July 12, 1949. W. HAMILTON 2,475,890

FORMWORK FOR MOLDING CONCRETE COLUMNS AND THE LIKE

Filed Sept. 4, 1946 3 Sheets-Sheet 1

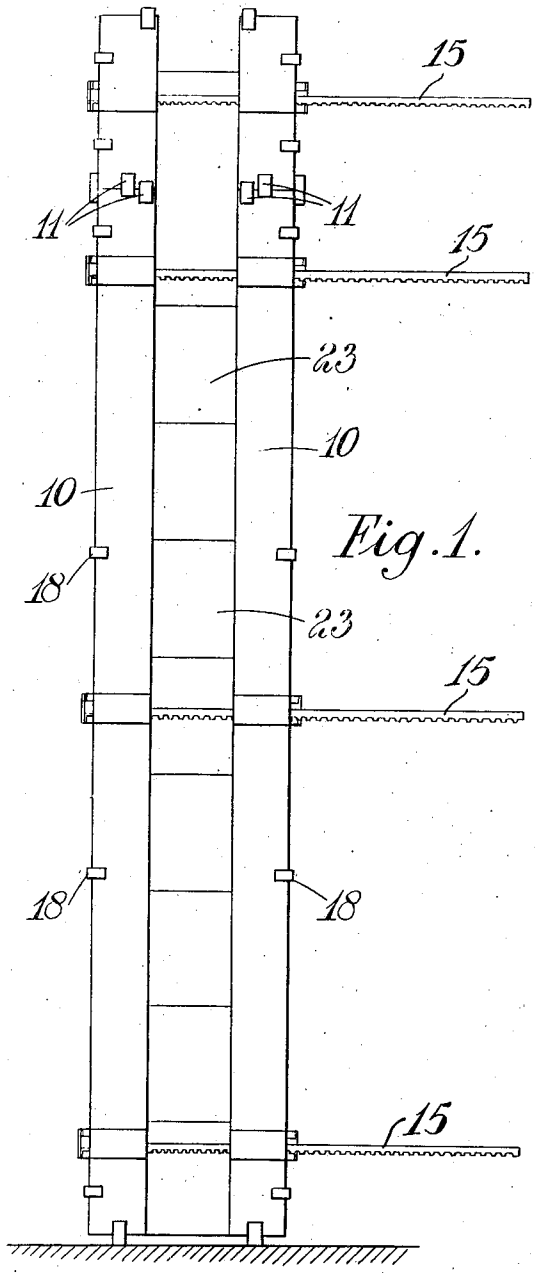


Fig. 1.

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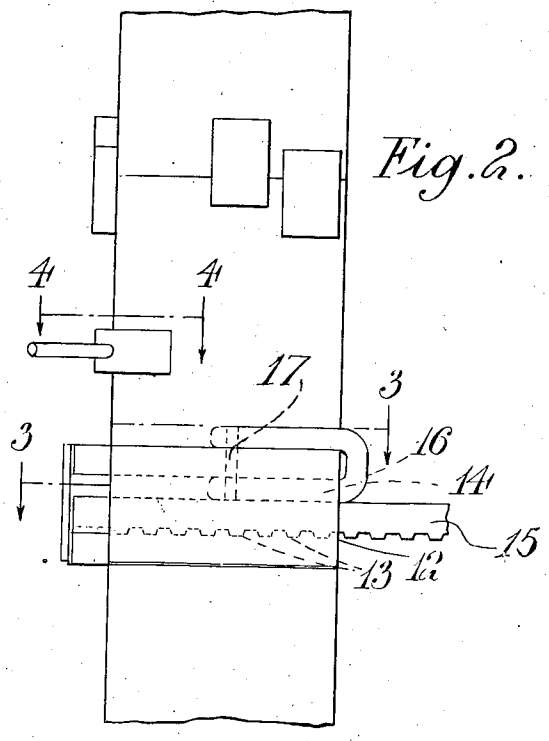


Fig. 2.

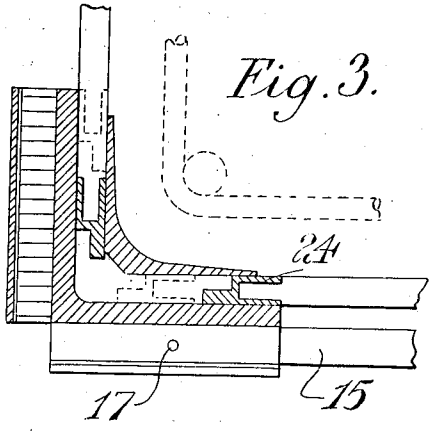


Fig. 3.

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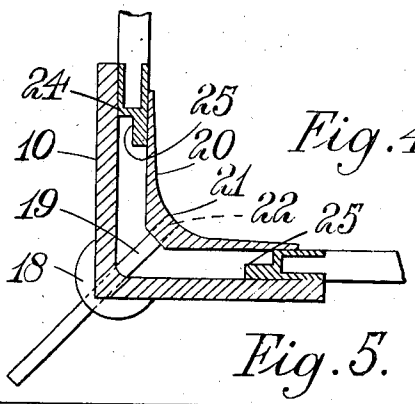


Fig. 4.

Fig. 5.

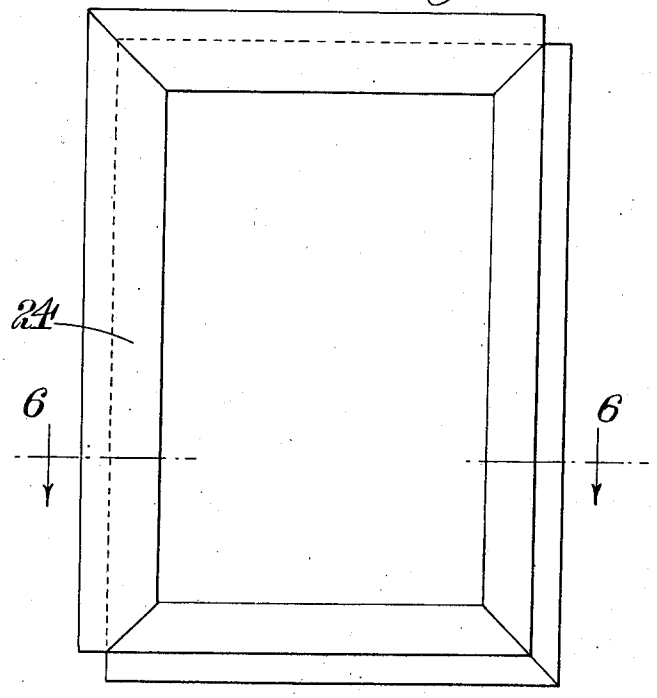
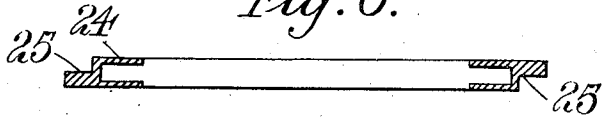


Fig. 6.



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Patented July 12, 1949

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UNITED STATES PATENT OFFICE

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FORMWORK FOR MOLDING CONCRETE COLUMNS AND THE LIKE

William Hamilton, Frimley Green, England

Application September 4, 1946, Serial No. 694,763
In Great Britain June 11, 1945

Section 1, Public Law 690, August 8, 1946
Patent expires June 11, 1965

1 Claim. (Cl. 25—131)

1

This invention relates to formwork or shuttering such as is used for casting in situ concrete and like structures and has for its object to provide formwork for the casting of columns, a particular object of the invention being to provide standardised parts which enable a variety of sizes of column to be cast, and which shall provide for the simple erection and assembly of the formwork, whilst ensuring that all the parts are firmly secured together when in use.

According to this invention, a formwork for moulding concrete and like columns comprises external angle-pieces arranged at the corners of the formwork, the limbs of each of which angle-pieces are each provided with one or more toothed external ledges extending towards an adjacent corner, one or more toothed locking bars extending across each side of the formwork and each engaging a toothed ledge on each of two angle-pieces, and panels each side of the formwork retained between two of said angle-pieces.

Internal angled fillets may be arranged to be supported in spaced relationship with said external angle-pieces so as to clamp between them the edges of said panels.

A number of angle-pieces may be arranged end to end, which ends are provided with co-operating lugs and sockets whereby the angle-pieces are aligned.

A number of panels on each side of the formwork may be arranged one above the other, and opposite edges of said panels may be recessed so that adjacent panels may overlap one another while maintaining their faces in alignment.

The aforesaid angle-pieces may be provided with projections overlying said ledges and removable locking means may be arranged for insertion between said projections and locking bars for maintaining said locking bars in engagement with the toothed ledges.

The aforesaid angled fillets may be each secured to their co-operating external angle-pieces by bolts arranged diagonally through their respective angles to provide for the simultaneous clamping of panels against both limbs of the angle-pieces.

The aforesaid panels may comprise a metal frame surrounding a sheet of plywood or the like.

The following is a description of one embodiment of the invention as applied to a formwork for casting a solid column, reference being made to the accompanying drawings in which:

Figure 1 is a side elevation of the general assemblage,

Figure 2 is an enlarged side view of a portion

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of two angle-pieces arranged end to end showing a locking bar assembled with one of the ledges,

Figure 3 is a section on the line 3—3 of Figure 2,

Figure 4 is a section on the line 4—4 of Figure 2,

Figure 5 is a face view of one of the panels and

Figure 6 is a section on the line 6—6 of Figure 5.

It will be assumed, for the sake of clarity, that the column is vertical and the formwork will be described in this setting. The external angle-pieces are constituted by aluminium angles 10 which may be, for example, of the order of 6 feet in height and they are provided on the outside at each end with lugs 11 which overlap the outside of the end of an adjacent angle-iron, thereby ensuring accurate alignment and rigid connection between the angle-iron. On the outer faces of each angle-piece there are formed a number of ledges 12 which are spaced apart lengthwise at suitable positions, and these ledges are toothed or serrated at 13, for example, with rectangular grooves, which may be about ¼ inch wide and $\frac{3}{16}$ of an inch deep, spaced ¼ inch apart. Each of these toothed surfaces has an overlying ledge 14 facing and spaced away from it, the two ledges 12 and 14, for example, constituting a pocket and they are disposed at their length transverse to the length of the angle-pieces. Toothed locking bars 15 which are shaped to engage with the toothed ledges are provided, and these may be of a length of the order of 2 feet 6 inches, and they can be adjustably engaged towards each end with two angle-pieces 10 to space them apart by any desired distance, and also to hold them rigidly when they are spaced by the interengagement of the bars with the teeth. When the locking bars have been assembled in place, they are securely retained therein by means of wedging pieces 16 which are inserted between the bar and the ledge opposite to the toothed ledge so as to hold the locking bar against displacement; these wedging pieces are conveniently made in the form of U-shaped clips which engage the outer surface of the untoothed ledge 14, and means may be provided for retaining them in place, for example, by a pin passing through holes 17 in the limbs of the clip and ledge 14.

On the outer corner of the angle-piece there are provided bosses 18 spaced at convenient points along the length, and these bosses are drilled so that the centre line of the whole bisects the angle between the two limbs of the angle-pieces to permit the insertion of a bolt 19 there-through, the threaded end of the bolt extending outside the

anglepiece to receive a butterfly nut (not shown) screwed down onto the boss.

Angled fillets **20** are used with each of the angle-pieces and are preferably made of a light metal alloy, and are curved at **21** on their inner faces to a suitable curvature which will constitute the mould for the corner of the concrete column, and these fillets are secured in place by the diagonal bolts **19** aforesaid which are screwed into the fillet at the corner thereof at **22** so that the external surfaces of the fillet when thus assembled are parallel with the internal surfaces of the angle-piece.

There are also provided panels **23** to fill the gap between two angle-pieces when spaced apart, and these panels are of rectangular oblong form. Their dimensions are so chosen as to provide a suitable range by setting the panels with their long edges either vertical or horizontal; thus, for example, the panels may be 8 inches in width and 11 inches in length. The edges of these panels are gripped between the angled fillet **20** and the angle-piece **10**, and these latter are made of such dimensions as to allow a tolerance of, say, 1½ or 2 inches in the depth to which the panel is inserted between them. When the panels are inserted with their length vertically, that is to say their dimensions of 8 inches between two angle-pieces, and there is a tolerance of 1½ inches on each angle-piece, a column of 8 inches in width can be formed, or by utilising the 1½ inch tolerance on each angle-piece any other dimension up to 11 inches in width can be achieved. A further range of width from 11 inches to 14 inches can be obtained by inserting the panels with their length between the angle-pieces so that any width of column from, say, 9 inches to 15 inches can be obtained with the one set of parts as above described.

The same angle-pieces can be used for larger columns by providing an alternative set of panels of which the dimensions may be of the order of 14 inches by 17 inches, thereby enabling columns of width up to 21 inches to be formed.

In order to provide a rigidity for the different panels when assembled in the angle-pieces, the panels are formed with metal frames **24**, preferably a light alloy with a plywood filling, and the

metal frames on opposite sides of the panel are recessed at 25 from opposite faces of the panel so that when two panels are assembled one above the other their edges interlock and ensure a rigid and truly aligned surface for the mould.

Scaffolding, such as tubular scaffolding, may be used for holding the column in position, and the concrete is poured into the formwork from the top of the column. The assembly permits vibration of the concrete and this may be effected by any suitable attachment.

It will be seen that this invention provides a standardized set of parts for the formwork which includes a wide variety of work to be done and that the erection and dismantling are very simple, quick and cheap, thereby considerably expediting the work.

I claim:

A formwork for moulding concrete and like columns comprising external angle-pieces arranged at the corners of the formwork so as to extend along the height thereof the limbs of each of which angle-pieces has fixed thereto one or more toothed external ledges extending towards an adjacent corner, and a projection overlying and spaced away from said ledge, one or more locking bars toothed at both ends and extending across each side of the formwork and each engaging the toothed ledges on each of two angle-pieces and locking means inserted between each said overlying projection and the locking bar beneath it, and panels on each side of the formwork retained between two of said angle-pieces and unattached to said locking bars.

WILLIAM HAMILTON.

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