comprises a web with at least two parallel sides, one of said sides having a portion defining a recess extending lengthwise

of the said side, the recess being presented laterally of the general plane of the web, and having a mouth narrower than the maximum internal width of the recess, and the opposite one of said sides of the component
5 having an enlargement of a size to be retained in the recess, the mast construction being made up by inter-engagement of said components to make up a hollow figure.

Preferably, each component includes a planar web with a C-shaped portion at said one side and a circular
10 section enlargement at the said opposite side, the C-shaped portion defining the recess which is part-circular in section and which is presented laterally of the plane of the web. The component may have lightening holes and in one example, these may be shaped to provide foot steps
15 to facilitate climbing of the mast. Other lightening hole shapes may be used or, in another example, no holes are provided at all.

A mast construction may be made up from components of such length that the junction between
20 superimposed components in the respective sides of the mast are staggered.

The closed figure section of the mast or beam may be three or four sided.

The recess may thus be shaped to allow
25 engagement of an adjacent component whereby said component may extend at varying angles to the first component. Where three components make up the hollow figure, the component webs extend generally at 60° . Where four components are used to make up the hollow figure, they
30 extend at 90° .

Conveniently, a part can be fitted to a component to serve as connecting means for a guy or other support.

The invention will now be described by way of
35 example with reference to the accompanying drawings in which:

Figure 1 is a view of a mast constructed in accordance with the invention;

Figure 2 is a view of a derrick constructed in accordance with the invention;

5 Figure 3 is a scrap view of a mast showing a guy cleat fixed to a three-sided mast construction;

Figure 4 is an enlarged cross sectional view of one of the components of the mast;

Figure 5 is a side view of one of the components of the mast;

Figure 6 is a side view of an alternative component of the mast;

Figure 7 is a side view of an alternative length component of the mast;

5 Figure 8 is a perspective view of the upper end of one form of mast constructed in accordance with the invention;

Figure 9 is a perspective view of the lower end of the form of mast shown in Figure 8;

Figure 10 is a perspective view of another form of mast or beam constructed in accordance with the invention;

Figure 11 is a view showing a guy attachment and

Figure 12 is a plan view of the guy attachment shown in Figure 11;

5 Figure 1 shows a complete mast made up from a number of components which will be described in detail herein. The mast may have a base indicated generally at 11 and is supported by a number of guys 12, in conventional manner. The base may include a swivel connection (not illustrated).

Figure 2 shows an alternative use for a mast construction including a main limb 13 and a shorter limb 14 connected approximately but not essentially at right angles thereto. The two limbs have respective end connections 15, 16, which are mounted on a base 17 through a common pivot 18. The common base is fixed to

the ground as shown. The two arms 13, 14 are connected by a series of guys 19, which will maintain the mutually perpendicular arrangement of the two arms 13, 14 as they swivel together about the pivot 18. To cause pivoting, a wire 21 is connected to the outer end of the shorter arm 14. By pulling on this, the assembly comprising the two arms 13, 14 can be swivelled about the pivot 18, to any required angle. Loads can be attached in any suitable way to the outer end of the longer arm, 13.

Masts may be used to support antennae or cables or to serve other purposes and length and strength may vary with requirements.

The mast is constructed using a number of similar components and Figures 3, 4, 5 and 7 show one form of such components. Each component is a metal extrusion typically made from aluminium. Figure 4 shows the section of the extrusion which has a flat web 22, which as seen in Figures 5 and 7 has a number of spaced openings 23. Each opening is of generally rectangular shape but with one end curved. These provide successive foot steps as can be seen from Figure 3. The component in Figure 5 has three such openings 23, but the shorter component in Figure 7 has only one. Components of varying length can be constructed. Lightening holes of other shapes may be provided as required.

As seen in Figure 4, each component has two parallel lateral edges, one of which has a portion 24, of C-shape. This defines a recess 25, extending throughout the length of the component and having a mouth presented laterally of the plane 22 of the web and having an opening narrower than the maximum internal width of the recess. The mouth has opposite flat side faces 26, 27, one of which, 26, is substantially perpendicular to the plane of the web 22 and the other of which, 27, is at an angle of approximately 60° with respect to that plane.

The opposite edge of the component has an enlargement 28, of circular section. The size of the enlargement 28 is substantially equal to the internal size of the recess, 25. Adjacent components can therefore be inter-connected by engaging a projection on one of the components into the recess 25 on the other component.

The angled faces 26, 27 of the mouth of the recess allow two adjacent components to engage at any angle between 90° and 60° with respect to the plane of the web 22. A mast can be made up using three such components as seen in Figure 3, or four components can be used as seen in Figures 8 and 9. The required strength of the mast will determine whether three or four components are used.

In constructing a mast, each of the three or four sides are made up using a series of super-imposed components connected in the manner described. The junctions between super-imposed components will, however, differ between one side and the other so that there is overlap between the joints whereby the structure is securely connected together. It may be necessary to use components of different length as seen in Figures 5 and 7. For example, near the top and bottom of the mast construction, shorter or longer components may be used to ensure overlap between junctions of the components throughout the length of the mast. Figures 8 and 9 show such arrangement using four components so that the hollow figure is square.

Figures 6, 8 and 9 show alternative types of component with circular lightening holes 29, spaced along the length of the component in the web 22.

In figure 10 there is shown a beam constructed from extruded or fabricated components, each of similar type to those already described but having triangular holes 32 in their webs 30. The components are fitted together in the manner already referred to.

Figures 11 and 12 show the use of a cleat part 31 for attachment of guys or other supports. The cleat has two portions defining spaced part-circular recesses of a size to accommodate the exterior of the C-shaped portions 24 of two adjacent mast components. A connecting portion between the two recessed portions engage the edge of an adjacent component and at one end, the cleat has an eye to which a cable or other support can be attached. This arrangement is shown in use in Figure 3. The cleat can be positioned between any pair of adjacent components or can be engaged in any one of the openings 23 in the component.

Where large scale masts are constructed it may be necessary to find additional fastenings including bolts or other conventional fastening means to secure the components together, but in most cases these are not necessary.

The mast construction is particularly easy to assemble, requiring a minimum of manipulation and is very strong. Where lightweight materials are used, a strong but lightweight construction can be made up.

The beam can be used as a vertical or horizontally placed element, or can be used in any other situation as a structural member.

CLAIMS

1. A mast or beam construction including a plurality of components, characterised in that each component is of similar cross-sectional shape comprising a web with at least two parallel sides, one of said sides having a portion defining a recess extending lengthwise of the said side, the recess being presented laterally of the general plane of the web, and having a mouth narrower than the maximum internal width of the recess, and the opposite one of said sides of the component having an enlargement of a size to be retained in the recess, the mast construction being made up by inter-engagement of said components to make up a hollow figure.
2. A mast or beam construction as claimed in claim 1 characterised in that each component includes a planar web with a C-shaped portion at said one side and a circular section enlargement at the said opposite side, the C-shaped portion defining part-circular section recess which defines an opening presented laterally of the plane of the web.
3. A mast or beam construction as claimed in claim 1 or claim 2 characterised in that components have lightening holes.
4. A mast or beam construction as claimed in claim 3 characterised in that lightening holes are shaped to provide foot or hand holes.
5. A mast or beam construction as claimed in any one of the preceding claims characterised by components of such length that the junctions between superimposed components are staggered as between respective sides of the mast.
6. A mast or beam construction as claimed in any one of the preceding claims characterised in that the hollow figure is three sided.
7. A mast or beam construction as claimed in any one of claims 1 to characterised in that the hollow figure

is four sided.

8. A mast or beam construction as claimed in any one of the preceding claims characterised in that the recess is shaped to allow engagement of an adjacent component whereby the said component can extend at varying angles to the first component.

9. A mast or beam construction as claimed in any one of the preceding claims characterised by a part which can be fitted to a component to serve as a connecting means for a guy or other support.

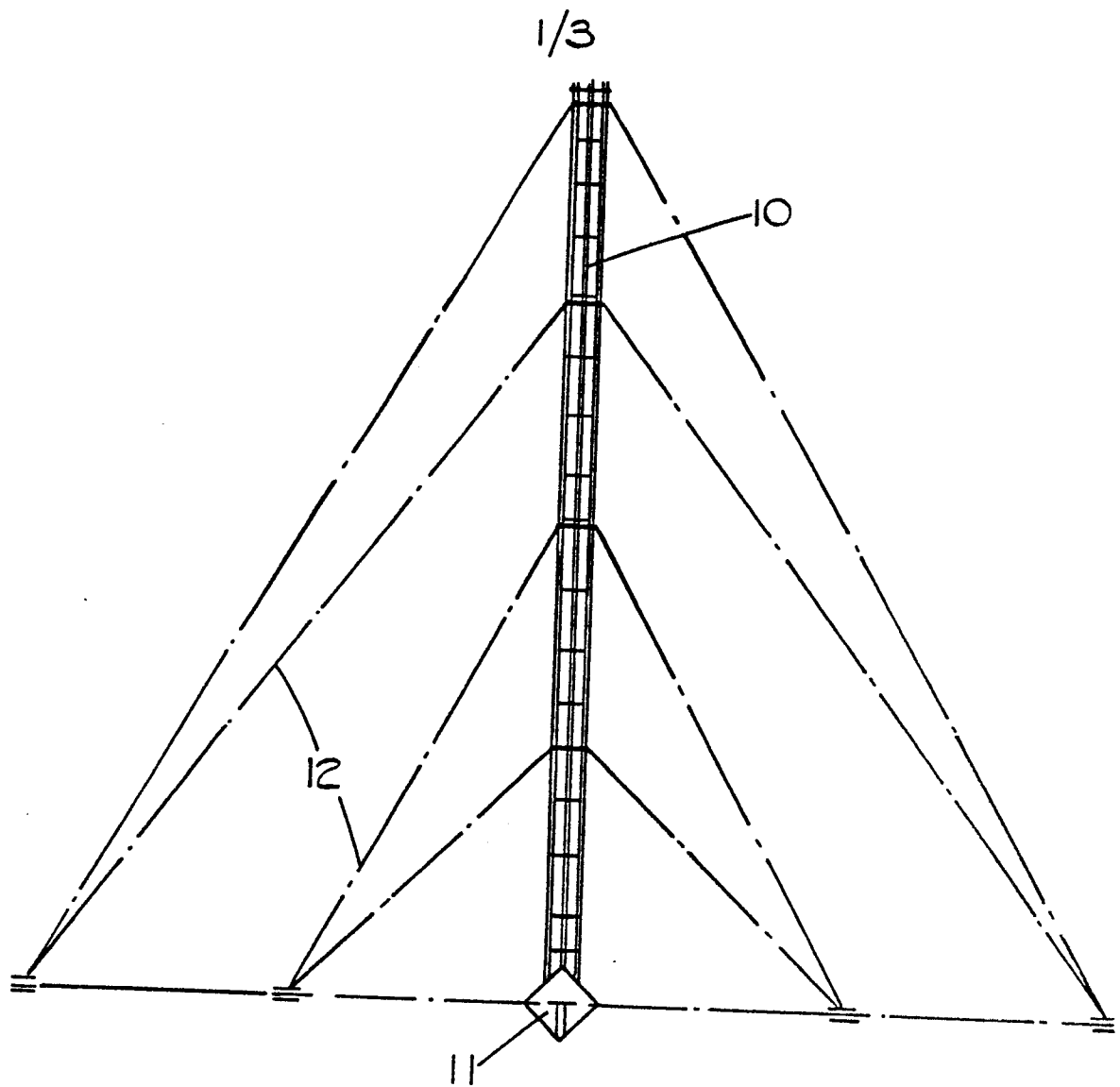


FIG. 1.

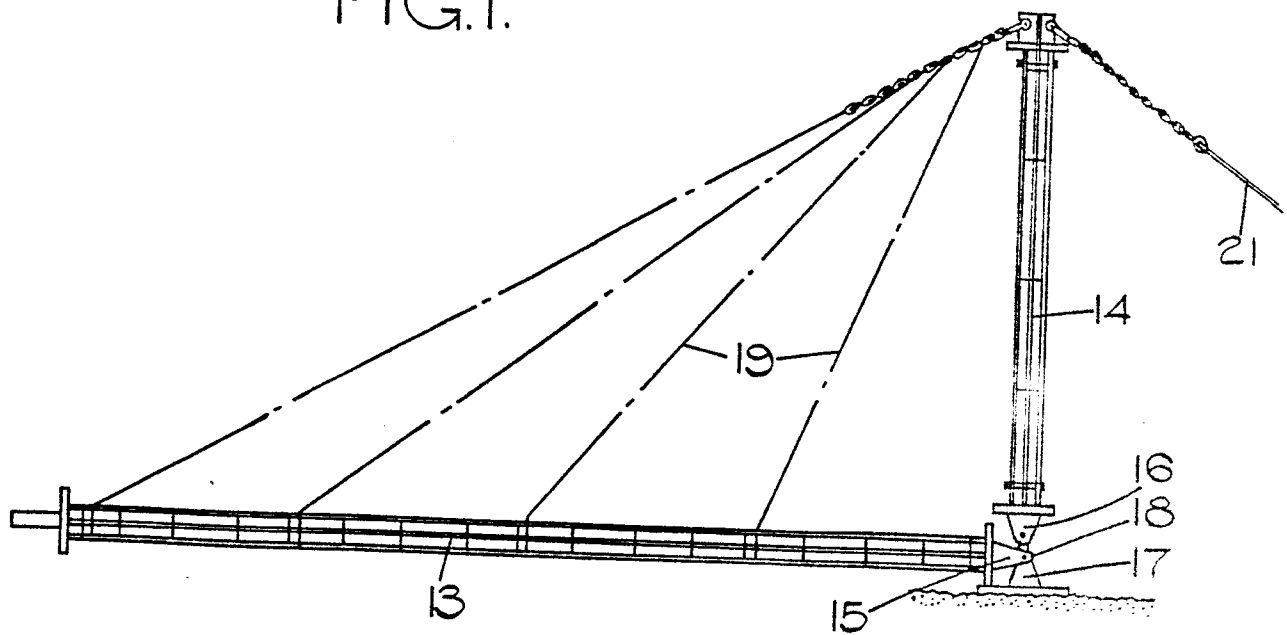


FIG. 2.

FIG.3.

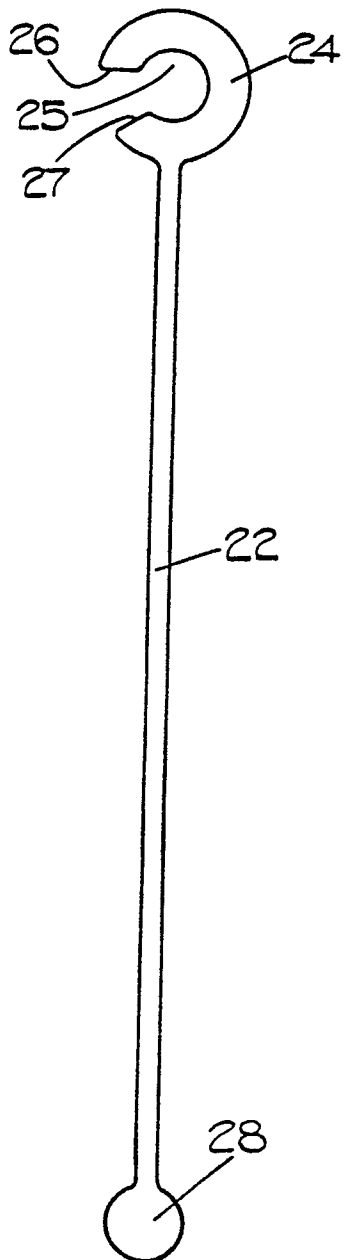
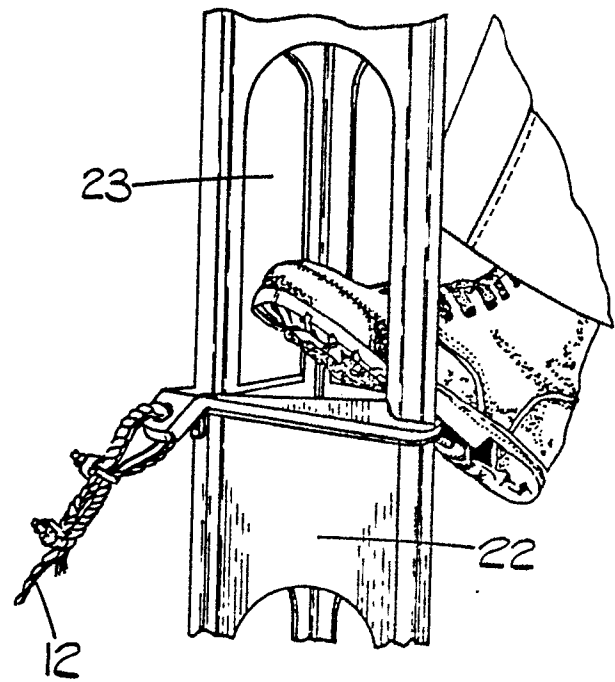


FIG.4.

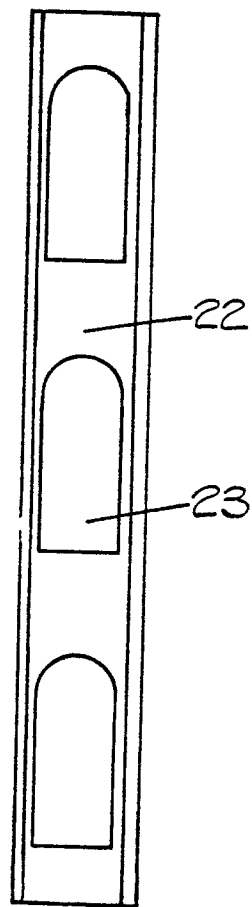


FIG.5.

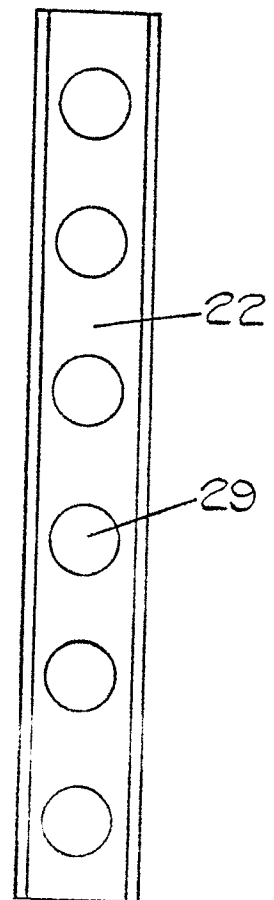


FIG.6.

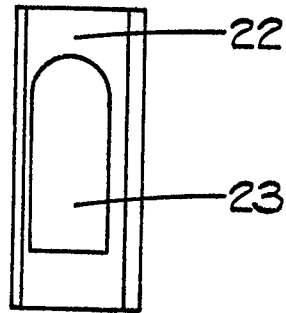


FIG. 7.

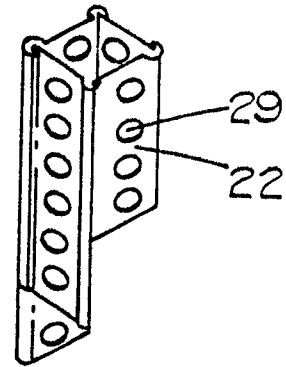


FIG. 8.

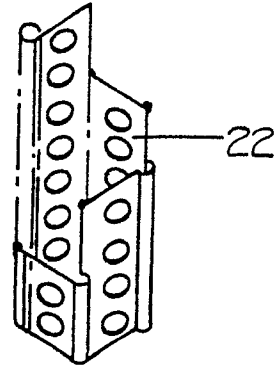


FIG. 9.

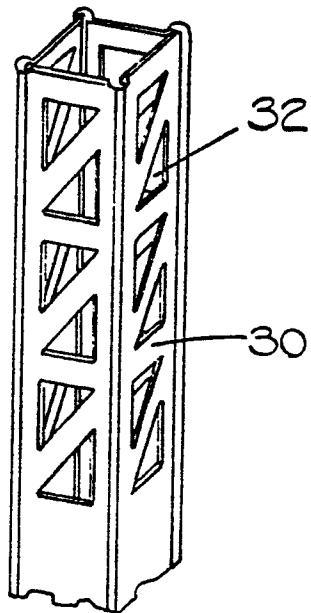


FIG. 10.

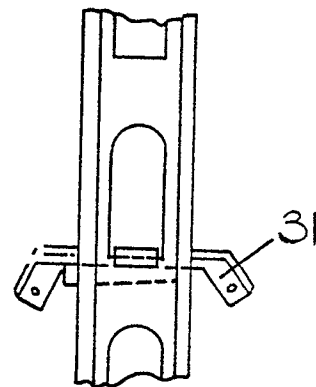


FIG. 11.

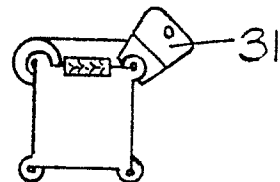


FIG. 12.