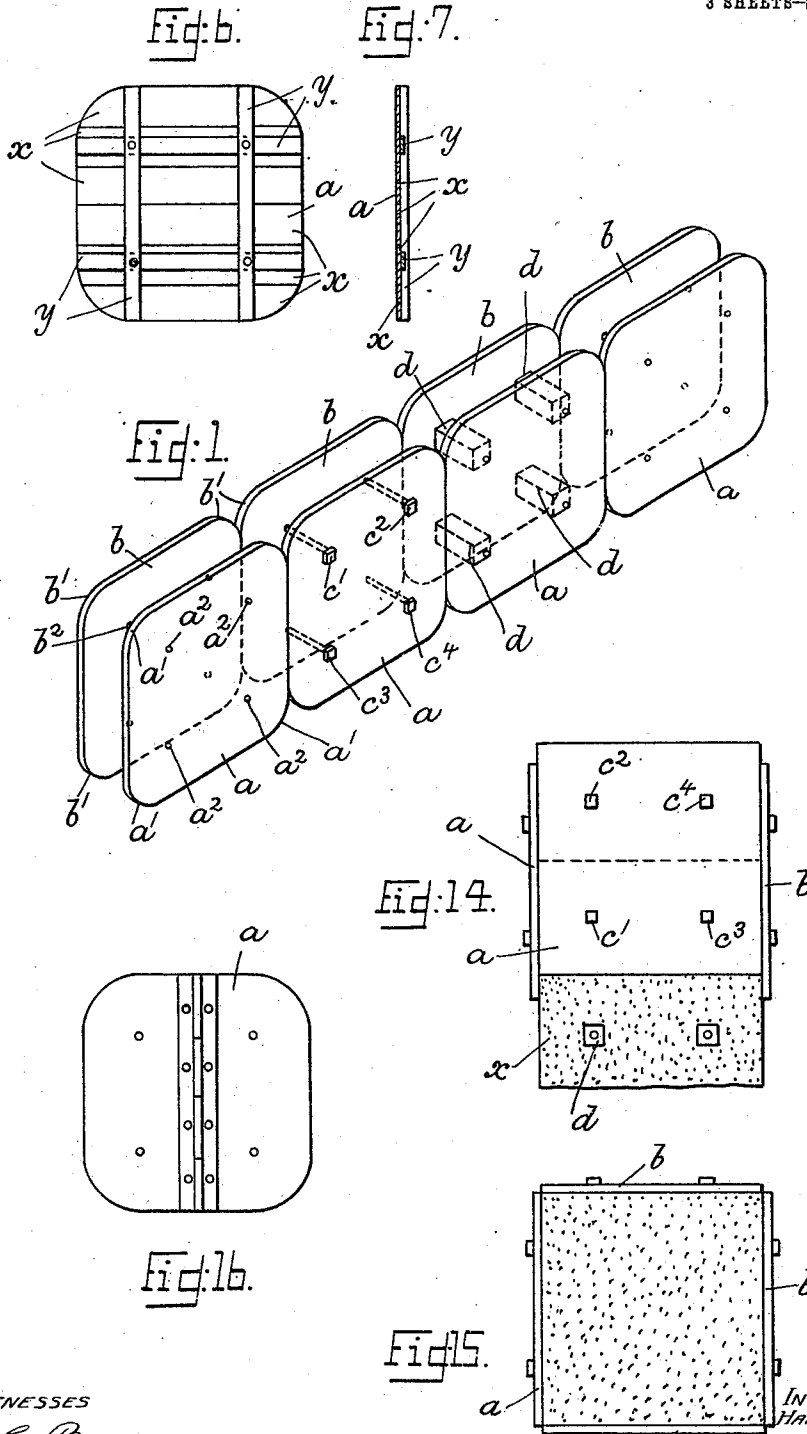


H. FRENCH.
 APPARATUS FOR CASTING CONCRETE STRUCTURES.
 APPLICATION FILED MAY 3, 1910.

975,943.

Patented Nov. 15, 1910.

3 SHEETS—SHEET 1.



WITNESSES
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E. M. Callaghan

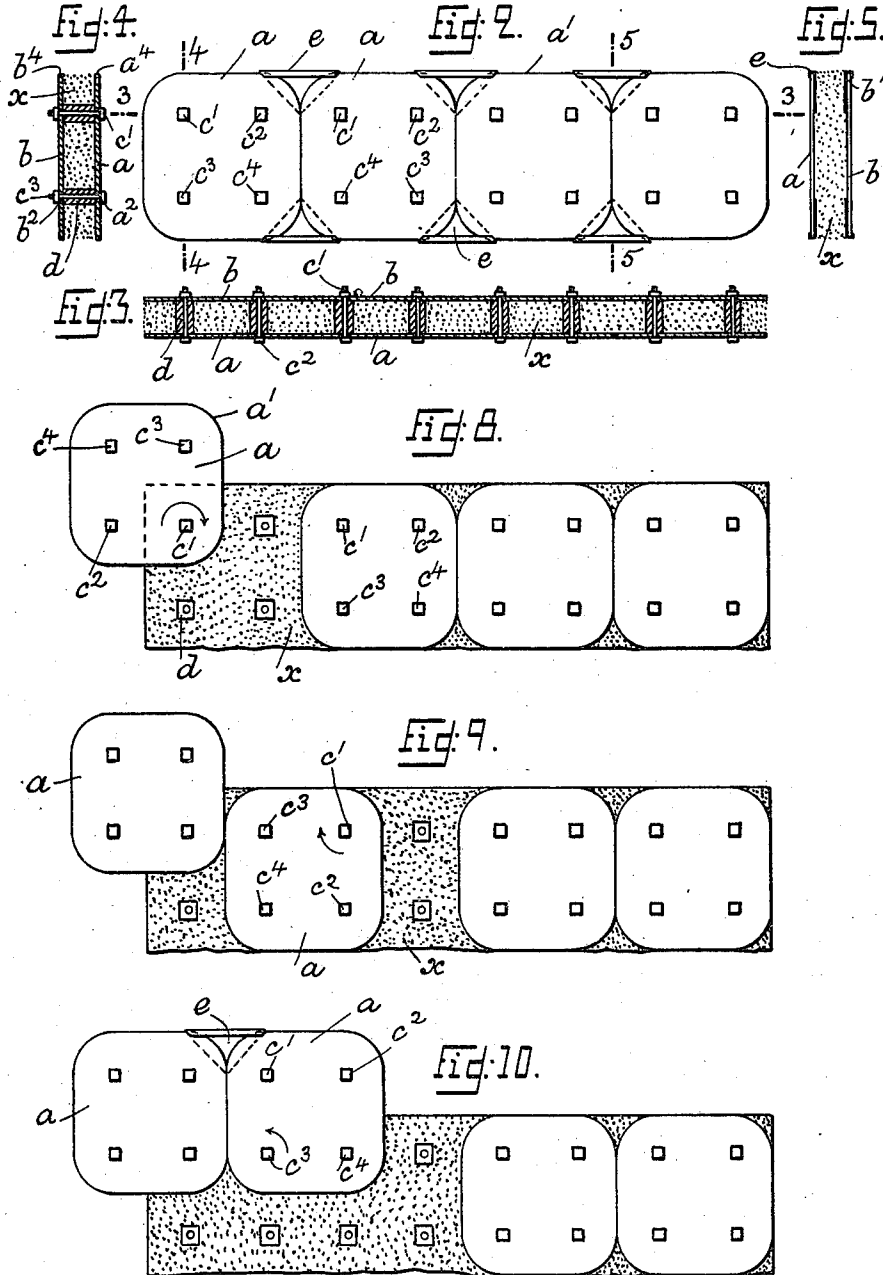
Fig. 15.
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 11.

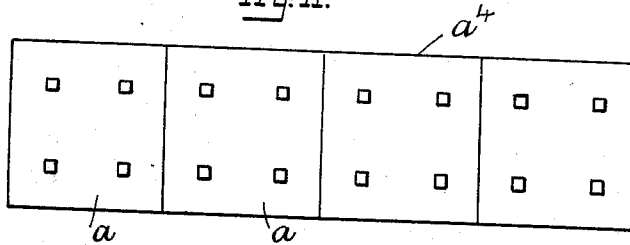


Fig. 12.

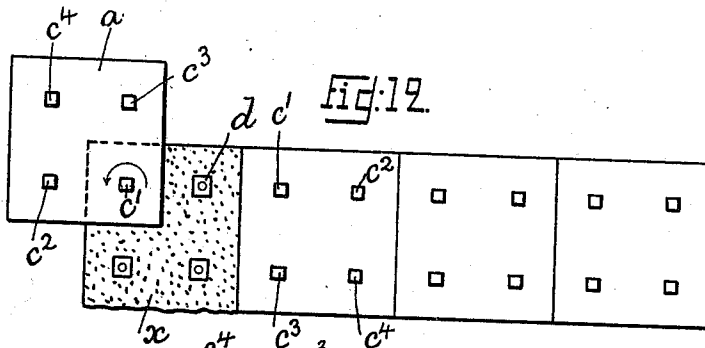


Fig. 13.

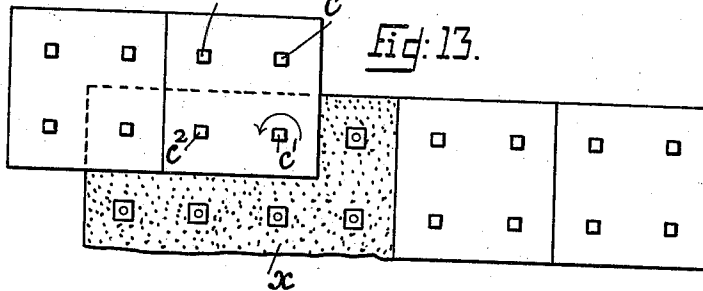


Fig. 17.

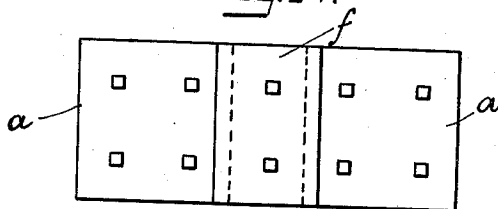
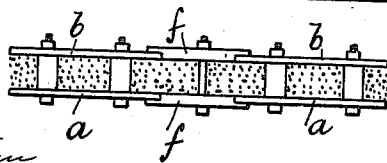


Fig. 18.



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UNITED STATES PATENT OFFICE.

HAROLD FRENCH, OF LONDON, ENGLAND.

APPARATUS FOR CASTING CONCRETE STRUCTURES.

975,943.

Specification of Letters Patent.

Patented Nov. 15, 1910.

Application filed May 3, 1910. Serial No. 559,103.

To all whom it may concern:

Be it known that I, HAROLD FRENCH, a subject of the King of Great Britain and Ireland, and a resident of London, England, have invented certain new and useful Improvements in Apparatus for Casting Concrete Structures; and I do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to improvements in forms for casting concrete, ferro-concrete and the like walls, solid or hollow, and also floors and roofs.

According to the customary methods of construction the forms consist of boards and battens, the latter forming the framing to support the former, and bolts or stays of wood are used to hold the sides of the form in place. As soon as a section of concrete is completed the bolts or stays are loosened and the form which is slotted is bodily lifted upward or the stays and form are taken down and reerected. Such forms are, however, of disadvantage in practice in that it is inconvenient to bodily lift them or to take them down and reerect them in new position, and in that a considerable amount of labor is required in so doing and in adjusting them, and in that they are liable to get out of square so that the wall becomes out of the perpendicular or the surface of the floor or roof becomes uneven.

This invention has for its objects, *inter alia*, to avoid such disadvantages.

According to the present invention the forms are constructed of a plurality of sections, preferably of square shape with or without rounded corners. The sections serve as the sides of the form, and are arranged in vertical horizontal or inclined planes, in opposite rows, one for each side of the form, and are secured in position by or with the aid of bolts passing through opposite sections in the two rows in conjunction with distance pieces. The bolts are so arranged that, after one section of the concrete has been filled in and is completed, by removing all the bolts, excepting one, securing each form section and loosening the remaining bolt each form section may be turned or partly rotated on this bolt in a plane parallel to the wall or the like, which operation is comparatively easily performed the weight of the form section being borne by the bolt as a pivot, so as to bring the form

sections one at a time by one or more turns or part rotations into new positions so that the form sections project beyond the completed concrete section and serve as a form for a new concrete section and partially overlap the already formed concrete section whereby true alinement and squareness of the wall or the like is insured, the operation being repeated until the wall or the like is completed.

The invention is illustrated in the accompanying drawings, in which:—

Figures 1 to 13, and 17 and 18 represent the application of the invention to the construction of concrete walls, Figs. 14 and 15, represent the application of the invention to the construction of piles or columns, and Fig. 16 is a detail of a modification. Fig. 1 is a perspective view; Fig. 2 is a side elevation; Fig. 3 is a sectional plan on 3—3, Fig. 2; Fig. 4 is a vertical section on 4—4, Fig. 2. Fig. 5 is a vertical section on 5—5, Fig. 2. Figs. 6 and 7 are respectively a side elevation and a sectional elevation. Figs. 8, 9 and 10 are side elevations. Figs. 11, 12 and 13 are side elevations of a modification. Figs. 14 and 15 are respectively a side elevation and a plan. Fig. 16 is a side elevation. Figs. 17 and 18 are respectively a side elevation and a plan.

In one manner of carrying out the invention represented in Figs. 1 to 10, as applied to the construction of a wall by way of example, the form sections, *a*, *b*, are made of square shape with rounded corners, *a*¹, *b*¹, and each section, *a*, on the one side is secured to a section, *b*, on the opposite side by four bolts, *c*¹, *c*², *c*³, *c*⁴, passing through holes, *a*², *b*², in the sections which are concentric with the rounded corners and also through blocks, or distance pieces, *d*, placed between the opposite sections, *a*, *b*. Having arranged two opposite rows in this manner Figs. 1 and 2, so that one edge of each section, *a*, *b*, rests on the ground or other foundation and so that the sections in each row are adjacent to one another to form two continuous rows, the concrete, *w*, is filled in the form in customary manner so as to embed the blocks bricks or distance pieces and hold them in position. After setting and when it is desired to add another section of concrete on the top of the completed section, the form sections may be raised by turning them in the following

manner which is given by way of example, but it will be obvious that the form-sections may be turned in various other ways to raise them. Speaking relatively to facing the wall:—All the bolts, c^2 , c^3 , c^4 , excepting the top left-hand one, c^1 , of the end form section on the left are removed and the section, a , is turned clockwise half a circle about the bolt, c^1 , which will raise the section to a new position above and partly to the left of that it formerly occupied, see Fig. 8. The opposite section, b , is similarly turned and then both are secured in position by inserting all the bolts and placing new distance pieces. This assumes there is no end wall which prevents the end form sections from being turned. The second form section from the left hand end is then turned about its top left hand bolt, c^1 , one quarter of a circle clockwise, see Fig. 9, and then about a bolt inserted through its now top left hand corner, c^3 , a quarter of a circle counterclockwise, see Fig. 10. This brings the second section into a raised position adjacent to the first section. The opposite second section, b , is similarly turned, and then both the second sections are secured in position by inserting all their bolts and placing new distance pieces. The remaining sections are then moved in a similar manner to the second sections. As regards the first sections it will be noted that a hole will require to be made in a suitable support (not shown) to accommodate the lower bolt, c^2 , which is inserted after the section is turned or a support (not shown) will require to be made for each bolt, but as regards the other sections the holes through the distance pieces already in fixed position (or made by the bolts themselves in the concrete) may be utilized, if the distance pieces or holes are equi-spaced.

When the corners are rounded as just described, the form sections can be turned on their bolts as pivots without being moved laterally away from the wall but when the corners are square the sections must be moved sufficiently laterally to clear the adjacent sections and the bolt heads, the bolts being made of a suitable length. If the sections in either case are moved laterally, each section can be moved in one operation to a new position directly above its former position by giving it a quarter turn about either of its upper bolts.

Although I have described a form having two opposite rows of sections, it will be understood that in constructing a retaining wall or the like, and other concrete structures only one row of sections on one side would be required.

The bolts may be worked from one side of the form only, by fixing the nuts in the blocks or sections on the opposite side of the form, and in such case it is advantageous to

have the ends of the bolts tapered or pointed to facilitate engagement with the nuts or threads.

When the sections are made with rounded corners, filling pieces, e , of zinc or the like are used to prevent the concrete from having an uneven surface or from escaping.

As no battens require to be used, the top edges, a^1 , b^1 , of the form-sections may be utilized as rails for a truck containing concrete to be run along.

It will be obvious that my invention is not confined to the use of square form-sections, and that oblong or other suitably shaped form sections may be used. It will also be obvious that my invention is equally well applicable to constructing concrete piles, columns, piers, or the like, see Figs. 14 and 15. As shown a single section on each of the four or other number of sides of the pile is moved upward by turning it about one of its securing bolts. To facilitate this, adjacent sections do not overlap one another at the edges, a^3 , b^3 . It will also be obvious as aforesaid that my invention is equally well applicable to constructing floors, roofs, flat or sloping, and the like, in which case the bolts may pass through prepared holes in beams, joists, rafters, or the like, of any material and the form-sections are turned in the horizontal or inclined planes in which they lie about their securing bolts as centers as before described, the beams, joists, rafters or the like acting also as distance pieces.

Figs. 6 and 7 illustrate suitable details of construction of a form section, but I do not confine myself to any particular construction thereof. In the construction shown the form section is made up of a plurality of boards, x , held together by means of cross pieces, y , suitably secured thereto, the cross pieces being provided with bolt holes at their points of intersection.

Fig. 16 illustrates a modified form of form section formed of pieces hinged together. This feature is of advantage in various circumstances such as where an end wall or a beam girder or the like obstructs the free turning of the sections.

In the arrangement shown in Figs. 17 and 18 the adjacent form sections in each row are not placed in contact with one another but are spaced apart and auxiliary intermediary form pieces, f , are used. These latter may be held in position by bolts or in other suitable manner and may be made smaller than the form sections, a , b , to enable them to be conveniently removed and readjusted to new positions. The sections, a , b , and the pieces, f , may engage by a lap joint as shown.

What I claim as my invention and desire to secure by Letters Patent is:—

1. A form for casting concrete, ferro-con-

crete and the like structures, comprising a form section having transverse through holes, and removable bolts passing through said holes for securing the form section in position, the form section having a plain inner surface and being adapted to be rotated on the bolts parallelly to the surface of the concrete structure so as to bring the form section into a new position overlapping that formerly occupied, substantially as described.

2. A form for casting concrete, ferro-concrete, and the like structures, consisting of a plurality of rectangular form sections arranged in opposite rows and having transverse through holes adjacent to the corners, distance pieces separating opposite form sections, and removable bolts passing through said holes for securing the form sections in position, the form sections having plain inner surfaces and being adapted to be moved on the bolts parallelly to the surface of the concrete structure so as to bring the form sections into new positions overlapping those formerly occupied, substantially as described.

3. A form for casting concrete, ferro-concrete and the like structures, consisting of a plurality of form sections of rectangular shape with rounded corners and having transverse through holes adjacent to the corners, and removable bolts passing through said holes for securing the form sections in position, the form sections having plain inner surfaces and being adapted to be rotated on the bolts in the plane in which they normally lie so as to bring the form sections into new positions overlapping those formerly occupied, substantially as described.

4. A form for casting concrete, ferro-concrete, and the like structures, consisting of a plurality of form sections having rounded corners arranged in opposite rows, one for each side of the form, distance pieces separating opposite form sections, and removable bolts passing through said form sections concentric with said rounded corners and through said distance pieces, the form sections having plain inner surfaces and being adapted to be rotated on the bolts in the plane in which they normally lie so as to bring the form sections into new positions overlapping those formerly occupied, substantially as described.

5. A form for casting concrete, ferro-concrete, and the like structures, consisting of a

plurality of form sections of rectangular shape with rounded corners and having transverse through holes adjacent to the corners, filling pieces between the corners of adjacent sections, and removable bolts passing through said holes for securing the form sections in position, the form sections having plain inner surfaces and being adapted to be rotated on the bolts in the plane in which they normally lie, so as to bring the form sections into new positions overlapping those formerly occupied, substantially as described.

6. A form for casting concrete, ferro-concrete, and the like structures, comprising a plurality of form sections having plain inner surfaces and transverse through holes, removable bolts passing through said holes for securing the form sections in position, intermediary form pieces placed between adjacent sections and engaging them with lap joints, and means for holding the intermediary pieces in position, substantially as described.

7. A form for casting concrete, ferro-concrete, and the like structures, comprising a form section having a plain inner surface and transverse through holes and made of a plurality of pieces hinged together, and removable bolts passing through said holes for securing the form section in position, the form section being adapted to be rotated on the bolts so as to bring the form section into a new position overlapping that formerly occupied, substantially as described.

8. A form for casting concrete, ferro-concrete, and the like structures, consisting of a plurality of form sections having plain inner surfaces and transverse through holes, the holes in the respective individual sections and in the respective pairs of adjacent sections being equi-spaced, and removable bolts passing through said holes for securing the form sections in position, the form sections being adapted to be rotated on the bolts so as to bring the form sections into new positions overlapping those formerly occupied, substantially as described.

In testimony whereof I affix my signature, in presence of two subscribing witnesses.

HAROLD FRENCH.

Witnesses:

ALFRED DAY,
ARTHUR WALTER DAY.