

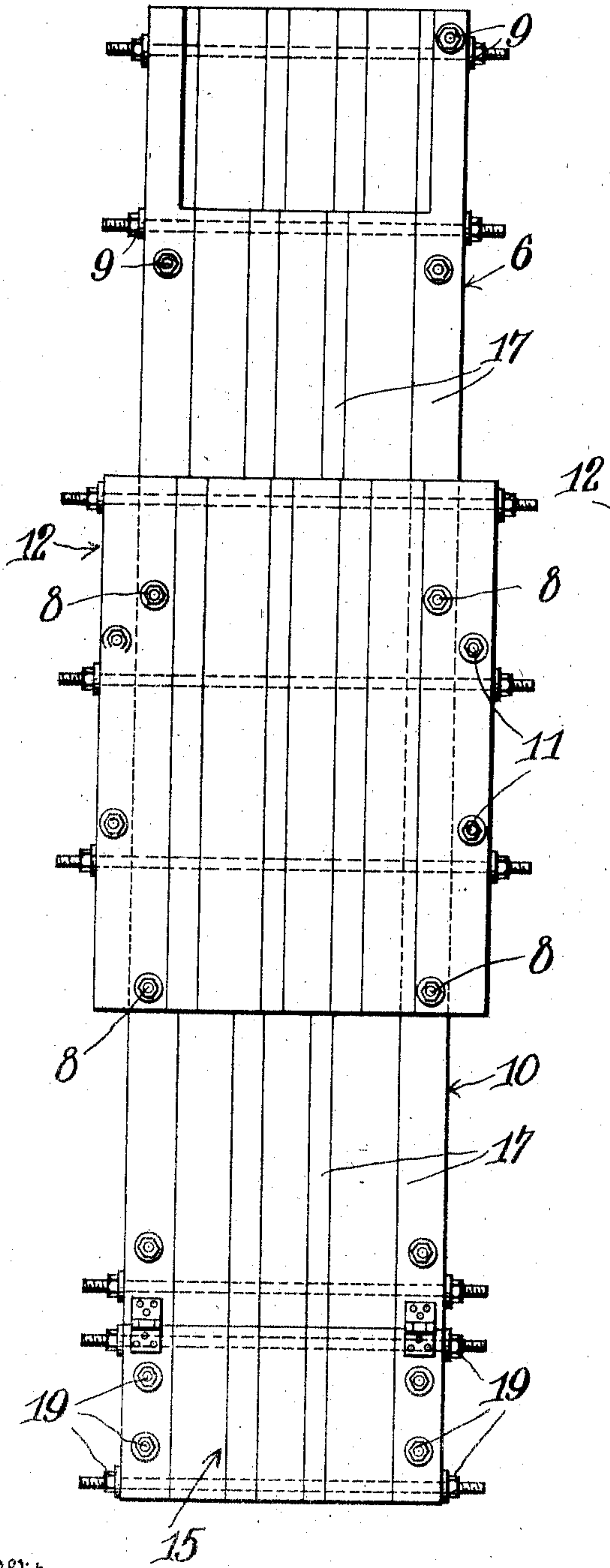
No. 864,767.

PATENTED SEPT. 3, 1907.

J. D. BICKFORD.
BUILDING MOLD.
APPLICATION FILED APR. 9, 1907.

3 SHEETS—SHEET 1.

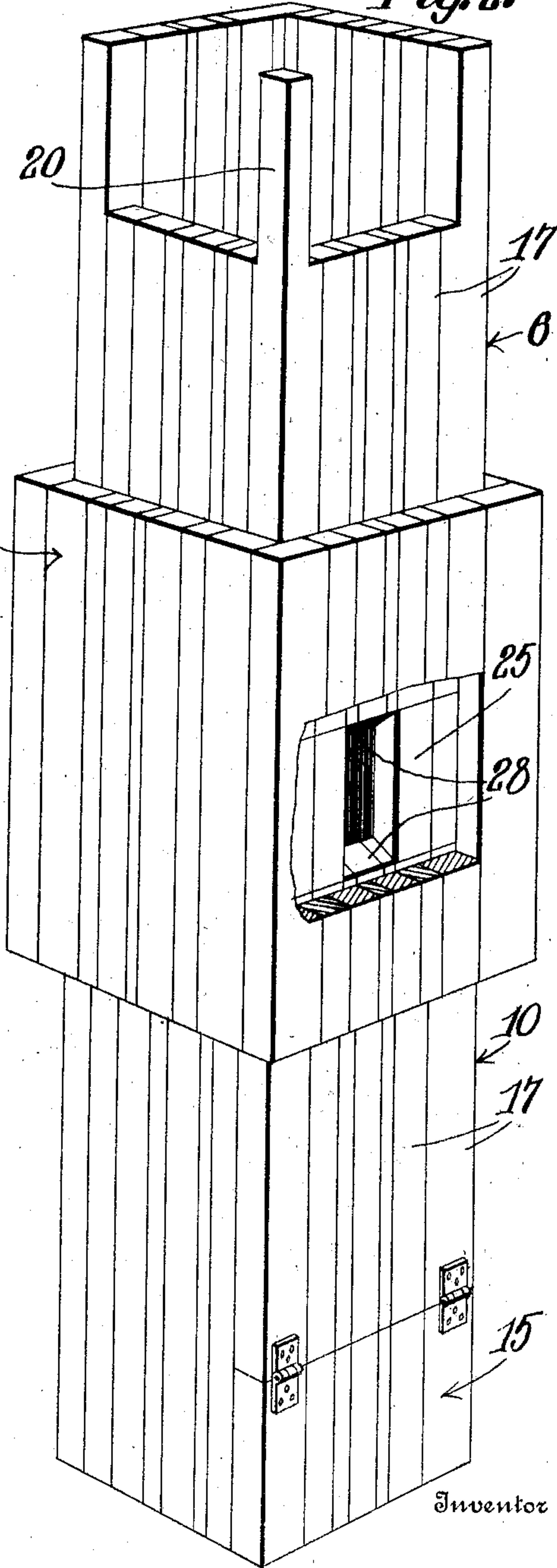
Fig. 1.



Witnesses

C. E. Smith.
Geo. E. Jew

Fig. 2.



Inventor

John D. Bickford
By M. B. Swanson.
Attorney

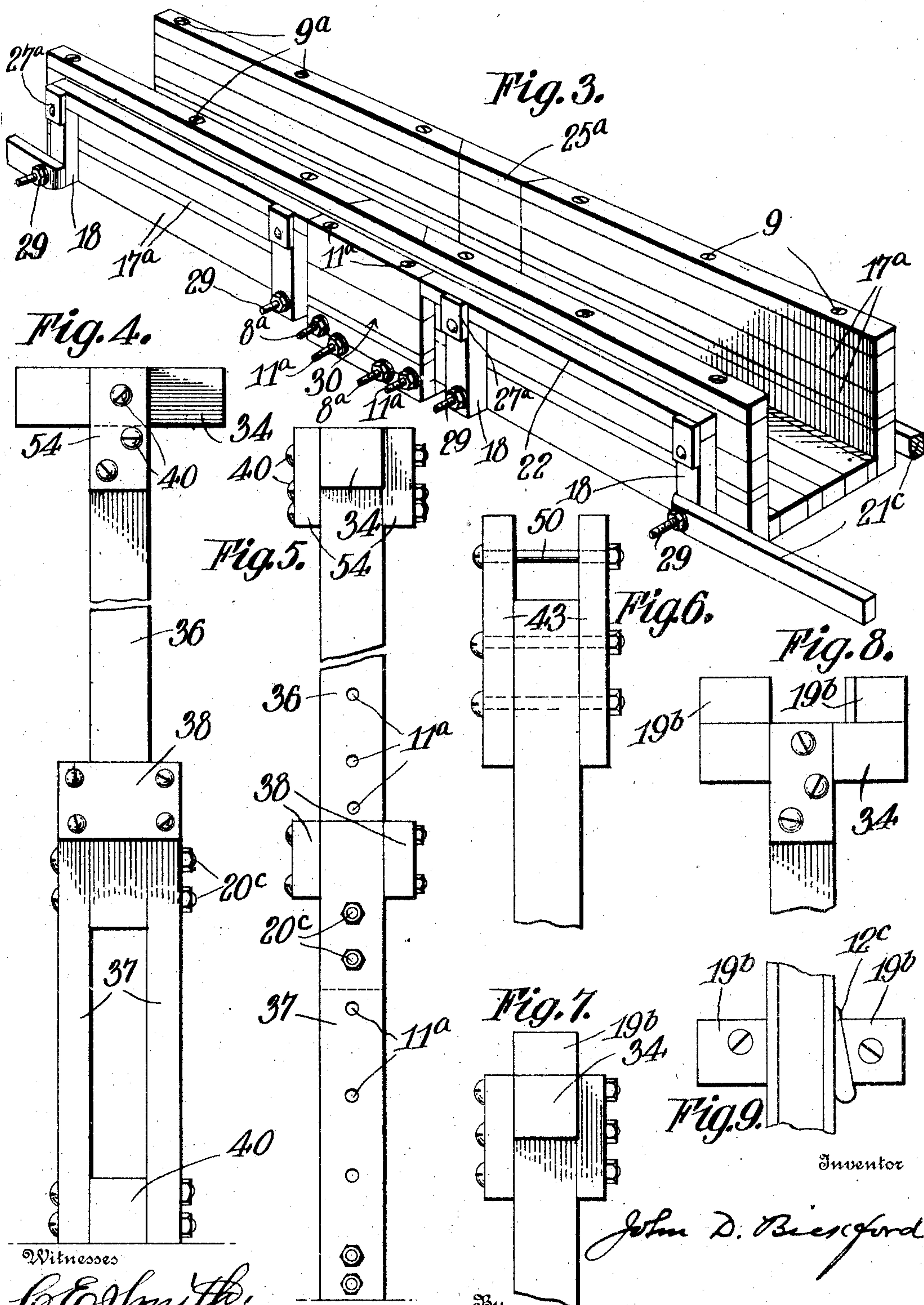
No. 864,767.

PATENTED SEPT. 3, 1907.

J. D. BICKFORD.
BUILDING MOLD.

APPLICATION FILED APR. 9, 1907.

3 SHEETS—SHEET 2.



Witnesses

C. E. Smith.
Geo. E. Tew.

Inventor

John D. Bickford

By

Mrs. B. Starnes

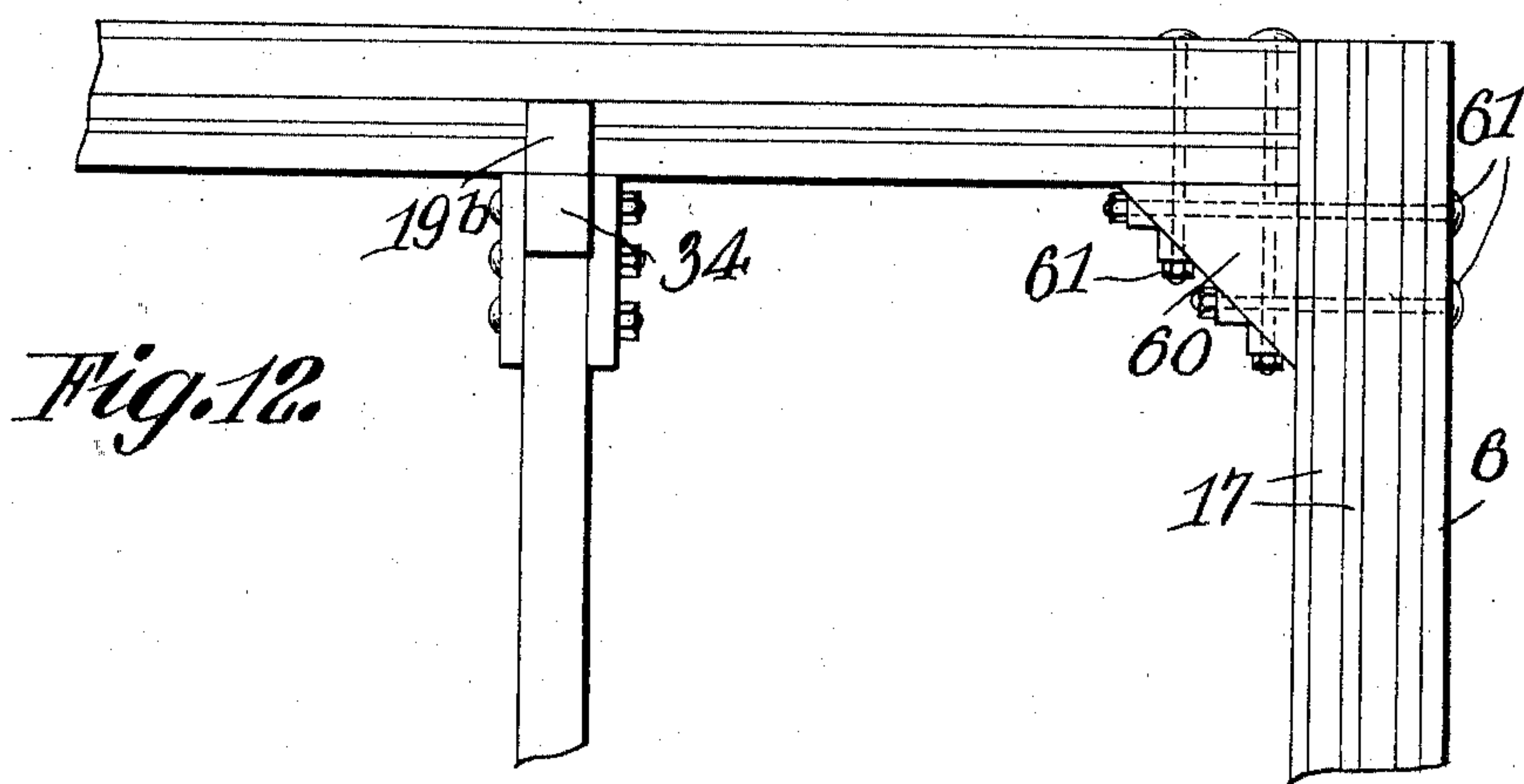
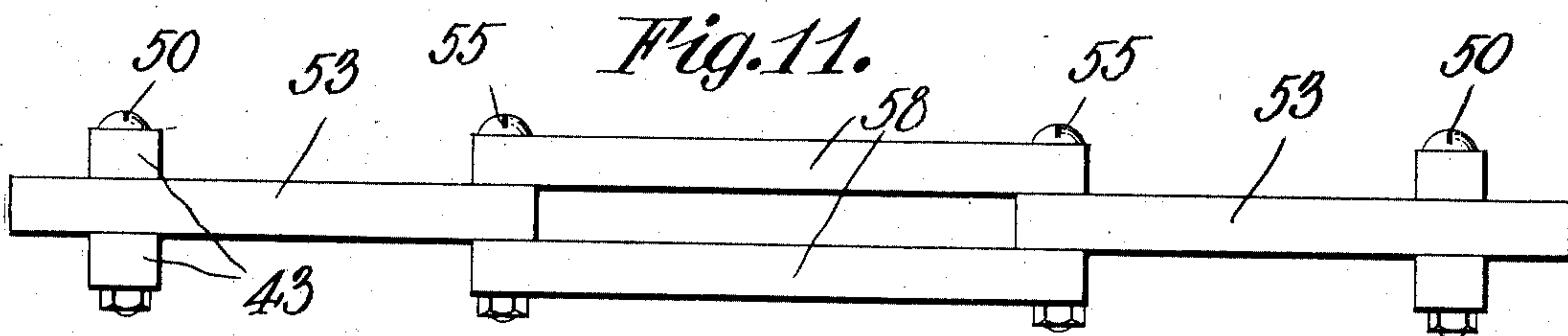
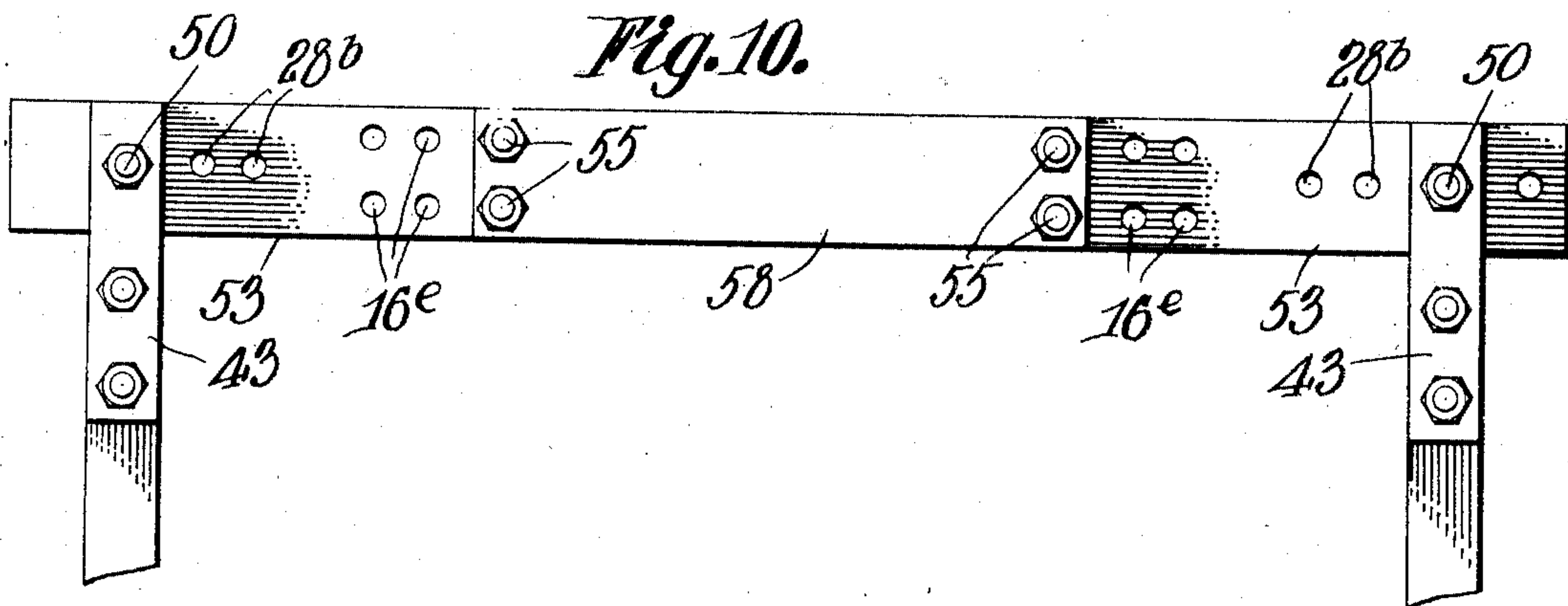
Attorneys

No. 864,767.

J. D. BICKFORD.
BUILDING MOLD.
APPLICATION FILED APR. 9, 1907.

PATENTED SEPT. 3, 1907.

3 SHEETS--SHEET 3.



Inventor

John D. Bickford.

Witnesses

C. E. Smith.
Geo. E. Jew

By

Miss B. Stenhouse.

Attorney &

UNITED STATES PATENT OFFICE.

JOHN D. BICKFORD, OF CLEVELAND, OHIO.

BUILDING-MOLD.

No. 864,767.

Specification of Letters Patent.

Patented Sept. 3, 1907.

Application filed April 9, 1907. Serial No. 367,199.

To all whom it may concern:

Be it known that I, JOHN D. BICKFORD, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Building-Molds, of which the following is a specification.

This invention relates to wall or building molds, and has for its object to provide an expansible separable, and adjustable mold or form suitable for erecting concrete buildings or useful in concrete building construction.

Inasmuch as different buildings usually vary in structure, upon the completion of one the forms and framework in which the walls, columns, beams and girders were molded, are usually of small value, and must be rebuilt or changed in various ways to meet the dimensions of the next structure, either by sawing off the ends thereof for a difference in height or length, or by taking them all apart for different widths or thicknesses; and for the erection of a larger structure new timber is usually necessary, because splicing of the old timber or forms will not withstand the strength test. In consequence of these and various other differences existing with respect to forms for concrete constructions, old sets of timbers or forms are frequently rendered valueless, which is expensive, for it often takes several thousand dollars to supply the timber forms necessary for building a modern building.

The object of the present invention is to provide means whereby the molds for the columns, beams, flooring, joists, etc. are adjustable to meet the requirements and dimensions of various structures, forming a permanent set of forms adapted to be used repeatedly, thereby lessening the cost and saving waste.

Various embodiments of the invention are illustrated in the accompanying drawings, in which,

Figure 1 is a side elevation of a form for a column. Fig. 2 is a perspective view thereof, without the connecting bolts, parts being broken away to show other parts more clearly. Fig. 3 is a perspective view of an adjustable beam form. Fig. 4 is a side elevation of a shore. Fig. 5 is a front elevation of the same. Fig. 6 is a partial front elevation of a shore having a modified top end adapted to receive the joists form or bearer. Figs. 7, 8 and 9 are details showing a key arrangement for holding the shores to beams and the like. Figs. 10 and 11 are side and top plan views of a joist bearer. Fig. 12 is a side view illustrating a knee support for the column and beam forms.

The column form is shown in Figs. 1 and 2, consisting of upper and lower sections or forms held together by a middle form or casing 12, which latter acts as a sleeve to cover or inclose the joint. The various sections are made of parallel strips or staves indicated at 17 fastened together by bolts 8, 9 and 11, as will appear in Fig. 1, which extend through suitable holes in the respective

staves of each wall or side of the form, and so bind the staves of each wall together as well as the walls to each other. The staves or strips 17 vary in width, say from a half inch up to several inches, and the adjustment is effected by using more or less of these staves, that is, the adjustment with respect to width, thickness or diameter. The outer casing or connecting part 12 fits over the adjacent ends of the sections 6 and 10, and is fastened thereto by means of bolts 8.

The vertical adjustment of the column form is effected by extending or retracting the upper and lower sections 6 and 10, in other words, by drawing them more or less out of the connecting casing 12, before the bolts 8 are put in place. In order to fill the space between the adjacent ends of the casings 6 and 10, a supply of short strips or staves are provided, as indicated at 25, which are fitted between said ends. These short strips or sections are made of the same timber with respect to width and thickness as the staves 17, and consequently will match the same in the various lateral adjustments provided, and in order to hold the short blocks 25 in place, the inner ends of the staves 17 are undercut or beveled, and the meeting ends of the blocks 25 are beveled, as indicated at 28, so that when said blocks 25 are put in place they are held by the bevel and cannot collapse or fall inwardly, and they cannot fall outwardly because the connecting section 12 extends or is placed around the same, to form a substantial backing for the joints. A stock of short blocks or sections 25 are provided, of different lengths, which can be substituted according to the work in hand and according to the height of the column. This construction makes it possible to use columns to reach any height of ceiling, and also to form columns of any size or diameter, since the forms can be built up to the required size by adding more staves and using longer bolts if necessary.

It is common in building construction of the kind referred to, with columns having steel cores or upright reinforcements, to wire the reinforcements or uprights at the top and bottom, to hold them in proper position before and while the concrete filling is being put in place. This may be readily done at the open upper end of the form, but at the bottom a hinged door 15 is provided in one side of the form. This door may be clamped and held closed by bolts 19 extending through the form, or by removing the bolts the door can be opened and the bottom of the steel column or reinforcement got at and wired to proper position, after which the door is closed while the concrete is run in.

At the top the upper section 6 may be cut away or out on each side to receive the beam forms, leaving, with a corner column form as shown in Figs. 1 and 2, a corner post 20 to hold the beam forms in place. The recesses or cut-away parts at the top of the sections for

other columns may be cut out according to the beams they are to support, and obviously the shorter or cut-away staves can be changed to any side desired.

In Fig. 3 a beam form is shown consisting of a horizontal casing formed in two sections, composed of strips 17^a bolted together by bolts 9^a in a manner similar to the column form above described. The beam form is open at the top and at the ends, and between the end sections are spacing pieces 25^a, corresponding in number and section to the pieces 17^a, and undercut or beveled at the ends in the manner heretofore referred to. When the forms are assembled the beam forms rest in the recesses at the top of the column form, and have side braces 21^c which project against the sides of the column form and steady the parts. The strips 17^a and the pieces 25^a allow the size of the beam form to be adjusted with respect to the width, thickness and length, in the manner similar to that already described with respect to the column.

The joint between the sections of the beam form is reinforced and inclosed by a central casing 30 which is composed of strips in a manner similar to the middle casing 12 of the column forms, said strips being held together by cross bolts 11^a extending vertically and horizontally, and bolted to the beam section by bolts 8^a. Cross bolts 29 extend through the sides and bottom of the form and support blocks 18 which carry a joist or timber 22 held by movable clips 27^a. These joists or timbers extend parallel to each other on opposite sides of the beam form and are supported on the joist bearers to be hereinafter described. The joists or beams 22 are for supporting the deck or temporary floor which when laid is flush with the top of the beam form, and which in the building construction will be covered with the concrete forming the floor and ceiling between the beams.

The beam form shown in Fig. 3 has the advantage that its sides are detachable by taking out the bolts, after the concrete has set, allowing a circulation of air around the beam which will dry it in less time than it now takes.

The adjustable shores shown in Figs. 4 and 5 serves a props for the beam forms and the joist bearers, and consist of an upright 36 having a cross piece 34 at the top fastened on each side by blocks 54 secured by bolts 40. Said upright is supported at its lower end between parallel uprights 37 connected at the top by blocks 38 at each side, bolted thereto, and having a block 41 between the uprights at the bottom. The upright 36 will move up and down between the lower bars 37 so that a vertical adjustment can be had, and set by bolts 20^c extending through any of the series of holes 11^a in the uprights.

For the purpose of holding the upper bar or upright 36 on the beam form or joist when adjusting the shore, two blocks 19^b, as shown in Figs. 8 and 9, are secured to the cross piece 34, and a wedge key 12^c is driven between the blocks and the beam form at one side. This

binds the top of the shore to the beam form and allows the shore to be adjusted to proper height. 60

In Fig. 6 a modified form of shore is shown, having a top end provided with upwardly-projecting strips 43 secured to the upright and provided at the top with a cross bolt 50 which may be used to connect the shore to a joist bearer. 65

Extensible and adjustable joist bearers are shown in Figs. 10 and 11, consisting of horizontal lengthwise strips 53 connected by parallel strips 58 and bolts 55, and capable of adjustment by placing the bolts in any of the series of holes 16^c. Said joist bearers are shown supported by the shores having the bolts 50, illustrated in Fig. 6, said bolts extending through one of the holes 28^b. The joist bearers abut against the beam forms and extend crosswise and support the joists which in the building construction extend parallel with the beams and support the deck or floor. 70 75

In Fig. 12 a knee support for the beam form is shown at 60, joined to the column and beam forms by vertical and horizontal bolts 61, which extend through the forms 80

All of the parts used in building the forms will be provided with suitable bolt holes to receive the bolts heretofore referred to and to allow the various adjustments. A set or stock of pieces or parts constructed in accordance with this invention will enable a builder to construct forms for various kinds and sizes of work, which can be built up to proper size and used repeatedly and allowing an adjustment to accommodate work of different widths and thicknesses. 85

I claim: 90

1. A mold for cement or concrete construction, comprising sections placed endwise with respect to each other and an outer casing inclosing the adjacent ends of the sections, said sections and casing being formed of a plurality of staves extending lengthwise beside each other, the staves of the sections and casing being of similar widths and capable of being removed or replaced to equally vary the size of said parts. 95

2. A mold of the kind described, consisting of sections placed endwise and spaced with respect to each other, an outer casing inclosing the adjacent ends of the sections, and filling pieces fitted between the said ends and within the casing. 100

3. A mold of the kind described, consisting of sections placed endwise and adjustable with respect to each other, a middle section inclosing the adjacent ends of said sections, and filling pieces fitting between said ends and within the middle section, the said sections being all built up of staves extending lengthwise side by side and separably fastened together, whereby more or less of the staves may be used, to vary the cross-section of the mold. 105 110

4. A mold of the kind described, consisting of sections placed endwise and spaced with respect to each other, the adjacent ends being undercut, filling pieces located between said sections and retained under said ends, and an outer casing surrounding said ends and the filling pieces. 115

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

JOHN D. BICKFORD.

Witnesses:

JOHN A. BOMMHAARDT.

SHIRLEY J. BOMMHAARDT.