No. 810,887. PATENTED JAN. 23, 1906.

H. C. SMITH.

WINDOW FRAME.

APPLICATION FILED FEB. 24, 1903.

6 SHEETS—SHEET 1.

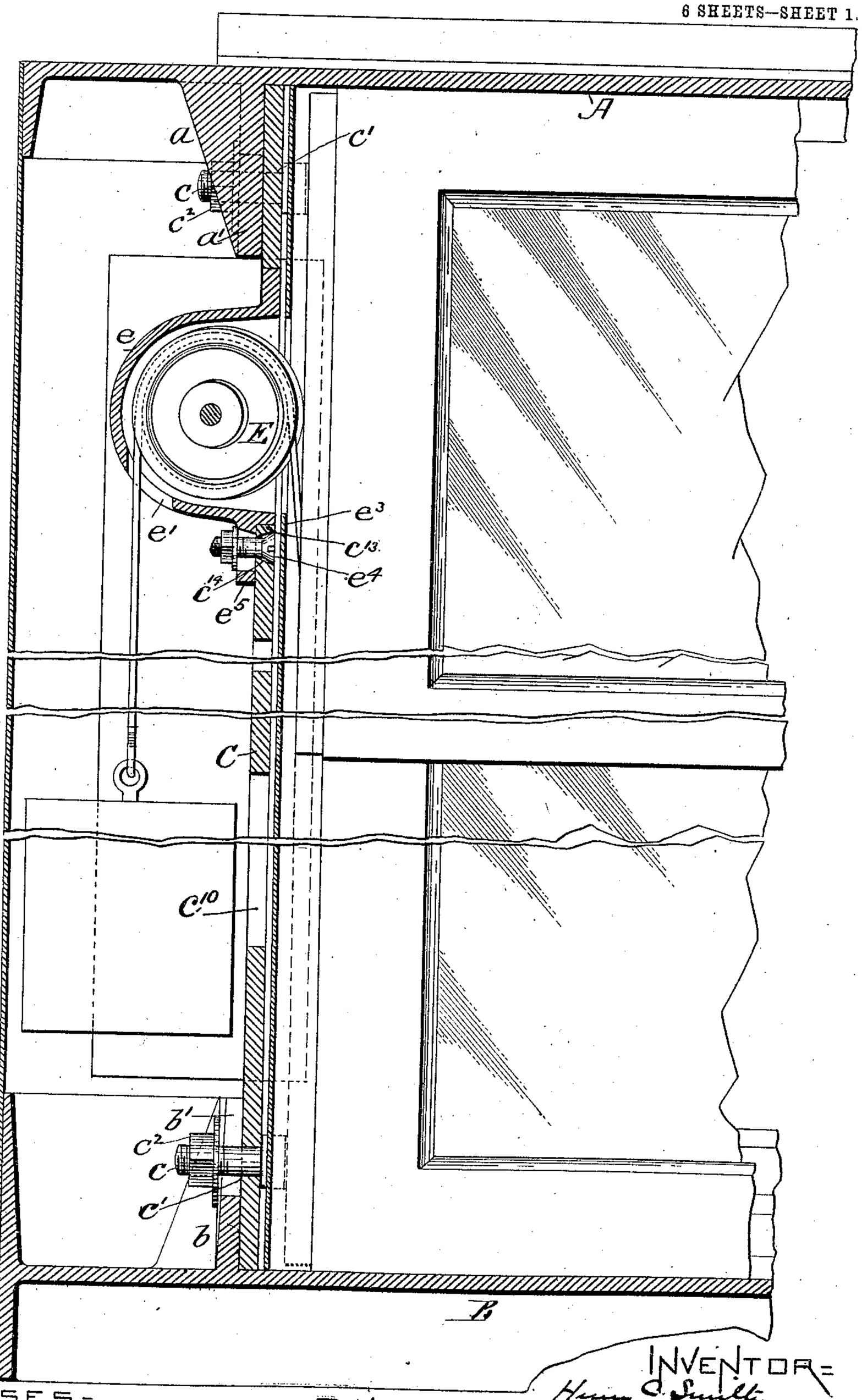

Fig. 1.

WITNESSES=

John Dolan

Paul Lipscomb

INVENTOR=

Henry C. Smith

by his atty

F. F. Raymond

No. 810,887. PATENTED JAN. 23, 1906.

H. C. SMITH.

WINDOW FRAME.

APPLICATION FILED FEB. 24, 1903.

6 SHEETS—SHEET 2.

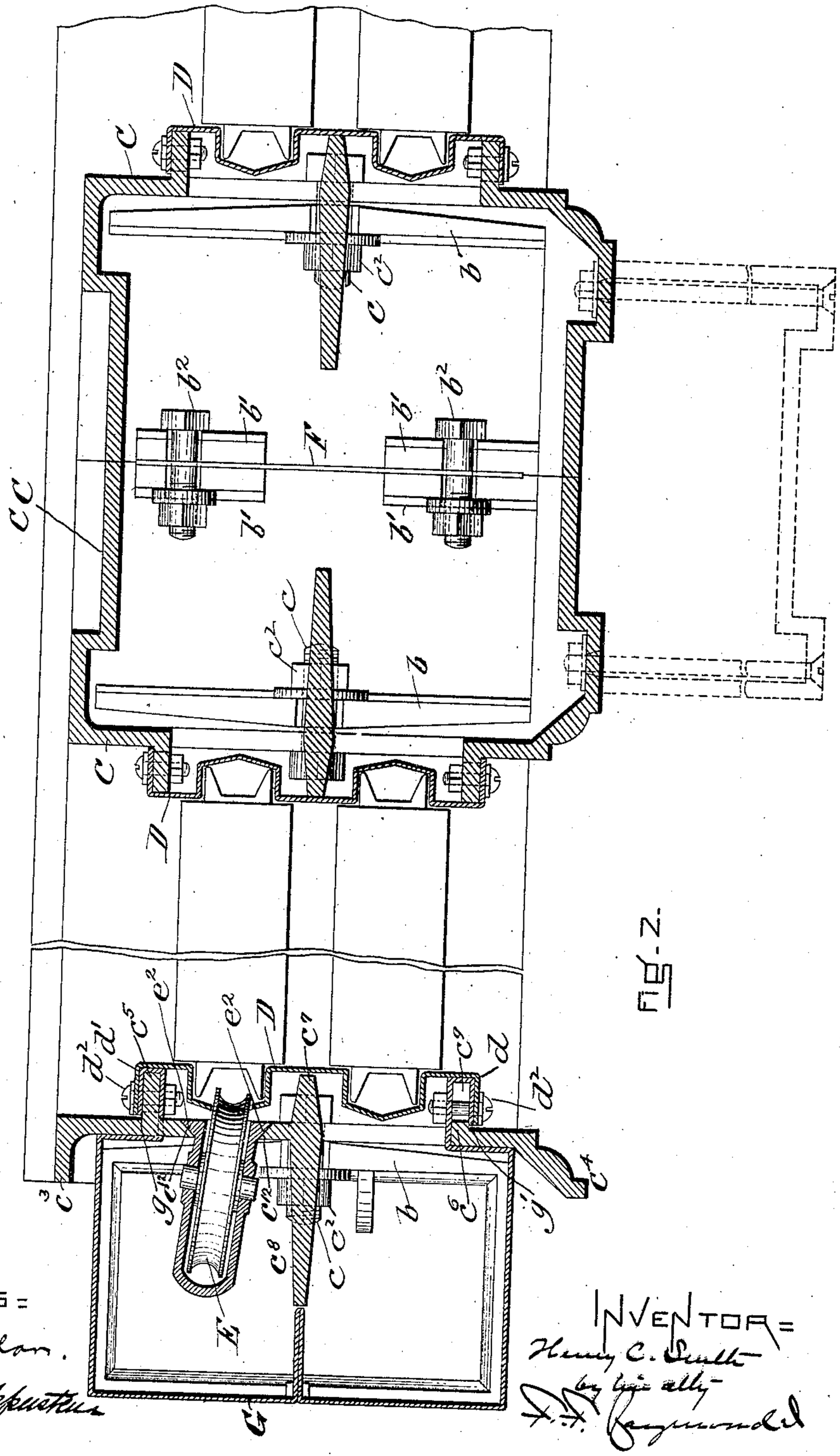

Fig. 2.

WITNESSES:

J. M. Dolan.

Paul Sipperstein

INVENTOR:

Henry C. Smith

by his atty

F. F. Raymond

No. 810,887. PATENTED JAN. 23, 1906.

H. C. SMITH.

WINDOW FRAME.

APPLICATION FILED FEB. 24, 1903.

6 SHEETS—SHEET 3.

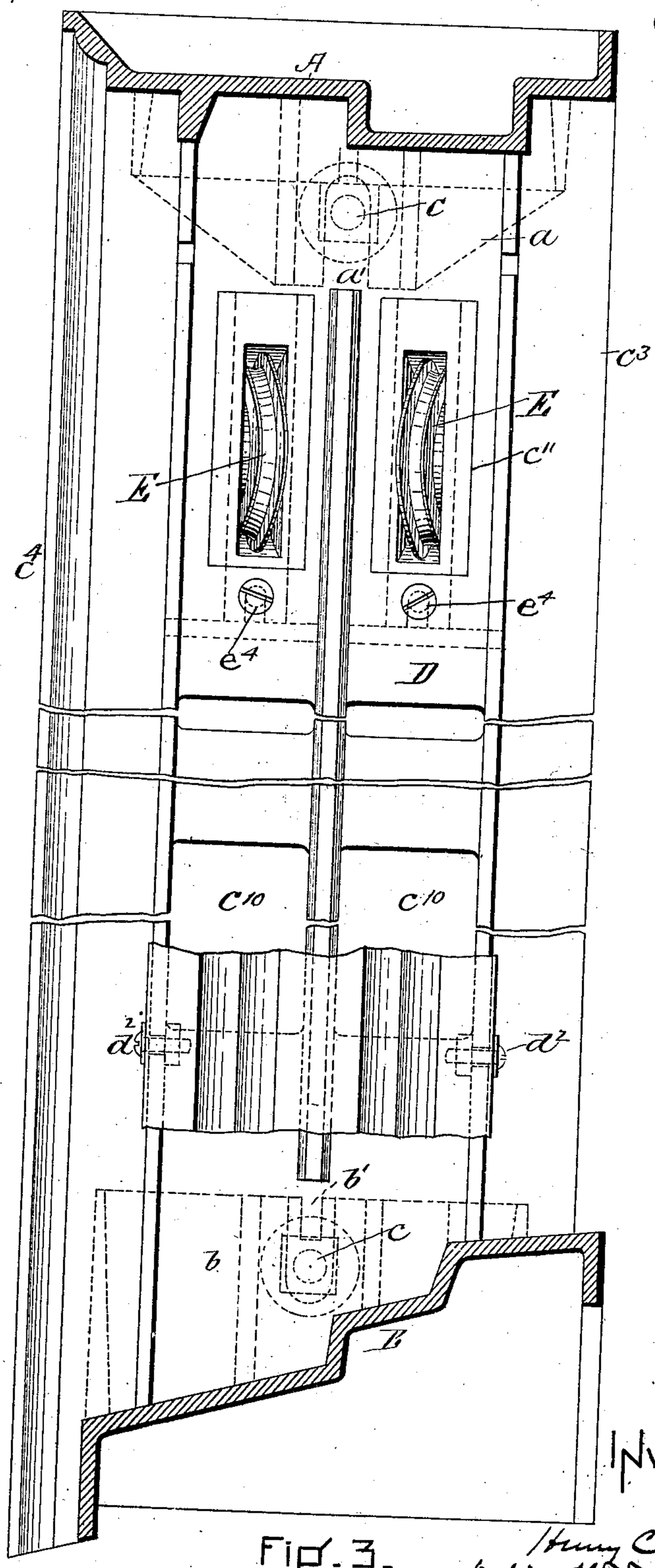

Fig. 3.

WITNESSES:

J. M. Dolan.

Paul Schoenstein

INVENTOR:

Henry C. Smith

by his atty F. F. Raymond

No. 810,887. PATENTED JAN. 23, 1906.

H. C. SMITH.

WINDOW FRAME.

APPLICATION FILED FEB. 24, 1903.

6 SHEETS—SHEET 4.

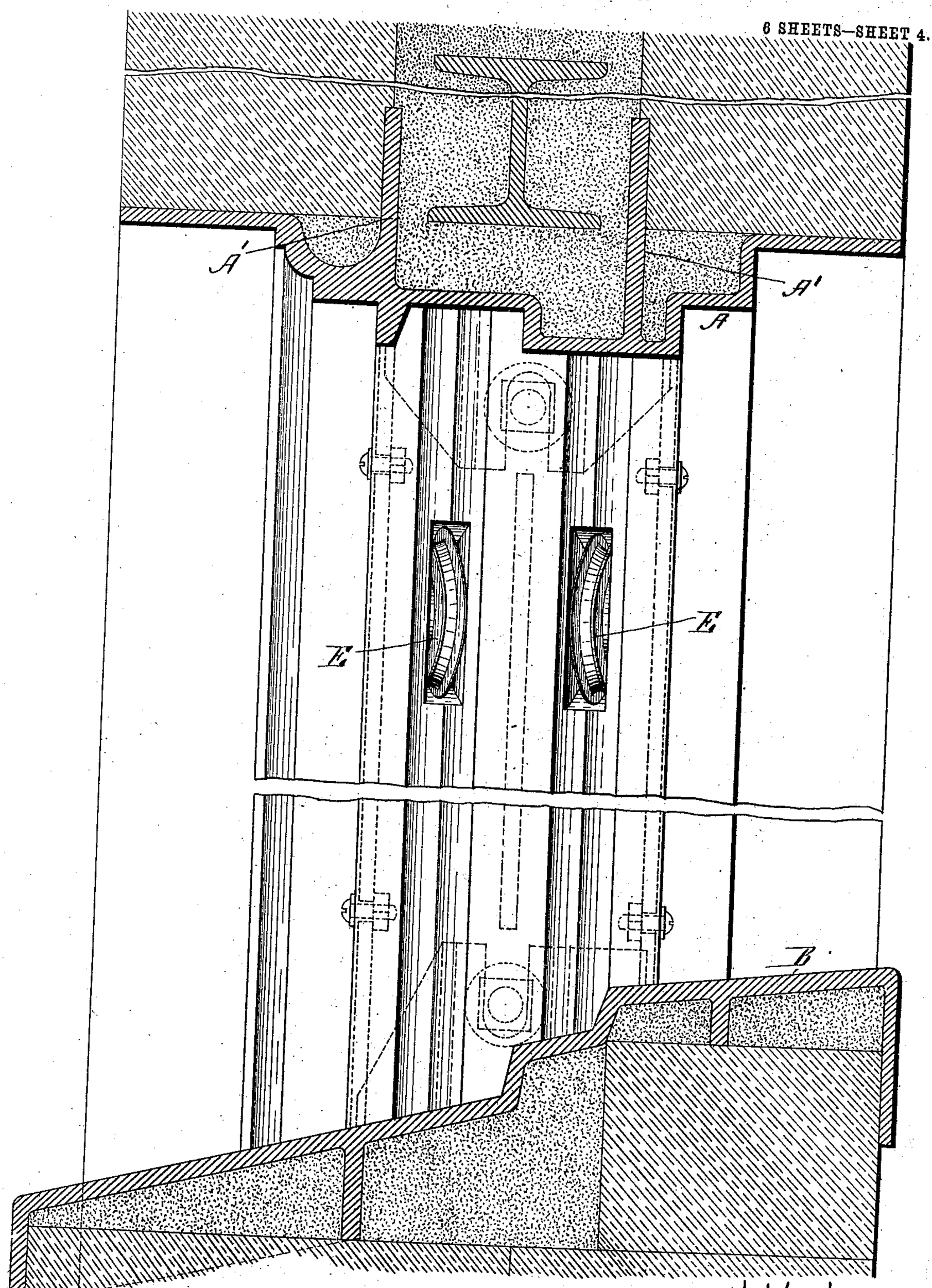

Fig. 4.

WITNESSES:

INVENTOR:

No. 810,887. PATENTED JAN. 23, 1906.

H. C. SMITH.

WINDOW FRAME.

APPLICATION FILED FEB. 24, 1903.

6 SHEETS—SHEET 5.

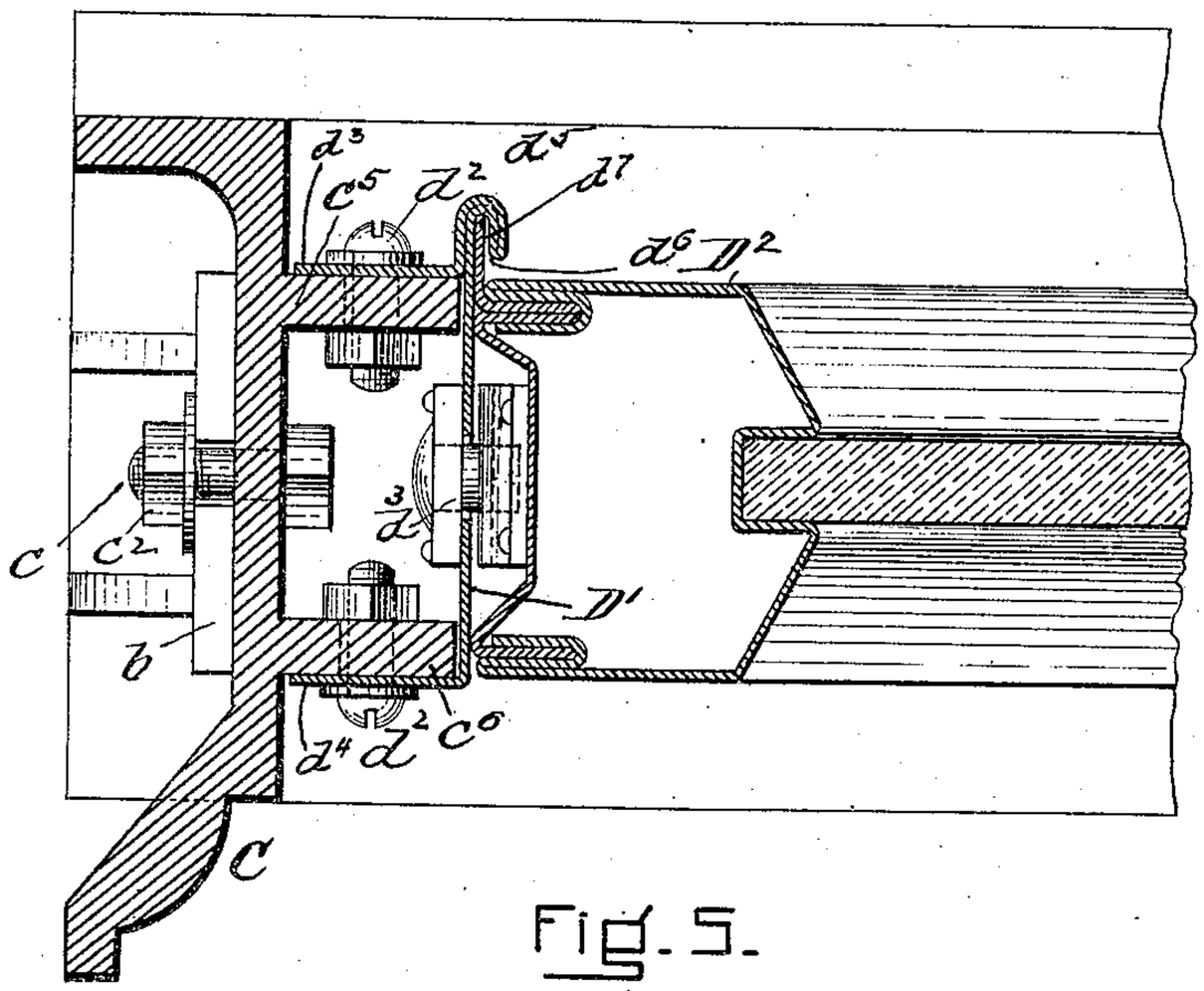

Fig. 5.

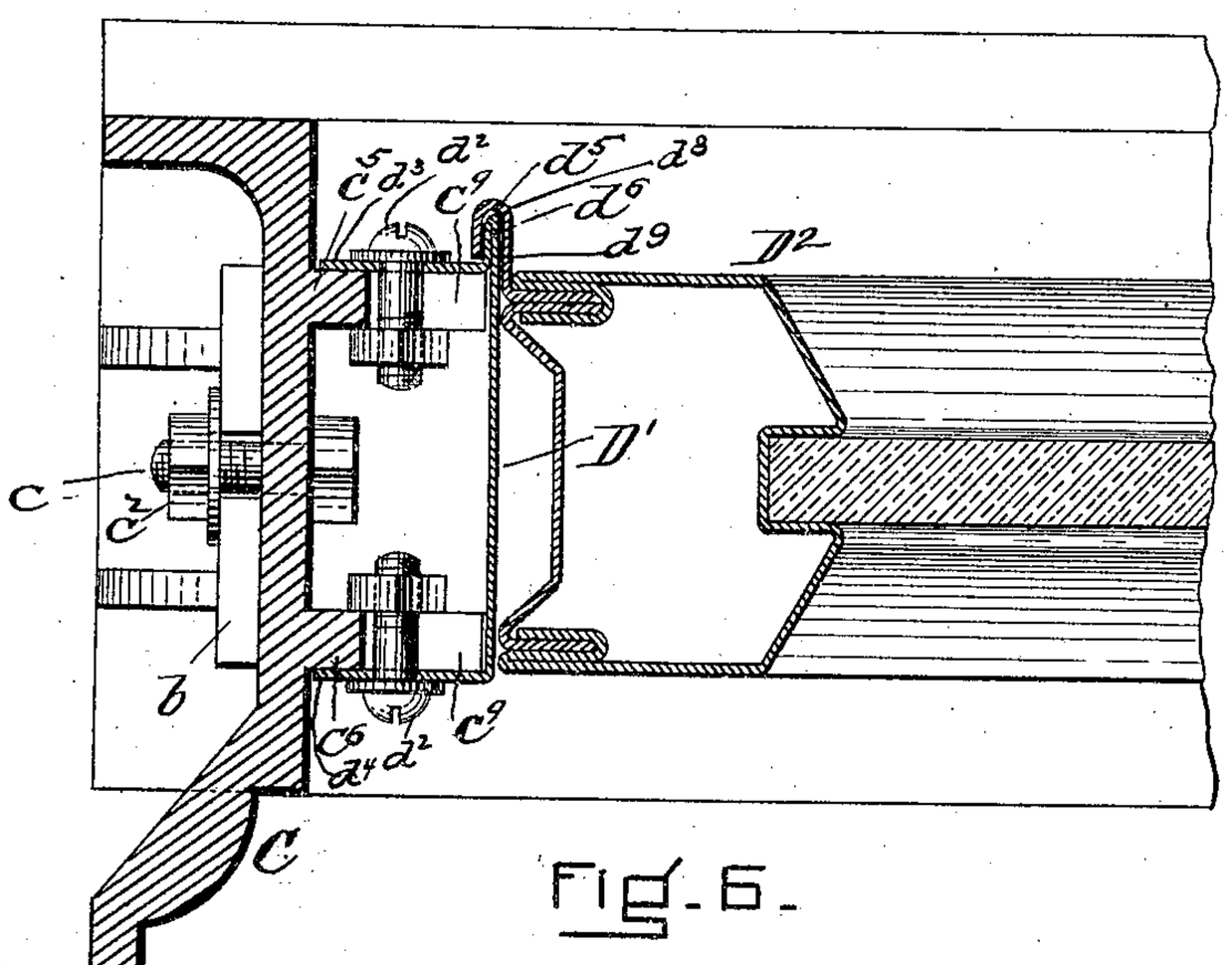

Fig. 6.

WITNESSES:

J. M. Dolan.

Paul Stipperstein

INVENTOR:

Henry C. Smith

by his atty

H. T. Fitzgerald

No. 810,887. PATENTED JAN. 23, 1906.

H. C. SMITH.

WINDOW FRAME.

APPLICATION FILED FEB. 24, 1903.

6 SHEETS—SHEET 6.

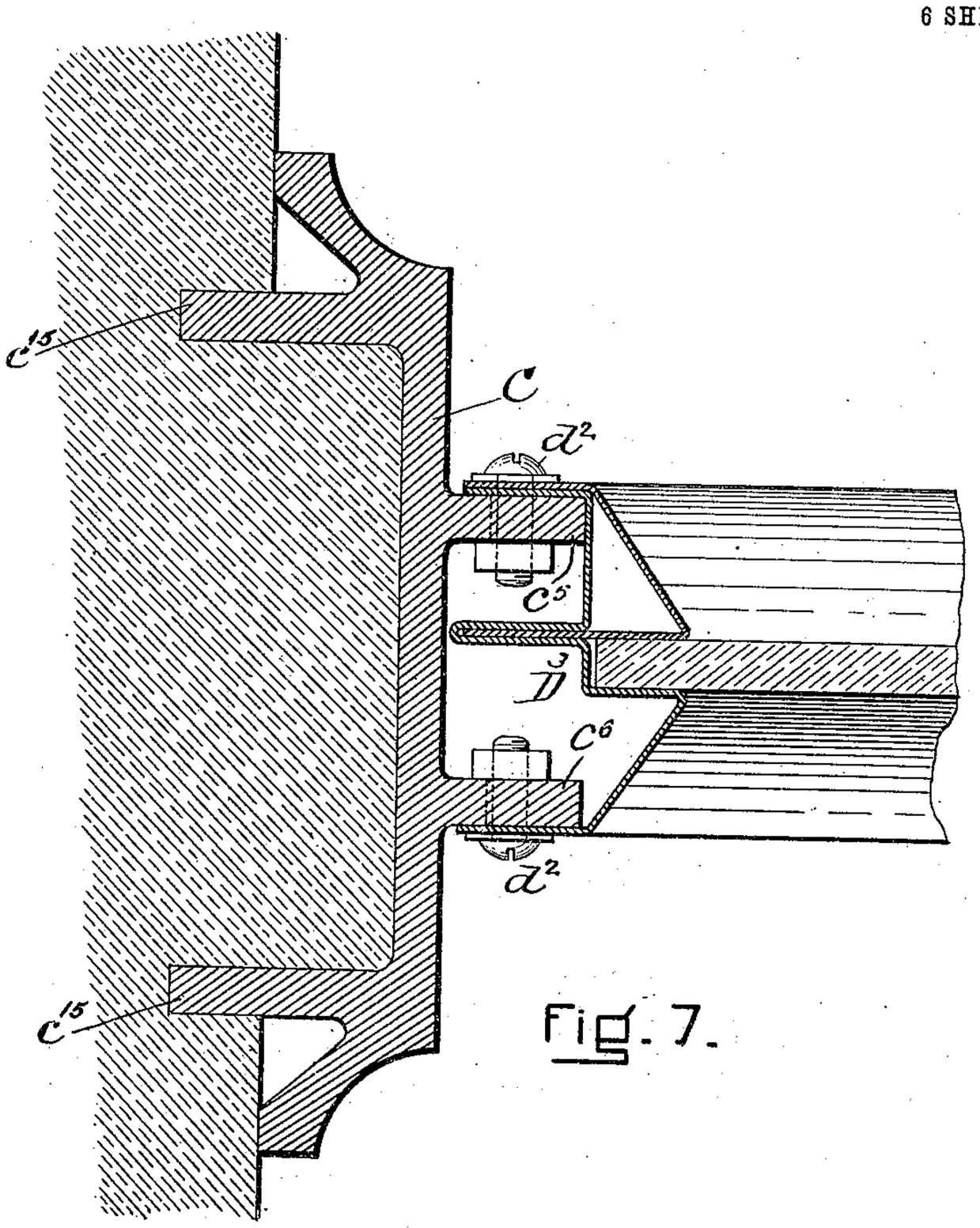

Fig. 7.

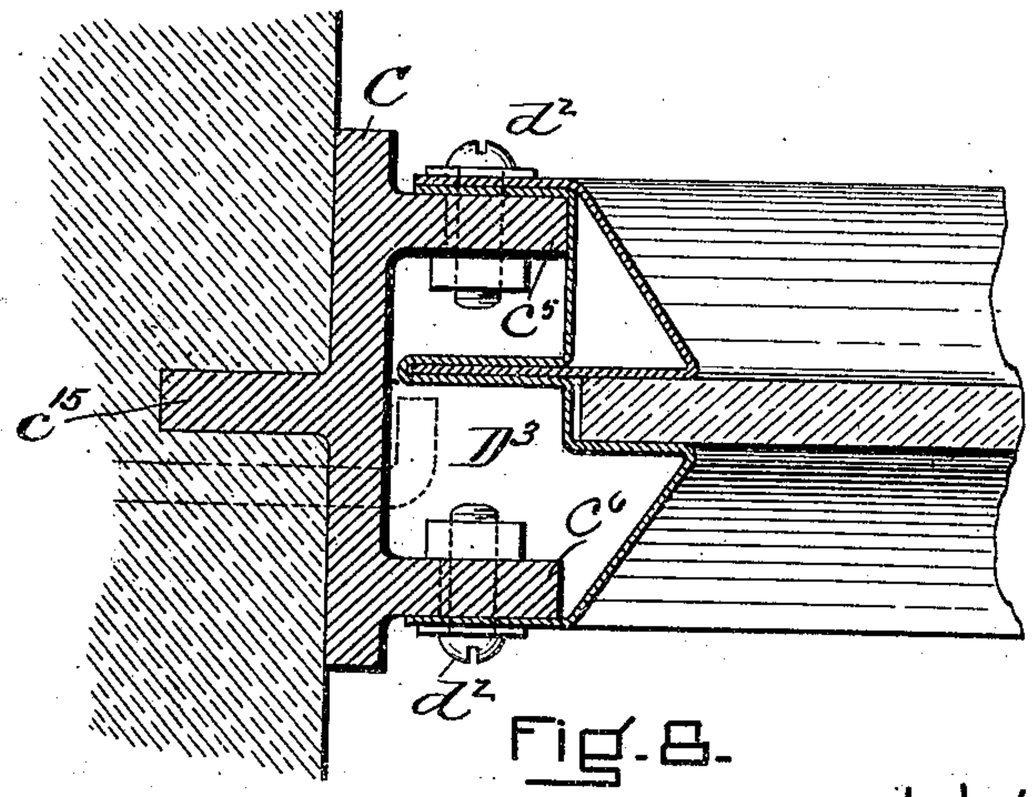

Fig. 8.

WITNESSES:

J. M. Dolan.

Paul Lipschutz

INVENTOR:

Henry C. Smith

by Wesley

H. Z. Raymond 2d.

UNITED STATES PATENT OFFICE.

HENRY C. SMITH, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO SMITH-WARREN COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

WINDOW-FRAME.

No. 810,887. Specification of Letters Patent. Patented Jan. 23, 1906.

Application filed February 24, 1903. Serial No. 144,627.

To all whom it may concern:

Be it known that I, HENRY C. SMITH, a citizen of the United States, residing at Boston, in the county of Suffolk 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.

My invention relates to an improvement in window-frames, and especially to a frame made of cast metal.

The objection to using cast-metal jambs in window-frame construction has been that it was impossible to make a cast-metal jamb true enough to provide guides for the sashes without planing out the runways, and this is a matter so expensive that it has practically prohibited the use of cast metal in the jamb, and for that matter the entire window-frame construction. By my invention, however, I have avoided any objection of this kind by providing the cast-metal jamb, rough as it may come from the mold, with a face or auxiliary plate or plates, which are secured to said jamb-casting and which by compensating for any irregularity or roughness in its formation provide true and smooth guiding-runways for the sashes.

My invention further consists in the adjustment of this face or auxiliary plate or plates that they may be trued to better compensate for the irregularity of position or roughness of form which may exist in the jamb-casting and be adjusted to hold the sash or sashes with better security and guide them more accurately.

My invention further consists in other novel features of adaptability incident to the parts just referred to, but which features can better be seen and appreciated by a detailed description in connection with the drawings, wherein—

Figure 1 shows the window embodying my improved frame construction in longitudinal vertical section. Fig. 2 shows the window in horizontal cross-section and with certain details of construction to which reference will be hereinafter made. Figs. 3 and 4 show the window in vertical section with special details of construction to which reference will hereinafter be made. Figs. 5 and 6 show my improved frame structure as applied to a pivoted sash. Figs. 7 and 8 show my improved frame structure as applied to a fixed sash.

Referring to the drawings, A represents the head of the frame, B the sill, and C represents the side portions of the frame or the jambs. The head, sill, and jambs are made up of separate pieces of cast metal bolted together. The head and sill castings have a formation by which they will be best suited to the kind of sash or sashes which they inclose and are also formed with reference to their architectural fitness; but to this reference will hereinafter be made. The castings C, forming the jambs, extend, of course, along either side of the window and between the head and sill. They are connected to the head and sill by being bolted to the lugs *a* and *b*, which project, respectively, from them at either side of the window at the top and bottom. The bolts *c*, by which the union of the castings is secured, are passed through holes *c'*, formed in the casting of the jamb-pieces, and slipped into slots *a' b'*, formed in the said lugs *a* and *b*, respectively, while nuts c^2, receiving the ends of said bolts, complete the union of the cast parts. This method of union is a desirable one in the fact that a certain amount of play is given to the parts for obtaining more or less of an adjustment in order that the parts may be fitted together as evenly as possible. The special advantage of the method of union consists in the fact that the parts can be united without any special preparation or, in other words, just as they come from the mold, no boring or other finishing being necessary.

The castings forming the chambers are substantially alike on both sides of the window, except when they may help form the boxes for the window-weights, if such be used, or made so that they may be joined to one another to form a continuous structure, as when there is a row of windows, as will hereinafter be explained.

The structure of the jamb-castings is best seen in Figs. 1 and 2. Each casting is provided with the inside and outside molded edges c^3 c^4, which form the side walls of the window on the inside and outside adjacent to the jambs and extending, of course, its vertical length. Projecting inward from the main casting are the two flanges c^5 c^6. These flanges extend the entire vertical length of

the casting. Between these flanges there projects inwardly what we may term a "rib" c^7, which helps support or give backing to the face-plate, as will hereinafter appear. Extending on the outer side the casting has the cast plate c^8, which helps to stiffen the structure and also serves as a division-plate for the weight boxes or casings when weights are used with the window. I do not wish to confine myself to this special form of jamb-casting; but it is a practical one as embodying the principles of my invention.

Now, as before stated, the objection to using the cast-metal frame, and especially the jamb portions of the frame, is that the castings could not be made true enough simply by their molding to serve as guides for the sashes, but runways would have to be planed out, and this, together with other finishing, is so expensive that it in the past has practically precluded the use of the cast-metal frame or jamb. Accordingly I do not endeavor to provide runways for the sashes with my cast-metal jamb, but take the casting just as it is, rough from the mold, and provide it with a face or auxiliary plate of sheet metal, which acts to hold and guide the sashes. This face-plate in the drawings is designated D, and it has the substantial configuration shown in Fig. 2, or any other configuration, for that matter, which best suits it for the sash or sashes which it serves to hold or guide. The face-plate is secured to the jamb-casting by its outside and inside edges d d' being turned to fit around the flanges c^5 c^6, extending inwardly from the jamb-casting, as before explained, and which edges are then bolted to the said flanges by the bolts d^2. The plate is reinforced at the center by the rib c^7, extending from the jamb-casting, as before referred to. The sheet-metal face is thus rigidly held in place secured to the jamb-casting, and it serves to provide smooth and accurate guiding-runways for the sash or sashes. Of course, as said before, by the use of the sheet-metal face-plate as a supplementary member I am able to procure such a sash retention and guidance as might be obtained by the cast-metal jamb alone, but only at great expense, which difficulty it is the purpose of this feature of my invention to overcome. The face-plate is, as it were, a finishing-facing applied to the jamb-casting. It covers the jamb-casting and conceals any unsightly roughness and compensates for all irregularities in its formation. In other words, I am able to use a jamb-casting rough, just as it comes from the mold, without any finishing whatever. All planing and other finishing is entirely eliminated. Moreover, the face-plate is adapted to be used for the retention of any sash. Its especial applicability is for the retention and guidance of the sliding sash; but it can be used for the retention of a pivoted sash as well.

Another feature of importance as furthering the advantageous use of the face-plate consists in the fact that it is made adjustable relatively to the jamb-casting. It will be noted that when the face-plate is secured to the jamb-casting the screws or bolts d^2, which hold the face-plate to the flanges c^5 c^6 on the jamb-casting, pass through slots c^9, which extend in horizontally from the edges of said flanges to which the face-plate is fastened. These slots permit of a certain amount of lateral play to the bolts or screws securing the face-plate, whereby the face-plate becomes adjustable not only to better compensate for any irregularity which may exist in the jamb-casting, but also permitting the face-plate to be trued or evened to better hold and guide the sashes. The slotted means thus shown for obtaining the adjustment of the face-plate is desirable in the fact that it can be obtained in the original jamb-casting without finishing of any kind or the addition of any supplementary part.

The face-plate is made of any suitable material, such as sheet metal, copper, or sheet-steel covered with copper or any other non-corrosive material. A non-corrosive wearing-surfacing along the runways is a desirable adjunct in the formation of the face-plate.

The cast-metal jamb, with its sheet-metal face-plate, is especially adapted to be used with a window or other sash having overbalancing-weights. The casting can easily be formed to provide proper weight boxes or casings. Then the casting may be made with openings, as openings c^{10}, which allow the entry of the weights through them into their boxes or casings. Any opening of this kind would of course be covered by the face-plate, and in this connection I might say that I preferably make the jamb-casting in a skeleton form as tending to secure economy in material. As said before, any opening thus left would be covered by the face-plate.

The special aptitude of the jamb-casting for use with a sash having weights is also seen in the means provided for the retention of the pulleys over which the cords or chains run which connect the sashes with their overbalancing-weights. This may best be seen in Figs. 1, 2, and 3.

The pulley, which is designated E, is inclosed in a casing e, which has an opening e' in its under side through which the sash-cord extends, as is common with such casings. The pulley is held in place by its casing being secured to the jamb-casting in the following manner: There is molded in the jamb-casting at the point where the pulleys are to be placed rectangular slots c^{11}. These slots have beveled side edges c^{12}. (See Fig. 2.) The pulley-casings e are made to fit into these slots, the forward edges of the casings at e^2 being beveled to rest against the beveled edges c^{12} of the said slots formed in the jamb-

casting, while the casing rests along its lower front edge e^3 on the lower edge c^{13} of the slots as a source of basal support. With this method of securing the pulleys, or rather their cases, no further fastening is required, for the load of the weight through the medium of the sash would hold the pulley in place fixed in its slot. In order, however, to prevent the dropping out of the pulleys in case they were inserted before the jamb-casting was set in place in the wall, there are shown bolts e^4, which pass through the jamb-casting at about the points c^{14} and fasten through lugs e^5, projecting from the under side of said pulley-casings, slots being cut in said lugs to permit of the entry of the bolts. The ends are secured in the ordinary manner by nuts. The holes where the bolts e^4 pass through the jamb-casting in order to secure the pulley-casings are preformed in the original casting, and in this connection it is to be especially noted that one feature of my invention as regards the jamb-castings, and for that matter the head and sill castings as well, is that they are so designed that absolutely no machine-work of any description is required to fit or adapt them for their combination or the reception of any supplementary part, not even the drilling of a single hole.

Reference has already been made to the fact that the jamb-castings are alike in their construction and in general, and especially with respect to an individual or isolated window the castings are formed substantially as before described; but where there is a row of windows the castings can be made so as to traverse the spacing between any two windows and provide a jamb-support at either side of each. This construction of the casting may be seen in Fig. 2, where the whole casting is designated C C. This form of casting is desirable as tending to great strength and rigidity of frame structure, especially since the casting is bolted to the head and sill of separate windows through the medium of the lugs *a* and *b*, as before described, and the head-castings and the sills of the separate windows are also bolted together, whereby there is formed a continuous structure. The head-castings and also the sill-castings are bolted together by being made so as to extend to abut or come together approximately at a central point between the windows in which they are contained, and then by means of lugs projecting from them and placed contiguously the separate castings are bolted together, the bolts passing through the lugs. For example, in Fig. 2 I have shown two sill-castings bolted together. The ends of the castings meet or abut at a point centrally located between the windows, and they are shown as having the lugs b' projecting from them, and through these lugs the bolts b^2 extend, the ends of which are properly secured by nuts. The head-castings are bolted together in the same way. There is thus obtained a framework of great rigidity and strength, which is especially to be desired in modern building and which also admits of any architectural matter being built upon or secured to it as a source of support. The modified form of jamb-casting just referred to also helps form the weight-boxes, if weights be used with the sashes, especially when they are supplemented by a division-plate F, of some sheet metal, which plate may be held in place by the same bolts b^2 which hold the head and sill castings together, the plate being interposed between the lugs through which the bolts pass. In contradistinction to this form of jamb-casting as regards the weight-boxes is the ordinary form of casting, seen at Fig. 2 at the left, (where if weight-boxes are necessary) they can be formed as supplementary parts by means of the sheet-metal box-forming plate G, and the aptitude is to be observed with which the plate G can unite with its corresponding jamb-casting by bending the edges *g g'* of the plate around the flanges c^5 c^6, which run along the inside of the jamb-casting, as before explained, and then fastening the said edges of the plate to the flanges by the same bolts or screws which secure the face-plate D, that is also fastened to these flanges. As for the head and sill castings A and B, respectively, they are formed or may be formed so as to be best adapted for the purposes of support and retention which they serve to obtain and also with regard to their architectural fitness. The cast head can be extended and formed with stiffening-ribs A' in such a manner as to support the wall overhead, thus saving the lintels that are usually used for this purpose, while the cast sill can be extended to cover the wall in such a manner as to take the place of a stone sill. (See Fig. 4.)

Reference has already been made to the fact that the cast-metal frame or jamb portions thereof, with its face or auxiliary plate of sheet metal, is as well adapted to be applied to a pivoting-sash as it is to a sash that slides, the difference only being one of configuration, which is immaterial in so far as the essence of my invention is concerned. In Figs. 5 and 6 I have shown as an example of such the aptitude with which a face or auxiliary plate such as I have described made of sheet metal may be applied to a pivoting-sash. The face or auxiliary plate is designated D' and the sash D^2, the sash being pivoted to the plate by any suitable form of pivotal connection d^3. The plate, it is to be noted, is adjustably secured to the flanges c^5 c^6 of the jamb-casting C by the bolts d^2, which pass through the turned outside and inside edges d^3 d^4 thereof and through the slots c^9, cut in from the edge of the flanges in the manner before described. The configuration of the face or auxiliary plate is such as to permit, of

course, the sash swinging in and out, and especially is formed to help provide the weather-stops, which protect the outer edges of the sash along the sides. These weather-stops are designated d^5 and they are formed differently, as they lie above or below the pivotal center of the sash, depending as it swings in or out. Above the pivotal center of the sash, as may be seen in Fig. 5, they are formed by bending or forming the plate along its outer edge, so as to form a groove d^6, which receives a complemental member d^7, extending from the corner of the sash, while below the said pivotal points of turning they are formed by bending or forming the metal at the corner of the sash to form a groove d^8, which receives a complemental member d^9, formed by a fold in the plate D′, and thereby securing in both cases when the sash is closed a weatherproof jointure.

In Figs. 7 and 8 I have shown the aptitude with which the cast-metal frame, with its face or auxiliary plate or plates, can be used for the retention of a fixed sash or one which is permanently secured to the frame. The side rail of the sash securing the glass pane may be made of two auxiliary plates D^3, secured to the flanges c^5 c^6 of the frame by the bolts d^2, and adjustably, if need be, as heretofore explained. These finished plates serve to cover any unsightly roughness in the casting of said frame or compensate for any irregularity therein. The flanges c^5 c^6 also provide a very good means for the retention of this kind of frame structure.

There is shown in Figs. 7 and 8 in the casting C an additional feature of construction to any that has heretofore been referred to and which comprises flanges or what may be termed an "anchor-hook" c^{15}, by which the same casting is anchored, as it were, to the masonry. In Fig. 7 the casting is formed with two of these back supports, while in Fig. 8 but one is shown. This feature is one which might be employed to advantage with the jamb-casting of any kind of window, for it would prevent any possibility of the casting warping out of the wall in case of fire.

Reference has been made in the specification and appended claims to the face or auxiliary plate or plates over the jambs as of sheet metal. By sheet metal is meant any smooth-finished metal plate or plates of the proper configuration, whether such be formed by bending the plate or plates into shape or rolling it.

Although the laterally-adjustable sheet-metal face or auxiliary plate hereinbefore described is especially designed for cast-metal framework, yet it might be successfully applied to the jamb portions of any frame structure, especially if such be roughly finished, the face-plate of course compensating for any irregularity or roughness in the structure and providing for a truer and better retention of the sash.

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

1. A window-frame, the head, sill and jamb portions of which are made of cast metal, lugs having slots formed integrally by the castings with and projecting from said head and sill portions, and means whereby said jamb portions may be united with said head and sill portions through the medium of said lugs, substantially as described.

2. The combination with a window-frame the jamb portions of which are made of cast metal, of a grooved face-plate adapted to cover the jamb portions of the frame and simultaneously to provide runways for the sash or sashes.

3. The combination with a window-frame, the jamb portions of which are made of cast-iron, of an adjustable face or auxiliary plate or plates of sheet metal for the said jamb portions of the frame, and means for obtaining an adjustment of said face or auxiliary plate or plates.

4. The combination with a window-frame of a face or auxiliary plate or plates made of sheet metal for the jamb portions of the frame, and means for securing said face or auxiliary plate or plates whereby the same may be held fixed at relatively different points of lateral adjustment.

5. A window-frame, the jamb portions of which are made of cast metal provided with outwardly-extending flanges, and a grooved sheet-metal face or auxiliary plate or plates secured to said flanges for covering said jamb portions of the frame and also providing runways for the sash or sashes.

6. A window-frame, the jamb portions of which are made of cast metal provided with flanges and having slots extending in from the edges thereof, a face or auxiliary plate or plates of sheet metal secured thereto, and means for adjustably securing said face or auxiliary plate or plates to said jamb portions of the frame along said flanges, substantally as and for the purposes set forth.

7. A window-frame, the jamb portions of which are made of cast metal and which are provided with a face or auxiliary plate or plates, said face or auxiliary plate or plates, and a rib extending from said jamb-casting for strengthening the same.

8. A window-frame having jamb portions of cast metal with an opening or openings therein permitting of the insertion of sash-weights, and a face or auxiliary plate or plates covering said opening or openings and providing for the retention of the sash or sashes.

9. A window-frame having jamb portions of cast metal, the same comprising outside and inside moldings, the vertically-extending

flanges c^5, c^6, and ribs c^7, c^8, and a face or auxiliary plate or plates of sheet metal secured to said jamb portions of the frame along said flanges, substantially as and for the purposes set forth.

10. A window-frame having jamb portions of cast metal with slots formed therein by the casting, and a sash-cord pulley the casing of which is adapted to fit into said slots and be supported substantially as described.

11. A window-frame having jamb portions of cast metal, a slot formed therein having beveled edges for receiving the casing in which is contained the sash-cord pulley, said casing and pulley, the casing having beveled edges to conjoin with the edges of said slot and be supported substantially as described.

12. In a window-frame, a metal casting adapted to form the jamb portions of adjacent windows.

13. A window-frame structure comprising a series of castings joined together and forming a unitary and continuous frame structure for the head and sill portions of a plurality of adjacent windows.

14. A window-frame structure comprising a series of castings joined together and forming a unitary and continuous frame structure for the head, jamb and sill portions of a plurality of adjacent windows, substantially as described.

15. A window-frame, the head portion of which is formed of cast metal, and stiffening-ribs A′ cast integrally with said head substantially as and for the purposes set forth.

HENRY C. SMITH.

Witnesses:
E. B. LAMPMAN,
A. LAMPMAN.