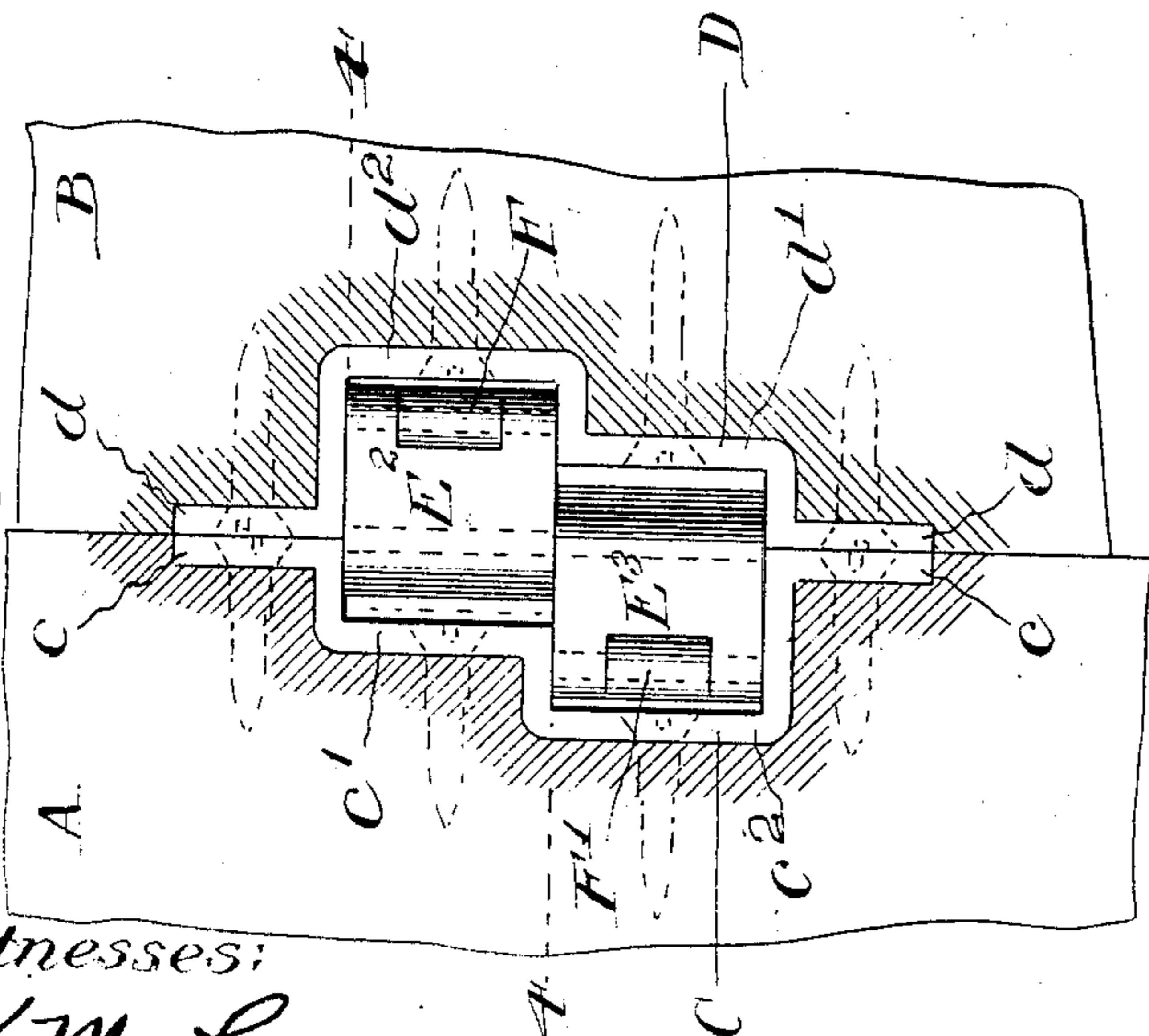


G. C. GARDNER.
HINGE.

APPLICATION FILED APR. 10, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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Fig. 2.

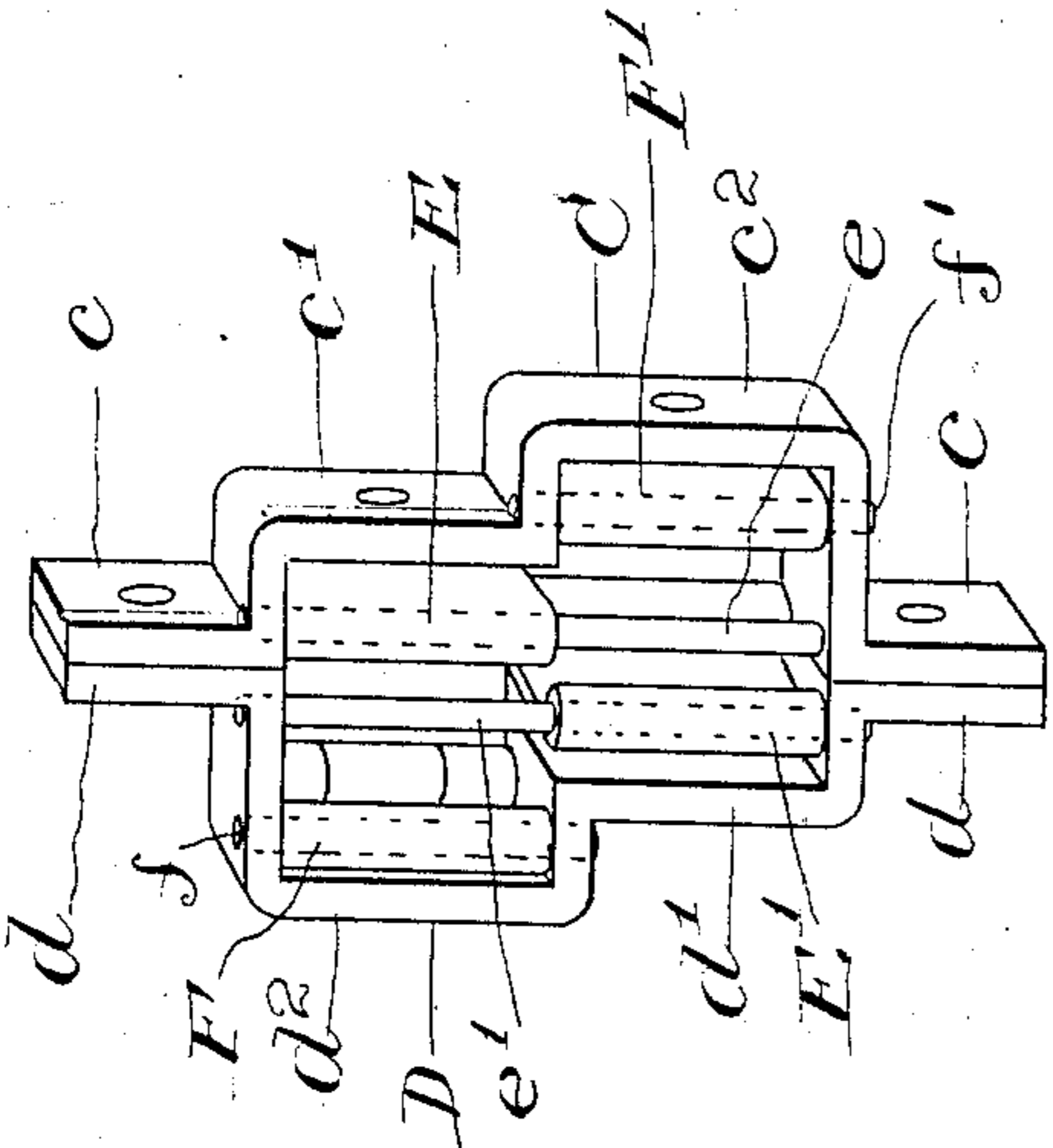


Fig. 3.

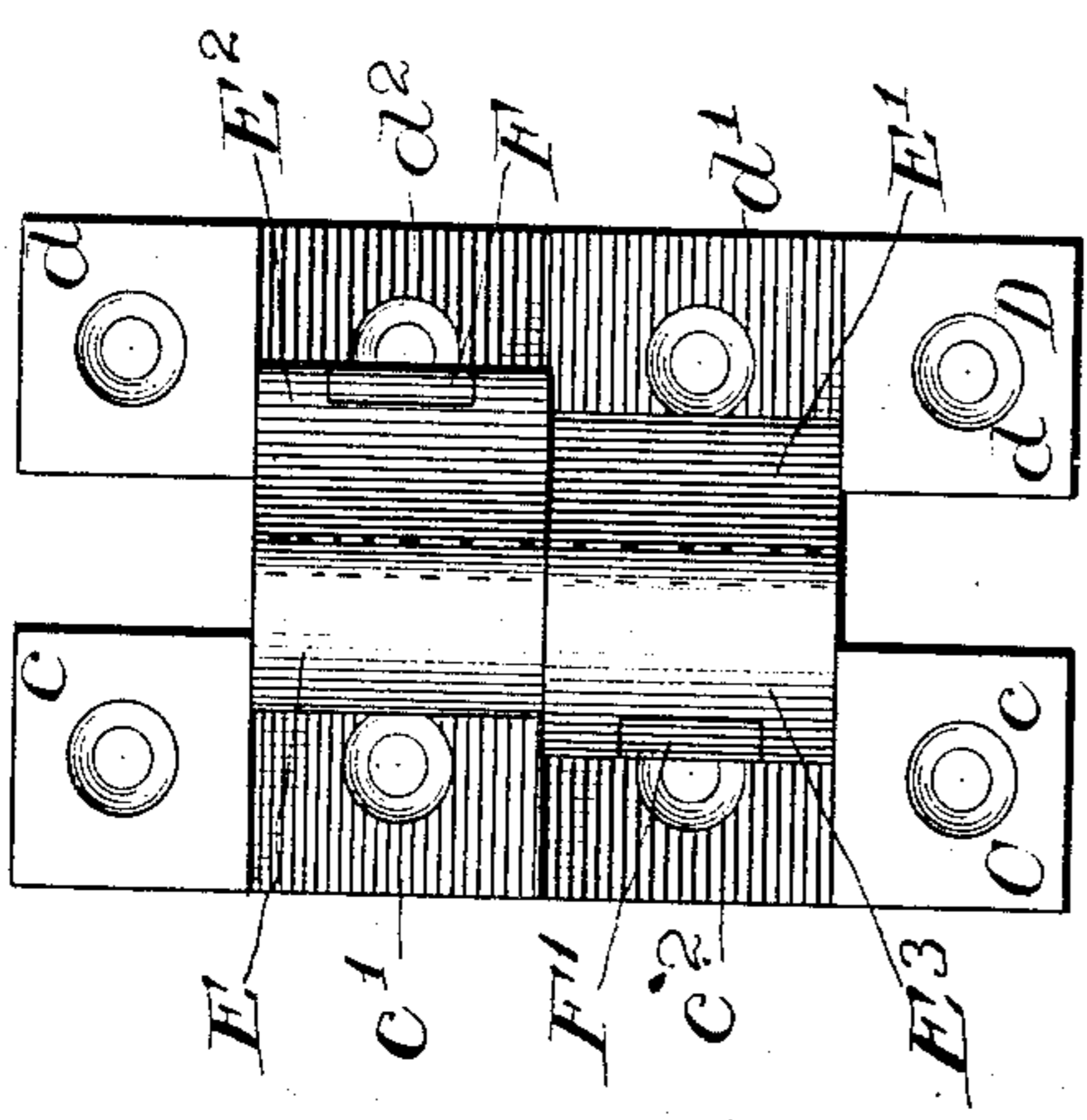


Fig. 4.

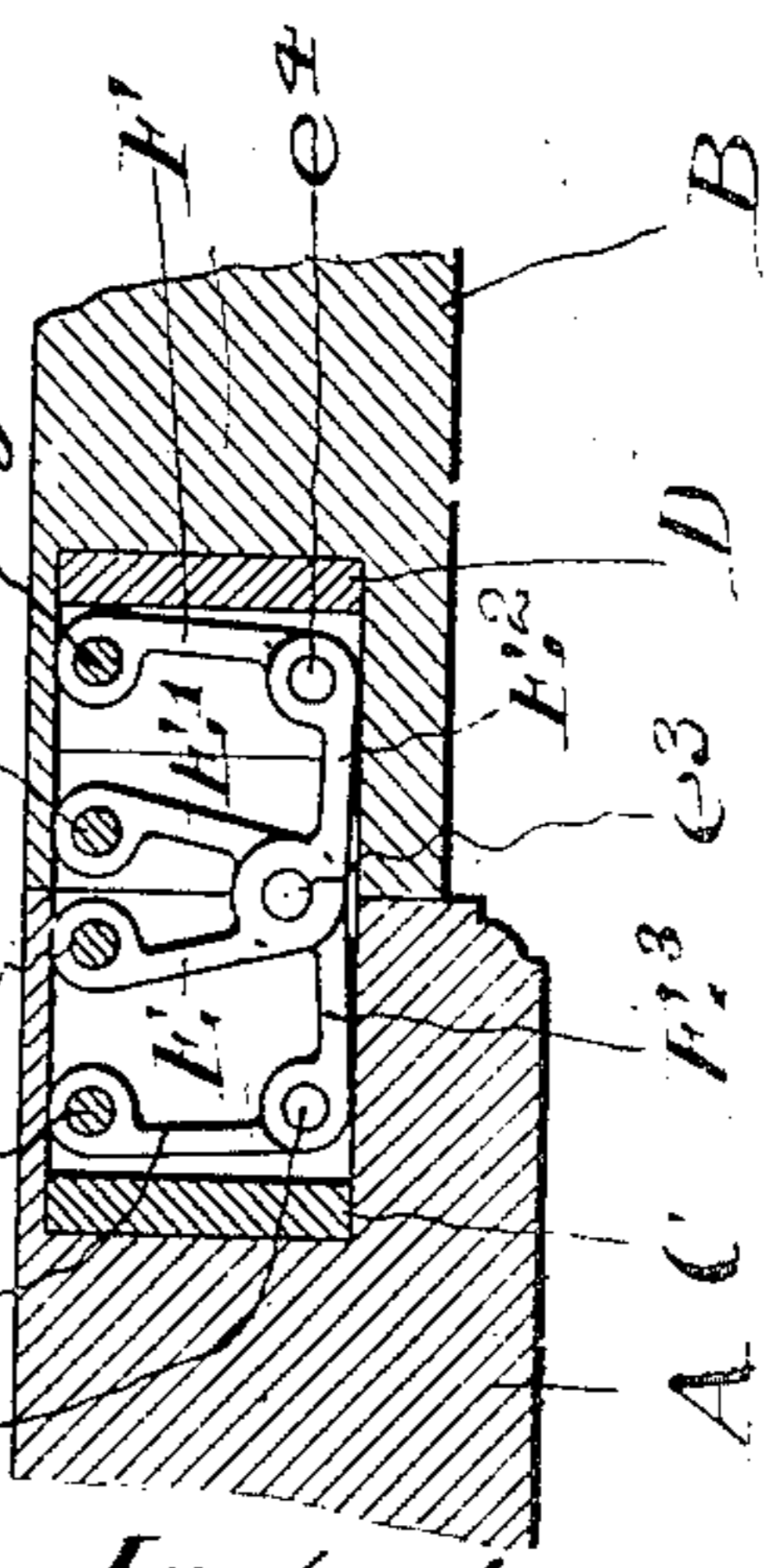


Fig. 5.

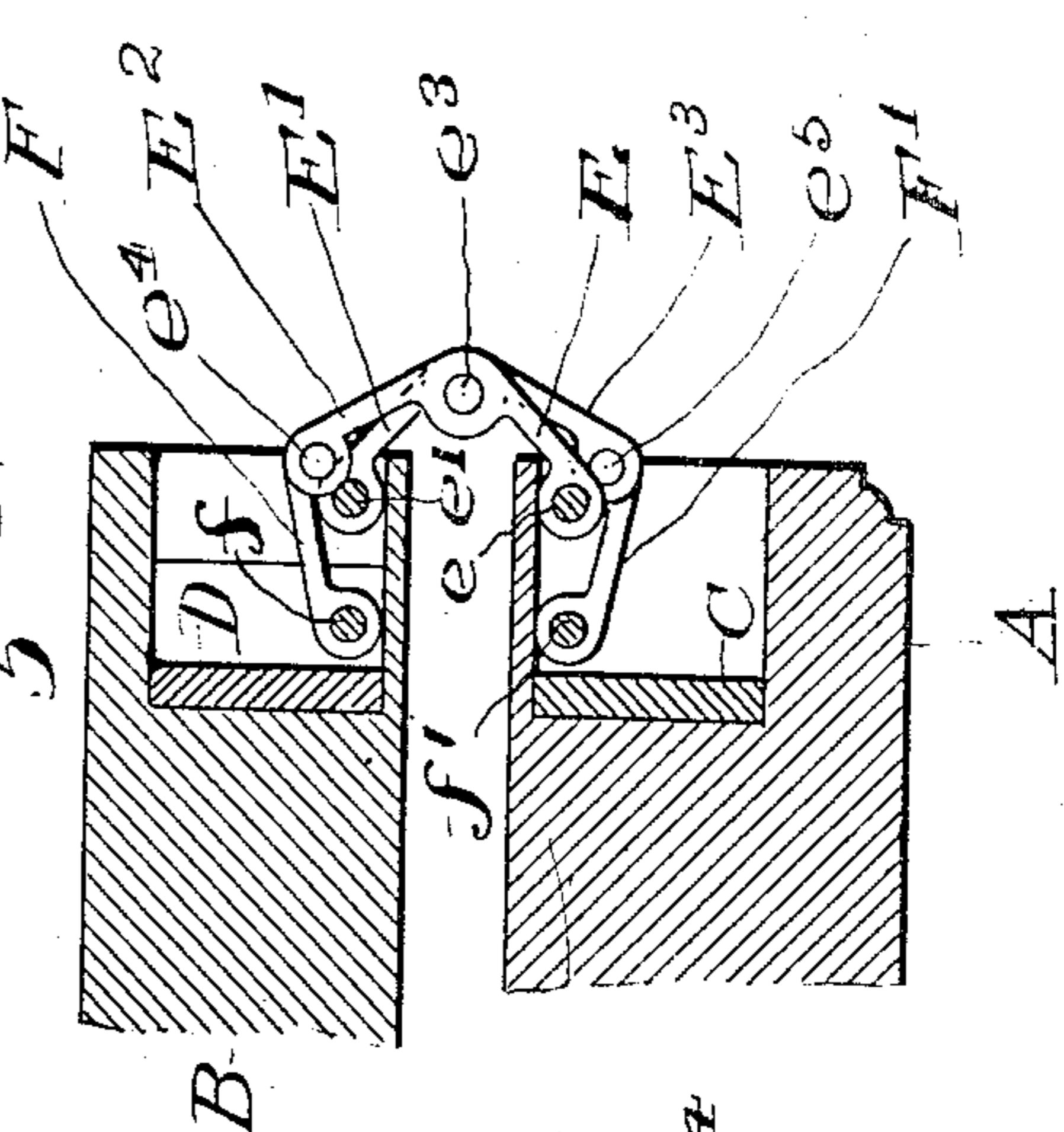
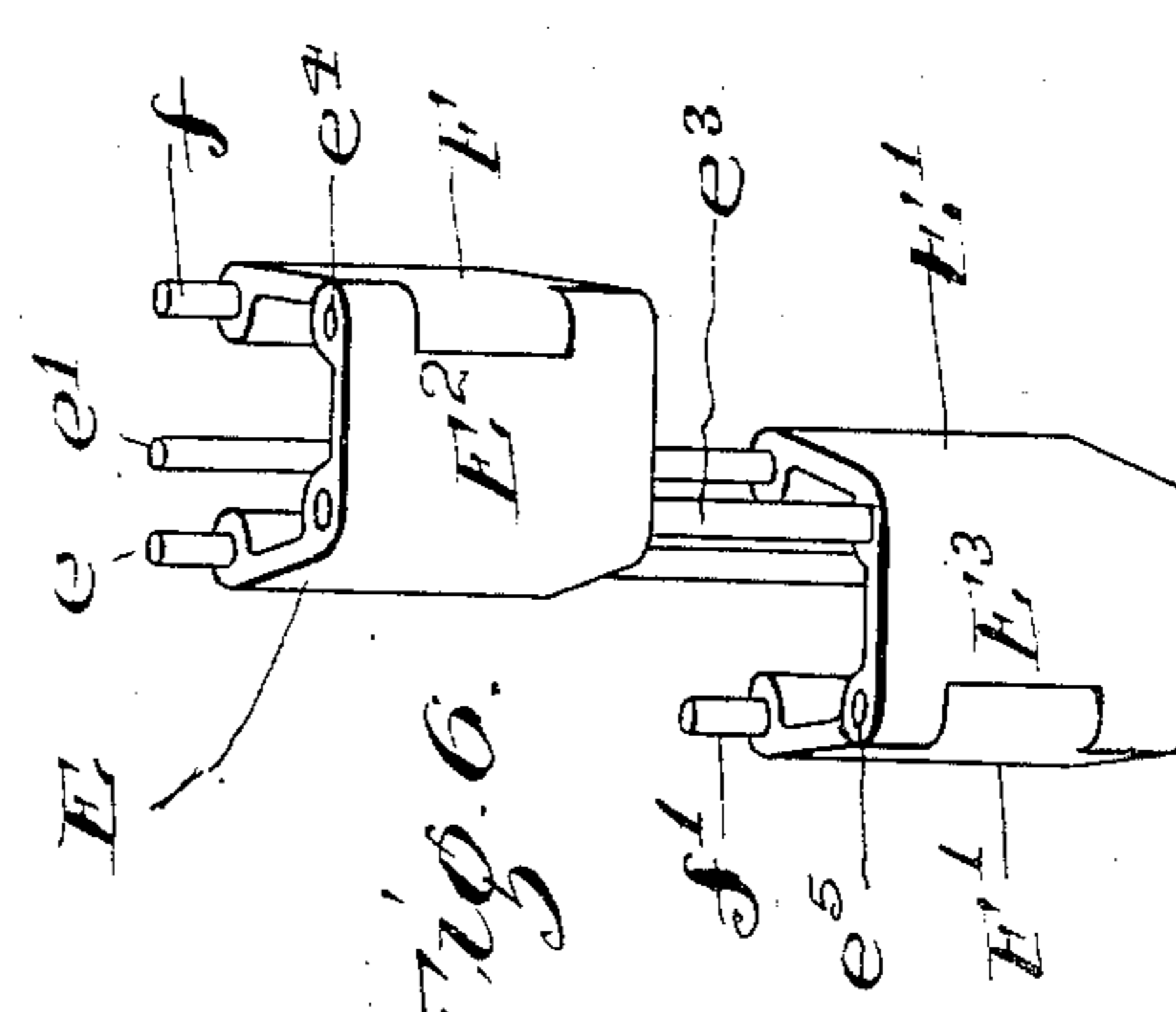


Fig. 6.

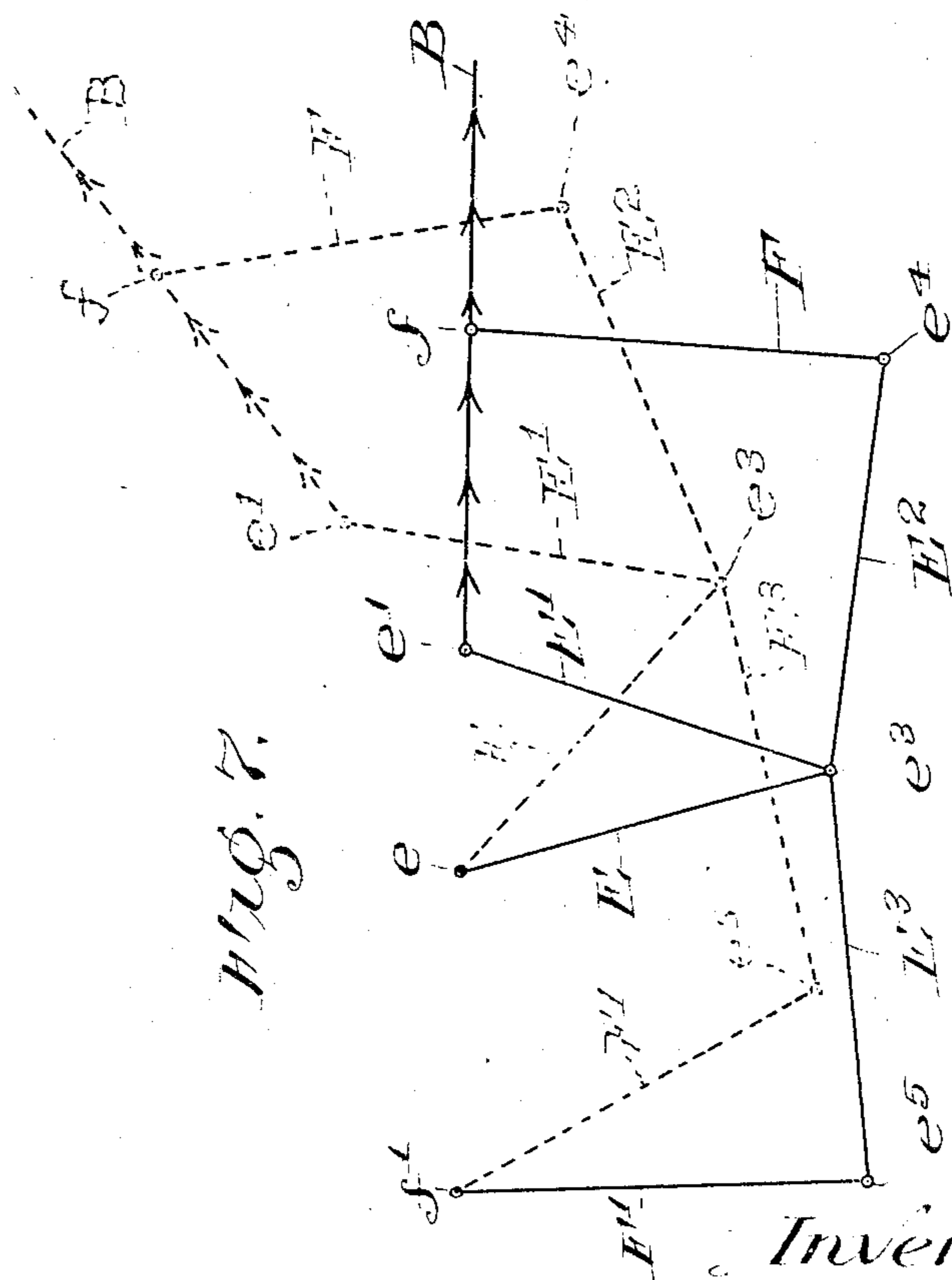
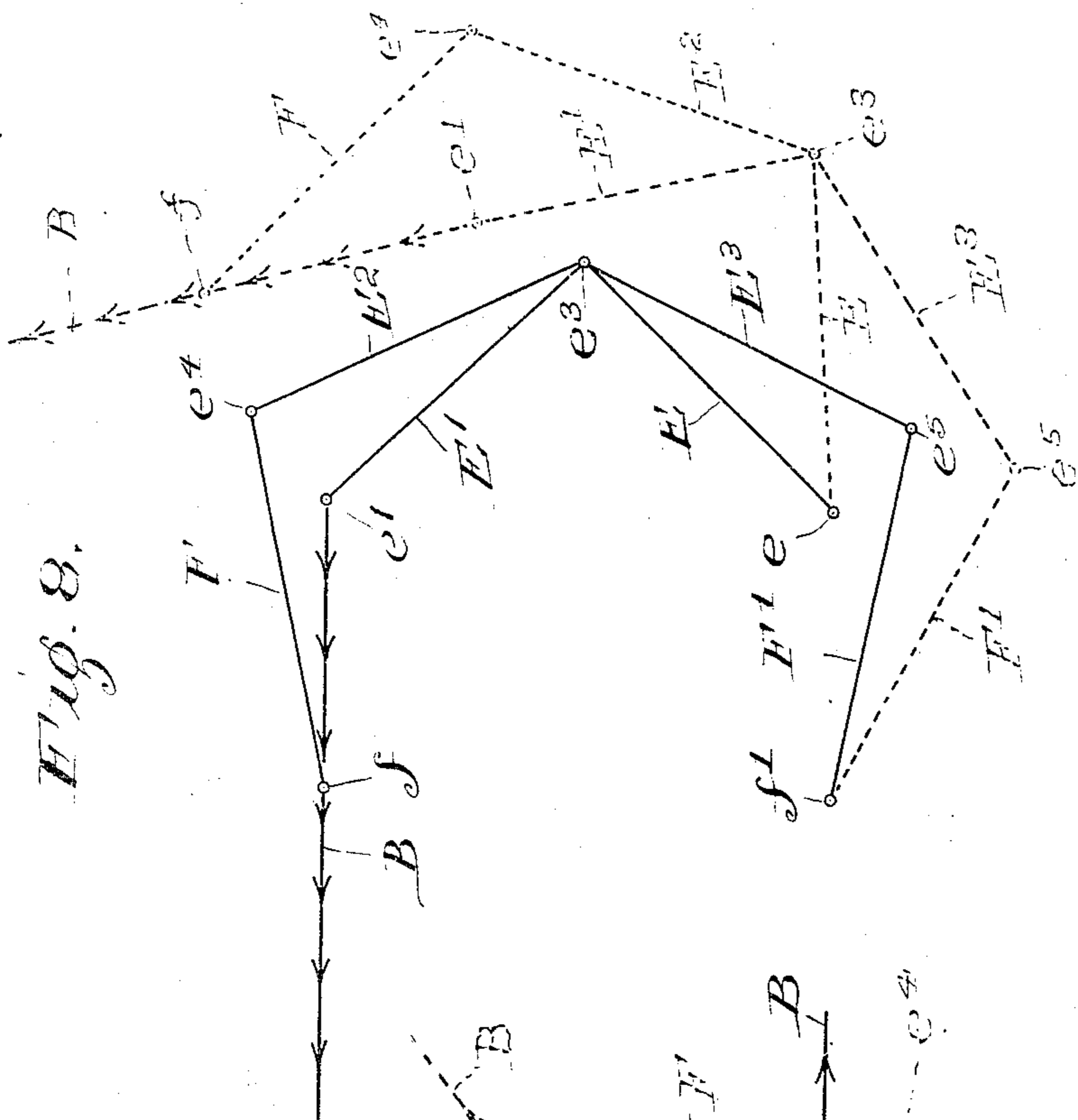


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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

GEORGE C. GARDNER, OF CHICAGO, ILLINOIS.

HINGE.

No. 862,550.

Specification of Letters Patent.

Patented Aug. 6, 1907.

Application filed April 10, 1905. Serial No. 254,682.

To all whom it may concern:

Be it known that I, GEORGE C. GARDNER, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hinges, of which the following is a specification.

My invention relates to improvements in hinges, and is fully described and explained in this specification, and shown in the accompanying drawings, in which

Figure 1 is a front view of my improved hinge, showing the same in place, the door and casing in which it is mounted being cut away to show the hinge construction; Fig. 2 is a perspective view of the hinge, looking at the opposite side thereof; Fig. 3 is an elevation of the hinge when the leaves have been swung back into line; Fig. 4 is a section in the line 4—4 of Fig. 1; Fig. 5 is a similar section showing the door opened; Fig. 6 is a skeleton view, showing the arrangement of certain of the moving parts; Fig. 7 is a diagram illustrating the movement of the various members of the hinge in operation, two positions of the device being indicated; and Fig. 8 is a similar diagram, showing two other positions of the device.

My improved hinge is what is known as a concealed hinge, *i. e.* one which can be rabbeted or otherwise secured in place wholly within the wood of the door and jamb, so as to be completely out of sight when the door is closed.

Referring to the drawings, A, indicates the door-jamb, and B, indicates the door with which my improved hinge is used. It will be seen that the hinge is shown as applied to a door at its left-hand edge, the door swinging away or back when viewed from that side shown in the drawings.

For the sake of greater clearness in description, I shall henceforth speak of the side of the door and hinge illustrated in Fig. 1, that is the side from which the door swings, as the front, and to the opposite side, or the one toward which the door swings, as the back. It will be evident from the drawings that the same hinge could be reversed and used on the right-hand side of a door swinging forward from the opening or turned upside down and used in the two other positions. By the use of these terms in describing my device, therefore, I do not intend to use said terms as terms of limitation, but merely as descriptive of the positions specifically shown herein.

The jamb, A, and door, B, are rabbeted out as illustrated, and within the depressions thus formed, are placed two leaves, C, D, respectively. These two leaves are similar each to each, but are inverted with respect to each other as shown. These leaves have ends, *c*, *d*, which lie flush with the adjacent edges of the jamb and door respectively, portions, *c*¹, *d*¹, near the top and bottom of the leaves, C, and D, respec-

tively, said portions being let into the jamb and door, and lying parallel with the edges thereof, and portions, *c*², *d*², lying near the bottom and top of the leaves, C, D, respectively, said portions being inset still further into the jamb and door. Extending from end to end of the leaves, C, D, are pivots, *e*, *e*¹, and these pivots carry at their top and bottom ends respectively, links, E, E¹. Said links are pivoted together upon a pivot *e*³, and are prolonged beyond said pivot in the form of arms, E², E³, which extend into the lower and upper portions of the leaves, D, C, respectively. These arms reach, when the door is closed, almost to the portions, *c*², *d*², of the leaves and said arms are pivoted by pintles, *e*⁴, *e*⁵, at their free ends respectively, to guide-links, F, F¹, said guide-links being pivoted on pivots, *f*, *f*¹, in the upper and lower portions respectively of the leaves, D, C.

This completes the description of the actual mechanical construction of my improved device.

As the door is swung open, the pivot, *e*³, swings away from the line of the door-jamb, and the door, following as it does a fixed path with relation to the path of the pivot, *e*³, swings not about the line of meeting of the two hinge-leaves, as do most hinges, but moves in a fixed path describing a fixed curve, the center of which curve is behind the edge of the jamb. By this means, it is possible to construct a hinge which can be entirely inset in the door and jamb, so as to be invisible when the door is closed and still leave the door free to be opened without wedging against the jamb.

The theory of operation of my device can probably be best understood from the diagrams of Figs. 7 and 8.

In Fig. 7 the parts are illustrated in solid lines in the position they occupy when the door is closed, and the plane of the door is indicated by the solid line provided with arrows.

The links and pivots are indicated in the diagrams by the same letters given them in the other figures.

It will be seen from the diagrams that the links, E, E¹, prolonged as they are to form the arms, E², E³, form with the links, F, F¹, and the leaves respectively, to which said guide-links and main links are pivoted, two quadrilaterals. It will be noted that the link E with its arm E² forms a side in each of the quadrilaterals, as does the link E¹ with its arm E³. That is, each of these bent links forms a side in both the quadrilaterals. This construction is such that as the quadrilaterals are changed in diagonal dimensions, the door plane, B, will swing in an irregular curve, first to the position shown in dotted lines in Fig. 7, then to the position shown in dotted lines in Fig. 8, and finally to the position shown in solid lines in Fig. 8.

The construction herein illustrated is particularly advantageous because of its neatness and compactness and the ease with which it can be applied to a

door. By bending the main links, as illustrated in the drawings, so that the two portions on opposite sides of the pivot thereof are practically at right angles to each other, I obtain a long link which occupies but
 5 a small space when the hinge is closed. Furthermore, by this construction I am enabled to use a short guide-link and to place the pivots of the main links and guide-links practically in the planes of the door and jamb. Furthermore, the frame which I have described
 10 and illustrated is particularly adapted to fit the links thereof and is also symmetrical on opposite sides, so as to simplify the manufacture and to make the hinge suitable for use on either side of a door.

I claim as new and desire to secure by Letters
 15 Patent:—

1. The combination with two leaves, of two main links pivoted to the said leaves at the opposite ends thereof respectively, a pintle upon which said main links are mutually pivoted together near their centers, each of said
 20 main links being bent at or near its center toward the other leaf from that to which it is pivoted, and two guide-links, one pivoted to each of the leaves at the opposite end of the leaf from the pivotal point of the main link and in substantially the same plane therewith with respect to the plane of the door, the pivotal point of said
 25 guide-links upon said leaves being farther removed from the edges of the leaves than the pivotal points of the main links, and the opposite end of said guide-links being pivoted to the ends of the main links carried by the opposite leaves.
 30

2. In a device of the class described, the combination with two leaves each of which contains a shallow and a deep portion, the shallow portion of each leaf being opposite the deep portion of the other, of two main links
 35 pivoted in the shallow portions of each leaf near one edge

thereof, said links extending approximately to the opposite edges of the leaves when the hinge is closed and being there pivoted together, each of said links being bent at the pivoted point and extending into the deep portion of the opposite leaf, and guide-links pivoted in the deep portion of each leaf near one edge, the opposite ends of said
 40 guide links being pivoted to the ends of the main links.

3. The combination with two leaves, of two main angle-shaped links pivoted together one above the other, one of the arms of each of said links lying in the plane of the
 45 other when the door is closed, the other arms being pivoted to the hinge leaves, and two guide links pivoted to the hinge leaves in a line passing through the pivots connecting the said angle-shaped links to the hinge leaves, and pivoted to the free ends of the main links.
 50

4. The combination with two leaves or holders, of two main movable parts or links pivoted to the said leaves or holders, a pintle upon which said main movable parts or links are mutually pivoted together near their centers, each of said main movable parts or links being bent toward the other leaf or holder from that to which it is
 55 pivoted, and two supplemental parts or guide-links pivoted to said leaves or holders, the pivotal point of said supplemental parts or guide-links upon said leaves or holders being farther removed from the edges of the leaves or holders than the pivotal points of the main movable parts
 60 or links and in substantially the same plane therewith with respect to the plane of the door, and the opposite end of said supplemental parts or guide-links being pivoted to the ends of the main movable parts or links carried by the opposite leaves or holders.
 65

In witness whereof I have signed the above application for Letters Patent at Chicago, in the county of Cook and State of Illinois, this 6th day of April, A. D. 1905.

GEORGE C. GARDNER.

Witnesses:

K. M. CORNWALL,
 J. E. SHERVEY.