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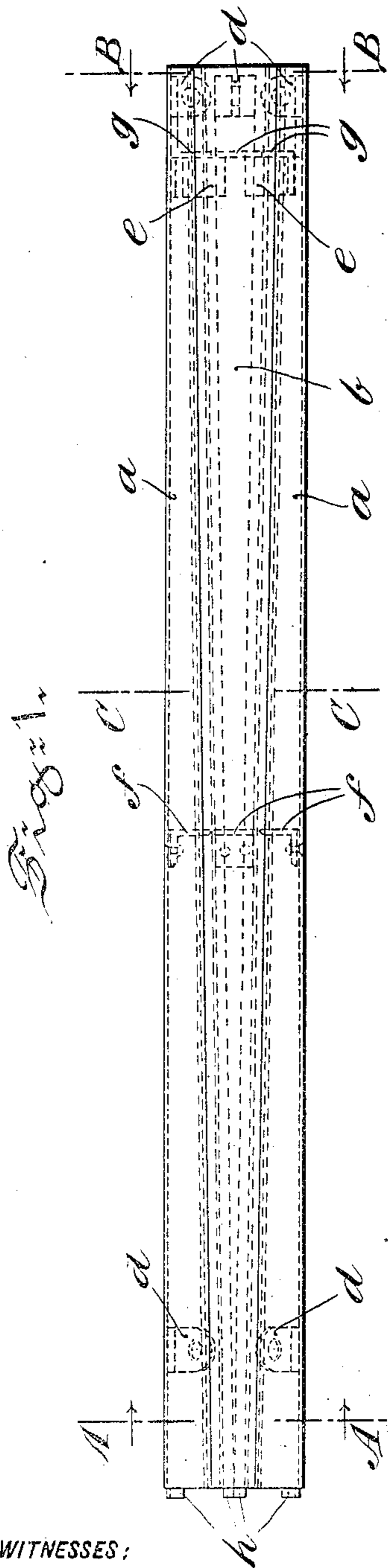
PATENTED AUG. 25, 1908.

D. L. HOUGH.

APPARATUS FOR MOLDING CONDUITS IN CONCRETE, &c.

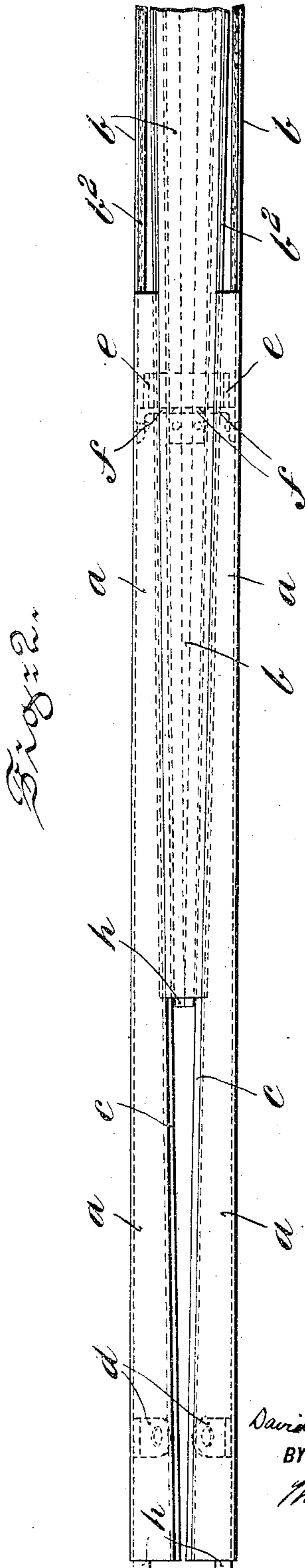
APPLICATION FILED SEPT. 7, 1906.

2 SHEETS—SHEET 1.



WITNESSES:

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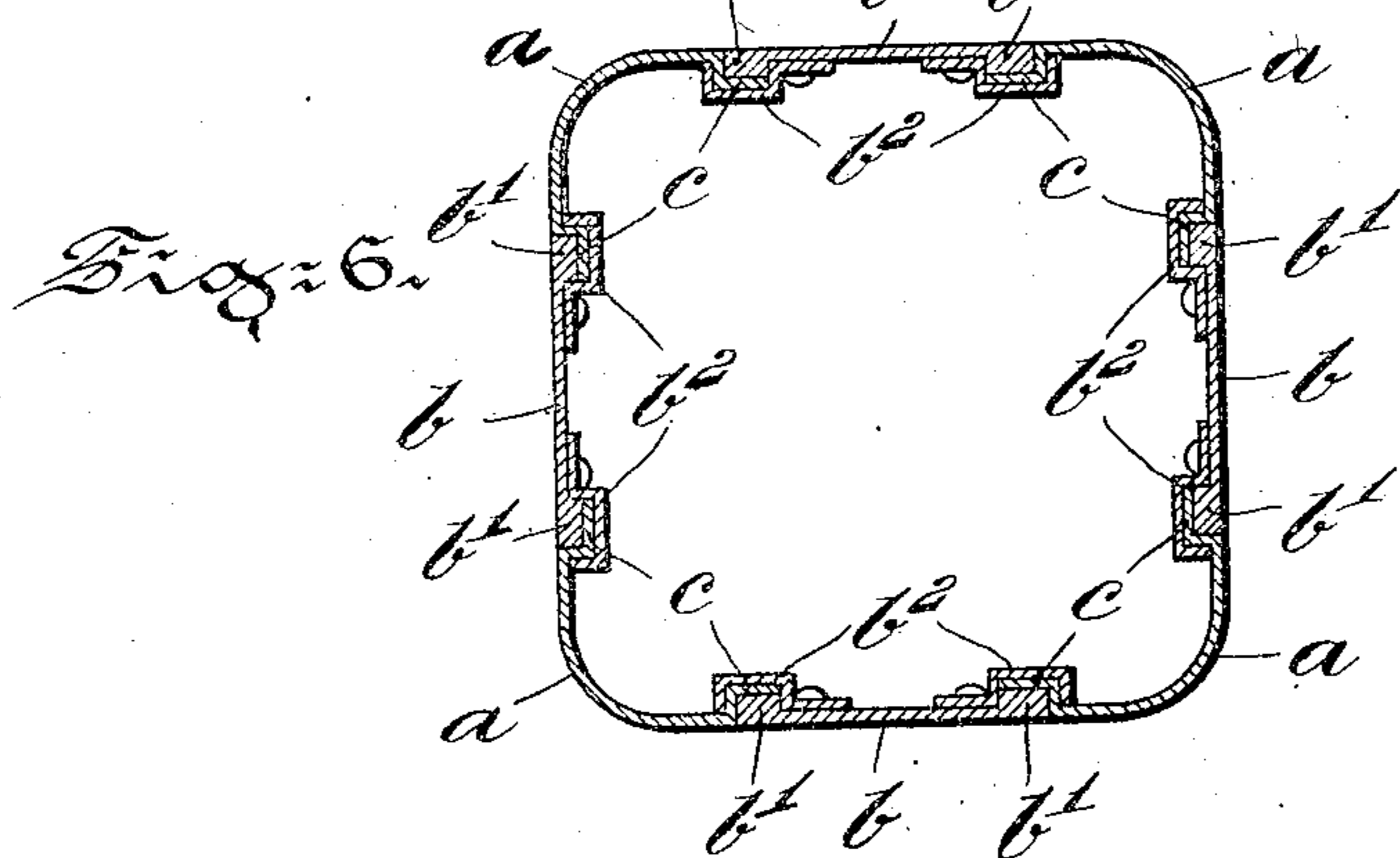
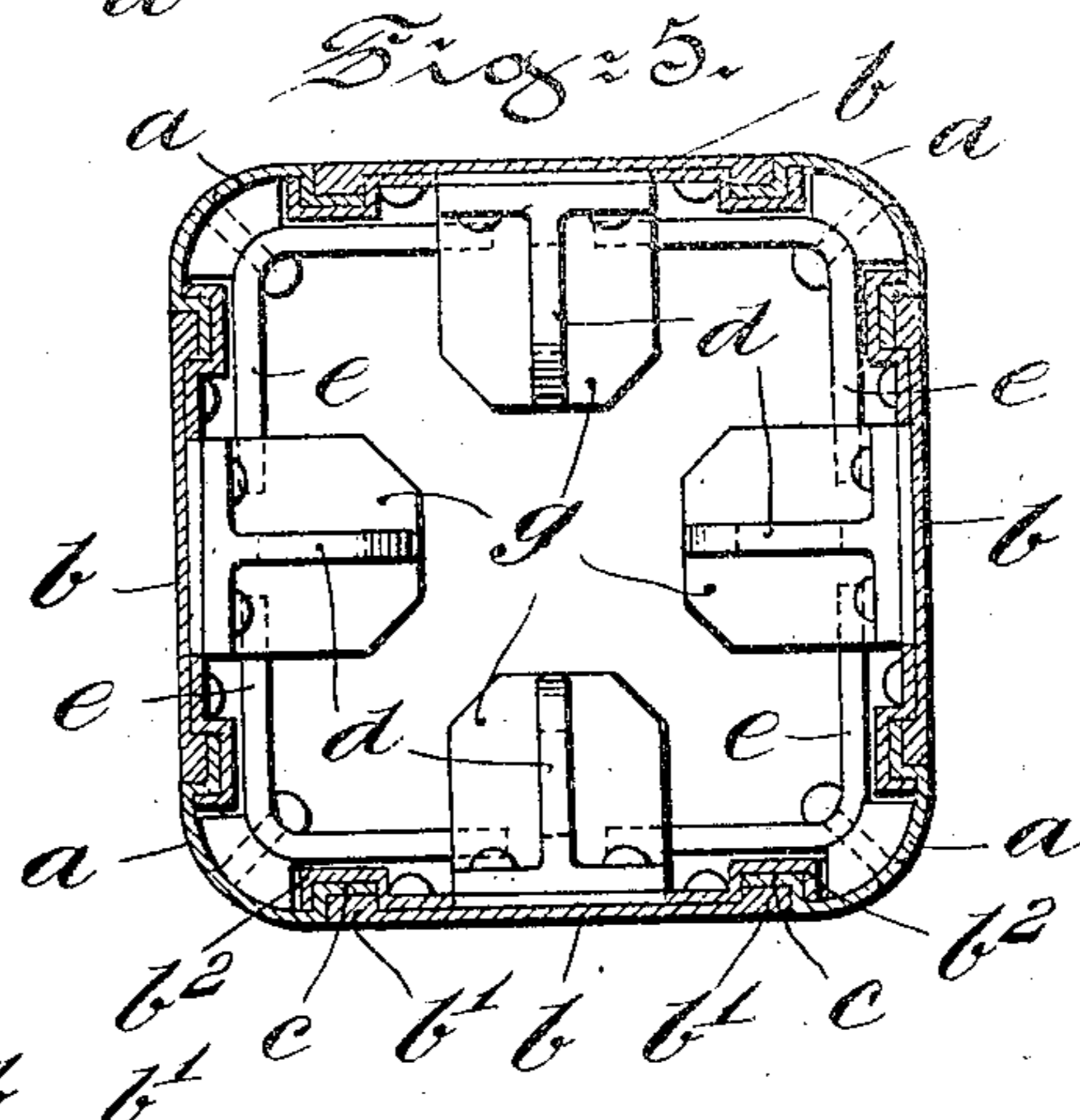
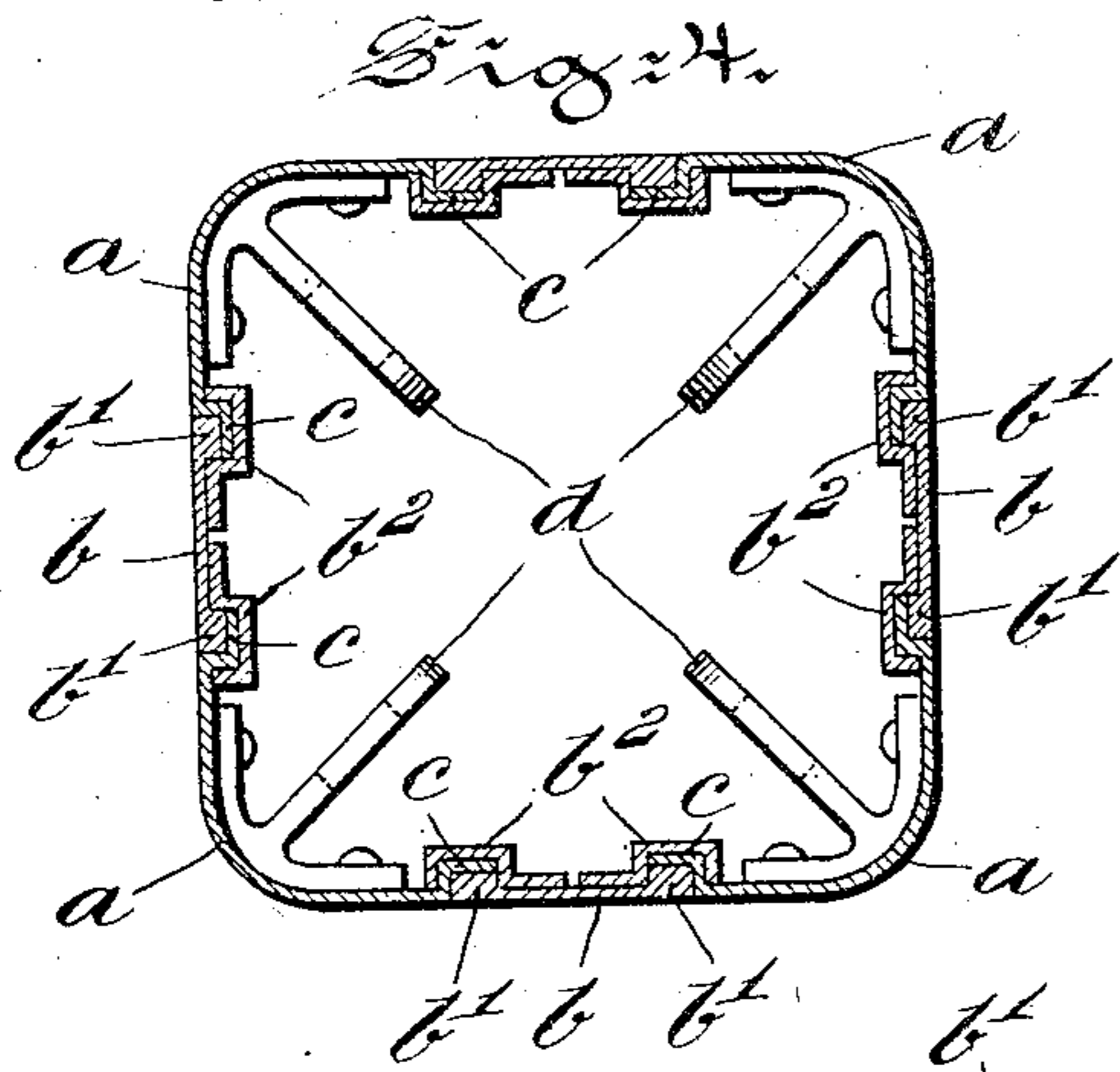
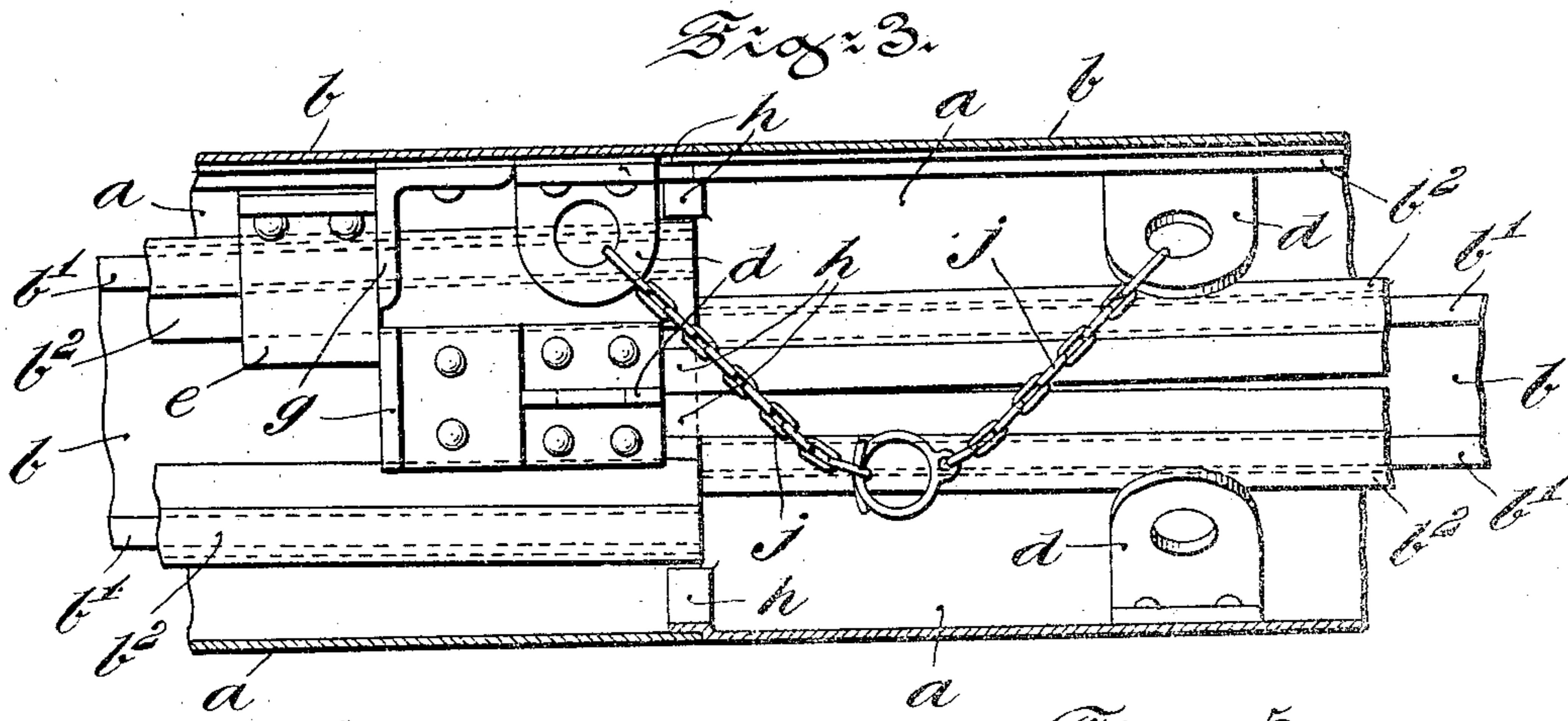
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2 SHEETS—SHEET 2.



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APPARATUS FOR MOLDING CONDUITS IN CONCRETE, &c.

No. 896,914.

Specification of Letters Patent.

Patented Aug. 25, 1908.

Application filed September 7, 1906. Serial No. 333,596.

To all whom it may concern:

Be it known that I, DAVID LEAVITT HOUGH, of the city, county, and State of New York, have invented an Improvement in Apparatus for Molding Conduits in Concrete, &c., of which the following is a specification.

Difficulty is met in making conduits for electric wires &c in concrete. While the terra cotta or vitrified clay conduit is satisfactory it is very difficult to make a conduit of that kind in a body of concrete or plastic material, since the tamping or ramming of the concrete while in a plastic condition is liable to fracture the conduit sections or to throw them out of line.

It is the object of my invention to dispense with such conduit sections and to form the conduit directly in the body of concrete by means of suitable molds which are expanded to the full size of the conduit section and after the concrete is set, are contracted or collapsed and removed.

A conduit section of any length desired may be made by employing a series of these mold sections connected together, and the connection is such that each section is independently collapsed or contracted, and the drawing out or removal of each section after contraction acts to contract or collapse the next section in the series.

In the drawings: Figure 1 is a plan view of one form of collapsible former embodying the invention showing the former closed or expanded to full size; Fig. 2 is a similar view showing the same extended and collapsed or contracted; Fig. 3 is a longitudinal vertical sectional view on an enlarged scale illustrating the connection of successive sections or formers; and Figs. 4, 5 and 6 are transverse sections, enlarged, on the lines A—A, B—B and C—C respectively of Fig. 1.

The mold consists of a series of sections or formers connected together in series. Each former or section consists of parts forming a tubular structure which is adapted to collapse or contract when the parts comprising it are extended or drawn apart.

In the particular form shown in the drawings, for the purpose of illustrating the invention, the formers consist of four corner pieces *a*, *a*, *a*, *a* and four intermediate pieces *b*, *b*, *b*, *b*, tapered longitudinally and united at the edges by engaging longitudinal grooves or dovetails *c*. The tapered pieces *a* are complementary to the tapered

pieces *b* so that when the parts are closed together, as shown in Fig. 1, they will form a hollow tube or former expanded to its maximum section.

When the pieces *a* and *b* are moved longitudinally, one set with reference to the other, the tapered longitudinal edges acting on one another will cause the tube to contract or collapse into a smaller section as shown in Fig. 2.

The parts *a* and *b* may be made of any suitable material, preferably stamped sheet metal and the engaging grooves may be formed in any convenient manner. I have shown the edges of the corner pieces *a* provided with L bends and the intermediate pieces *b* with longitudinal ribs *b'* resting on the bends and channeled plates *b''* engaging the outer sides of said bends. These are, however, details which are not material.

Successive formers are connected together by a loose or flexible connection in such manner that the longitudinal movement of one former, after it has been collapsed or partially collapsed, will act to extend and collapse the next former in the series.

As shown in the drawings this flexible connection consists of chains *g* connecting the rear ends of the corner pieces *a* of one section with the front ends of the intermediate pieces *b* of the next section. I have shown the pieces provided on the inside with suitable eyes *d* for the connection of the chains *g*.

The corner pieces *a* are provided near their front ends with lugs or stop plates *e*, and the intermediate pieces *b* are provided with lugs or stop plates *f* preferably at or about the center. These plates *e* and *f* are so arranged that when the pieces *b* are drawn out from the pieces *a* to collapse or contract the former their lugs or plates *f* will strike the lugs or plates *e* at the front ends of the corner pieces *a*, and a further movement forward of the pieces *b* will pull the pieces *a* forward with them. As the rear ends of the pieces *a* are united by the connections *g* with the front ends of the pieces *b* of the next section this forward movement of the pieces will pull out the pieces *b* of the next section and collapse that section; and so on throughout the series, each section, when collapsed and being pulled out, acting to extend and collapse the next section in the series.

The front ends of the intermediate sections *b* are shown also provided with plates *g* adapted to strike the stop plates *e* at the

front ends of the corner sections and limit the inward movement of the pieces *b* at the point of the maximum expansion. The abutting ends of the sections may also be provided with centering lugs and recesses *h* to insure the alinement of successive sections.

In using these formers as a mold for making a conduit they are placed in series end to end to form a continuous tube of the desired length, *i. e.* from manhole to manhole. They are then surrounded by the concrete, and after the same has set, the formers are collapsed and removed. The first former in the series is extended and contracted and then drawn out and as it is withdrawn it acts on the next former in the series to contract and withdraw it, and so on throughout the series until all are withdrawn leaving the hole through the concrete. As each section is withdrawn it may be disconnected and laid aside.

It will be noted that no section is pulled until the section in advance has been collapsed and consequently the strain in withdrawing the sections is greatly reduced.

Where the conduit is to be curved the formers or sections may be made with a suitable curvature.

It is important that means should be employed to prevent the concrete adhering to the sections and thus preventing their contraction and removal. This may be effected in various ways, as by painting the outer surfaces of the former sections before the concrete is applied with soft soap or mineral oil, or by wrapping them with a light paraffin paper to which the concrete will adhere, but which will not adhere to the formers.

It must be understood that I do not mean to limit my invention to collapsible formers of the particular construction consisting of the parts *a* and *b*, as my invention comprehends formers, however constructed, which are capable of being expanded to the sectional area of the conduit to be formed and then contracted to a smaller area so that they may be withdrawn.

With a conduit mold composed of a series of such collapsible or contractible formers, each is independently collapsible, but the withdrawal or forward movement of one former after contraction, acts through the connection of that former with extensible portions of the next former to extend and contract that former, and so on throughout the series, and there is no draft or strain on any former until those in advance have been extended and contracted.

The formers or sections may be made of any shape *i. e.* cross section, desired; that shown is usually preferable as it produces a rectangular conduit which is the shape usually desired.

I have shown the connections *j* between the rear ends of one set *a* of members of one

section and the front ends of the opposite set *b* of members of the next section. This is preferable as it enables shorter chains or connections *j* to be employed, the connection may, however, be made between corresponding sets of members, or in any way that produces the contraction of one section by the forward movement of the section in front.

I claim:

1. An apparatus for molding conduits in concrete and plastic material consisting of a series of independently collapsible sections or formers, and means controlled by one former for collapsing the next former in the series, whereby the manipulation of each former will collapse the next former in the series.

2. An apparatus for molding conduits in concrete and plastic material consisting of a series of independent sections or formers each composed of extensible members adapted to collapse when extended, and means, connecting any former to the next in the series, for extending the members of the next section when the section in advance is moved longitudinally.

3. An apparatus for molding conduits in concrete and plastic material consisting of a series of independent sections or formers, each consisting of extensible parts arranged to contract or collapse when extended, and a connection between the rear end of one section and the front end of the next section, whereby the movement of the forward section after extension and contraction, will cause the extension and contraction of the next section in the series.

4. An apparatus for molding conduits in concrete and plastic material consisting of a series of independent sections or formers, each consisting of extensible parts arranged to contract or collapse when extended, and a flexible and detachable connection between the rear end of one section and the front end of the next section, whereby the movement of the forward section after extension and contraction will cause the extension and contraction of the next section in the series.

5. An apparatus for molding conduits in concrete and plastic material composed of a series of independent sections or formers, each consisting of longitudinally movable members connected together at their edges by complementary tapered guides, whereby the extension of its members will contract or collapse each former, and a connection between the rear ends of part of the members of one former and the front ends of part of the members of the next former in the series, whereby the movement of one former after extension and contraction will cause the extension and contraction of the next section in the series.

6. A collapsible former for molding conduits in concrete and plastic material consisting of two sets of parts, the outer sur-

faces of which constitute the mold surface, the parts of one set being connected with the parts of the other set by complementary longitudinally tapered interlocking guides, whereby the longitudinal movements of one of said sets of parts will, through said interlocking guides, positively draw in and force out the adjacent parts of the other set and contract and expand the peripheral area of the former.

7. A collapsible former for molding conduits in concrete and plastic material consisting of two sets of parts, the outer surfaces of which constitute the mold surface, the parts of one set being connected with the parts of the other set by complementary longitudinally tapered interlocking guides, whereby the longitudinal movements of one of said sets of parts will, through said interlocking guides, positively draw in and force out the adjacent parts of the other set and contract and expand the peripheral area of the former, and stops between said sets of parts to limit the extension and contraction.

8. An apparatus for molding conduits in concrete and plastic material composed of a series of independent sections or formers each consisting of two sets of parts, the parts of one set being connected with the parts of the other set by complementary longitudinal tapered guides, whereby the extension of one of said sets of parts with reference to the other set will cause the former to contract or collapse, said formers being provided with stops between said sets of parts to limit the extension and contraction of the former, and a connection between a set of parts of each former and a set of parts of the next former, whereby the movement of one former after extension and contraction, will extend and contract the next former in the series.

9. A collapsible former for molding conduits in concrete and plastic material consisting of four corner pieces *a* and four intermediate pieces *b*, said former and intermedi-

ate pieces being connected at their edges by complementary longitudinal tapered guides *c*.

10. An apparatus for molding conduits in concrete and plastic material composed of a series of independently collapsible formers each consisting of four corner pieces *a* and four intermediate pieces *b*, said corner and intermediate pieces being connected at their edges by complementary longitudinal tapered guides *c*, a set of corresponding pieces of one section being connected with a set of corresponding pieces of the next section in the series.

11. A collapsible former for molding conduits in concrete and plastic material consisting of four corner pieces *a* and four intermediate pieces *b*, said pieces *a* and *b* being connected at their edges by complementary longitudinal tapered guides *c*, and the stops *e, f* carried by the pieces *b* and *a* respectively and adapted to limit the extension of said pieces and the contraction of the former.

12. An apparatus for molding conduits in concrete and plastic material composed of a series of independent formers each consisting of four corner pieces *a* and four intermediate pieces *b*, said pieces *a* and *b* being connected at their edges by complementary longitudinal tapered guides *c*, and the stops *e, f*, carried by the pieces *b* and *a* respectively and adapted to limit the extension of said pieces after the section has been contracted, and detachable connections between one set of pieces of each section and a set of the pieces composing the next section, whereby the movement of a section after extension and contraction will extend and contract the next section.

In testimony of which invention, I have hereunto set my hand.

DAVID LEAVITT HOUGH.

Witnesses:

LOYAL LEALE,
WALLACE STEVENS.