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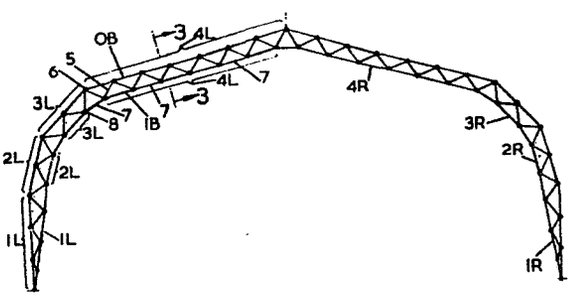
(54) Building arch.

(57) The invention is a building arch for use in constructing a frame for a building.

An arch comprises several rigid strut units (1, 2, 3, 4) each having two spaced booms (OB, IB) in pin-jointed connection with one another. One boom (OB or IB) of each unit is pin jointed directly to one boom of a successive unit to form a chain, and the other boom (IB or OB) of each same unit is connected to the other boom of the same successive unit by way of a link (7) pin jointed to the said other booms to form another chain.

Arches of different contours may be formed using strut units of the same dimensions by varying the number of strut units employed and by employing links of different lengths.



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BUILDING ARCH

The subject of this invention is a building arch, a frame for a building of a chosen length being constructed by erecting several such arches in spaced relation side by side to provide the desired length.

A building arch according to the invention comprises several rigid strut units each including two interconnected spaced booms, one boom of each strut unit being pin-jointed to a corresponding boom of a successive strut unit in the form of a chain and connecting links pin-jointed at their ends to the adjacent ends of the other booms of the strut units also in the form of a chain consisting of a boom and a connecting link occurring alternately, the lengths of the connecting links and the relative lengths of the two booms of each strut unit being chosen to provide that each two adjacent strut units are at the appropriate angle to one another to constitute chords of an arch of the desired contour.

The booms of at least selected strut units may be of the same length, whereupon the connecting links are on the outside of the arch or may be of different lengths whereupon the connecting links are on the outside or the inside of the arch depending on whether the shorter booms are placed at the outside or the inside of the arch respectively.

In one particular construction the arch is symmetrical about a centre line. In one such particular construction each half of the arch comprises four strut units connected to one another so that the angles between adjacent struts from the bottom end of the half arch to the top end are respectively 195°, 210° and 210°, the two struts of the two half arches connected at the apex of the arch presenting an angle between them of 210°.

At least selected strut units of the arch may be

made of several shorter strut units joined end to end. By this expedient irregularly shaped arches may be made up of standard length strut units. Where the two booms of each shorter unit are of the same length the shorter units may be directly pin-jointed to one another and where the booms of each unit are of different lengths the shorter booms are connected to one another by connecting links pin-jointed to the booms, the lengths of the links being chosen such that the strut units make angles of 180° with one another. In one construction the two strut units joined to one another at the top of the arch are each formed of several shorter strut units and the remaining three strut units on each side of the top of the arch forming the remainder of the arch are single strut units.

The two strut units at opposite ends of the arch may be shaped as inverted triangles when the arch is in the erected position, the apex of the triangular-shaped struts being connectible preferably by a pin joint to an anchorage.

The two booms of each strut unit may be interconnected by bracing and there may be provided a socket at each end of each boom of at least the intermediate strut units in the series forming the arch for reception of a pin, there being provided at each end of each link a socket for a pin, adjacent strut units being connected to one another by putting the appropriate sockets into register and inserting pins through the registering sockets.

Practical embodiments of the invention are illustrated in the accompanying drawings in which Fig. 1 shows one form of arch, Fig. 2 illustrates an alternative construction for an arch of the same general form as the arch of Fig. 1 and Fig. 3 is a section through the line 3-3 in Fig. 1 and Fig. 2 of one form of strut unit.

The arch illustrated in Fig. 1 is formed of

sections 1L, 2L, 3L and 4L forming one half of the arch and the other sections 1R, 2R, 3R and 4R forming the other half of the arch. Each strut unit consists of outer and inner booms OB and IB respectively connected by bracing 5. The outer booms OB are longer than the inner booms IB and are directly pin-jointed to one another at 6 and the shorter inner booms IB are connected to one another by connecting links 7 pin-jointed at their ends at 8 to the inner booms IB. The long strut units 4L and 4R are constructed of several shorter strut units connected to one another using connecting links 7 of a length appropriate to provide that the short units all make an angle of 180° with one another. The outer booms of the lowermost sections 1L and 1R are vertical and the connecting links 7 are of lengths such that the outer booms of the adjacent sections 1L and 2L and 1R and 2R are inclined at an angle to one another of 195°, the outer booms of the sections 2L and 3L and 2R and 3R are inclined at an angle to one another of 210° and the outer booms of the sections 3L and 4L are inclined at an angle to one another of 210°. The two strut units joined at the top of the arch form between them an angle of 210°. The sections 1L and 1R are of the shape of inverted right angle triangles, their apices 9L and 9R being connectible to anchorages in the ground.

An arch of the invention constructed according to Fig. 2 incorporates structural units of which the intermediate units at least have outer and inner booms OB and IB of the same length. In this construction the inner booms are directly pin-jointed to one another at 10 and each connecting link 7 connects the outer booms OB of adjacent strut units. In this construction strut units of any desired length can be constructed without the use of connecting links.

Referring now to Fig. 3 the outer boom OB and the inner boom IB are formed of rolled plates the portions 11 of which are parallel with one another and have

converging portions 12 outwardly turned at 13 to provide a supporting surface 14. The converging portions 12 and the outwardly turned portions 13 form a dove-tail construction suitable for receiving an anchorage bar for attachment of a covering sheet. The flanges 15 and 16 are there merely for stiffening purposes and may have configurations other than that shown. The booms OB and IB are connected by the bracing 5.

In practice, a building of any desired width and height can be constructed from a few standard forms of strut. For example a building wide with respect to its height can be constructed as illustrated in Fig. 1 by forming the sections 3L and 4R of a number of shorter strut units. By eliminating one or two of the shorter strut units the building can be reduced in width. A building of the same width but of greater height can be built by making the sections 2L and 2R, for example, of several shorter strut units. The pin joints used to connect the various sections to one another make for easy construction while at the same time providing high strength and rigidity.

The arches may be connected to one another by bracing which may include wind bracing. Additionally or alternatively they may be connected by purlins laid across the outer booms OB or the inner booms IB, the purlins also acting as supports and connecting means for cladding which may be flexible sheets or rigid sheets, for example sheets of metal or non-metallic material.

CLAIMS

1. A building arch made up of several rigid strut units (1,2,3,4) each including two interconnected spaced booms, (IB,OB) characterized in that one boom only of each strut unit is pin-jointed (6 or 10) to a corresponding boom of a successive strut unit in the form of a chain and that connecting links (7) are pin-jointed at their ends (8) to the adjacent ends of the other booms of the strut units also in the form of a chain consisting of a boom and a connecting link occurring alternately, the lengths of the connecting links (7) and the relative lengths of the two booms (IB,OB) of each strut unit being such as to provide that each two adjacent strut units are at the appropriate angle to one another to constitute chords of an arch of the desired contour.

2. A building arch according to claim 1, characterized in that the booms of at least selected strut units are of the same length.

3. A building arch according to claim 1, characterized in that the booms of at least selected strut units are of different lengths.

4. A building arch according to claim 1, characterized in that the arch is symmetrical about a centre line and each half of the arch comprises four strut units (1,2,3,4) connected to one another so that the angles between adjacent struts from the bottom end of the half arch to the top end are respectively 195°, 210° and 210°, the two strut units of the two half arches connected at the apex of the arch presenting an angle between them of 210°.

5. A building arch according to claim 1, characterized in that at least selected strut units of the arch are made of several shorter strut units joined end to end.

6. A building arch according to claim 1, characterized in that the two strut units (1L,1R) at opposite ends of the arch are shaped as inverted triangles when the arch is in the erected position, the apex (9L,9R) of the triangular spaced strut units being connectible to an anchorage.

7. A building arch according to claim 1, characterized in that at least one boom of at least selected strut units is formed of two rolled plates having portions (11) fastened to opposite sides of bracing bars (5) arranged to interconnect the two booms so that said portions (11) are parallel with one another and other portions (12) which project beyond the bracing bars converge to form a dove-tail shape suitable for receiving an anchorage bar for attachment of a covering sheet.

8. A building arch according to claim 7, characterized in that the tip portions (13) of the converging portions of the rolled plates are outwardly turned away from one another to form two flanges (14) lying in the same plane.

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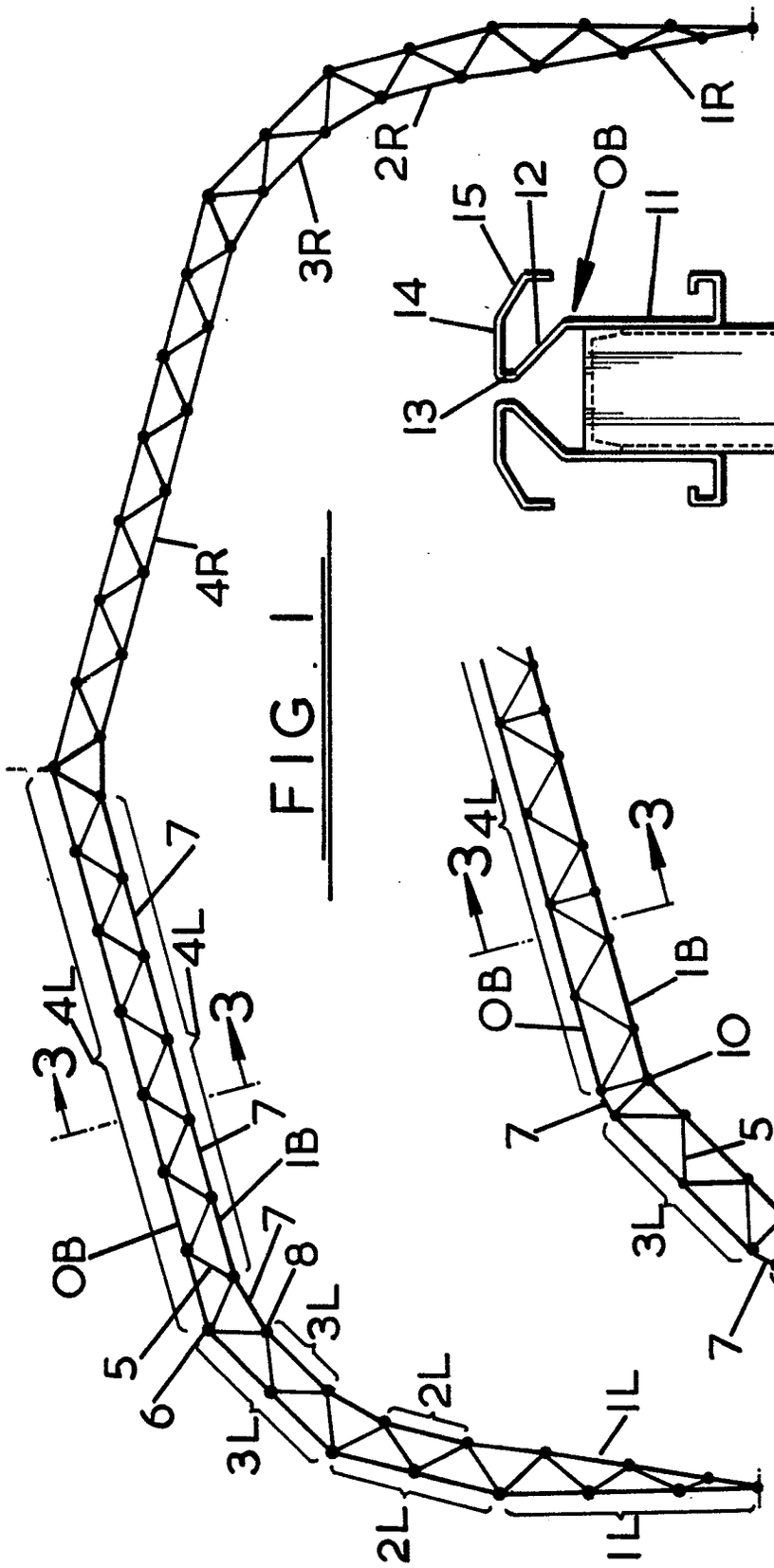

FIG. 1

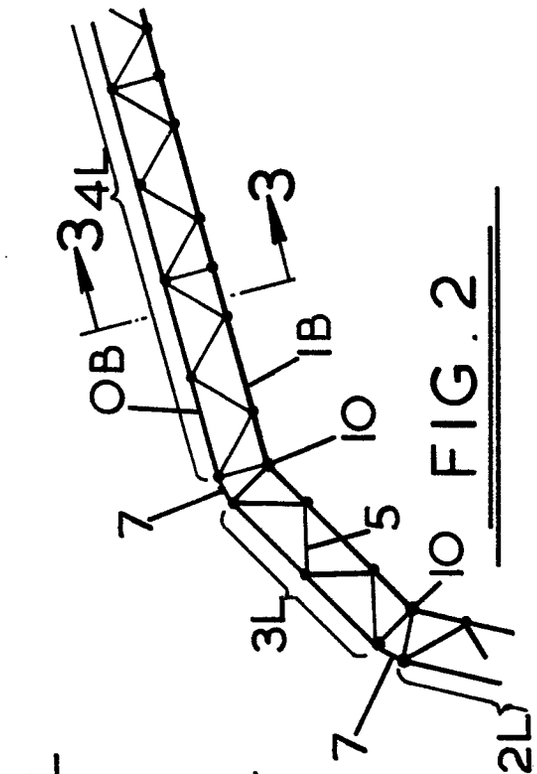

FIG. 2

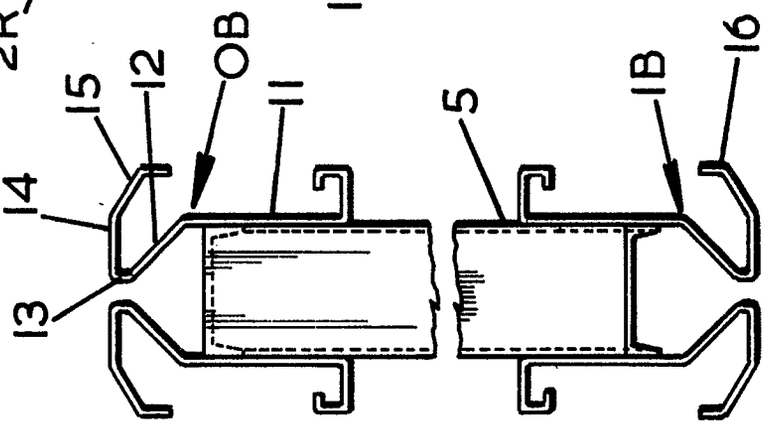

FIG. 3