

No. 644,150.

Patented Feb. 27, 1900.

H. C. SMITH.  
WINDOW FRAME.

(No Model.)

(Application filed May 31, 1899.)

3 Sheets—Sheet 1.

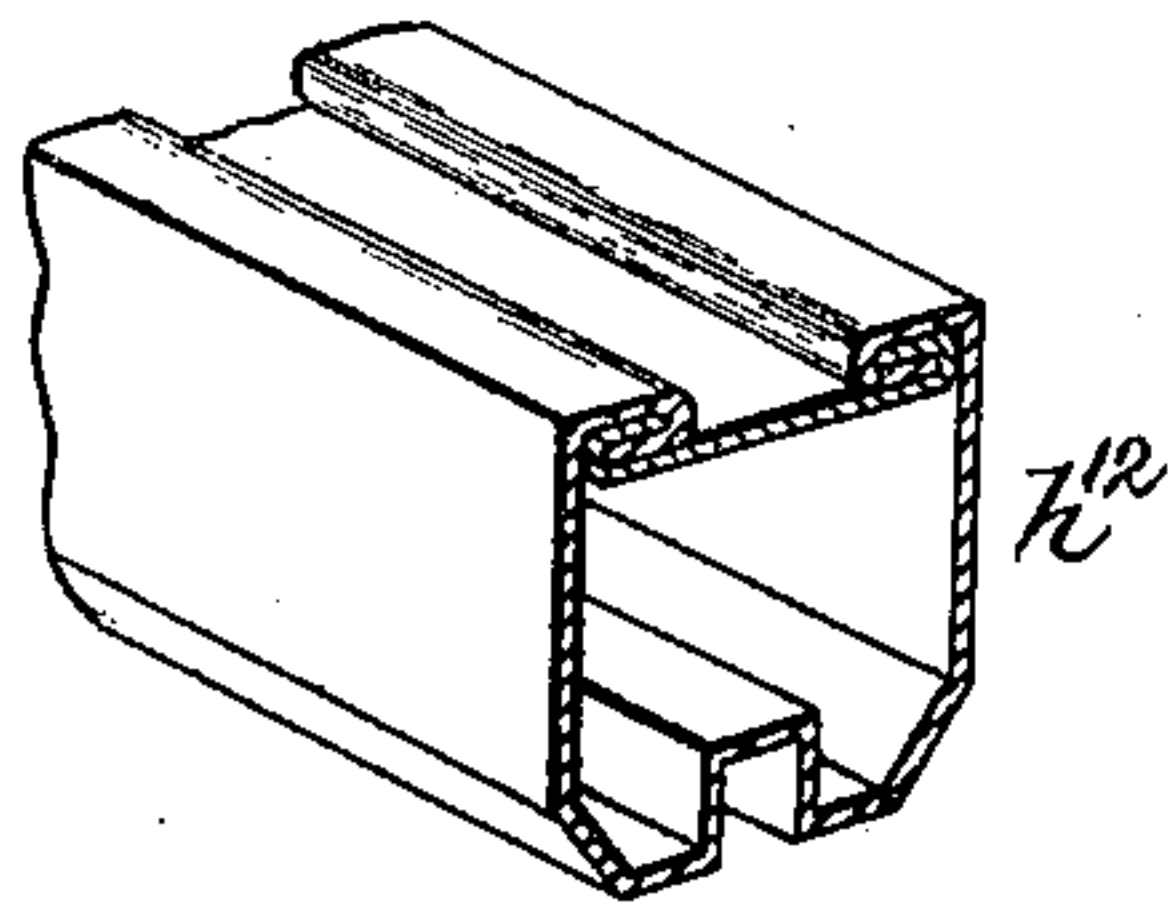


Fig. 12.

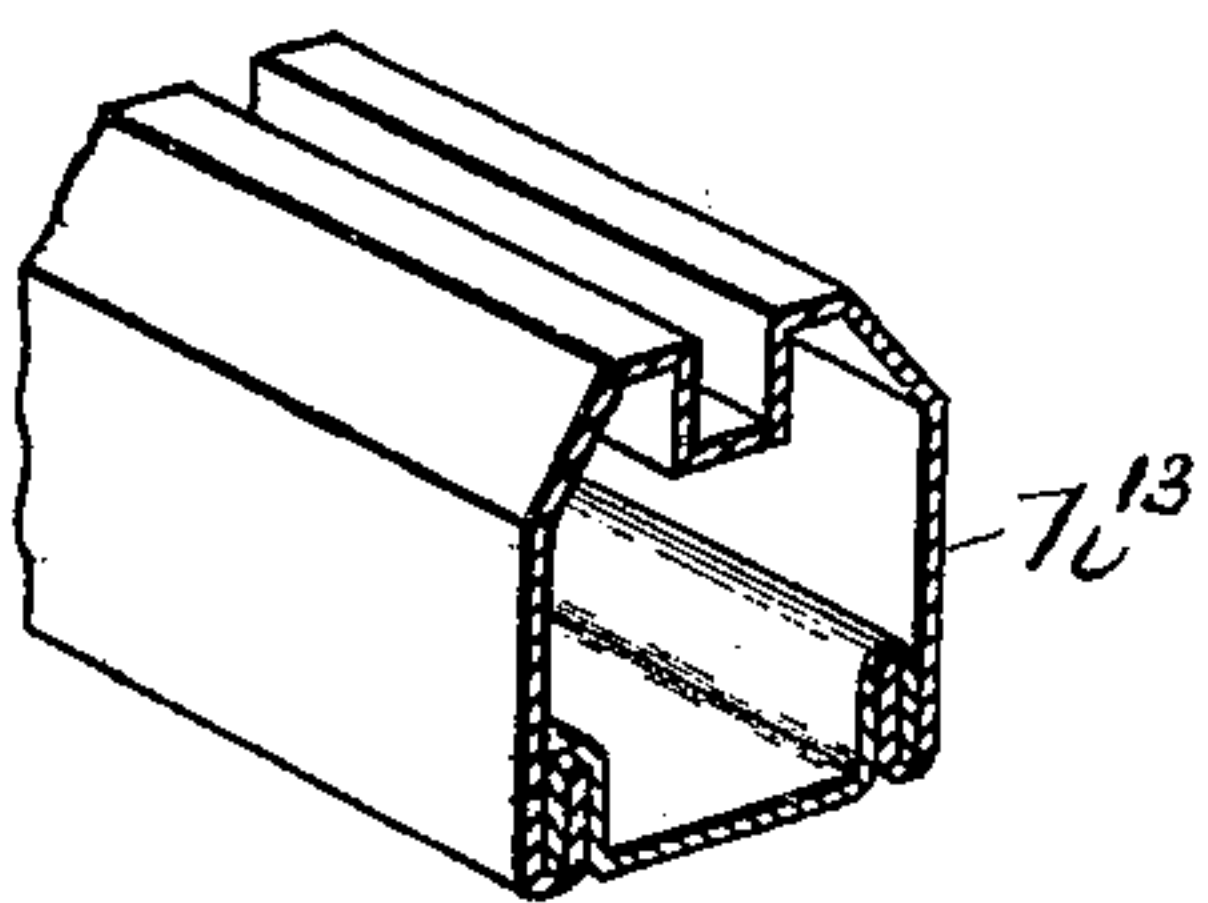


Fig. 13.

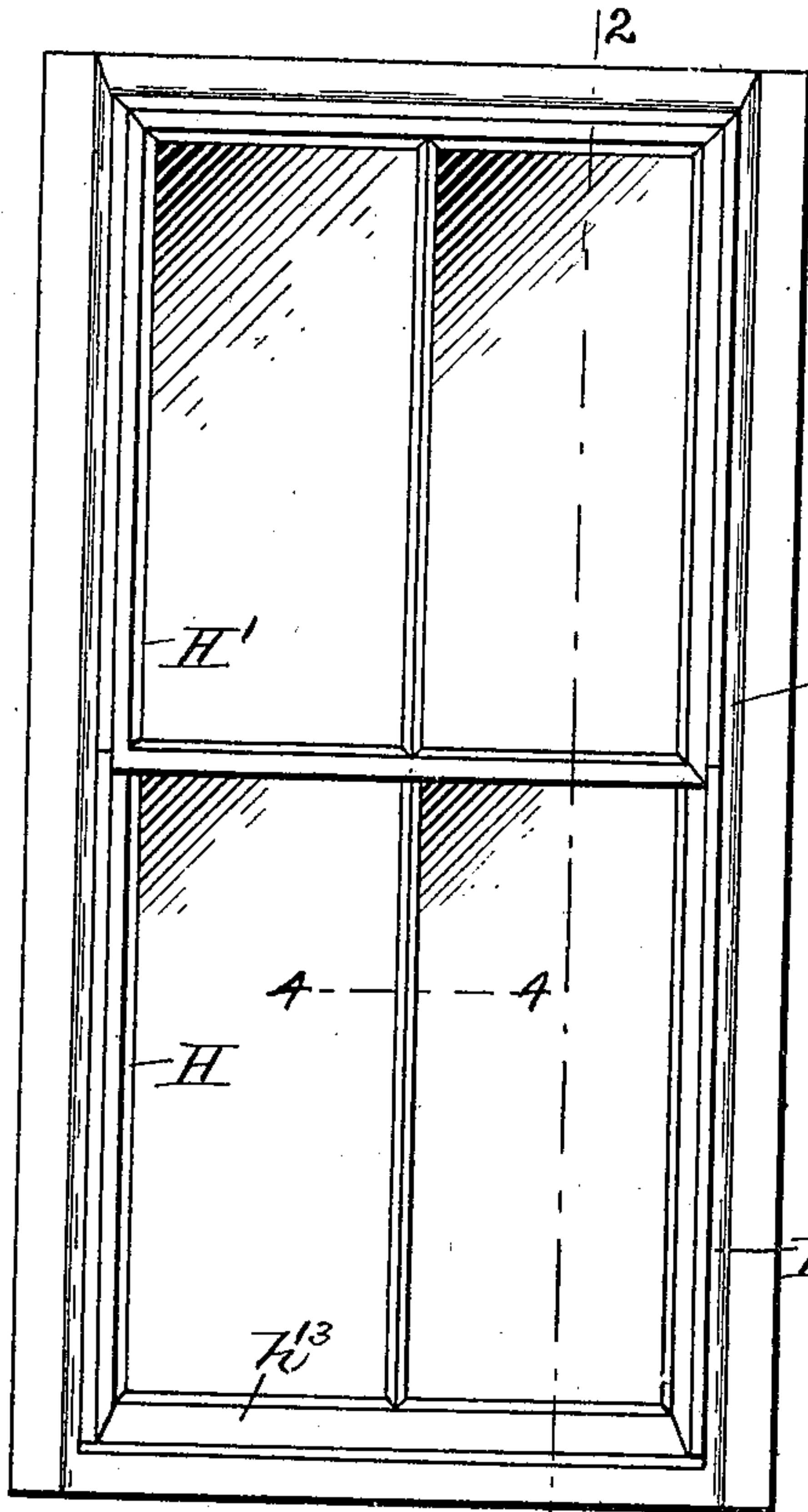


Fig. 1.

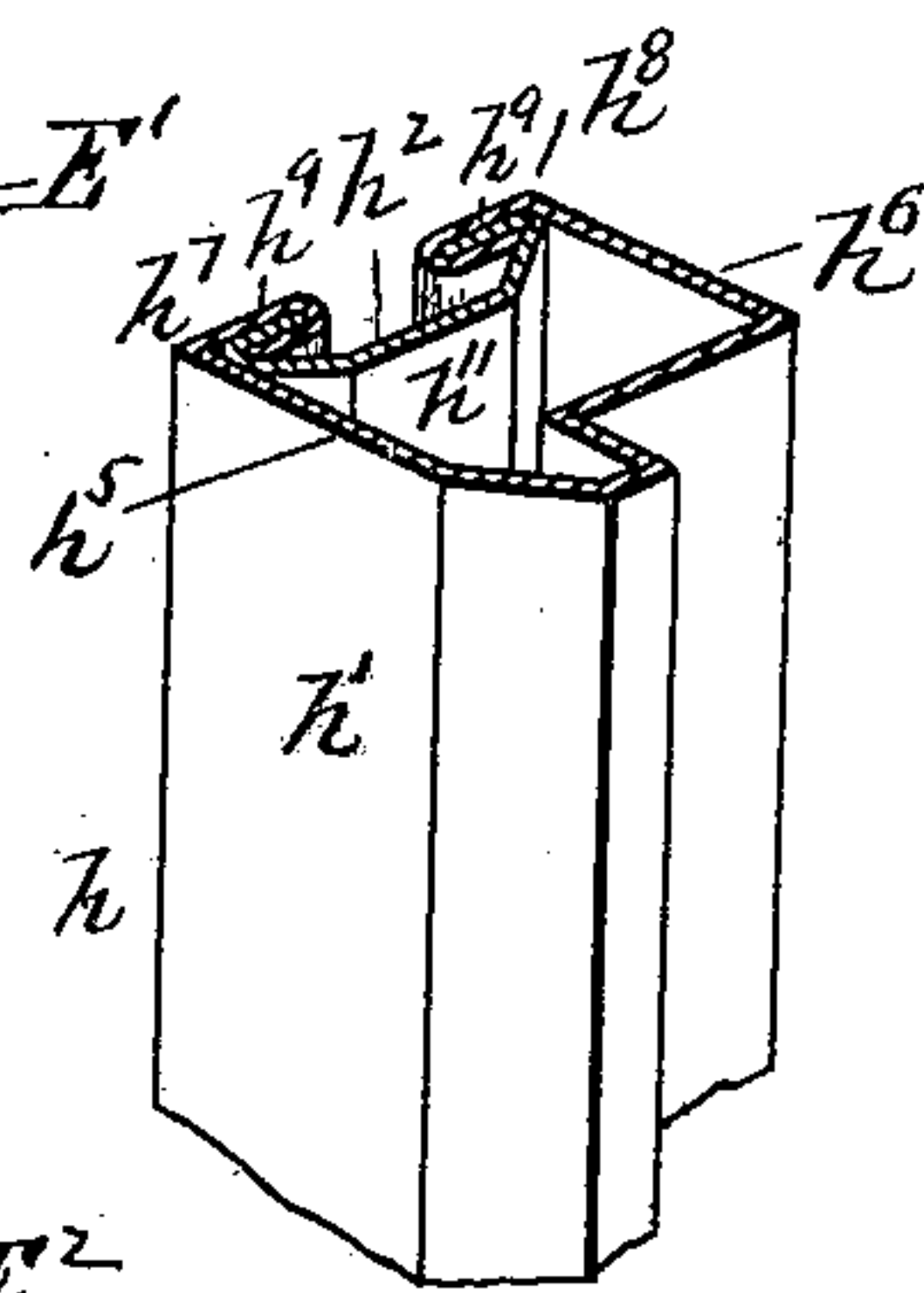


Fig. 11.

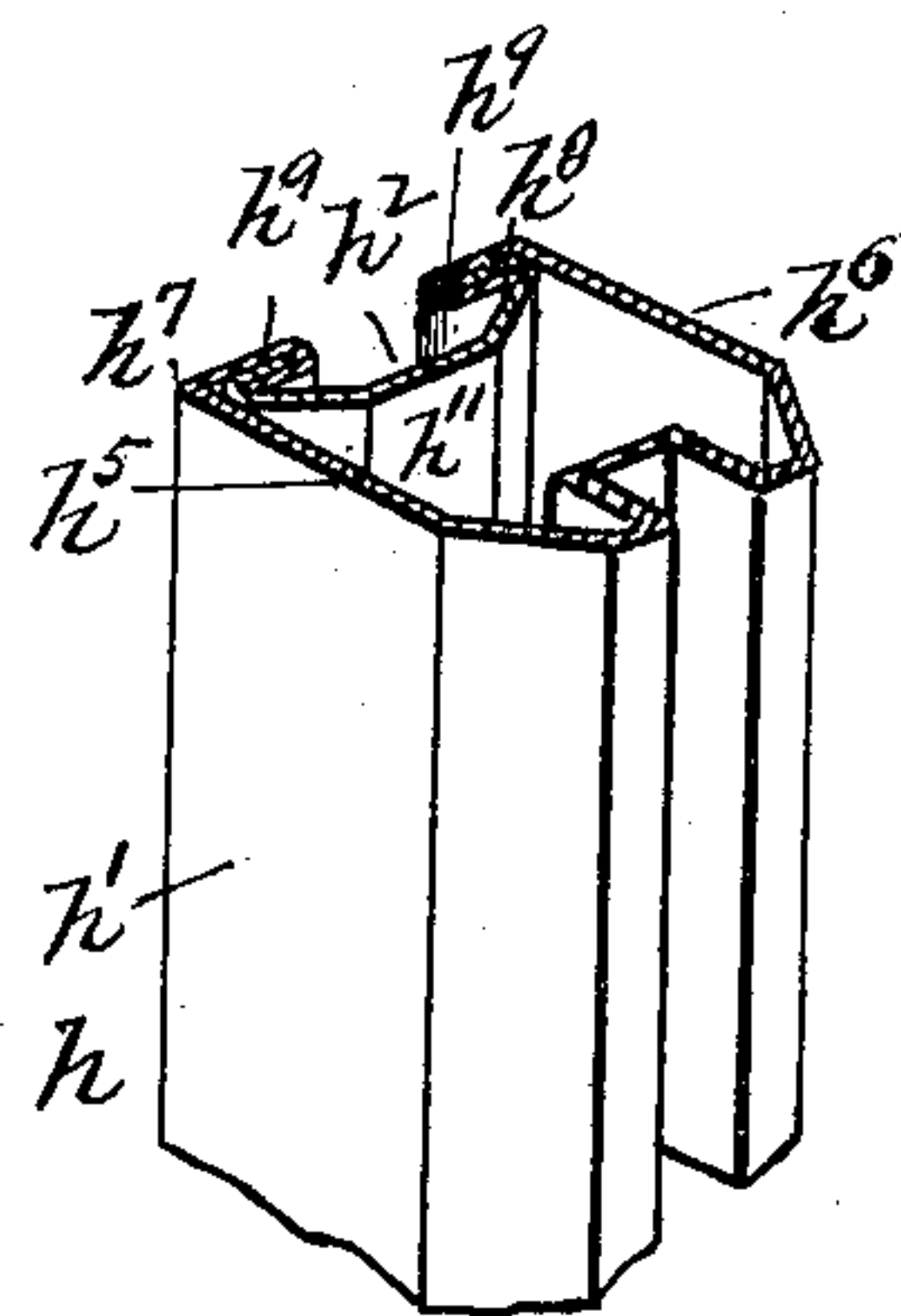


Fig. 10.

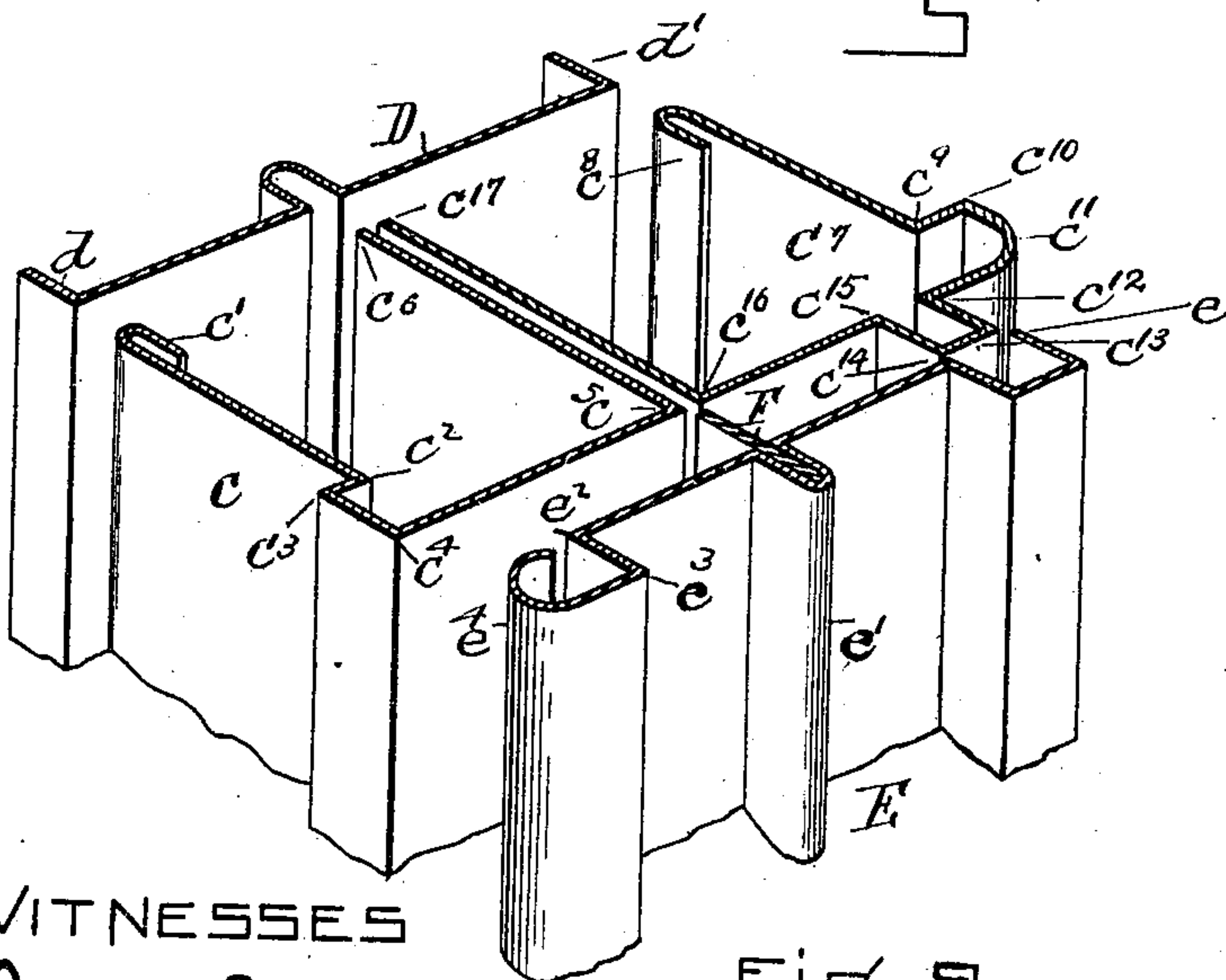


Fig. 9.

WITNESSES

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Leo. A. Walsh.

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Charles Raymond

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3 Sheets—Sheet 2.

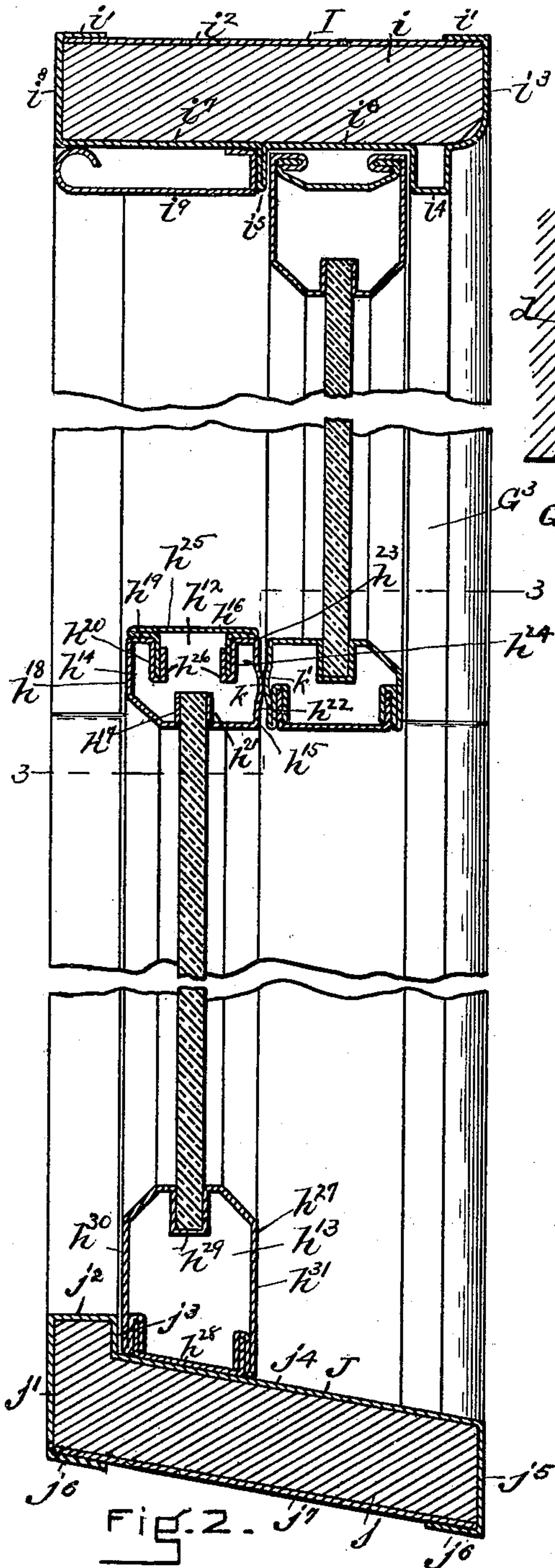


FIG. 2.

WITNESSES

J. M. Dalton  
Leo A. Wahl

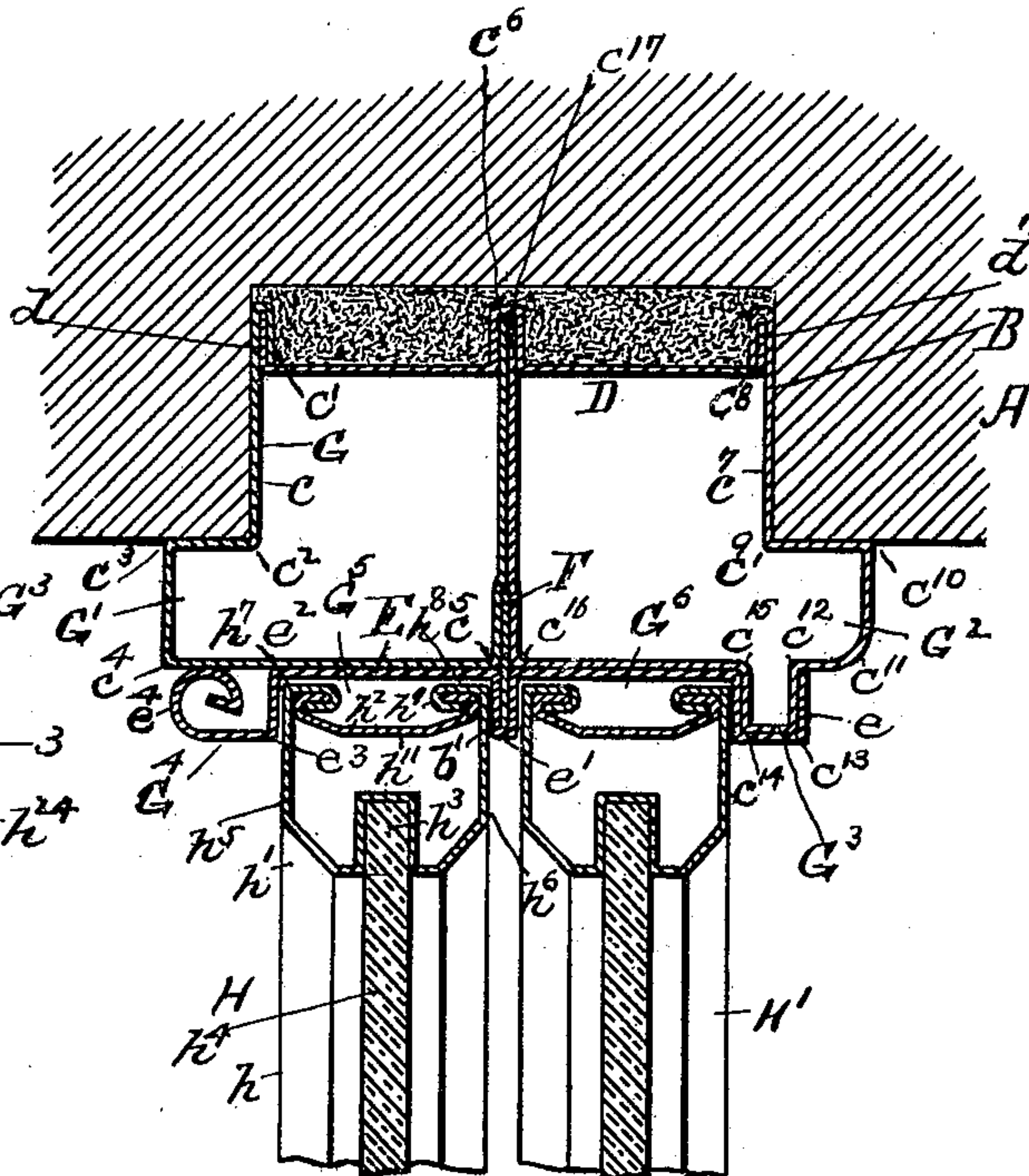


Fig. 3.

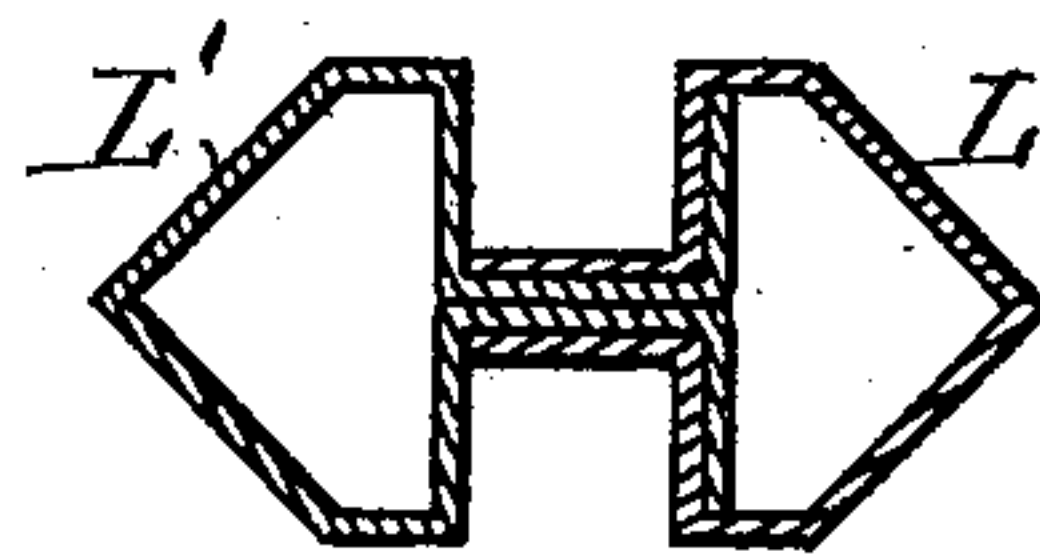


Fig. 4.

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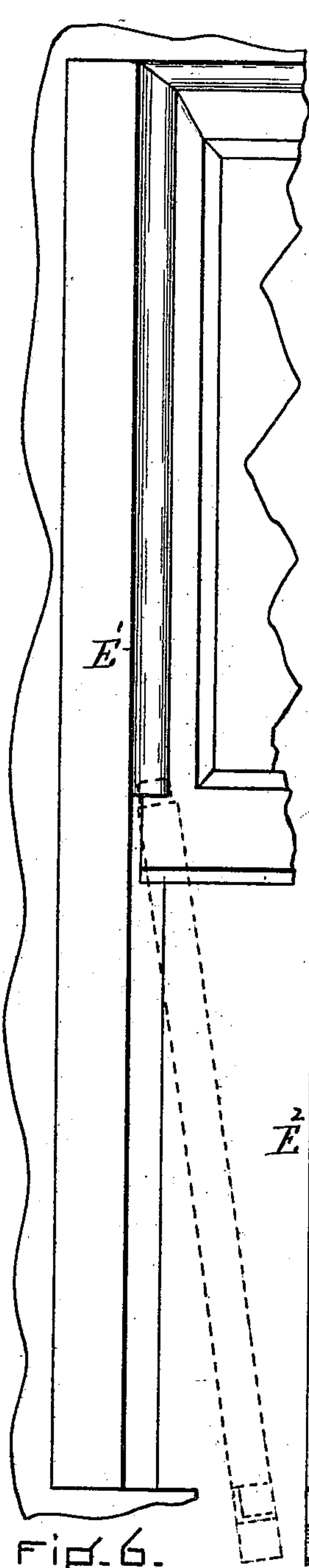


Fig. 6.

WITNESSES

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*Geo. A. Walsh*

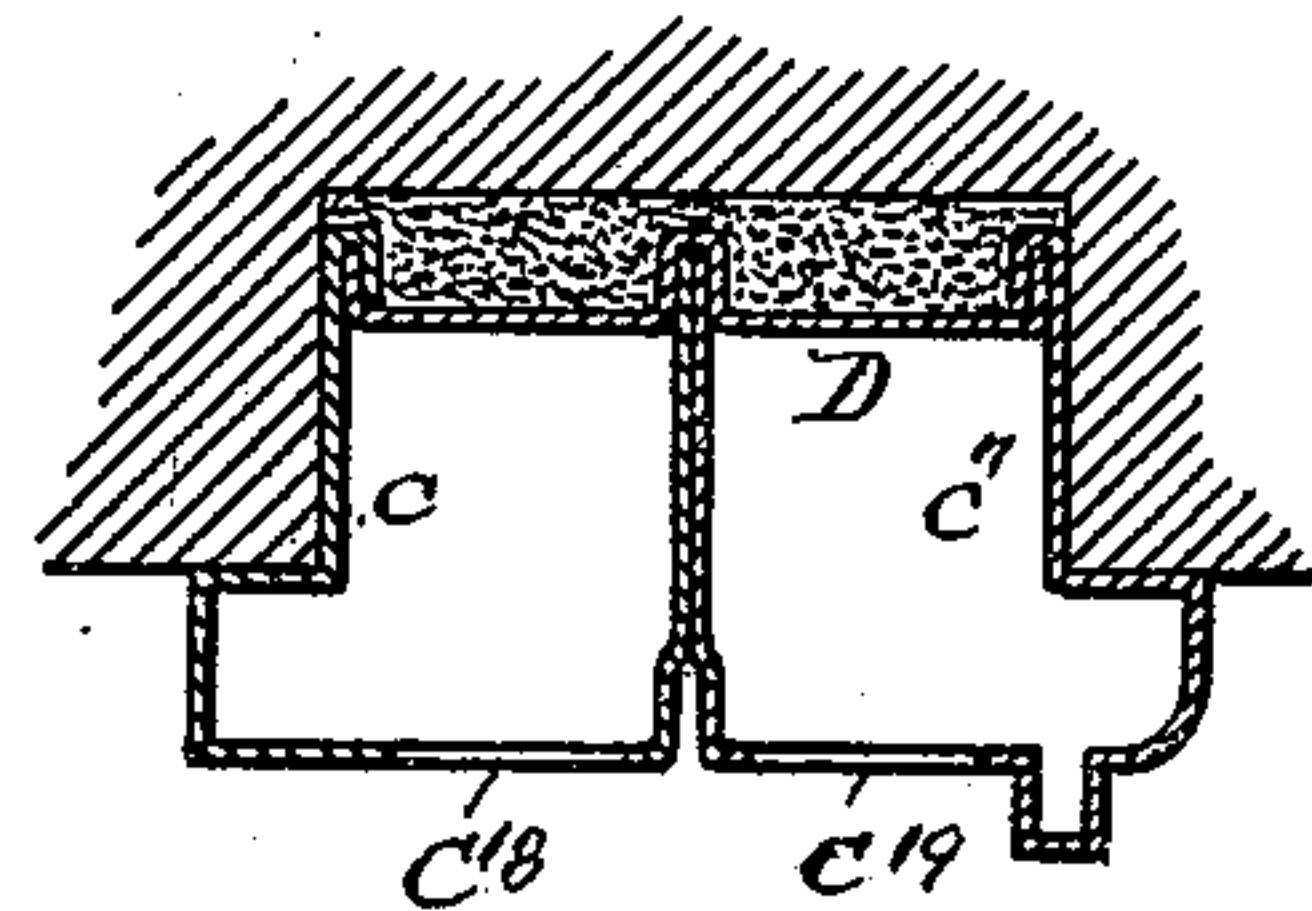
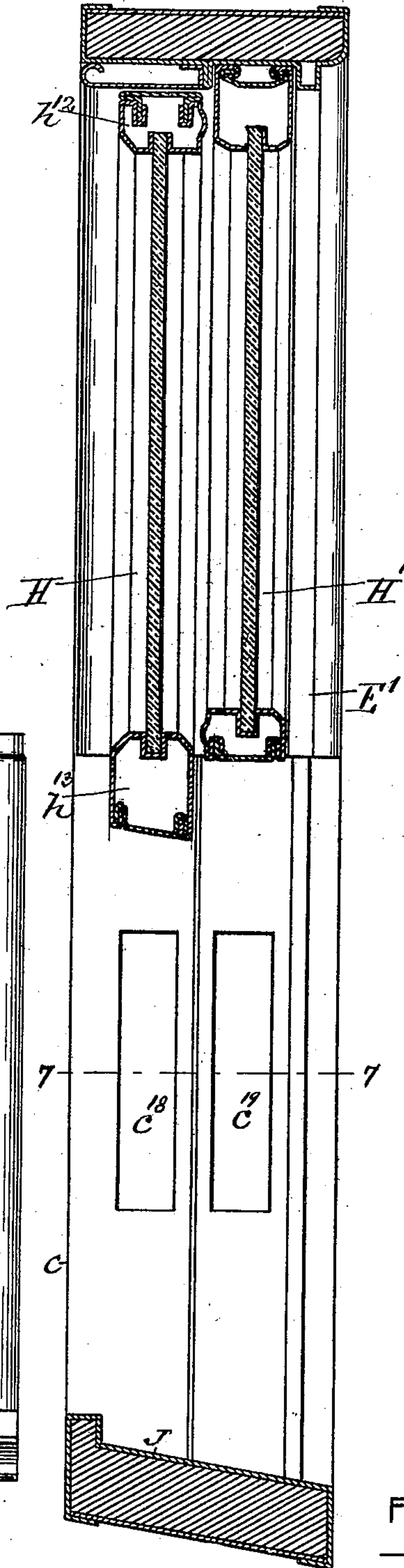


Fig. 7.

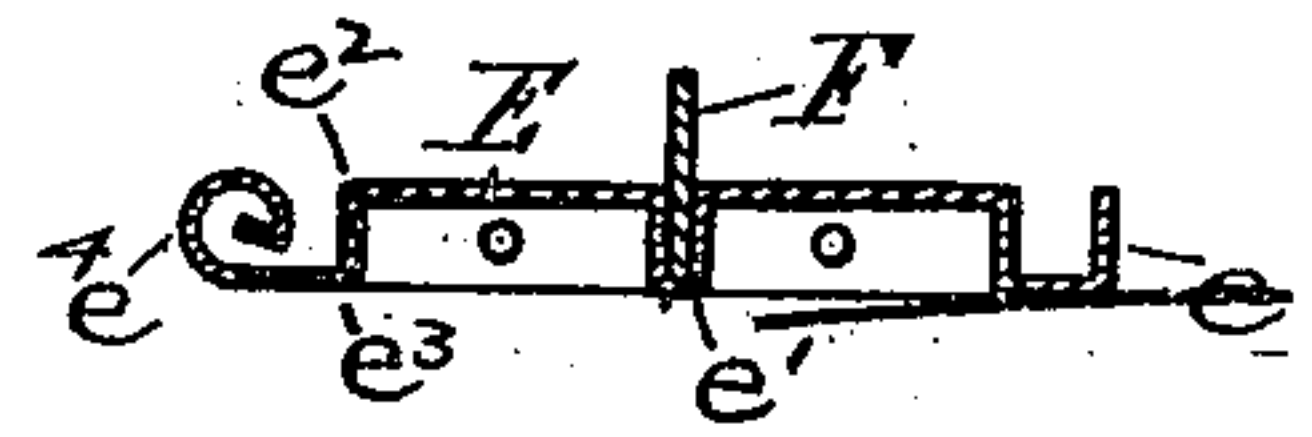


Fig. 8.

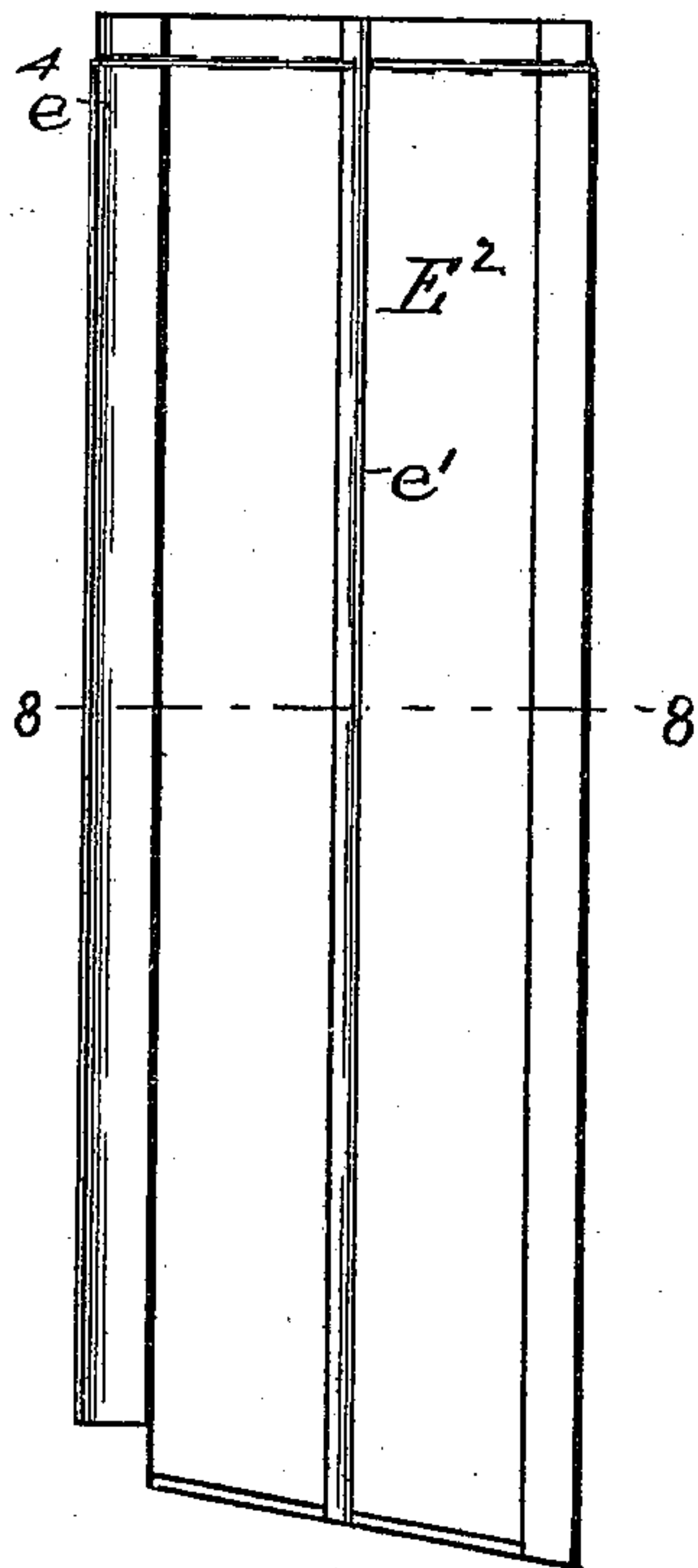


Fig. 5.

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# UNITED STATES PATENT OFFICE.

HENRY C. SMITH, OF SOMERVILLE, MASSACHUSETTS.

## WINDOW-FRAME.

SPECIFICATION forming part of Letters Patent No. 644,150, dated February 27, 1900.

Application filed May 31, 1899. Serial No. 718,794. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY C. SMITH, a citizen of the United States, residing at Somerville, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Window-Frames, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates to a metallic window-frame made of sheet metal and having the construction hereinafter specified.

In the drawings, Figure 1 is a view in elevation of the window and sash frames. Fig. 2 is a vertical section, enlarged, of such portions of the frames as are necessary to show their construction and upon the dotted line 2 2 of Fig. 1. Fig. 3 is a view in horizontal section upon the line 3 3 of Fig. 2. Fig. 4 is a horizontal section, enlarged, of a mullion upon the dotted line 4 4 of Fig. 1. Fig. 5 is a view enlarged, partly in vertical section and partly in side elevation, to show especially the construction of the side-bead strips and the manner of placing the window-sashes in the frame. Fig. 6 is a view in elevation of these parts to further illustrate this feature. Fig. 7 is a view in horizontal section upon the dotted line 7 7 of Fig. 5. Fig. 8 is a view in horizontal section upon the dotted line 8 8 of Fig. 5. Fig. 9 is a view in perspective to represent the final shape of the various parts forming one side of the frame, but separated from each other. Figs. 10, 11, 12, and 13 are perspective views of portions of the sash-frame, to which reference will hereinafter be made.

I will first describe the construction of the window-frame. It will be understood that it and the sash are especially designed for use in fireproof buildings and because of their fireproof construction.

Ordinarily the window-frame as a whole is built into the brick or fireproof wall as the wall is laid. In the drawings, A, Fig. 3, represents a conventional fireproof wall, and the recess which is formed about a portion of the window-frame as the wall is laid is lettered B. The complete window-frame comprises the vertical side portions and the horizontal top and bottom connections. Each of the side

portions of the frame is made of plates of flat sheet metal, which are in their completed and united form shown in Fig. 3. They are also shown dissociated in Fig. 9, that their shape and construction may be better understood and followed. Each side portion consists of two weight-holding box-like sections  $c$   $c'$ , arranged side by side and each made of a single plate, shaped as hereinafter specified, which forms the side walls, outer flanges and facing, and the open back of the section, and these sections are combined together by a back plate common to both and by a bead-forming plate in two parts, also common to both.

Referring to Figs. 3 and 9, the plate which forms the box-like sections  $c$  of the frame is shaped to form an inner edge  $c'$ , where it is bent upon itself to form one member of a locking-joint, the other of which members is formed upon the edge of the back plate above referred to. From the locking-joint it extends to the corner  $c^2$ , furnishing one wall of the box. From the corner  $c^2$  it extends at a right angle to the corner  $c^3$ , where it is again bent, preferably at a right angle, and extends to the corner  $c^4$ , where again it is bent at a right angle and extends backward to the corner  $c^5$ , where it is bent inward at a right angle and extending to its inner edge  $c^6$  forms the inner wall of the box-section. The portion bounded by the angles  $c^2$   $c^3$   $c^4$  forms a flange to rest against the building-wall surrounding the window-space, and the part between the angles  $c^4$   $c^5$  forms an outer facing, which is covered by a bead-forming strip, as hereinafter specified. The section  $c'$  of the frame is of a similar shape. It extends from the inner corner  $c^8$ , where its edge is bent to form a member of a locking-joint, to the point  $c^9$ , where it is bent at a right angle, thence to the point  $c^{10}$ , where it is again bent at a right angle, thence to the inwardly-curved corner  $c^{11}$ , thence to the right angle  $c^{12}$ , thence outward to the right angle  $c^{13}$ , thence to the right angle  $c^{14}$ , thence backward to the right angle  $c^{15}$ , thence to the right angle  $c^{16}$ , and thence inward to its edge  $c^{17}$ . The portions between the angles from  $c^9$  to  $c^{15}$  form two flanges, one of which rests against the wall of the window-recess and the other of which projects at a right angle to the first to form the outer ledge



or bead of the outer sash guideway or runway of the frame or a portion of it. These two sections  $c\ c^7$  are combined together at the back by a back plate D, the edges  $d\ d'$  of which are bent at an angle to form sections to interlock with the locking-joints of the said sections  $c\ c^7$ . The back plate also has at the center of its width a pocket which receives the ends  $c^6\ c^{17}$  of said sections  $c\ c^7$ . This back plate, it will be seen, stiffens the sections at their corners, where it is united with them, spaces the walls thereof, and ties together the two walls, which are adjacent to each other, and also stiffens the entire construction of this part of the frame.

The sections  $c\ c^7$  are combined on their outer surfaces by the bead-forming plate E, which is made in two sections—namely, the upper section  $E'$  and the lower section  $E^2$ . (See Figs. 5 and 6.) Each section of the plate is formed along one edge  $e$  to a shape to engage and contain the outer flange-forming section of the frame. This shape is preferably rectangular, open on its inner side, and of a size to fit over the flange-forming section of the frame. From thence it extends parallel with the outer face of the section  $c^7$  to its angle  $c^{16}$ , where it is bent outward and returned (see Figs. 5 and 8) to form the central bead  $e'$ , which separates longitudinally the two window-runways of the frame. The bead-forming plate thence extends parallel with the face of the section  $c$  to the angle  $e^2$ , where it is bent outward at a right angle  $e^3$ , and thence extended to the curved edge  $e^4$ , which is adapted to come into contact with the face of the section  $c$  near its angle  $c^4$ , thus forming the inner flange to the inner sash-runway.

The central bead-forming section  $e'$  of the bead-forming plate and the inner walls of the sections  $c\ c^7$  near the angles  $c^5\ c^{16}$  may hold between them a flat plate F to stiffen the bead and frame, and in use I prefer to unite it to the bead-forming plate, as represented in Fig. 8, before it is applied to the faces of the box-sections. The bead-forming plate is made in the two parts  $E'\ E^2$  in order that the window-sashes may be readily placed in the frame. This is done by first putting in place the upper sections of the bead-forming plate and by then placing in the outer runway thereof the outer sash and in the inner runway thereof the inner sash, both sashes being introduced into the runways of the upper part  $E'$  of the bead-forming plate from below. After the inner sash has been placed in position the lower sections of the bead-forming plate are put into place against the sides of the frame, and the meeting-points of the two sections of the bead-forming plates may be so constructed that each upper one shall lap slightly upon the lower one, and each lower section may also be secured in place by a screw passing through an ear into a wood filling-piece of the sill.

It will be seen from what I have said that each side of the window-frame is formed of a structure made of five principle plates con-

nected to form a section G, having inward-extending angular stiffening-joints at its inner corners and midway between the same lateral shoulders or extensions  $G'\ G^2$ , a permanent outer flange  $G^3$ , a central spacing-bead  $b'$ , and a permanent inner flange  $G^4$ , and that the outer flange, central bead, and inner flange establish the two guideways  $G^5\ G^6$  for the window-sashes H H'.

The side sections of the frame are joined at their upper ends, preferably, by miter-joints with the top section I. (See Fig. 2.) This section comprises a cross filling-piece,  $i$  of wood, inclosed by a metal covering-plate, the edges  $i'$  of which lap upon a plate  $i^2$  upon the upper face of the piece and is fashioned to provide the outer face  $i^3$ , the horizontal top flange  $i^4$ , which is a continuation of the flange  $G^3$ , the horizontal central bead  $i^5$ , which is a continuation of the bead  $e'$ , the face  $i^6$  to the top of the upper-sash guideway, the face  $i^7$  to the top of the lower-sash guideway, and the inner face  $i^8$ . A metallic molding  $i^9$  may be applied to the face  $i^7$ , as represented in Fig. 2. The lower corners of the side sections of the frame are united, preferably, by miter-joints to the metal housing J, inclosing the wooden filling-piece or sill  $j$ . This housing is shaped to entirely cover the inner side  $j'$  of the piece  $j$  to form the sill  $j^2$ , the outer face or flange  $j^3$  of the sill, the inclined surface  $j^4$ , extending from the sill outward, and the outer face  $j^5$  and the edges  $j^6$  of this covering-plate are bent upon a flat plate  $j^7$ , which covers the under surface of the wooden sill. (See Fig. 2.)

It will be understood that the sections  $c\ c^7$  of the frame are hollow and form the window-weight-holding cavities and are provided with the openings  $c^{18}\ c^{19}$ , (see Fig. 5,) through which the weights are entered into the cavities, and which openings are covered by the lower sections of the bead-forming plates.

The two window-sashes H H' are made in substantially the same way, and the description of one will answer for both.

The frame of the sashes is hollow and made of sheet-metal plates fashioned as hereinafter described. The sides  $h$  of the frame are made of the plates  $h'\ h^2$ . The plate  $h'$  is formed at the center of its length with a vertical pocket for holding the side edge  $h^3$  of the pane  $h^4$ . It is further shaped to provide the inner and outer sides  $h^5\ h^6$  of the sash, the side corners  $h^6\ h^8$ , and the interlocking sections  $h^9$  of a joint. The plate  $h^2$  provides the inner face  $h^{11}$  of the sash and is shaped to form outward angular extensions and interlocking edges, which interlock with the joint-forming parts of the first-named plate  $h'$ . This construction provides the sash-frame with stiffness and with pockets the full length of the sash, in which the sash-cord may be held and play, thus permitting the cords to be fastened to the sides of the sash at any desired point. These side sections of the sash-frame are united to the top and bottom cross sections or bars  $h^{12}\ h^{13}$  by miter or other joints, and the



upper cross-section  $h^{12}$  of the lower sash may be made, as represented in Fig. 2, of three plates bent to form the parts  $h^{14}$   $h^{15}$   $h^{16}$ , the part  $h^{14}$  having the wall  $h^{17}$ , the face  $h^{18}$  the inward extension  $h^{19}$  and the joint-forming section  $h^{20}$ , and the part  $h^{15}$  having the wall  $h^{21}$ , the outer face  $h^{22}$ , the inward-returning section  $h^{23}$ , and the joint-forming section  $h^{24}$ . The walls  $h^{17}$   $h^{21}$  are separated from each other by a space equivalent to the thickness of the pane of glass, and the two parts  $h^{14}$   $h^{15}$  are not joined until the pane has been slid down between them into the side pockets of the side sections of the sash and the lower pocket of the lower section of the sash-frame, when they are united by the plate  $h^{25}$ , which is of a width to extend to the upper corners of the parts  $h^{14}$   $h^{15}$  and to be bent backward upon itself and downward to make joint-forming sections  $h^{26}$ , which are combined with the joint-forming sections  $h^{20}$   $h^{24}$  of the parts  $h^{14}$   $h^{15}$ . (See Fig. 2.)

The lower cross-piece  $h^{13}$  of the sash is made of the two parts  $h^{27}$  and  $h^{28}$ . The part  $h^{27}$  has the pocket  $h^{29}$  for receiving the lower edge of the window-pane. It also forms the sides  $h^{30}$   $h^{31}$  and is united at its lower corners to the bottom part  $h^{28}$  by a stiffening overlapping corner-joint of the character already described.

Instead of a pocket or groove for receiving the glass the sash may be provided with a shoulder, as represented in Fig. 11, against which the glass may be set in any desired way.

In Fig. 12 I have represented a form of joint which in some instances I prefer to employ.

It will be understood that the invention is for the purpose of providing a fireproof window-casing and window and that the casing and window are used in connection with fireproof surroundings, such as a brick or metal wall, and that it is preferable that the window-glass used should be of the kind known as "wire-glass."

The mullions may be made, as represented in Fig. 4, of two pieces of sheet metal, one of

which is fashioned to form the part L and the other of which is fashioned to form the part L', the two parts having a glass-receiving recess between them and portions of the part L lapping upon the part L', as represented in Fig. 4.

The meeting-rails of the sashes may be bent outward at  $k$   $k'$  to come into contact with each other when closed, as represented in Fig. 2.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. A metallic window-frame having hollow side-forming sections comprising the parts  $c$ ,  $c'$  shaped substantially as described, and the inner combining-plate D uniting the inner edges of the side sections, and the bead-forming plate E made in the two parts  $E'$ ,  $E^2$ , and united to the side-forming sections, as and for the purposes set forth.

2. A metallic window-frame having hollow side-forming sections comprising the parts  $c$ ,  $c'$  shaped to form the section G, and the flanges  $G'$ ,  $G^2$ ,  $G^3$ , the inner combining-plate D united to the sections  $c$ ,  $c'$  substantially as described to lock and stiffen the inner corners thereof, and the bead-plate E formed in two parts  $E'$ ,  $E^2$  each having a central bead and two flanges forming the runways for the window-sashes, one of which flanges is extended to form a molding and the other of which to inclose the flange  $G^3$ , and a bead stiffening or reinforcing plate, as and for the purposes set forth.

3. In a metallic window-frame the combination of the hollow sections  $c$ ,  $c'$  having in their faces weight-openings, the combining-plate D and the sectional bead-forming plates  $E'$ ,  $E^2$ , one of which is adapted to be secured to the sections  $c$ ,  $c'$  in advance of the other, and one of which also covers the said weight-openings, as and for the purposes set forth.

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Witnesses:

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F. F. RAYMOND, 2d.