

(No Model.)

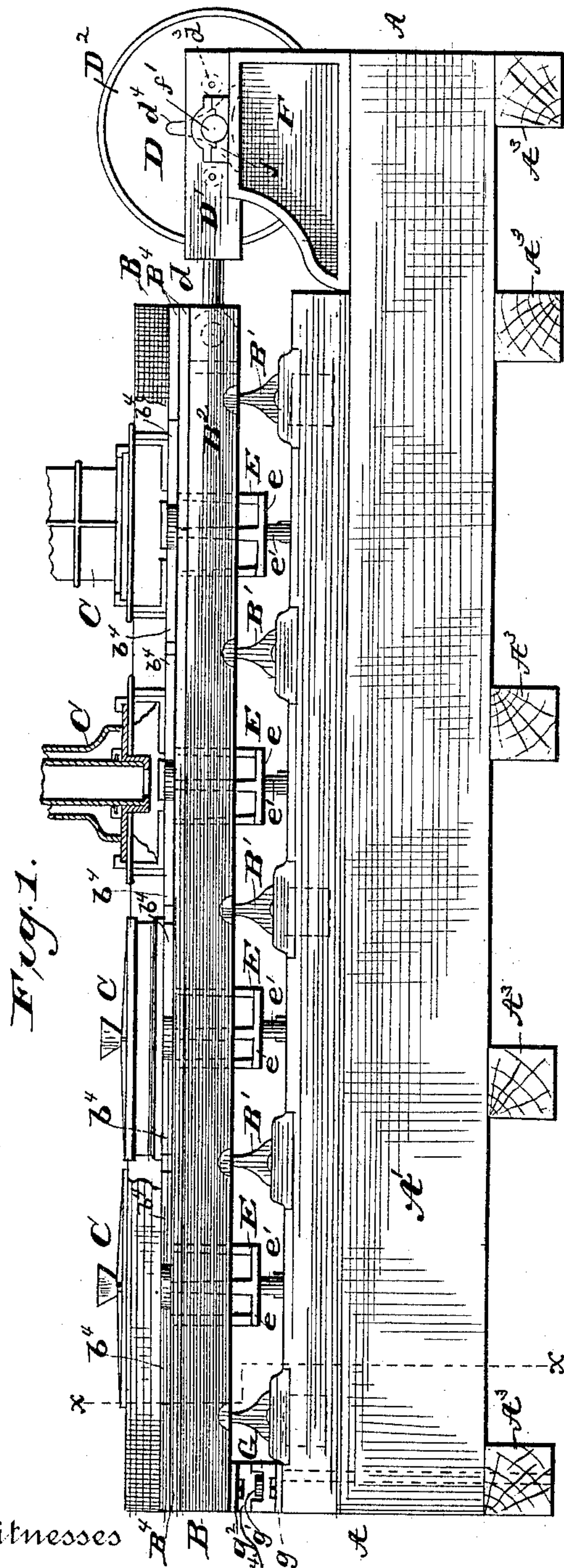
5 Sheets—Sheet 1.

G. RICHARDSON.

MACHINE FOR SOLIDIFYING CONCRETE MIXTURES.

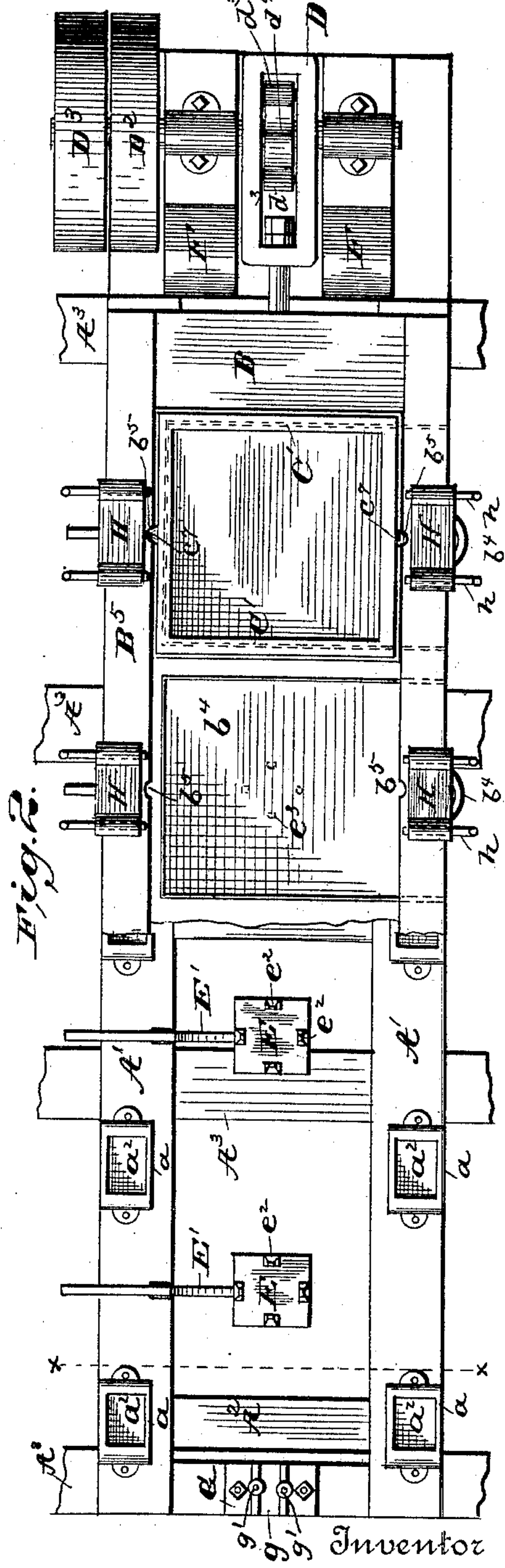
No. 461,889.

Patented Oct. 27, 1891.



Witnesses

Fred. R. Cornwall,
E. J. Walker



Inventor

George Richardson

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MACHINE FOR SOLIDIFYING CONCRETE MIXTURES.

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Fig. 7.

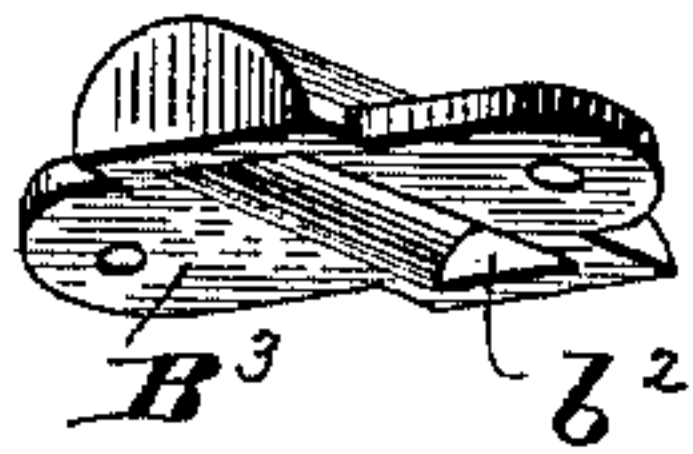


Fig. 6.

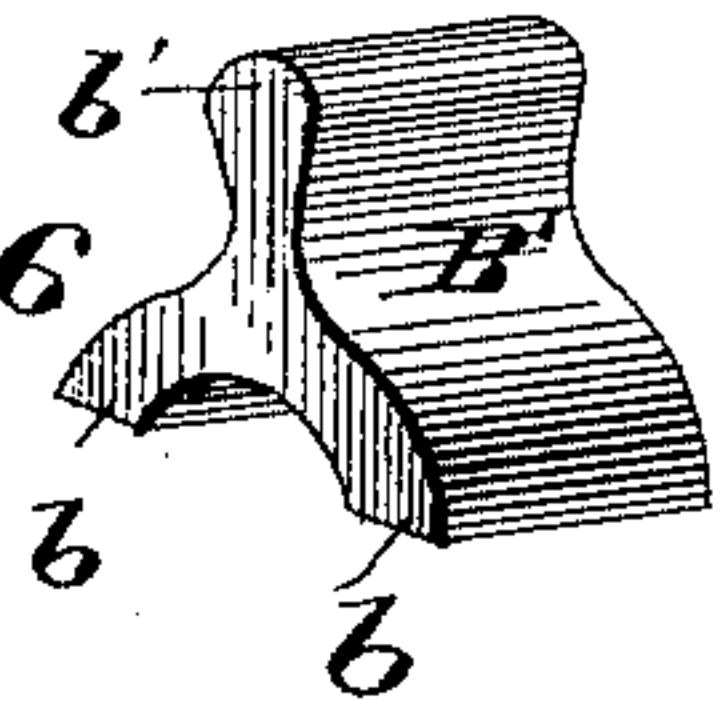


Fig. 8.

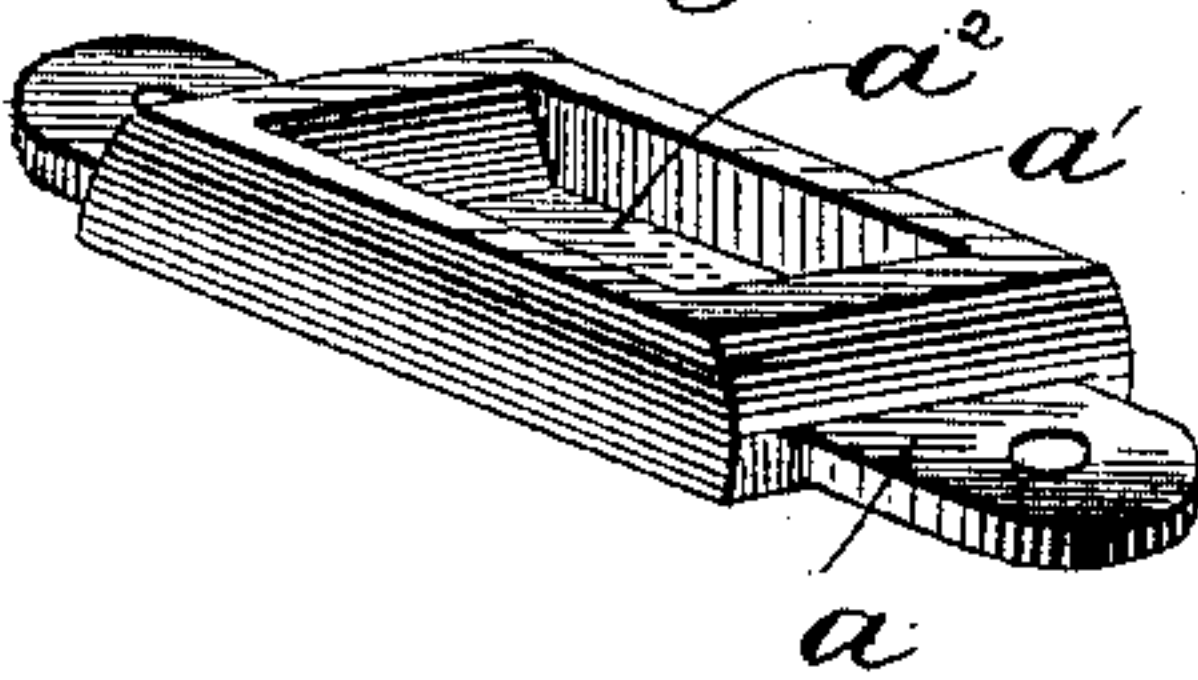


Fig. 4.

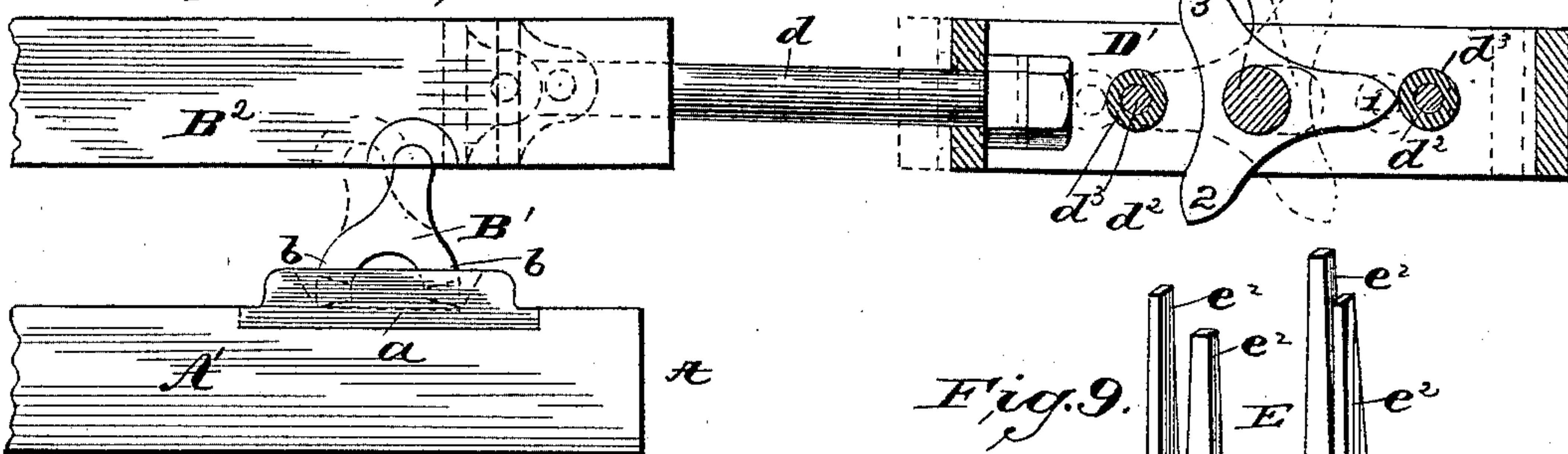


Fig. 9.

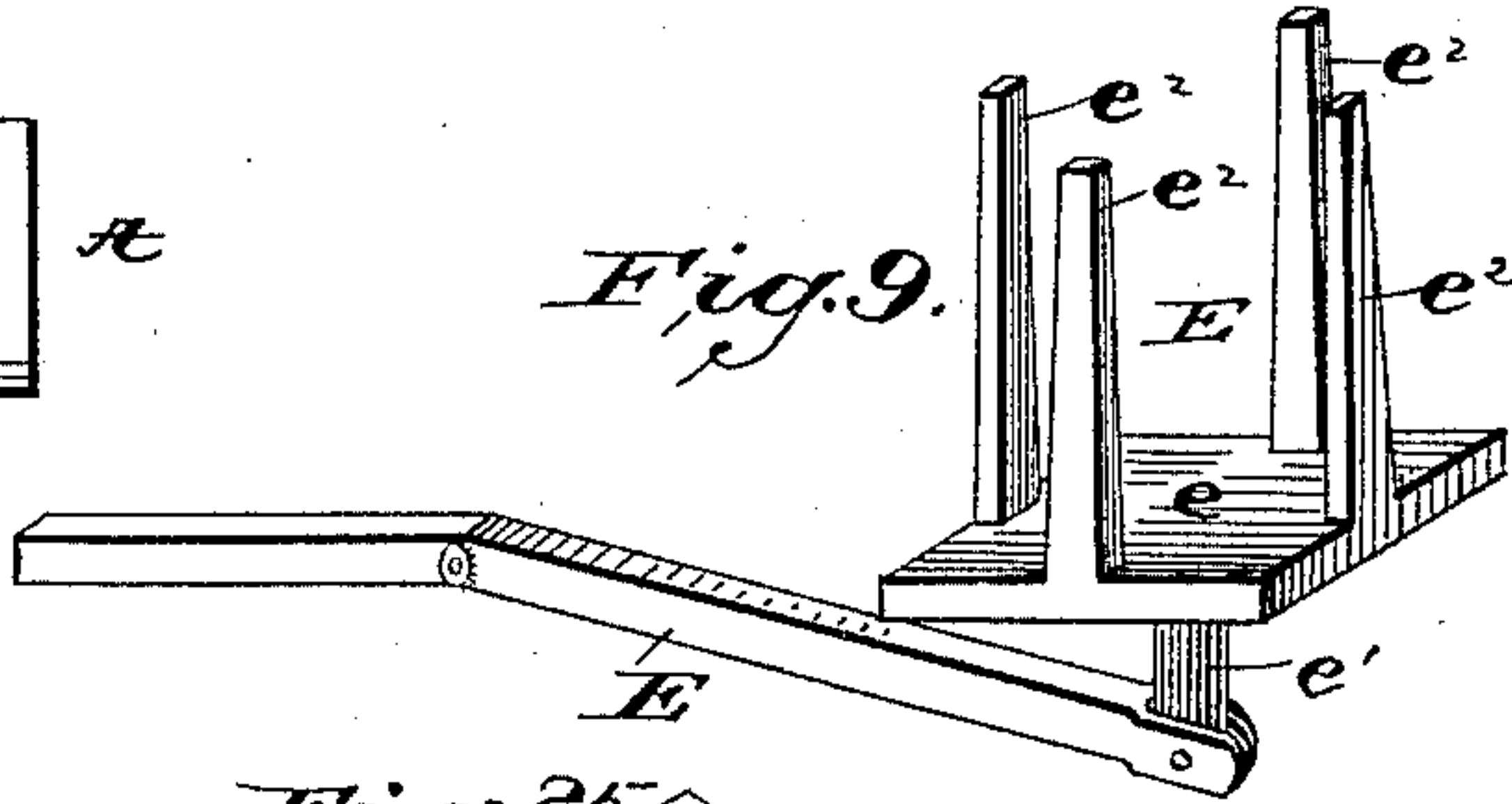


Fig. 11.

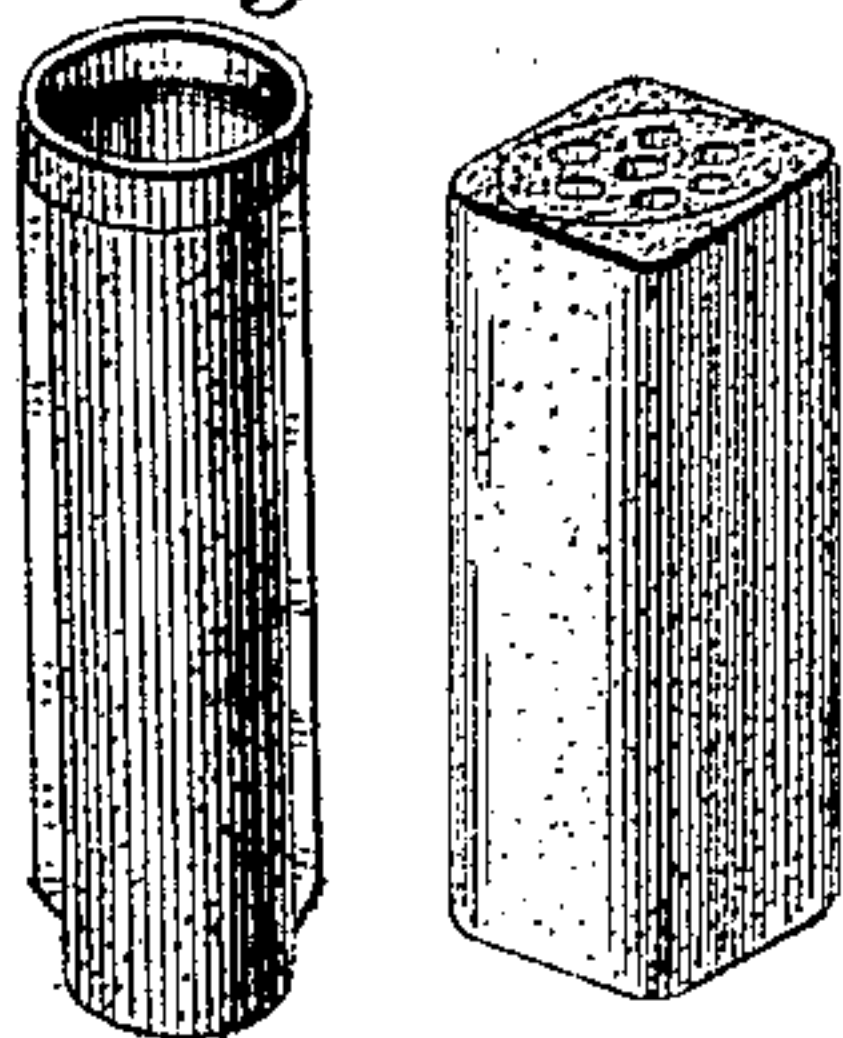


Fig. 10.

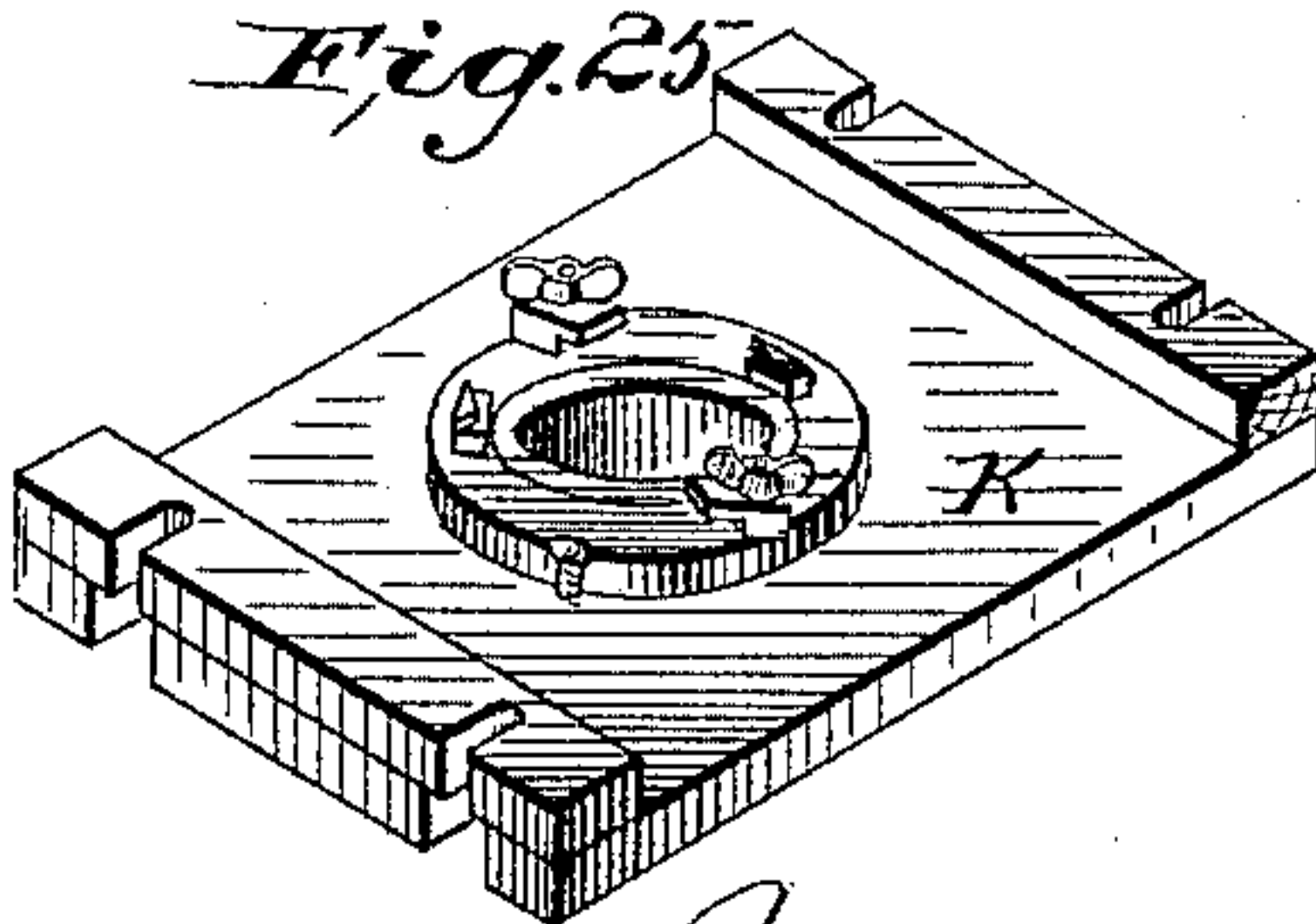


Fig. 25.

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Fig. 21

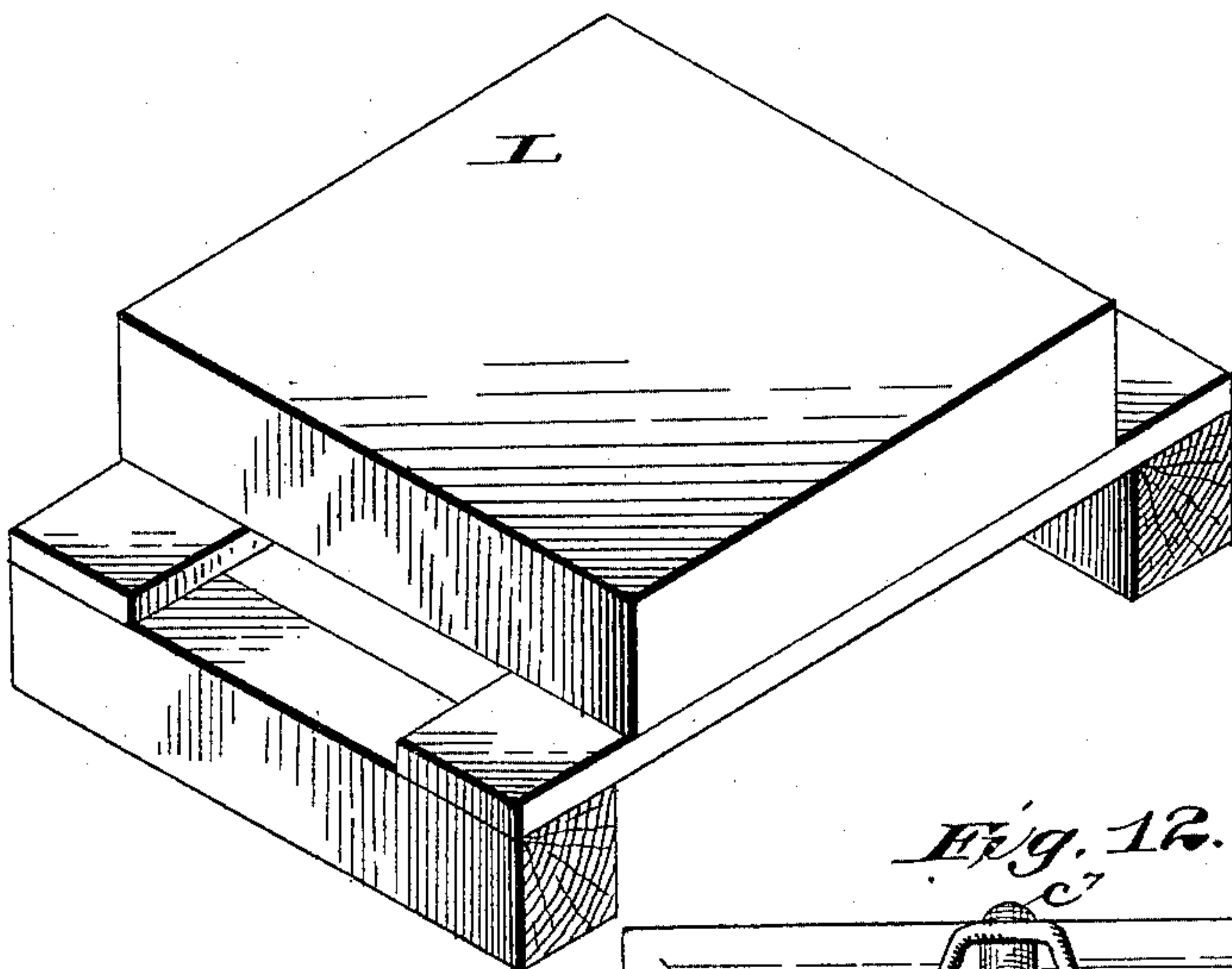


Fig. 16

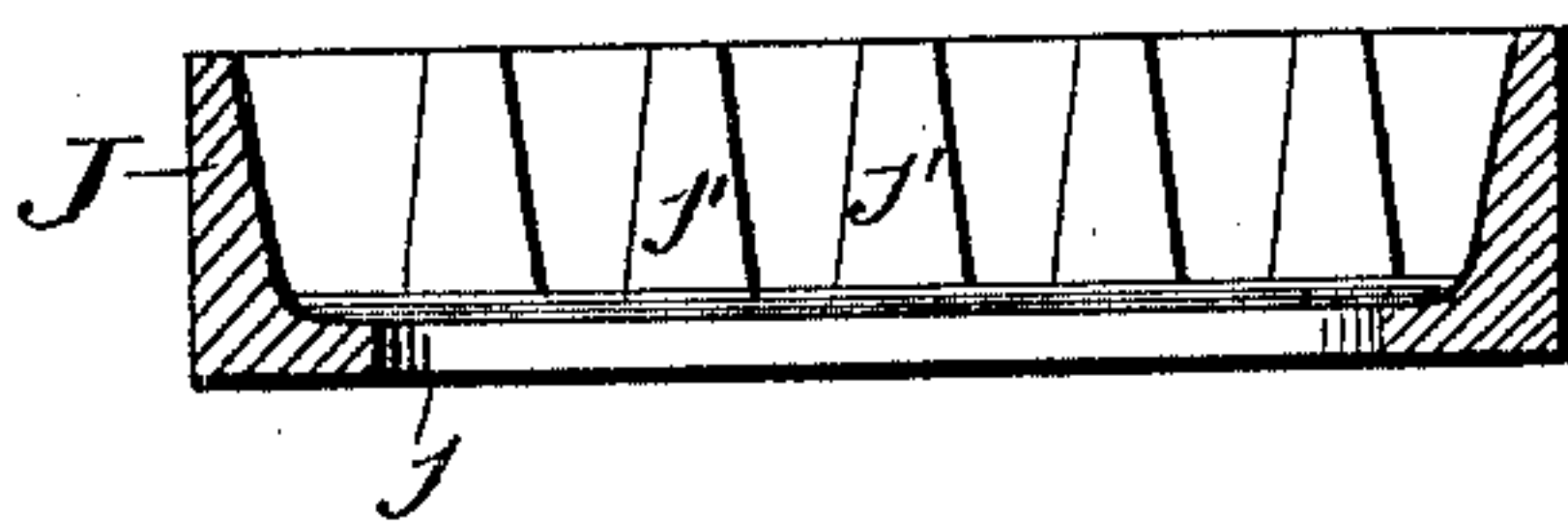


Fig. 15

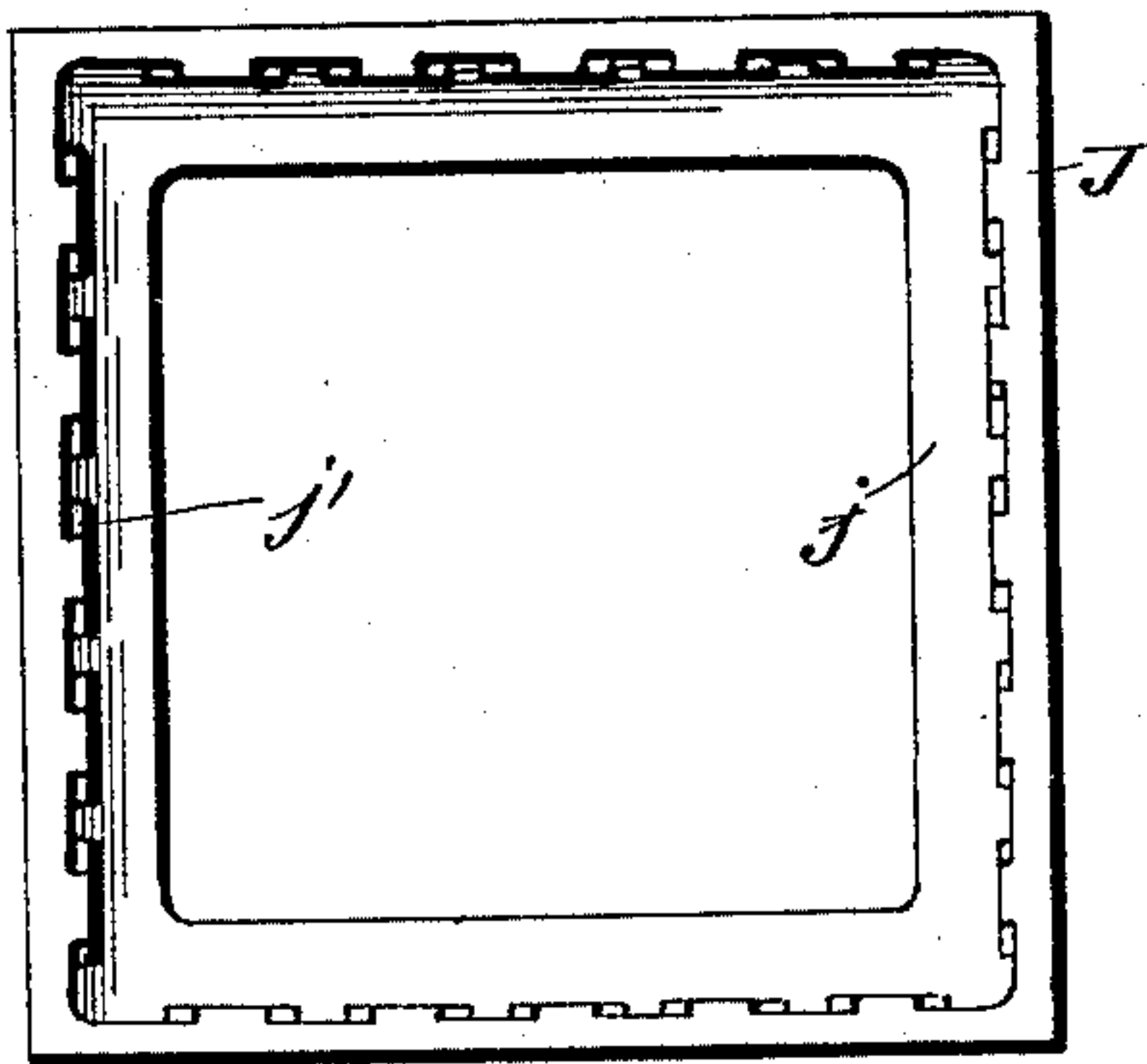


Fig. 12

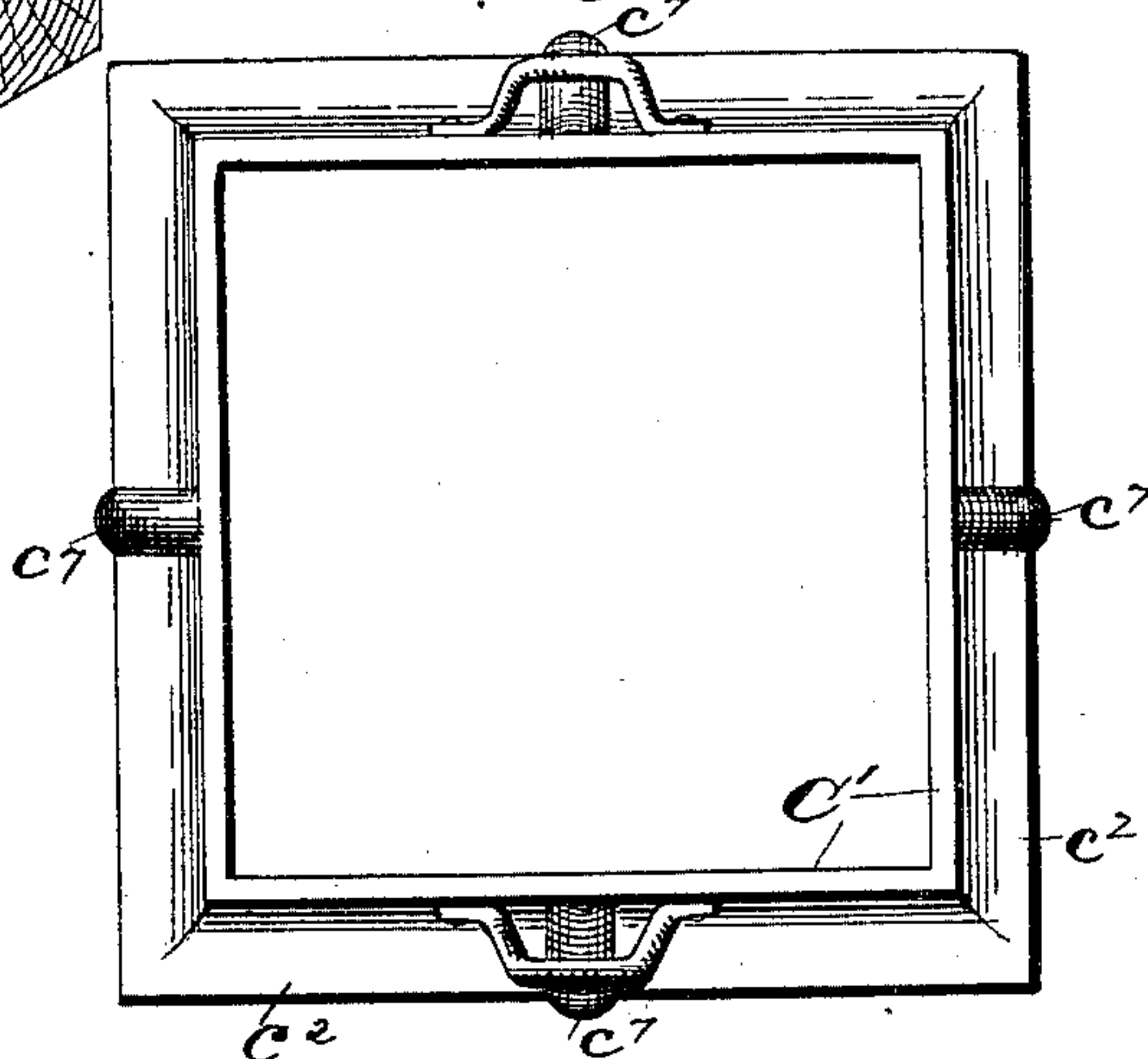


Fig. 14

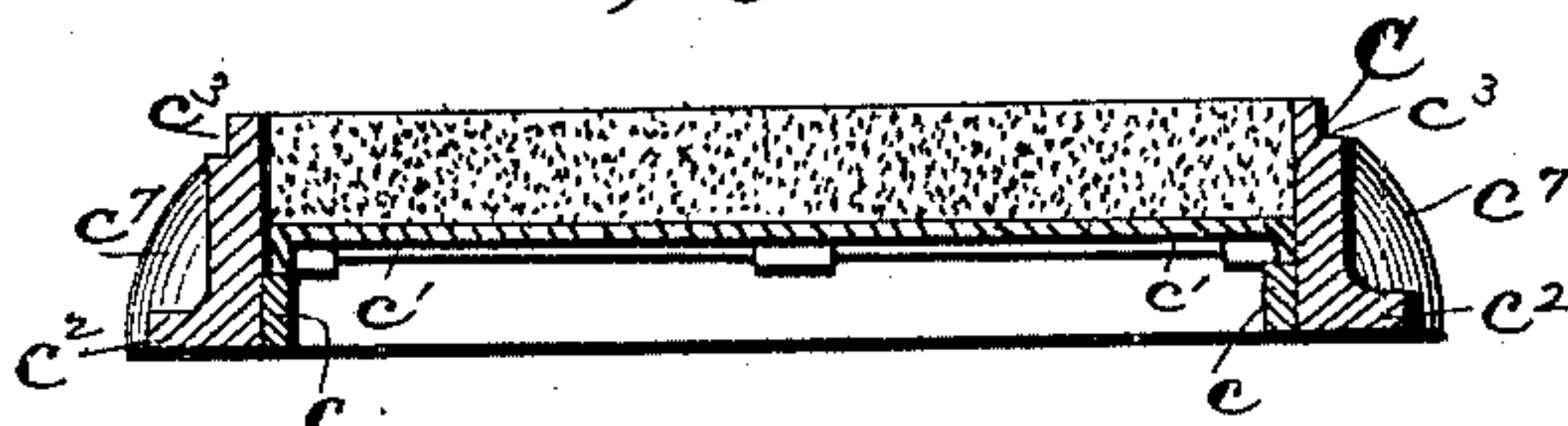
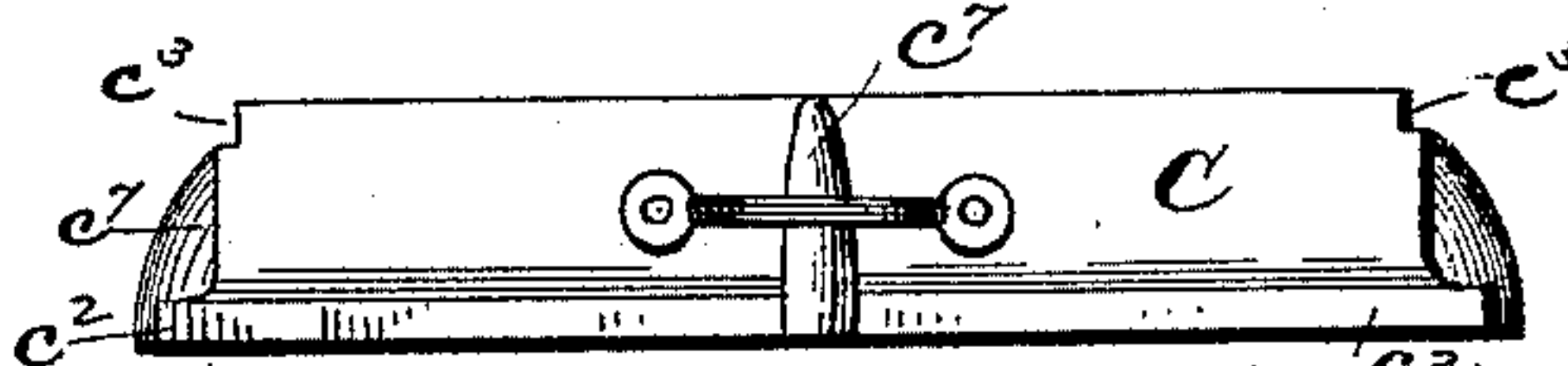


Fig. 13



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Fig. 17

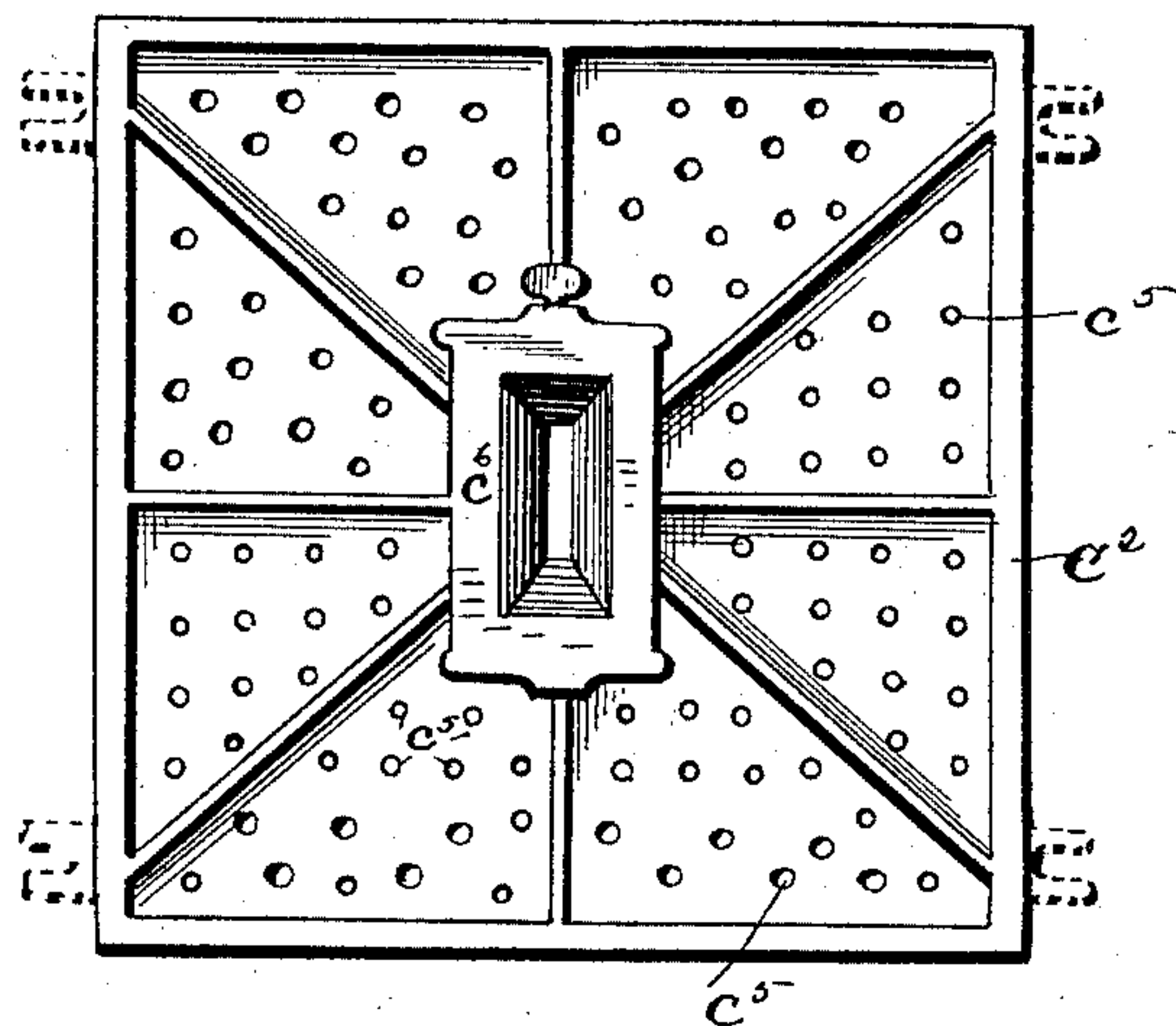


Fig. 18.

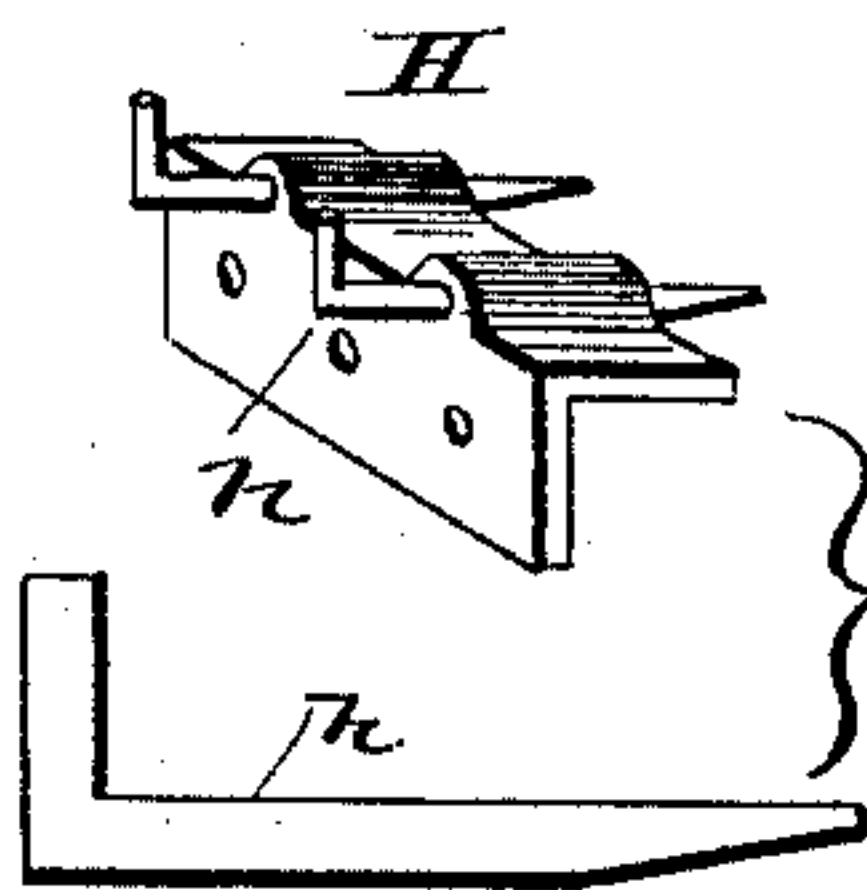


Fig. 19

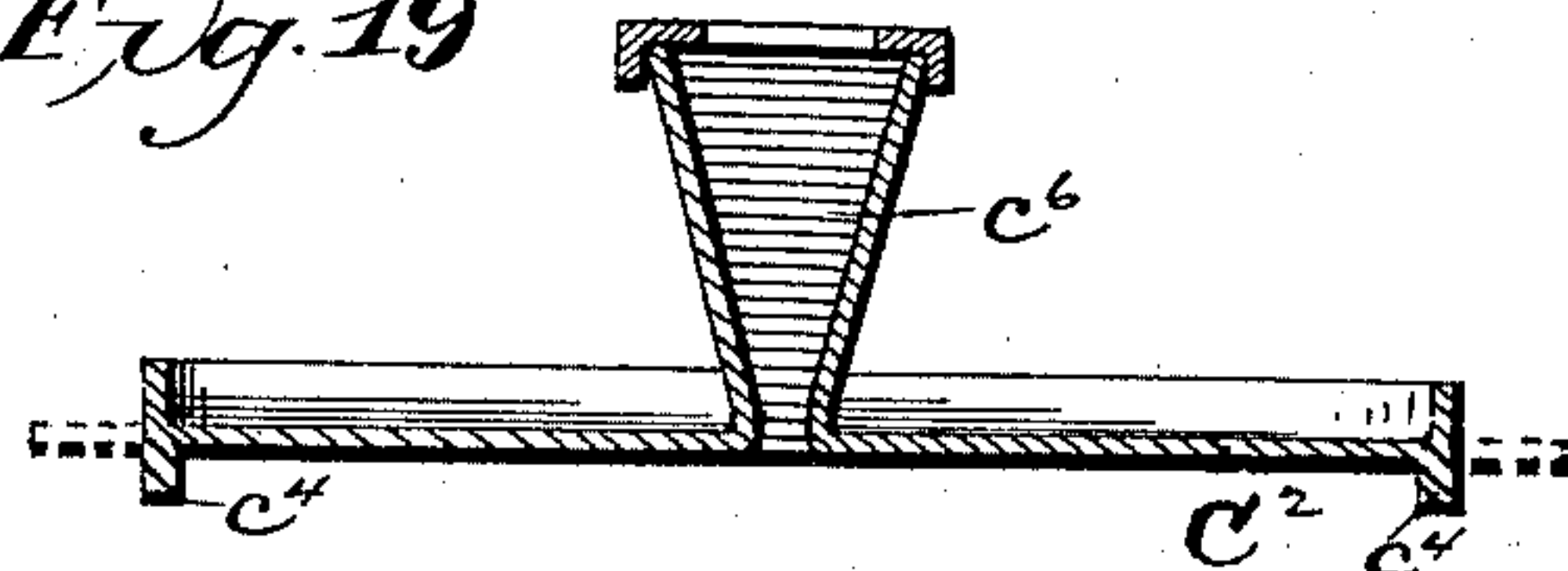
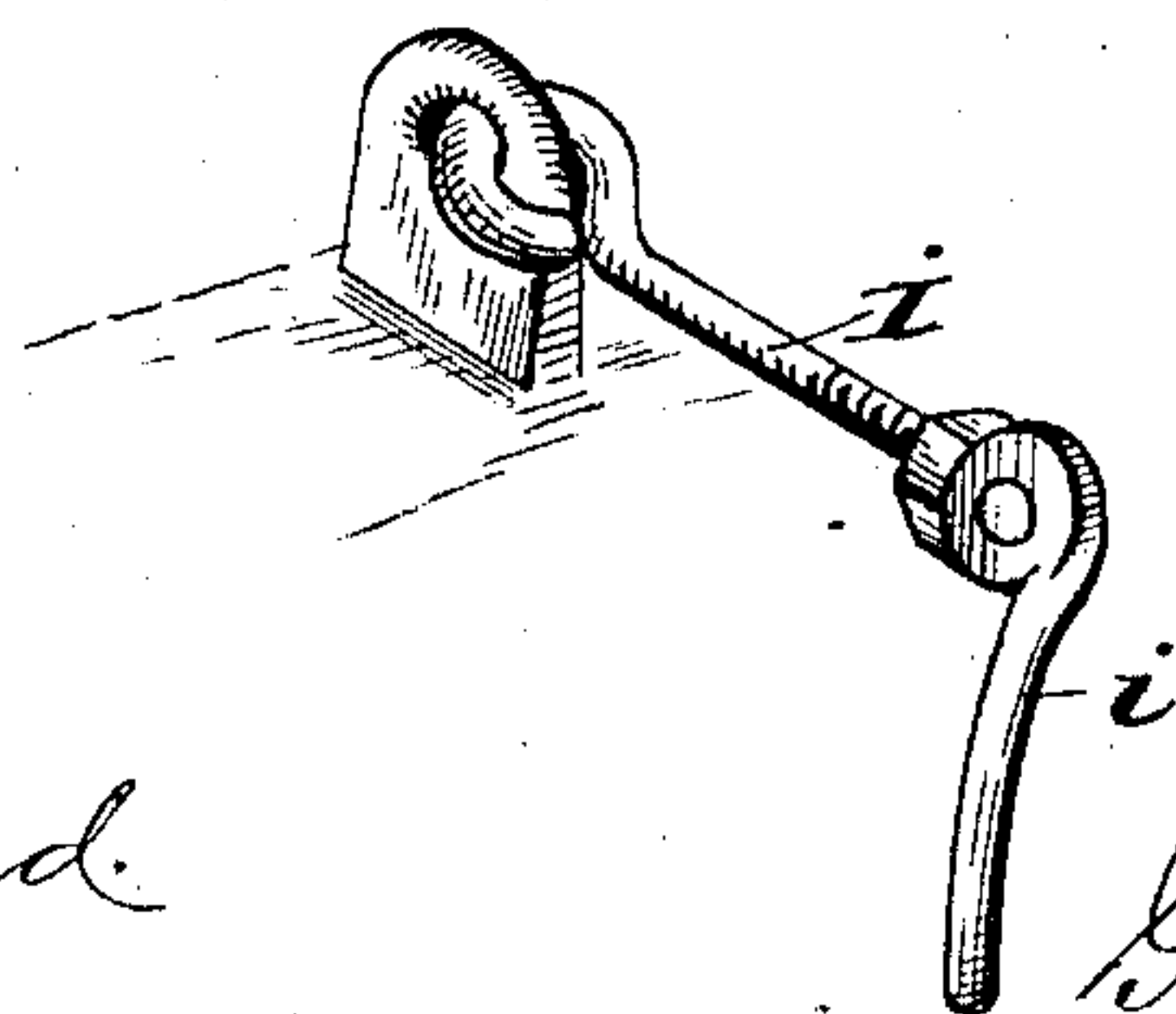


Fig. 20



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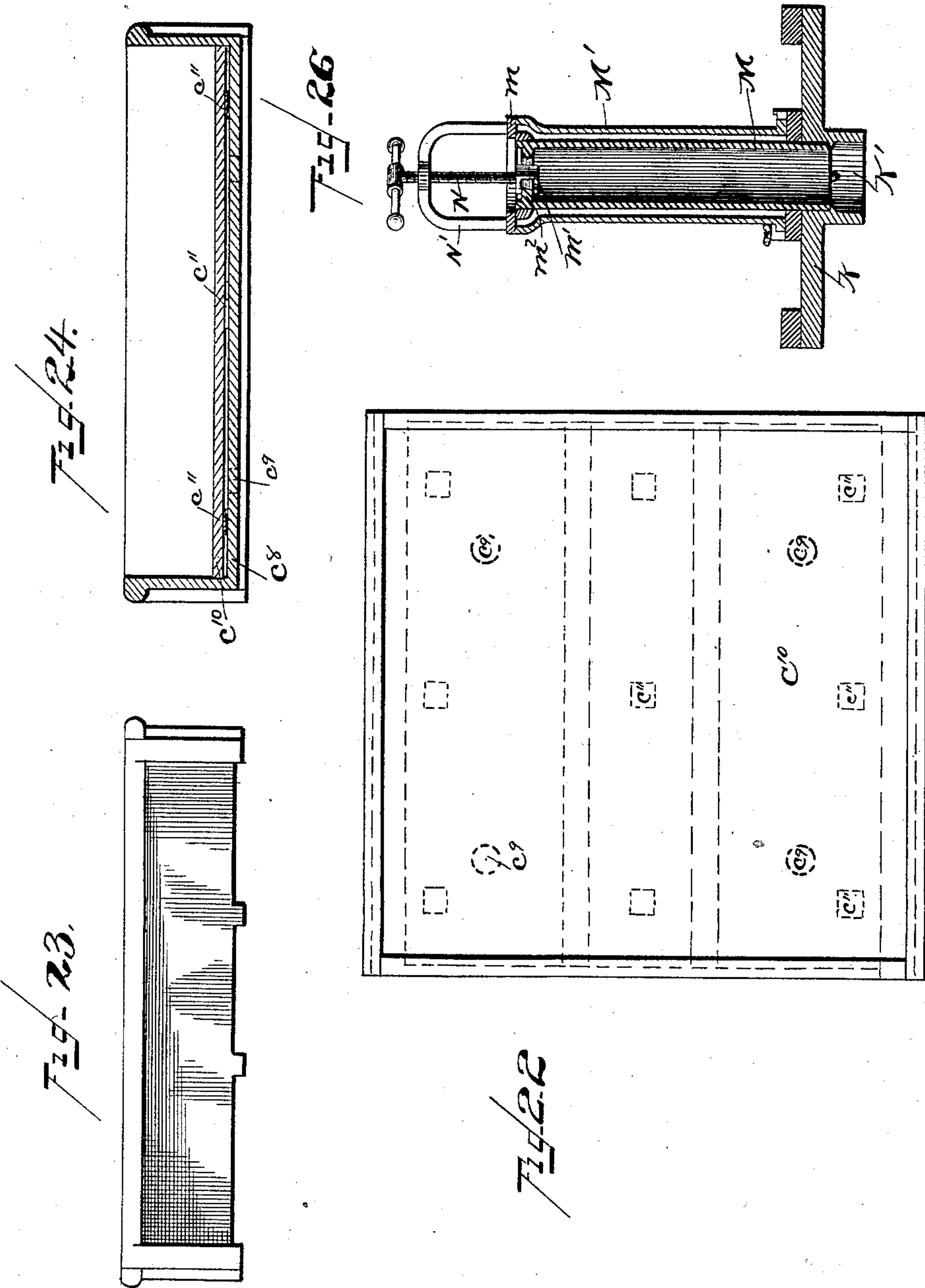
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MACHINE FOR SOLIDIFYING CONCRETE MIXTURES.

No. 461,889.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR SOLIDIFYING CONCRETE MIXTURES.

SPECIFICATION forming part of Letters Patent No. 461,889, dated October 27, 1891.

Application filed October 16, 1889. Serial No. 327,155. (No model.)

To all whom it may concern:

Be it known that I, GEORGE RICHARDSON, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Machines for Solidifying Concrete Mixtures; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in machines for solidifying and compacting concrete mixtures in the manufacture of paving-blocks, building-stone, drain-pipes, and electrical conduits, and for any other purposes for which concrete formations may be used.

The object of my invention is to form a solid concrete article by driving out of the mixture any superfluous water and air spaces contained therein while the same is in the mold; and to this end my invention consists in a machine for subjecting the mold and contents to a jolting and jarring action; also to a mold especially adapted for said purposes; also to means for removing the block from the mold after the material has solidified, and also in minor details of construction and combination of parts, to be hereinafter more fully set forth in the following specification and claims.

In order that my invention may be more clearly understood, I have illustrated in the accompanying drawings a machine which I am using with practical success, and in which—

Figure 1 represents a side elevation of my improved machine, the sides of the shaking table being broken away to show the molds thereon, one of which is an electrical-conduit-pipe mold, another a sewer-pipe mold, and the other a paving-block mold. Fig. 2 is a top plan view of the same, showing a paving-block mold thereon, a pan for catching the drippings, part of the shaking table being broken away to show the device for removing blocks from the mold. Fig. 3 is a vertical cross-section on the line xx of Fig. 1. Fig. 4 is a side elevation of so much of the machine as will suffice to illustrate the operation of the jarring or shaking mechanism, the yoke in-

closing the cams being shown in section. Fig. 5 is an end view of part of the stationary bed and shaking table, showing the guides for preventing the lateral motion of the table. Fig. 6 is a perspective view of the supporting-blocks for the shaking table. Figs. 7 and 8 are detail perspectives of the upper and lower bearing-plates for the supporting-blocks. Fig. 9 is a perspective of the lifter for removing the blocks from the mold. Figs. 10 and 11 are perspective views of a section of electrical conduit and drain pipe, respectively. Figs. 12 and 13 represent, respectively, plan and side elevation of a mold for molding blocks. Fig. 14 is a vertical cross-section of a paving-block mold, showing the removable bottom and a block therein. Figs. 15 and 16 are bottom, plan, and section, respectively, of a removable lining for a paving-block mold. Figs. 17 and 18 are top, plan, and section, respectively, of a cover for a paving-block mold. Fig. 19 is a perspective view of a clamp for clamping the cover to the mold. Fig. 20 is a perspective of another form of fastening for the mold-cover. Fig. 21 is a perspective view of another form of device for removing the block from the mold. Figs. 22, 23, and 24 are plan, side view, and section, respectively, of a modified form of block-mold. Fig. 25 is a perspective of the bottom plate of a pipe-mold. Fig. 26 is a vertical section of a pipe-mold, showing the manner of removing the core therefrom.

The same letters and numerals of reference indicate identical parts in all the figures.

In the drawings, A represents the frame or bed of the machine; B, the shaking table upon which the molds C are mounted; D, the mechanism for reciprocating the table, and E the lifter for removing the blocks from the molds.

The frame of the machine consists of the side pieces A' A' , of any desired length, according to the capacity of the machine, firmly connected together at top at suitable distances apart by cross-bars A^2 , and at the bottom are rigidly secured to sleepers A^3 . To the top of the side pieces A' and at suitable distances apart are bolted or otherwise secured bearing-plates a , having an upwardly-projecting rim or flange a' , forming a depres-

sion a^2 , as shown in Fig. 8, in which loosely rests a supporting-block B' for supporting the shaking table B . This supporting-block B' is of inverted-Y form, the lower end of the branches b of which are flat and in the same plane as shown in Fig. 6, while the remaining branch b' is rounding on its upper edge to fit in a correspondingly-shaped groove b^2 in the upper bearing-plates b^3 , secured to the under sides of the side bars B^2 of the shaking table. The shaking table B is composed of two side bars B^2 , connected together by cross-bars B^3 , on top of which is a floor B^4 , upon which rests the molds C , and on the floor of the table are parallel side bars B^5 , extending lengthwise of the machine, between which the molds C are firmly held. The floor B^4 is partly cut away directly beneath the openings in the molds to form a slideway or depression for the reception of a flat pan b^4 , which is slid in place from one side of the machine, as shown in Figs. 1 and 2, for the purpose of catching the drippings from the molds.

Located beneath the center of each mold is a lifter E , which is pivotally connected to the inner end of one arm of a lever E' , which in turn is pivoted in bearings secured to the inner under edge of the side bars B^2 of the shaking bed, so that the outer arm thereof will bear against the under side of the side bar B^2 and thereby limit the downward movement of the inner end thereof. The lifter E is composed of a plate e , having a central downwardly-projecting arm e' , to which the lever E' is connected, and on its upper side the plate e is provided with four upwardly-projecting pins or projections e^2 , the upper ends of which enter apertures e^3 in the floor of the shaking table below the drip-pans b^4 , so as to press against the under side of the removable bottom of the mold when the drip-pans are withdrawn to remove the bottom plate and block from the mold after the block has sufficiently solidified to retain its shape.

On the bed or frame A of the machine, at one end thereof, are mounted standards F carrying journal-bearings f , in which the driving-shaft f' is journaled, and the shaft is provided with the usual driving and idler pulleys D^2 and D^3 .

To one end of the shaking table B is pivotally connected a pitman-rod d , carrying at its outer end a yoke or link D' , provided with elongated openings d' in its side, through which the shaft f' passes, and mounted on pins d^2 in the yoke D' are rollers d^3 on opposite sides of the shaft f' , which are struck by a cam d^4 , secured to the shaft f' within the yoke or link D' . I have shown the cam d^4 as a triple-acting cam, whereby the table is moved forward and backward threetimes on each revolution of the shaft f' ; but, if preferred, the cam may be provided with any number of cam-surfaces, and said cams may be of equal or unequal throw, as desired.

In order to prevent side movement of the

table B , I provide said table at one or both ends with guides G , which consist of a plate g , bolted to the cross-tie bars A^2 of the bed, and on this plate g are mounted guide-rollers g' , and to the cross-tie bar B^3 on the shaking table is bolted a T-plate g^2 , the projecting rib g^4 of which reciprocates between the rollers g' .

The molds which I have shown for molding paving-blocks consist of a frame C' , open at top and bottom and having an internal rib or flange c at its bottom, upon which the removable bottom plate c' rests, and at the bottom is an external flange c^2 . At the top of the mold is a rabbet c^3 for the reception of a corresponding offset c^4 on the cover-plate C^2 , and at the sides are ribs c^7 , which enter recesses or notches b^5 in the side bars B^5 for preventing the longitudinal motion of the molds on the table B . The cover C^2 is provided with perforations c^5 and a funnel-shaped mouth c^6 , the purpose of which will be set forth hereinafter. To the side bars B^5 of the shaking table B , opposite the molds, are bolted angle-plates H , provided on their upper side with sliding bolts h , as shown in Fig. 19, the end of which bolts are beveled on the under side to overlap the cover of the mold and clamp the same to the mold. While I have shown and described this construction of mold-cover and latch as my preferred construction, I may provide the cover with slotted lugs, as shown in dotted lines in Figs. 17 and 18, and secure the same to the mold by means of a pivoted screw-threaded bolt I and lever-nut i , secured to the side bars B^5 of the table B .

While I have shown the mold C provided with an internal rim or flange c , I may in some cases do away with said flange and provide the movable bottom c' with short legs to rest directly on the floor of the shaking table.

In cases where it is desired to mold blocks of two or more grades of material I provide the mold with a removable lining J , also open at top and bottom, the thickness of which increases from bottom to top and terminates at the top in an intumed flange j , the inner face of said lining having dovetailed or other shaped projections j' thereon.

In Figs. 22, 23, and 24 I have shown a modified form of block-mold, which differs from the mold above described in that I provide the mold with a permanent bottom c^8 , provided with openings c^9 for the arms or upright e^2 of the lifter E , and on the permanent bottom c^8 I place a removable bottom plate c^{10} , having short projections or legs c^{11} on its under side.

The device shown in Fig. 21 for removing the blocks from the mold consists of a block L of the same dimensions as the interior of the mold, mounted on any desirable base of about the width of the block. In removing a block from the mold with this form the mold and contained block is removed from the shaking table and placed on the block L , so that in pressing down on the mold the remov-

able bottom c' and molded block will be forced from the mold, when the bottom plate and block can be easily removed from the block L and set aside to dry.

5 The operation of my invention is as follows: Supposing that it is desired to mold paving-blocks, the molds are placed on the table so that the rib c' will engage with the notches b^5 in the side bars B^5 . The concrete mixture
10 is then placed in the mold and the cover C^2 firmly clamped thereon by the slide-bolts h , the drip-pans having been slid in position beneath the molds, when the machine is started. On the rotation of the driving-shaft the cam
15 projection 1, striking against the right-hand roller d^3 , forces the table to the position shown in full lines in Fig. 4. The supporting-block B' , being tilted to the right leg b , slightly raises the table. The cam 2 next strikes against the
20 left-hand roller d^3 and forces the table in the opposite direction to the position shown in dotted lines, tilting the supporting-block on the left leg and again raising the table, and so on, the table receiving three horizontal and
25 six vertical reciprocations during each rotation of the driving-shaft. It will thus be seen that the constant jarring of the block B' in tilting from one leg to the other causes a thorough mingling of the contents of the mold
30 and drives out the superfluous water and air spaces through the perforations c^5 in the cover of the mold, the funnel-shaped mouth being filled with a supply of the mixture, which gradually enters the mold as the contents are
35 compacted, a portion of the water escaping into the drip-pan b^4 . After the contents of the mold have been subjected to the jarring motion a sufficient length of time to thoroughly solidify the same the drip-pan b^4 and mold-
40 cover C^2 are removed, and the lifter E is elevated by pressing down on the outer arm of the lever E' , which removes the block and the bottom plate c' from the mold. In case it is desired to mold blocks of two or more
45 grades of material, I first place in the mold the lining shown in Figs. 15 and 16 and fill the space therein with one grade of material, when the lining is removed, and the space formed thereby is filled with another grade of
50 the mixture, after which I proceed as above described.

In molding sewer and conduit pipes I proceed as above described, except that I employ a form of mold substantially like that shown
55 in Figs. 25 and 26, in which K is a base-plate secured to the shaking table in the same manner as a block-mold and provided with a central opening K' , adapted to receive the core M . M' is a partible mold detachably secured to the base-plate K , and N is a screw
60 for removing the core from the mold after a pipe has been molded. At the end of the screw is swiveled a block m' , having a bayonet-joint therein for engaging a cross-bar m^2 in the hollow core. The screw N is threaded in a frame N' , which rests on a removable flat ring m on the top of the mold. On turning

the screw N the core will be withdrawn from the mold or pipe sufficiently to allow it to be taken out by hand.

What I claim, and desire to secure by Letters Patent, is—

1. The combination, with the stationary bed, of Λ -supports loosely mounted thereon, a movable table mounted on said supports, and a
75 rotary shaft having a cam thereon for reciprocating said table, substantially as and for the purposes described.

2. The combination, with the stationary bed, of a vertically and horizontally reciprocating
80 table mounted on said bed, a rotary shaft having a cam thereon, a yoke supported on said shaft and carrying friction-rollers on which the cam operates, and a connecting-rod between said reciprocating table and yoke, sub-
85 stantially as and for the purposes described.

3. The combination, with the stationary bed, of Λ -shaped supports loosely mounted in seats on the bed, a vertically and horizontally reciprocating table mounted on said supports,
90 longitudinal guides for said reciprocating table, and means for reciprocating said table, substantially as and for the purposes described.

4. The combination, with the stationary bed,
95 of a shaking mold-table mounted thereon and provided with drip-pans below the mold, and means for shaking said mold-table, substantially as and for the purposes described.

5. The combination, with the stationary bed,
100 of a shaking table, a mold mounted on said table and having a removable bottom, a lifter located below said mold for removing the article from said mold, and means for shaking
105 said table, substantially as and for the purposes described.

6. The combination, with the stationary bed, of a shaking table mounted on said bed, notched side bars secured to the floor of said
110 table, a mold having ribs on its sides adapted to enter the notches in said side bars, and means for shaking said table, substantially as and for the purposes described.

7. In a machine for solidifying concrete mixtures, the combination, with the shaking
115 table, of a mold or molds mounted thereon and having a removable cover provided with perforations, and means for securing said cover to the mold, substantially as and for the
120 purposes described.

8. In a machine for solidifying concrete mixtures, the combination, with a shaking
125 table, of a mold or molds mounted on said table and having a removable cover, locking devices secured to said table for locking the cover to the molds, a removable bottom for
130 said mold, and a lifting device secured to said table for removing the article from the mold, substantially as and for the purposes described.

9. In a machine for solidifying concrete mixture, the combination, with a shaking
table, of a mold or molds mounted thereon, removable drip-pans adapted to slide in ways

beneath said molds, and lifting devices secured to said table for removing the articles from the molds, substantially as and for the purposes described.

- 5 10. In a mold for solidifying concrete articles, the combination, with a mold having an internal flange at the bottom, of a removable bottom adapted to rest on said flange, a removable perforated cover, and means for se-
10 curing the cover to the mold, substantially as and for the purposes described

11. In a mold for solidifying concrete articles, the combination, with a mold having an internal flange at the bottom, of a removable
15 bottom adapted to rest on said flange, a removable perforated cover having a funnel-shaped mouth, and means for securing the cover to the mold, substantially as and for the purposes described.

- 20 12. In a machine for solidifying concrete mixtures, the combination, with a shaking table, of a mold and a removable lining for said

mold having alternate ribs and grooves on its inner side, substantially as and for the purposes described.

- 25 13. In a machine for solidifying concrete mixtures, the combination, with a shaking table, of a mold and a removable cover for said mold, said cover having a supply-opening, substantially as and for the purposes de-
30 scribed.

14. The combination, with the stationary bed and shaking table, of plates secured to said bed and table and having depressions in their adjacent faces, and an interposed A-
35 shaped block loosely seated in said depressions, substantially as and for the purposes described.

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

GEORGE RICHARDSON.

Witnesses:

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F. W. RITTER, Jr.