

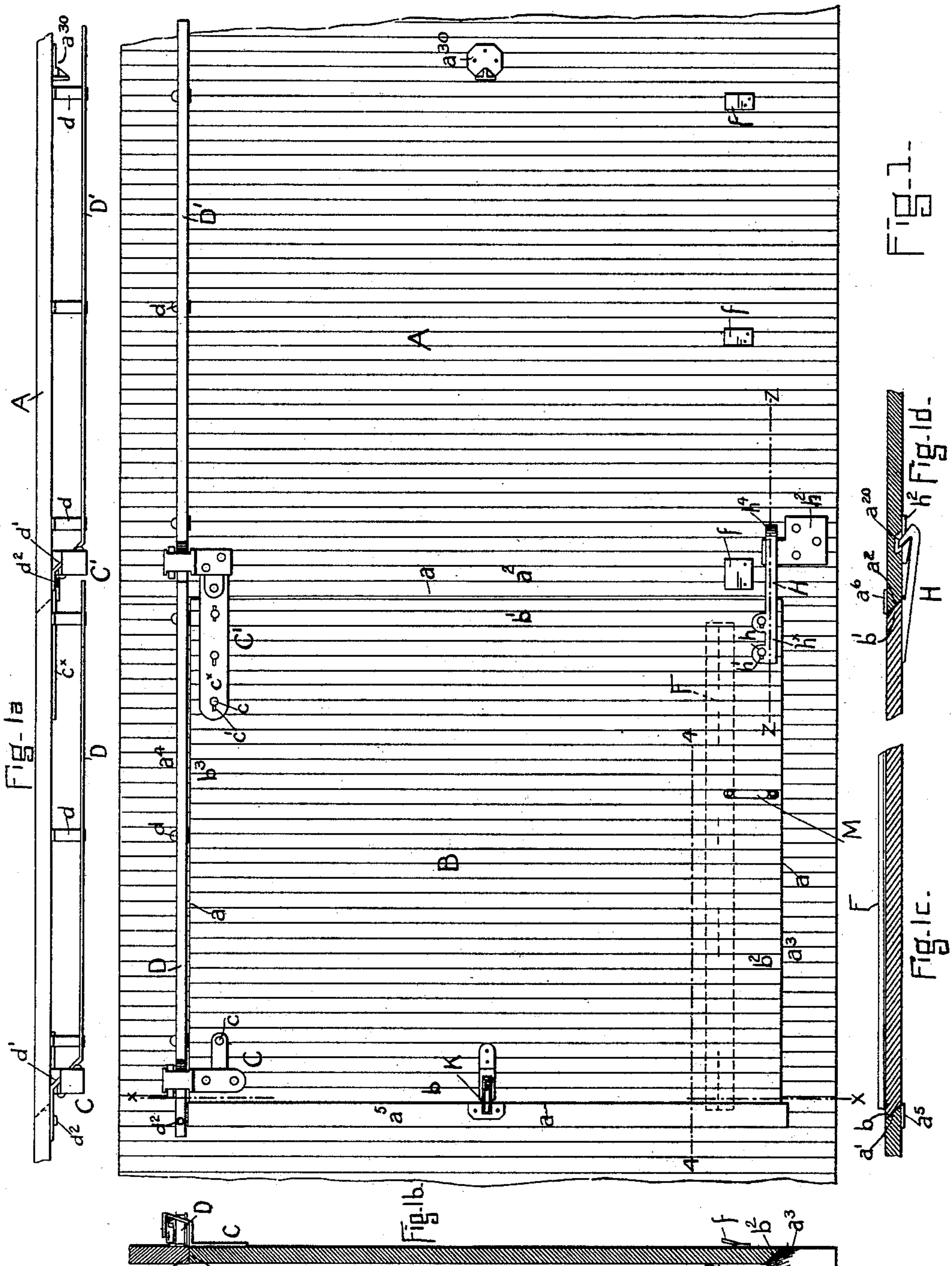
No. 609,893.

Patented Aug. 30, 1898.

D. MANUEL.
FLUSH SLIDING DOOR.
(Application filed Nov. 1, 1897.)

(No Model.)

2 Sheets—Sheet I.



WITNESSES,

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INVENTOR,
DAVID MANUEL,
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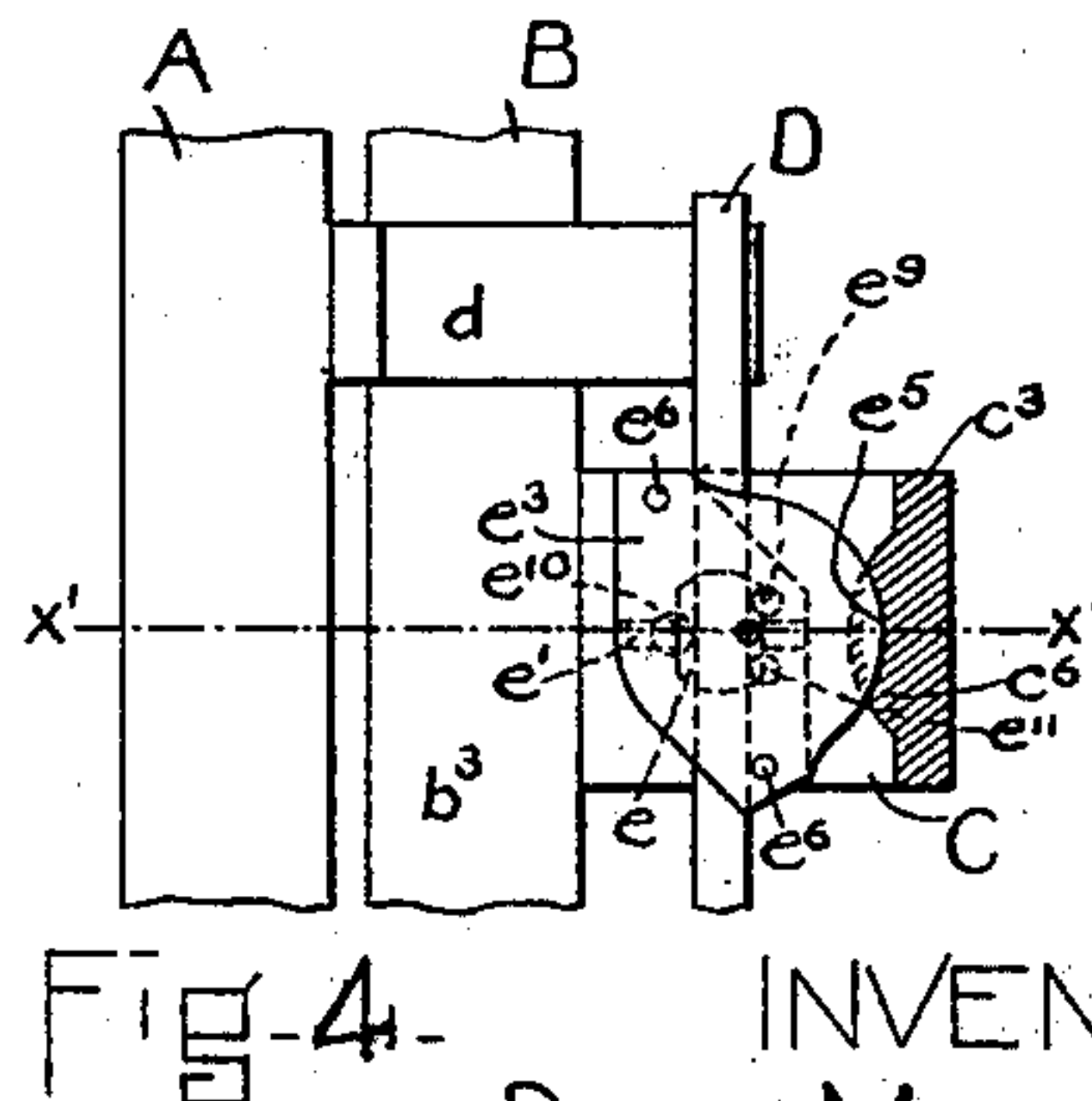
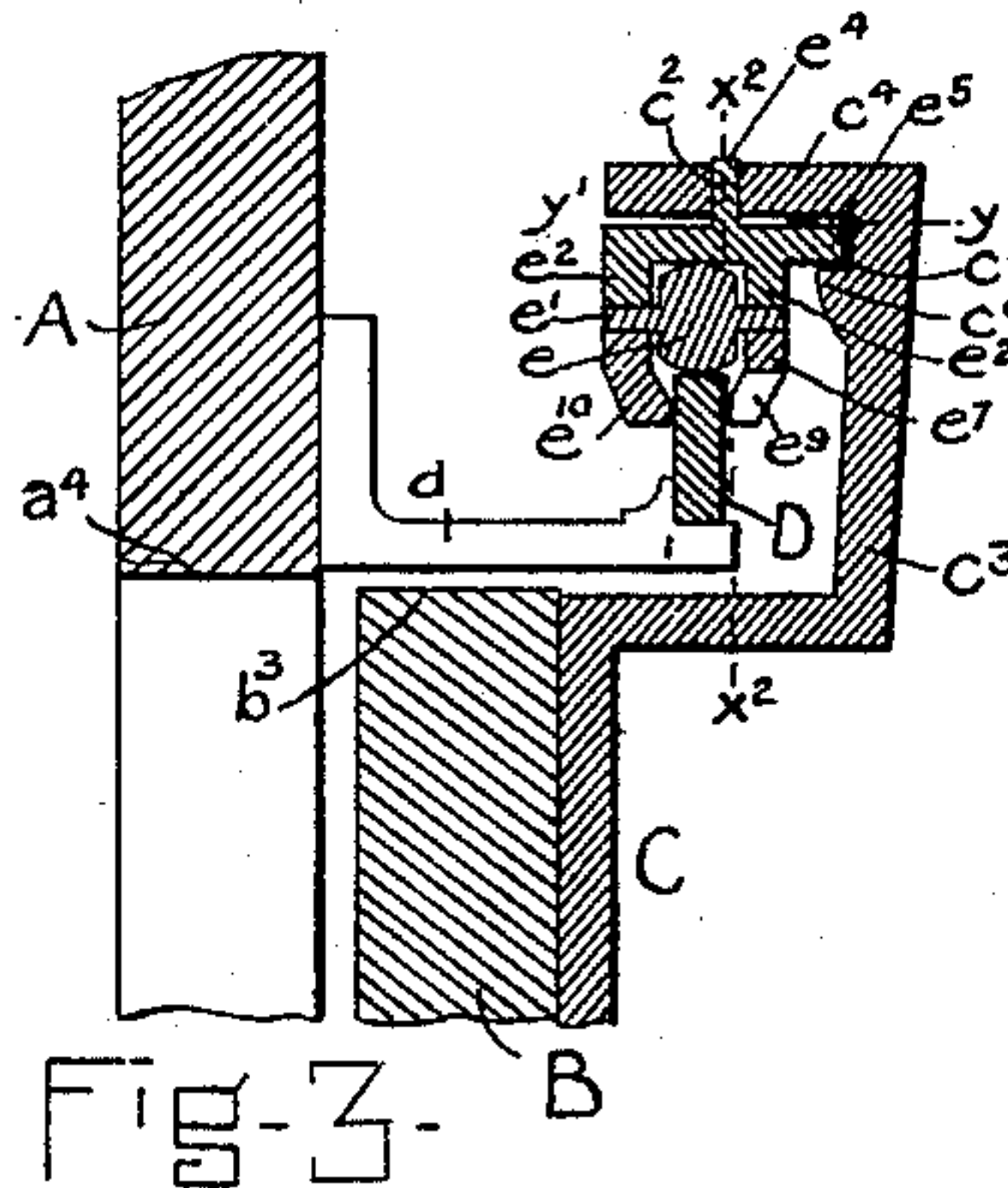
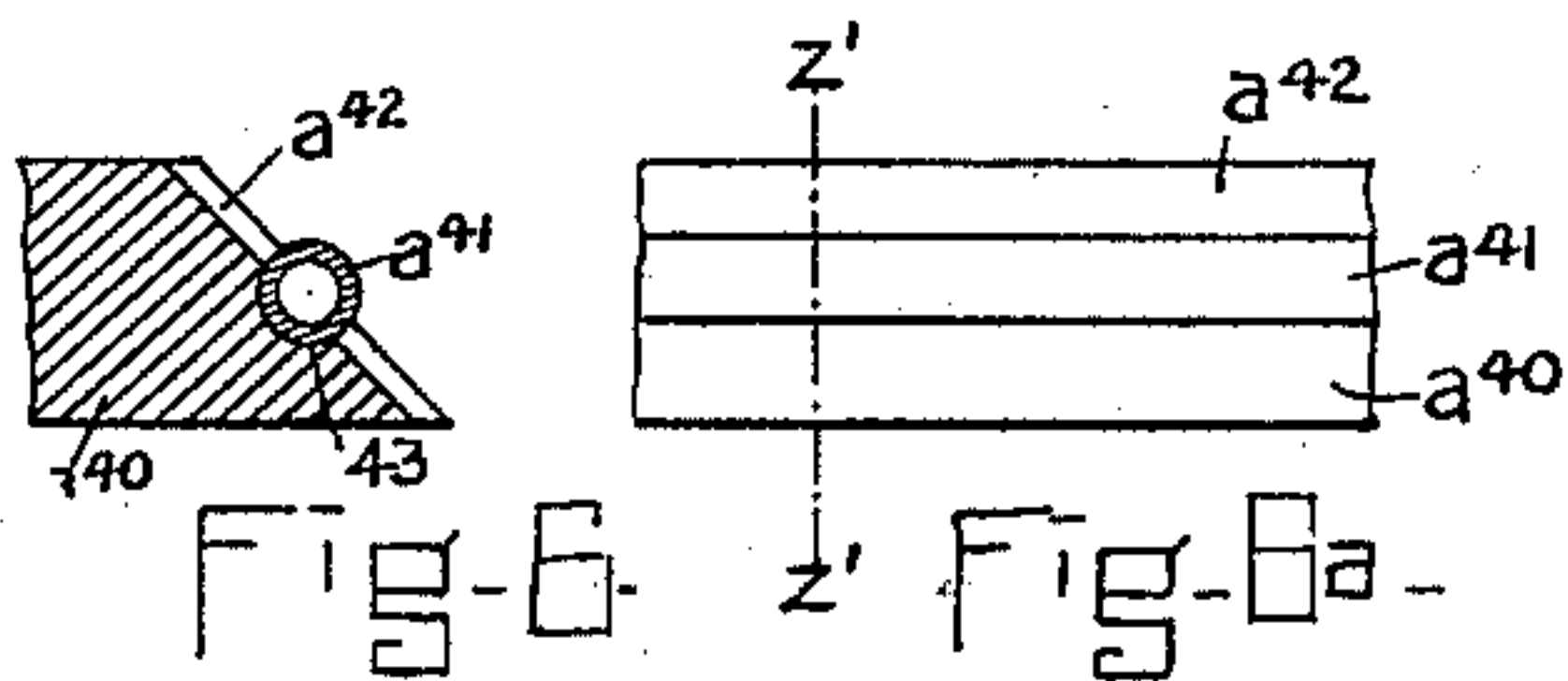
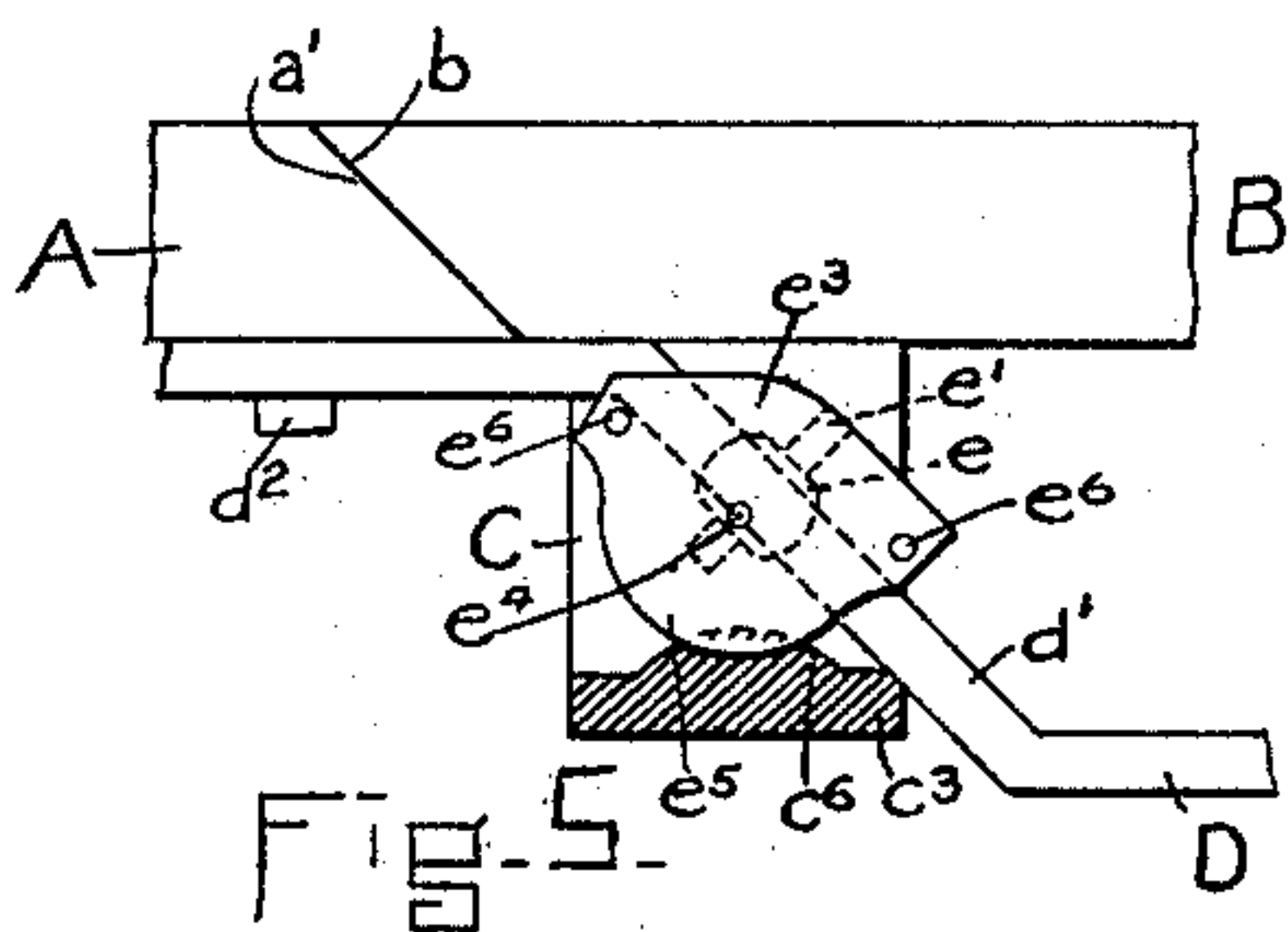
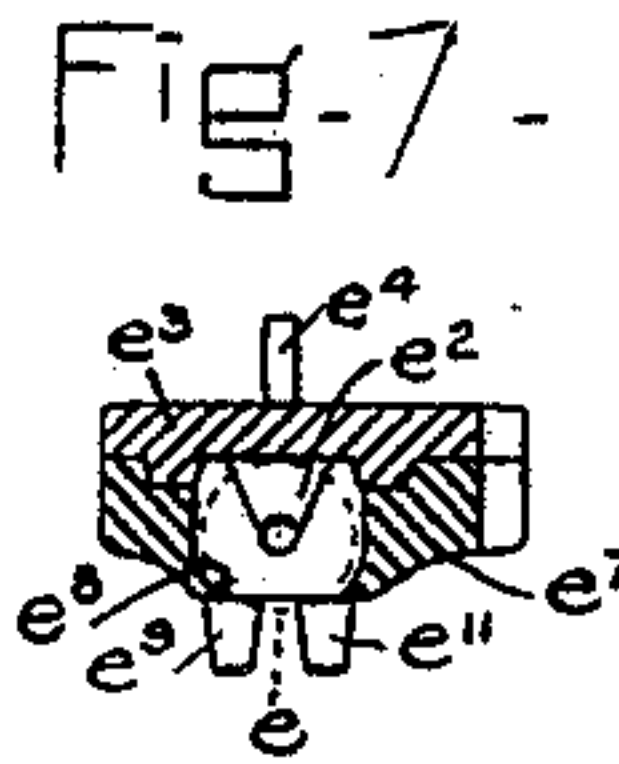
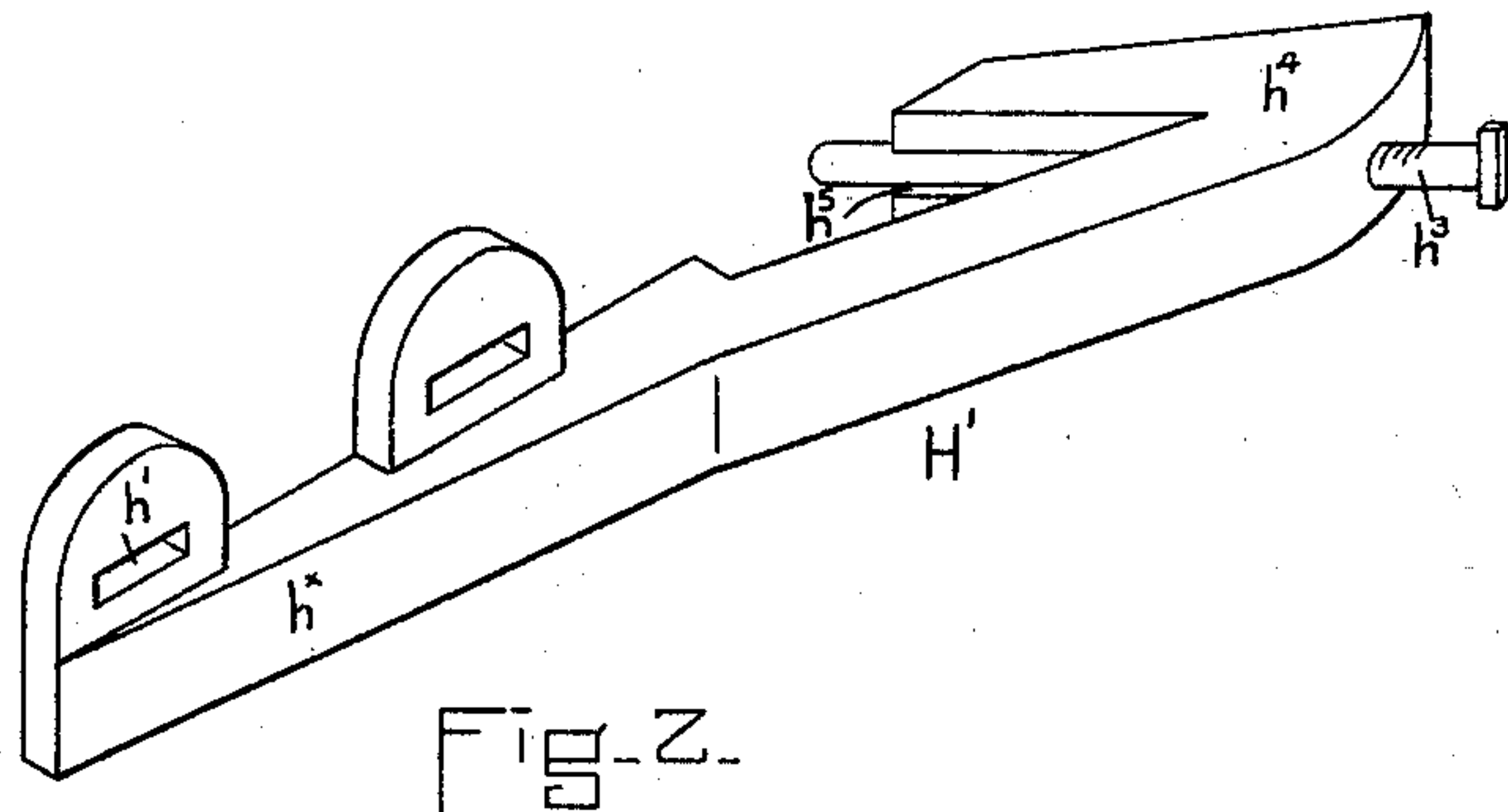
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WITNESSES.

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UNITED STATES PATENT OFFICE.

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FLUSH SLIDING DOOR.

SPECIFICATION forming part of Letters Patent No. 609,893, dated August 30, 1898.

Application filed November 1, 1897. Serial No. 656,993. (No model.)

To all whom it may concern:

Be it known that I, DAVID MANUEL, of Hyde Park, county of Norfolk, State of Massachusetts, have invented an Improvement in Flush Sliding Doors, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to sliding doors, and has for its object the provision of a sliding door which when shut will be flush with the walls of the aperture it is designed to close, such a door being particularly adapted for use on freight-cars and in like situations where projection of the door is accompanied to a peculiar degree by liability to displacement and difficulty in securing complete closure of the aperture. Preferably the door is arranged to travel in such a manner as to permit closure to be effected by an uninterrupted sliding movement, thus obviating any necessity for delay or shock in operation.

The various features of my invention will be fully illustrated and described in the accompanying drawings and specification and set forth in the claims.

In the drawings, Figure 1 illustrates in front elevation a portion of a wall, with a door shown in place, constructed in accordance with my invention, Fig. 1^a being a plan view of the same; Fig. 1^b, a view in vertical sectional elevation taken on the line xx , Fig. 1, looking from left to right; and Figs. 1^c and 1^d, horizontal sectional views on the lines 4 4 and zz , respectively, Fig. 1, looking from top to bottom. Fig. 2 is a detail view in perspective of a modification of the hook device shown near the bottom of the door, Fig. 1. Fig. 3 is an enlarged vertical sectional view through the left-hand hanger and trolley, Fig. 1, with adjacent parts of wall, track, and door in the open position of the latter, as also shown in Fig. 4, Fig. 3 being a section on the line $x'x'$, Fig. 4, looking from left to right; and Fig. 4, a horizontal section on the line $y'y'$, Fig. 3, looking from top to bottom. Fig. 5 is a view similar to Fig. 4, but with the door shown in closed position. Fig. 6 is a horizontal section of a beveled abutting edge of a door-sill or door, illustrating one form of packing and taken on the line $z'z'$ of

a front elevation of the same, Fig. 6^a. Fig. 7 is a vertical sectional view of the trolley on the line x^2x^2 , Fig. 3, looking from left to right.

I have selected for illustration as a convenient embodiment of my invention to be described its application to a freight-car, of which a portion of one side or wall is designated by the reference-letter A and is shown of ordinary construction, although any suitable construction may be used, as desired.

The position of the doorway and its proportions are indicated by the lines a and the door itself by the letter B, the general appearance of the same differing but little in the instance shown from well-known types.

To facilitate introduction of the door into its closed position flush outwardly with the side A and to enable as tight a joint to be formed as possible, I prefer to bevel one or more of the edges of the door and to provide a corresponding bevel on either or both of the jambs, and the sill and the lintel also may be beveled, if desired, though in the drawings I have not so illustrated it.

In the instance illustrated the front edge b of the door is beveled rearwardly and outwardly, and the corresponding jamb a' of the doorway has an undercut bevel to receive the wedge-like door edge and cooperate therewith to cause an inward cramping of the door as the latter slides to the left.

A parallel beveling of the door at its rear edge b' and of the jamb a^2 permits entrance at that region, and inward and upward beveling of the sill a^3 and lower door edge b^2 is useful as providing means to cramp the door upward to cause snug engagement of its upper edge b^3 with the lintel a^4 .

Strengthening-strips may be provided where desired, as the strips $a^5 a^6$ at the jambs, respectively.

To support the door and guide it into place, any track or equivalent device of suitable construction may be utilized; but I consider that the means illustrated presents a runway of very high efficiency, providing, as it does, a convenient arrangement to permit uninterrupted forward movement of the door until seated, such a movement being greatly preferable to any combination of right-line movements with intervening rests.

In the drawings the door is shown as provided with a plurality of hangers C C', two being a convenient number, attached to the door by any suitable means, as the bolts c, provision being made, preferably, for adjustment of one or both of the hangers, the slots c' in the leaf c^x answering this purpose in the instance of the hanger C', which is preferably arranged to project slightly to the rear of the door, but otherwise may be and preferably is of similar construction to the hanger C, so that a description of one will answer for both. Before proceeding with such description brief reference may be made to the support or track, which is illustrated as of a simple form, but may be of suitable construction, as desired, the essential part being a rail on which the door-hangers can run. This rail (lettered D D' in the drawings) may be carried conveniently by suitable supports on arms d, projecting to a sufficient distance from the wall A to permit the door B to slide parallel with the wall and clear of the latter during the rearward portion of the opening and closing movement of the door.

In my preferred construction offsets d' are provided in this rail to afford a support to the door as it slides from its position outside of the plane of the door-frame into its position of complete closure flush with the same, and it is desirable, though not necessary, that for the sake of rigidity the rail be attached directly to the wall at the region or regions where it approaches the latter. For this purpose attaching means d², shown as bolts, are illustrated, and if this attachment be sufficiently strong it may be possible, though not desirable, to dispense with the arms d or other supporting means for the rail.

To facilitate removal endwise of the hangers from the rail, I prefer to make the rail in two parts D D', slightly separated, although I do not limit myself to the use of a discontinuous rail.

Taking up now the construction of the hangers, I provide these with antifriction devices, the preferred form of which is best illustrated in Figs. 3 to 5, wherein is shown a roller mounted rotatably in a cage-like support or bearing, in its turn mounted in its hanger and free to rotate about a vertical axis, so that when the hanger in traveling along the rail reaches the bend or curved offset portion the roller-bearing under the influence of suitable guiding means changes its position in the hanger to conform to the new direction of travel, while remaining upon the rail. For the sake of simplicity and certainty of operation I prefer to divide this antifriction device into three main parts—the structure comprising the antifriction device proper or roller, a bearing-block interposed between the hanger and roller, and a guide member depending below the roller into position to engage and follow the line of the track. The contour of these parts may be somewhat varied in prac-

tice; but I have found the form illustrated to be satisfactory in operation.

The roller e is shown as having its tread slightly rounded to reduce the area of contact with the rail, while an elongated axis e' is provided integral with the roller in the instance illustrated and journaled in reversed trunnions e², (best seen in Fig. 7,) extended downwardly from the plate-like body e³ of the bearing-block, from the upper surface of which extends upwardly a projection or pivot e⁴, free to turn in a bearing e² in the hanger C, (or C', as the case may be.)

The plate e³ is extended, preferably, in the form of a lip, as at e⁵, to enter a berth c⁵, formed between the top c⁴ and a projection or shoulder c⁶ on the riser c³ of the hanger, or formed in any other suitable manner, the contour of the top being such as to permit withdrawal of the block from the hanger when the plate is rotated out of normal position, although this provision for withdrawal may be omitted, if such omission be found desirable.

The guide member e⁷ is of suitable contour to fit snugly against the under surface of the bearing-block without interfering with freedom of rotation of the roller and is arranged, preferably, to inclose the latter at all points except a limited portion of its tread, thus rendering the bearing dust-proof, an aperture e⁸ being left to permit contact of the roller with the rail.

The guide devices comprise projections e⁹ e¹⁰ e¹¹, three in number in the instance illustrated, depending below the tread of the roller, the guide e¹⁰ being positioned in about the medial axial plane of the roller and arranged to prevent outward displacement of the roller from the rail by engaging the rail on the inner side, as will be readily understood from Fig. 3.

Inward displacement and undue approach of the door toward the wall A are similarly obviated through the instrumentality of the fingers or projections e⁹ e¹¹, the three members of the guide device coöperating with the rail at the bend to cause the antifriction device or trolley to change its line of travel in conformity with the new direction of the track.

The single projection at the inside permits a ready pivotal turn of the trolley, while the two outer guide projections, preferably staggered with respect to the single projection, prevent binding of the trolley-guides on the rail and insure the retention of the trolley on the rail at the bend. To hold the parts of the trolley together, pins or other suitable means e⁶ may be utilized.

To prevent the bottom of the door from swinging away from the wall A when open, I provide suitable retaining means, in the instance illustrated comprising a fin-like piece F, preferably secured to and extended for some distance along near the lower inner edge of the door, upon opening movement whereof the fin enters behind the retaining-clips f, attached to the wall A, with their free portions

extended away from the door to receive the fin. To serve a similar function when the door is closed, I prefer to provide a keeper near the lower rear corner of the door, the forward edge being taken care of by the bevel of the jamb. Such a device is shown in the form of a hook H, Figs. 1 and 1^d, attached, preferably, by an adjustable bolt-and-slot connection h h' to the lower rear corner of the door, whence it projects rearwardly, preferably, for some little distance, the point of the hook being directed inward and forward in position to enter behind a catch-plate h^2 or its equivalent as the door moves bodily inward into flush closed position, thus locking effectually the door against strains perpendicular to the wall A.

To the hook is added, in the modification shown in Fig. 2, a set-screw h^3 , thrust through the head h^4 of the hook and adapted to be screwed in or out to regulate the degree of penetration of the point of the hook behind the catch-plate whether a recess, as a^{20} , Fig. 1^d, be provided in the wall A or not, and also furnishing means to start the door in case it chances to stick, although one of the chief advantages of the preferred beveled form of my door withdrawn at an angle is its freedom from tendency to bind in place or be frozen tight.

To permit the ready passage of the screw h^3 , the modified form of hook H' is shown as having, in this instance, its point divided like the claw of a hammer at h^5 .

Provision may be made for limiting the normal range of rearward movement of the door, as by a stop a^{30} , Fig. 1, and suitable locking means may also be provided, as at K.

When the edges of door and jamb are beveled, a construction is presented peculiarly adapted for the use of weather-packing, and the form I prefer to use is illustrated in Figs. 6 and 6^a, in which a^{40} is the edge, a^{41} the packing, shown as tubular, and a^{42} retaining means therefor.

Having thus described fully the various features of my invention, it will be understood that the details of construction illustrated may be varied to a considerable extent without departing from the spirit of my invention.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with a wall having a doorway, and its sliding door, of a keeper device comprising holding means on said wall, and a hook device secured to said door, near the rear of the latter, said hook device being arranged to engage said holding means automatically upon sliding, closing movement of said door, to cramp the latter inward and prevent displacement from said doorway in a direction perpendicular to said wall.

2. A keeper for sliding doors, comprising an attaching portion adapted to be secured to the door adjacent its rear edge, and a hook

portion adapted to project to the rear of said door with the point of said hook turned inwardly and forwardly, and arranged to operate substantially as described.

3. The combination with a wall and its door, of a keeper, secured to said door near the rear of the latter, and adapted to engage said wall at times, said keeper comprising an inwardly and forwardly directed hook and means to regulate the operation of said hook.

4. The combination with a wall having a doorway and a door adapted to slide horizontally parallel with said wall when open and to enter said doorway flush with said wall to close said doorway, of means to prevent displacement of said door during sliding movement near the rear portion of its path, said means comprising a fin or ledge and a cooperating projection mounted one on said wall and the other on said door and arranged to engage one another to prevent displacement of said door from the path in which it slides normally, but offering no hindrance to movement of said door into flush position.

5. The combination with a wall having a doorway, and a door arranged to slide outside of and parallel to said wall when open, and into position flush with said doorway to close the latter, of means to prevent displacement of said door when sliding in front of said wall, said means comprising a straight horizontal ledge attached to said door and having an extended free portion, and a projection secured to said wall and also having a free portion, said free portions being arranged to overlap one another and enter into mutual engagement upon transverse movement of the door when in open sliding position, but to offer no obstacle to sliding movement of said door into flush closed position.

6. A hanger-trolley for sliding doors comprising a bearing-block having downwardly-extended trunnions; a roller provided with an extended axle journaled in said trunnions and presenting a convexly-rounded tread to run upon a track, and a guide member of suitable contour to fit snugly the lower surface of said bearing-block and inclose said roller and axle; said guide member having an interiorly-located aperture to permit passage of said roller-tread.

7. A keeper for sliding doors, comprising an attaching portion h^x , adapted to be secured to the door adjacent the rear edge of the latter, a hook portion h^4 adapted to project to the rear of said door with the point of said hook turned inwardly and forwardly, and means h^3 , adapted to regulate the length of said hook.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DAVID MANUEL.

Witnesses:

MARY FRANCES MANUEL,
LUCY A. SMITH.