

March 20, 1928.

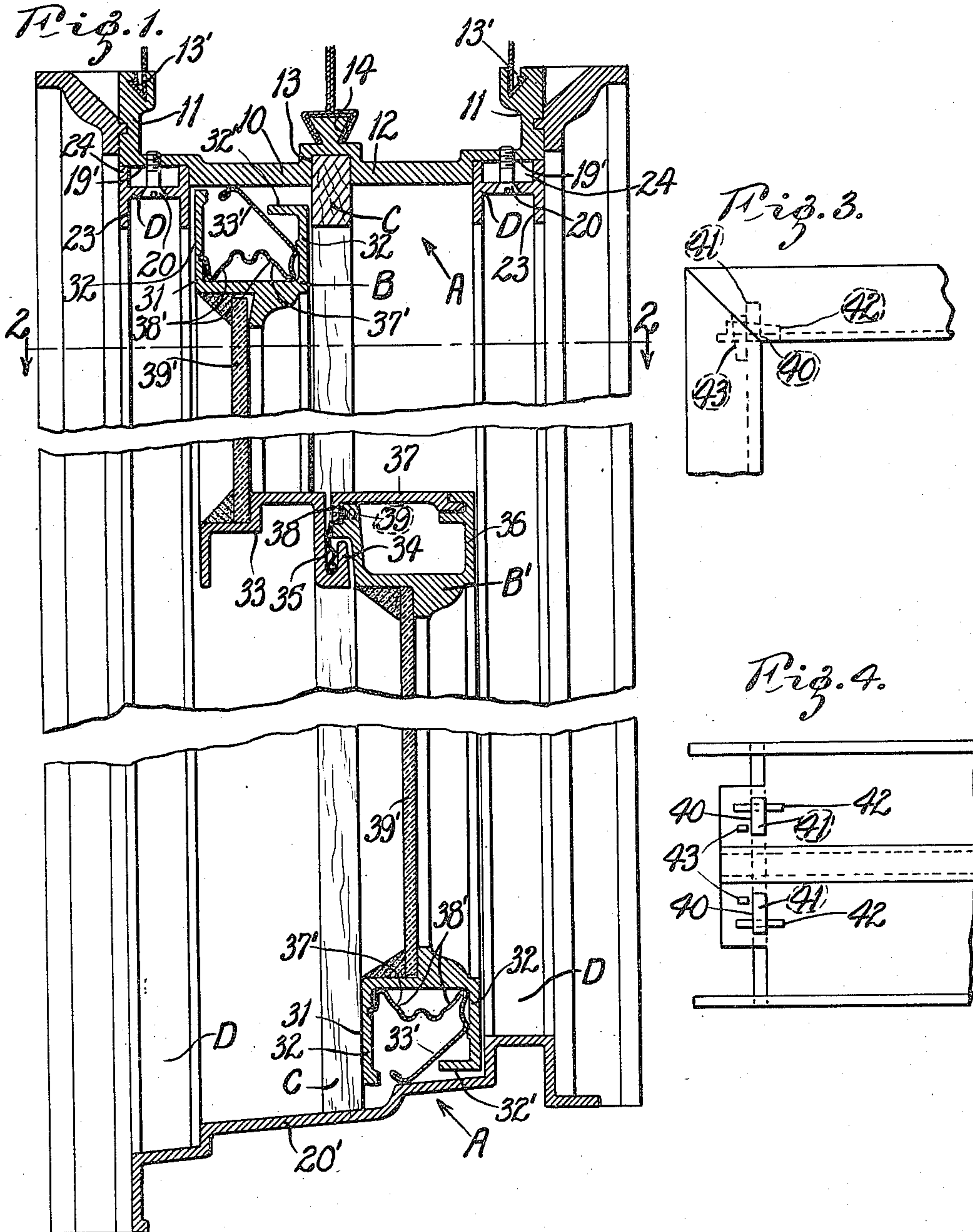
1,663,134

A. M. LANE

METAL WINDOW CONSTRUCTION

Filed July 16, 1925

4 Sheets-Sheet 1



INVENTOR:
ALFRED M. LANE,

by *Conrad*

HIS ATTORNEYS.

March 20, 1928.

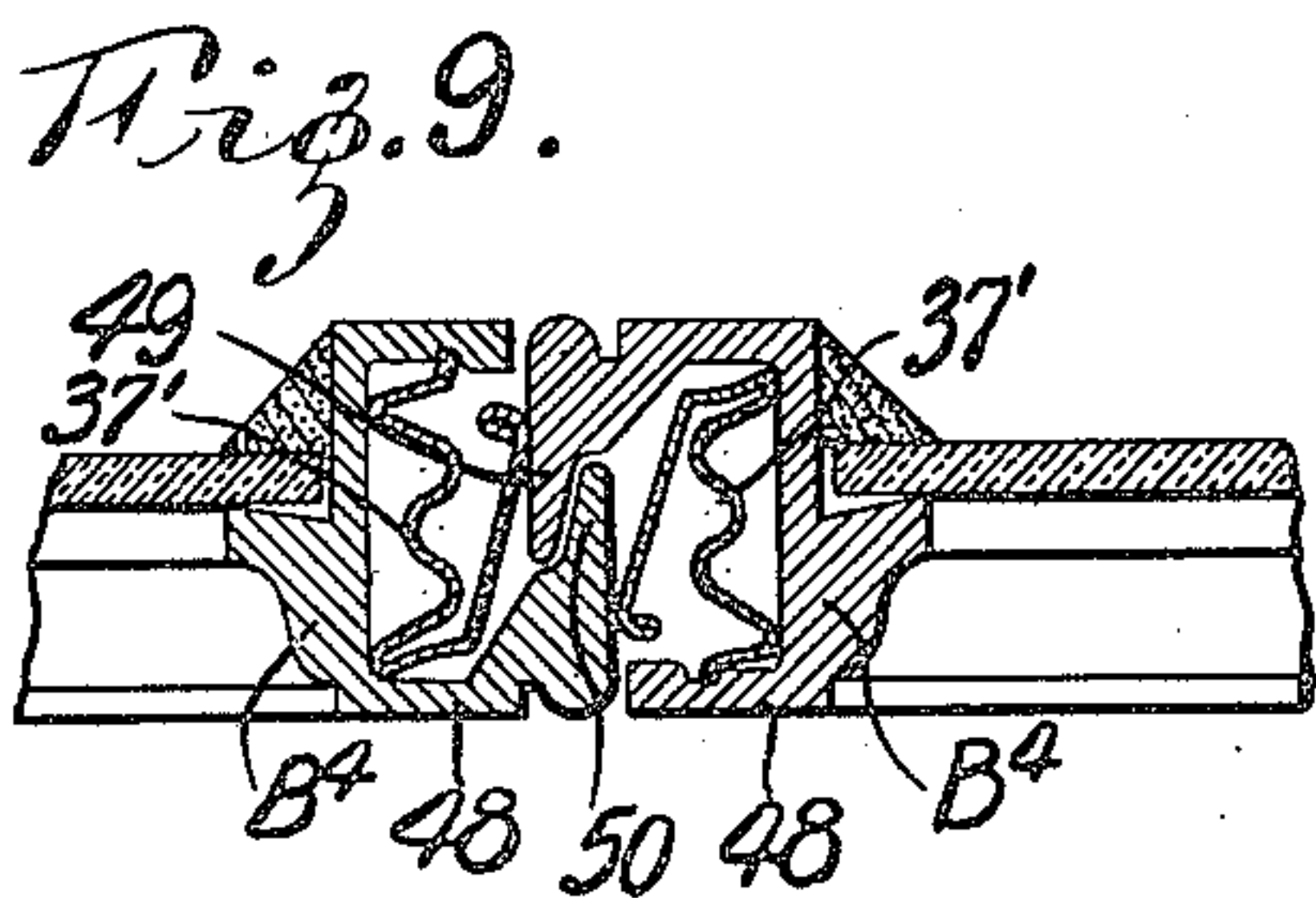
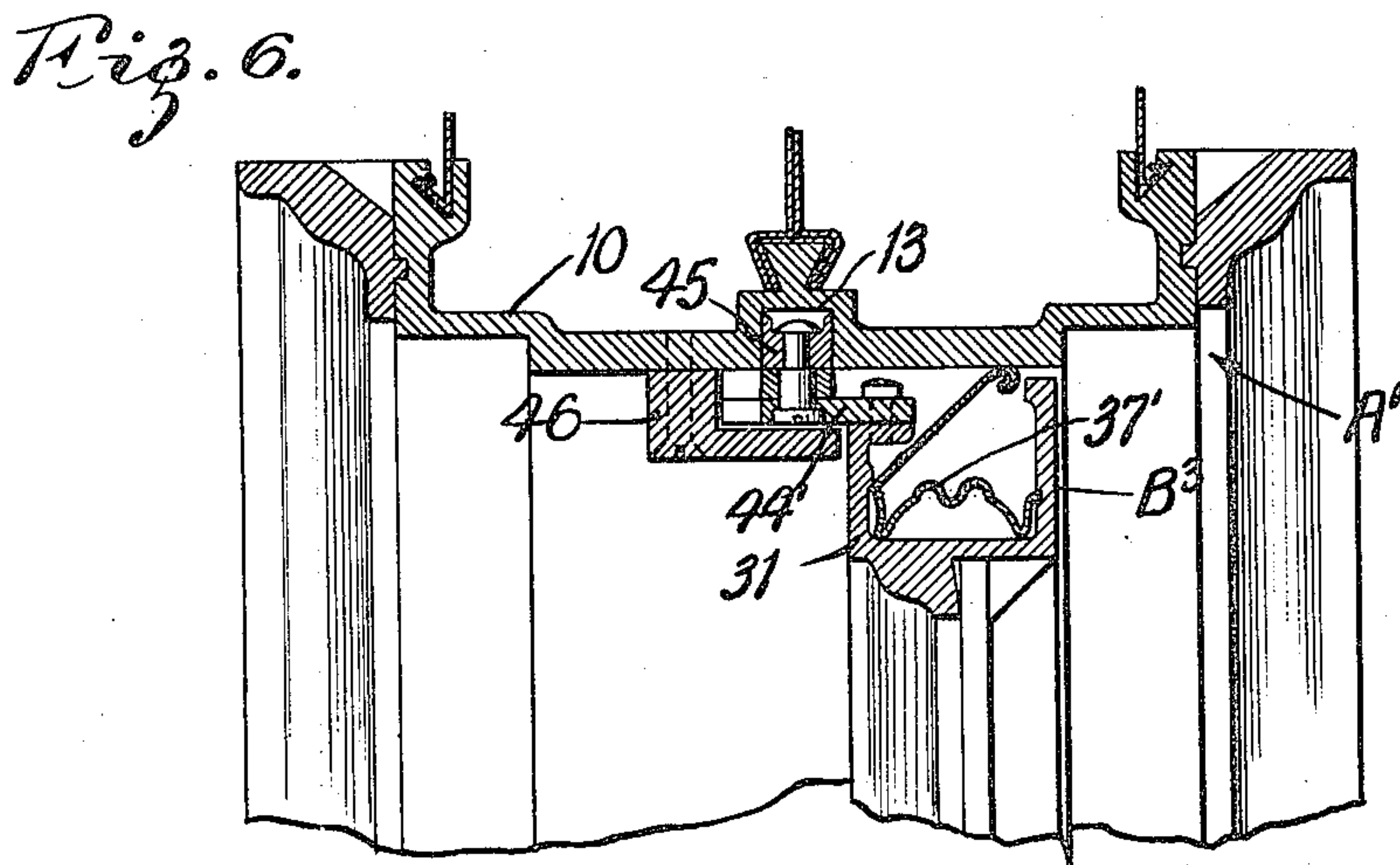
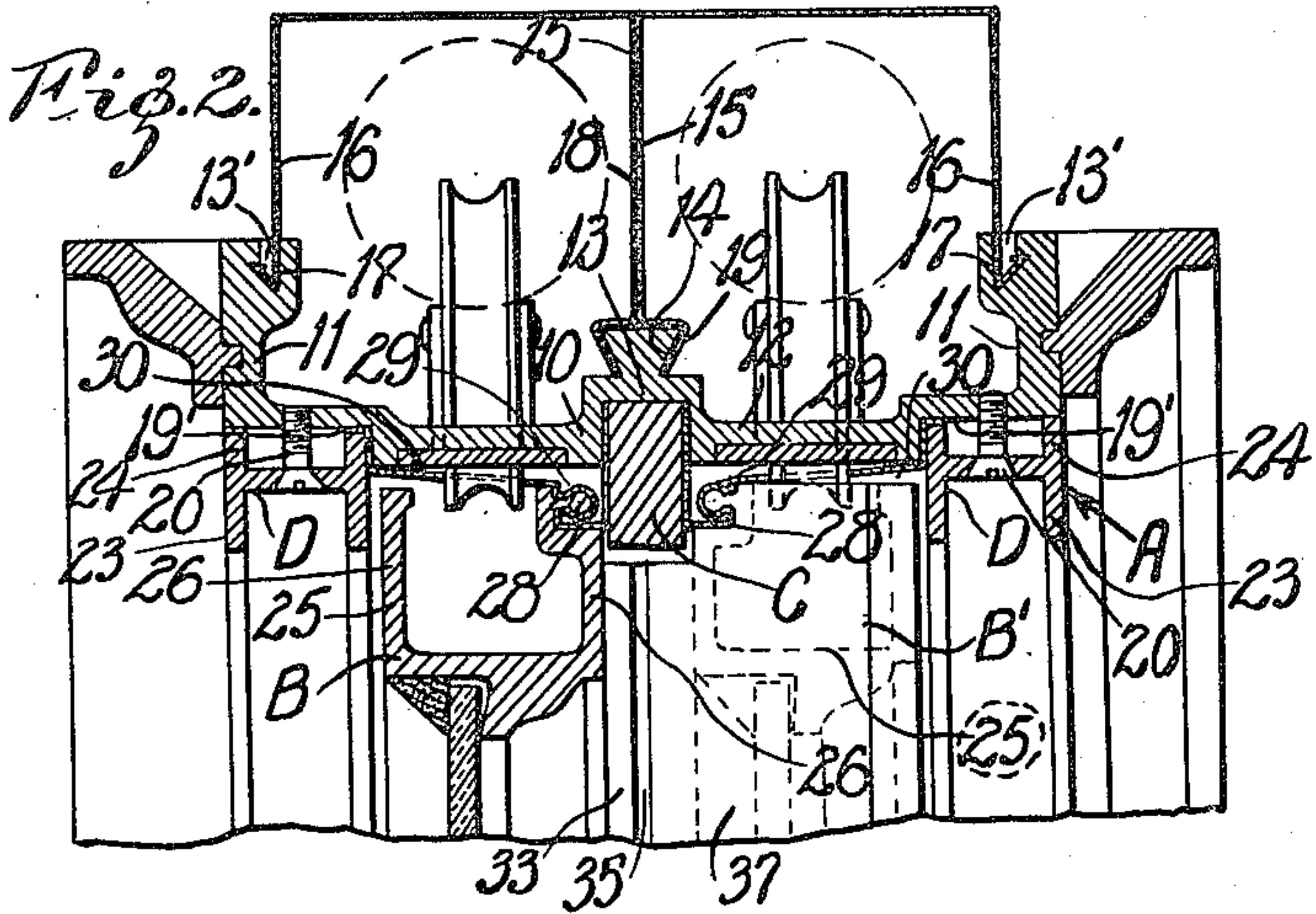
1,663,134

A. M. LANE

METAL WINDOW CONSTRUCTION

Filed July 16, 1925

4 Sheets-Sheet 2



INVENTOR:
ALFRED M. LANE,
by *Carstensen*
HIS ATTORNEYS.

March 20, 1928.

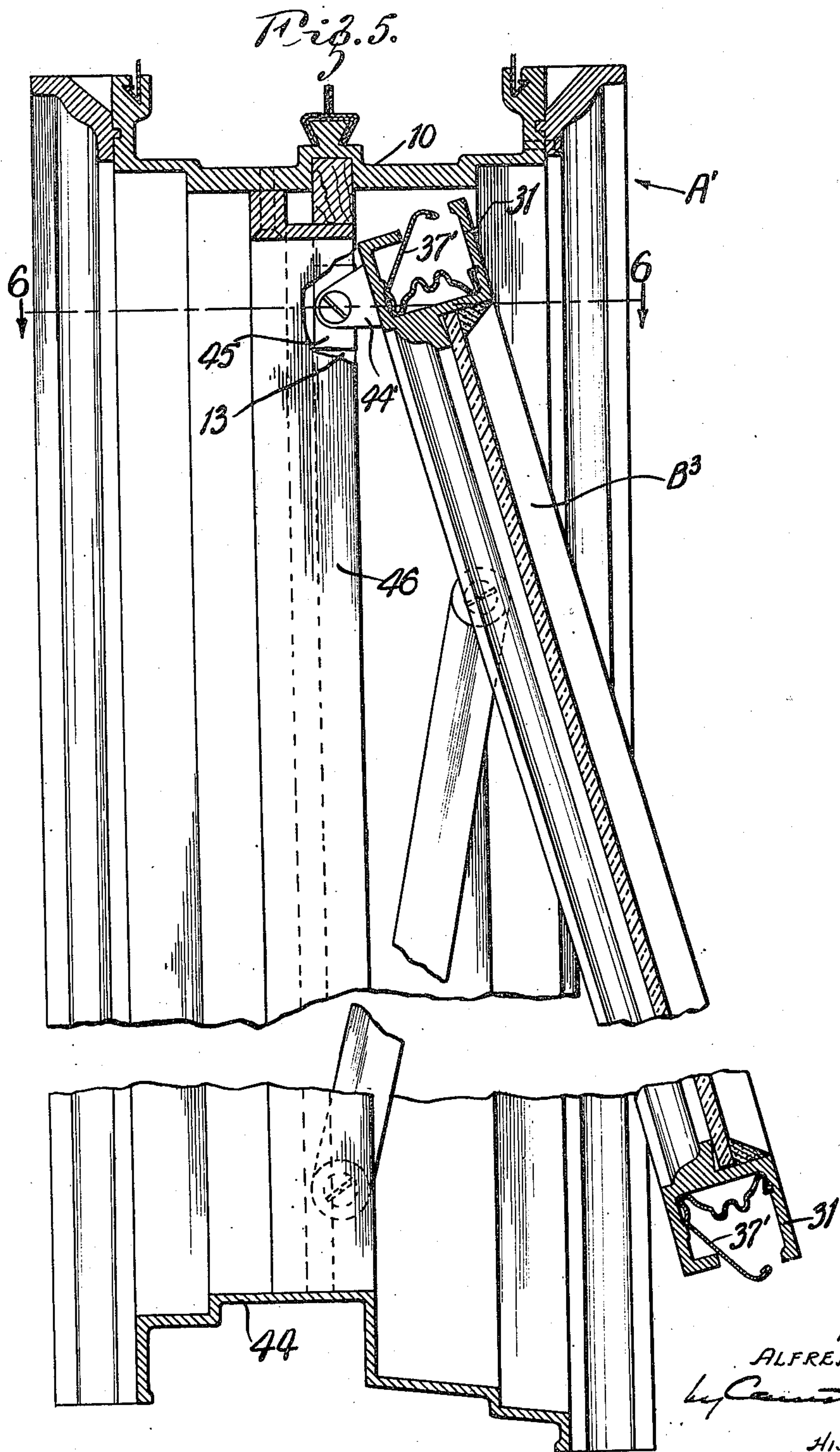
1,663,134

A. M. LANE

METAL WINDOW CONSTRUCTION

Filed July 16, 1925

4 Sheets-Sheet 3



INVENTOR:
ALFRED M. LANE,

By *Carroll*

HIS ATTORNEYS.

March 20, 1928.

1,663,134

A. M. LANE

METAL WINDOW CONSTRUCTION

Filed July 16, 1925

4 Sheets-Sheet 4

Fig. 7.

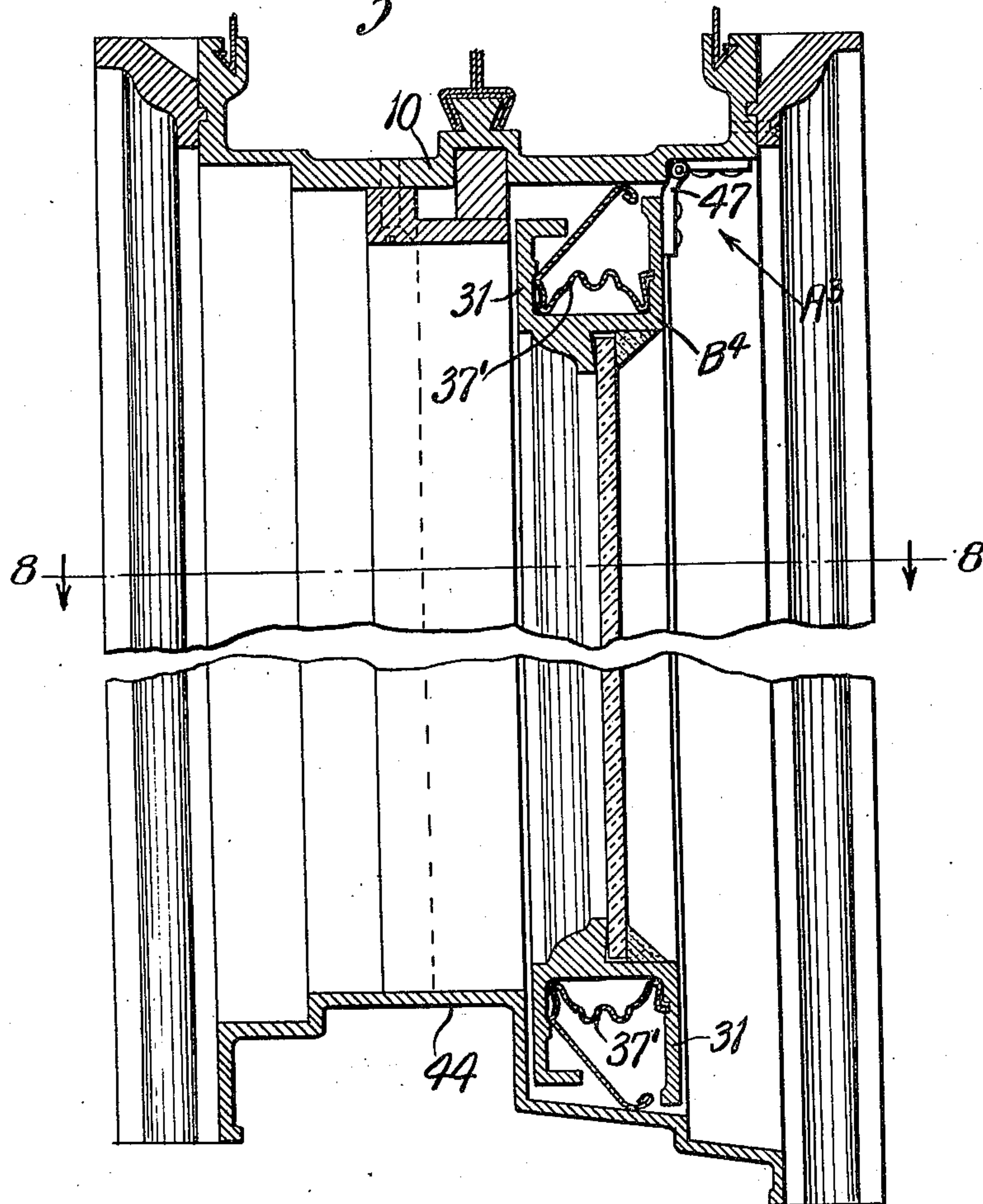
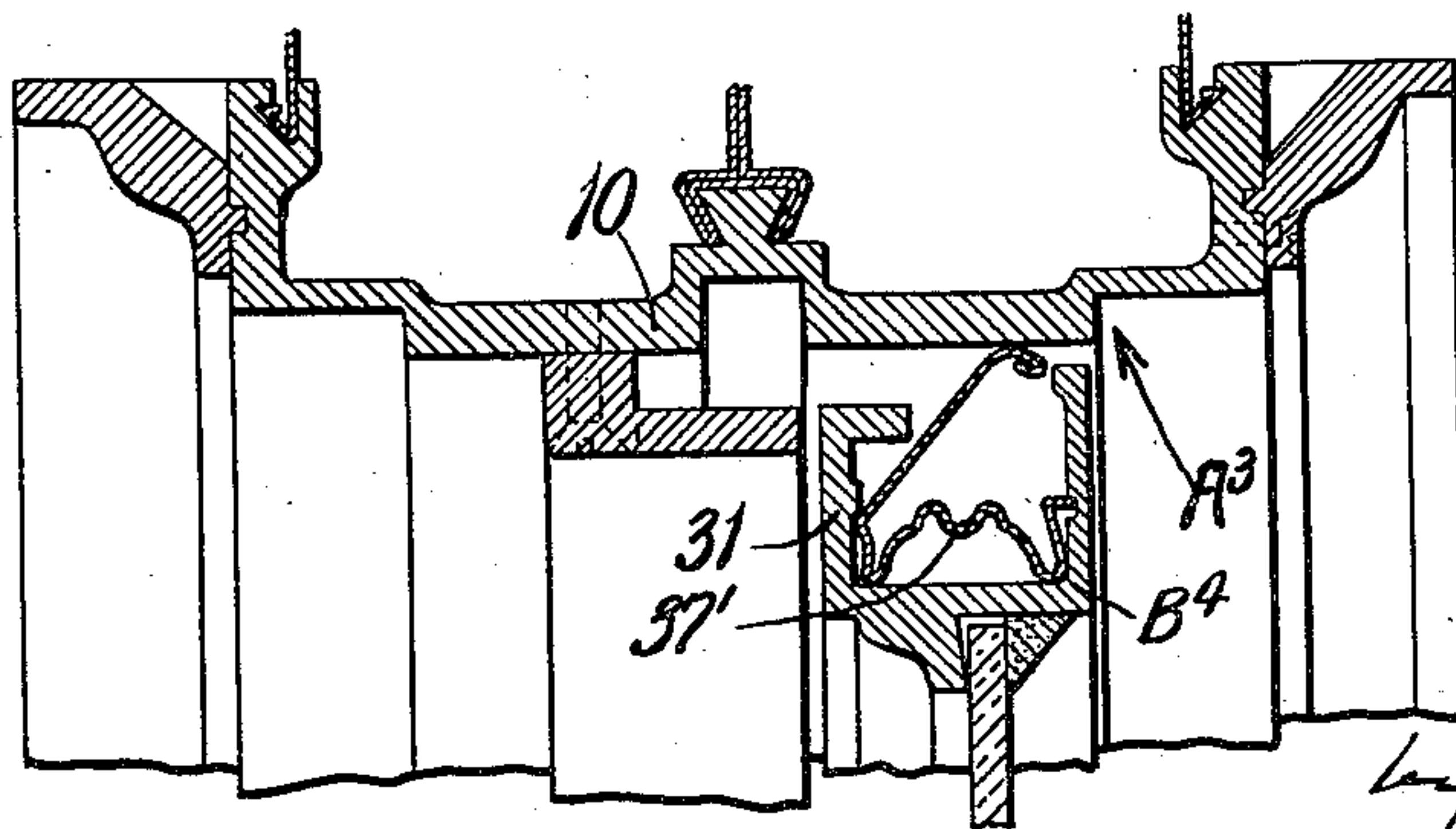


Fig. 8.



INVENTOR:
ALFRED M. LANE,

by *Carstensen*,
HIS ATTORNEYS.

Patented Mar. 20, 1928.

1,663,134

UNITED STATES PATENT OFFICE.

ALFRED M. LANE, OF ST. LOUIS, MISSOURI.

METAL WINDOW CONSTRUCTION.

Application filed July 16, 1925. Serial No. 43,902.

This invention relates to metal windows. The principal objects of the present invention are to produce a strong, rigid, lightweight metal window of simple construction and pleasing appearance which can be cheaply manufactured; to reduce the number of parts of the window, and to provide for the easy assemblage of these parts to form window casing and sashes of accurate dimensions and of such cross-sectional shape that they will readily accommodate metal weather strips and render easy the application of such strips thereto; to utilize parts of the same cross-sectional shape and dimensions for most of the framing members of the windows of different types; and to provide members adapted to serve as combined window stops and screen supports for said windows.

The invention consists principally in the metal window constructions hereinafter shown and described; and it also consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

In the accompanying drawings which form part of this specification and wherein like symbols refer to like parts wherever they occur,

Fig. 1 is a vertical cross-section through a metal window of the double-hung sliding-sash type conforming to my invention;

Fig. 2 is a horizontal section through one side of the window frame and the adjacent portion of the upper sash, the section being taken on the line 2—2 in Fig. 1;

Fig. 3 is a fragmentary side view of one corner of the window frame, showing the manner of securing together at the corners of said frame the adjacent ends of the framing members thereof;

Fig. 4 is an edge view of said corner portion of said frame;

Fig. 5 is a vertical cross-section through a window of the reversible ventilator type, the sash being shown partly open;

Fig. 6 is a horizontal section through one side of said window on the line 6—6 in Fig. 5, the sash being shown in closed position;

Fig. 7 is a vertical section through a double casement window;

Fig. 8 is a horizontal section through one side of said window on the line 8—8 in Fig. 7; and

Fig. 9 is a horizontal section through the

meeting rails of the sashes of said double casement window.

Referring to Figures 1 and 2 of the accompanying drawings, the invention is illustrated in connection with a window of the double-hung sliding-sash type. Said window comprises a window casing arranged for vertically sliding upper and lower sashes B and B¹, respectively, wooden parting strips C and metal inside and outside stops or mouldings D. The window casing or frame A is made up of one-piece metal side, head and sill members. The side and top members 10 are of the same cross-sectional shape and size, each of said members comprising side marginal flanges 11 connected by a web portion 12. The web portions of the framing members 10 are provided with grooves or channels 13, which extend longitudinally from end to end thereof and are adapted to receive the parting beads or strips C.

The end faces of the side marginal flanges 11 of the framing members 10 are provided with undercut grooves 13' which extend longitudinally of said flanges from end to end thereof; and the webs of said members are provided at their middle portions with undercut ribs 14 which are disposed on the flanged side of said web and extend from end to end thereof. Doubly-channeled sash weight boxes 15 have side marginal flanges 16 provided with undercut ribs 17 adapted to slidably engage the undercut grooves 13' in the framing members 10 that form the jamb members of the window casing; and the webs 18, which separate the two channels, are formed with undercut grooves 19 adapted to slidably engage the undercut ribs 14 on said jamb members. By this arrangement, the members 10 and 15 can be readily assembled to form completely enclosed boxes for the sash weights and pulleys. The members 15 are preferably made from a single piece of sheet metal which is longitudinally folded to the shape desired.

The top and side framing members 10 of the window casing A are also provided at their inner and outer corners with rectangular recesses or rabbets 19' adapted to receive the inside and outside stops or mouldings D which are removably secured in position by means of screws 20. The bottom frame or sill member 20' of the window casing A is of slightly different cross-sectional shape, said member comprising a sloping web portion,

a depending outer marginal flange and an upstanding rib portion adjacent to the ends of the inner margin of the other sill which serves as a stop for the bottom rail of the lower sash.

The stops or mouldings D are shown in the form of metal strips of substantially H-shaped cross-section; that is, each strip is provided on each side with a channel, either one of which is adapted to serve as a slide for a window screen (not shown). As shown in the drawing, one channel 23 of the strip is of greater depth than the other channel 24 thereof; and the strips forming the slideways for the screen are preferably arranged so that the shallow channel of one strip faces the deep channel of the opposite strip. As the width of the screen is greater than the distance between the edges of the opposing channel-shaped slideways, the greater depth of one slideway enables the screen to be readily placed in position by placing one edge thereof in the deep slideway, and swinging the opposite edge inwardly towards the opposite shallow slideway to clear the edge thereof. The screen may then be shifted laterally to bring said opposite edge into the shallow slideway.

The framing members 25, which form the side rails of the upper and lower sash B and B¹, are of the same cross-sectional size and shape. Each of the members 25 comprises side marginal flanges 26 connected by a web portion. The outer marginal portions of the adjacent side marginal flanges of the upper and lower sashes are offset laterally away from the parting bead C and are formed with integral undercut bead or rib portions 28 which extend from top to bottom thereof. These undercut ribs or beads have a sliding fit in undercut grooves formed near one margin of resilient metal weatherstrips 29 whose opposite margins are clamped to the jamb members of the window casing by means of the stop strips C. The grooved margins of said weatherstrips are extended in the direction of the jamb members of the window frame to form a flange portion 30, which extends between the adjacent sides of the parting strips and the walls of the grooves provided therefor in said jamb members. It is noted that this arrangement permits the sashes to be loosely fitted in the window frame while preventing draft and keeping out dust and water.

The framing members 31, which form the top rail of the upper sash and the bottom rail of the lower sash, are of the same cross-sectional size and shape. Each of said members comprises side marginal flanges 32 connected by a web portion, one of said side marginal flanges being shorter than the opposite side marginal flange and terminating in the laterally extended portion 32' which projects toward said opposite flanges. The

lower or meeting rail 33 of the upper sash B comprises a framing member of substantially inverted channel-shaped section, whose inner marginal flange is provided with an upwardly extending flanged portion 34 spaced away from said flange far enough to accommodate the free end of a resilient metal weatherstrip 35. The top or meeting rail of the lower sash B¹ comprises a channel-shaped member 36 whose channel is closed by means of a horizontal plate 37 whose inner margin fits in a groove provided therefor in the rear flange of the meeting rail. The outer margin of the plate 37 has a depending flange 38 which rests on a shouldered portion of the outer marginal flange of the meeting rail and is removably secured thereto by means of screws 39. The weatherstrip 35 is clamped between the depending flange 38 of the top plate 39 and a shoulder provided therefor in the front marginal flange of the meeting rail and is thus adapted to move with the lower sash when the same is raised and lowered. The framing members of the sashes have their web portions offset to form rabbets adapted to accommodate the marginal edges of sash panes 39', said panes being held in place by putty, in accordance with common practice.

As shown in Fig. 1 of the drawings, the joint between the top rail of the upper sash and the head member of the casing and the joint between the bottom rail of the lower sash and the sill member of said casing are rendered weather-proof and dust-proof by means of metal weatherstrips 37'. These metal weatherstrips preferably comprise reversely bowed side marginal flanges 38' connected by transversely curved or bowed web portions. The strips are adapted to be sprung in the channels of the framing members 31 and have resilient sealing flanges or tongues 33' adapted to bear against the adjacent faces of the window frame and thus seal or close the joints therebetween. A great practical advantage of the construction just described is that it minimizes time and expense in applying the weatherstrip by eliminating the necessity of altering the sash or frame and by enabling the strip to be readily applied without the use of separate fastening members.

At the corners of the window frames and sash frames, the adjacent ends of the side flanges of the framing members thereof are beveled and are disposed with their beveled ends in abutting relation. The web at one end of a framing member overlaps the adjacent end of the web of the other framing member and is provided with apertures 40 adapted to receive tongues or fingers 41 which project from the end of said other framing member. The overlapping portion of the framing member that receives the extensions

41 of the other framing member has a wedge 42 extending therethrough in position to bear against said extension 41, which are also provided with openings adapted to receive wedges 43. By this arrangement, the beveled ends of the frame members of the window frames and sash frames are tightly drawn together to form rigid corners which prevent distortion of said frames.

10 It is noted that the manner of assembling the window and sash frame permits shipment of said frames in knocked-down form and enables the frame to be quickly and easily assembled at the place of use without the difficult and expensive operation of crimping, welding or riveting the parts.

15 The window shown in Figures 5 and 6 of the accompanying drawing is of the reversible ventilator type, said window comprising a metal window casing or frame A¹ having a metal sash B³ mounted therein for vertical sliding and vertical swinging movement. In this type of window construction, the framing members 10 form the head and both jamb members of the casing A¹; and a separate inverted channel-shaped framing member 44 having a downwardly offset web portion, forms the sill member thereof. The sash B³ is made up of the 20 channel-shape framing members 31, which are secured together in the manner shown in Figures 3 and 4. The upper corners of the sash are pivotally secured, by means of brackets 44', to blocks 45 that are slidably mounted in the channels 13 of the framing members 10 of the window casing. The slide blocks 45 are retained in the channels 13 by means of metal strips 46 that are removably secured to the members 10 adjacent to said channels and project across the same. The weatherstrips 37' are sprung into the channels of the frame members 31 of the sash B³ and thus serve to weatherproof the window.

45 The window construction shown in Figures 7 to 9, inclusive, is of the double-casement type and comprises a metal window casing or frame A² and two vertically pivoted metal sashes B⁴ pivoted to the jamb members of the window frame by means of hinges 47. In this type of window construction, the framing members 10 form the head and jamb members of the window casing A², and the sill member 44, shown in 50 Figure 5, forms the sill member thereof. The framing members 31 form the inner, top and bottom rails of the sashes B⁴, and separate members 48 form the meeting rails thereof. These meeting rails comprise framing members of substantially channel-shaped section and are arranged so that their outer flanges overlap in the closed position of the sashes. The outside flange of one meeting rail is provided with an inwardly extending flange 49, and the inside

flange of the other meeting rail is provided with an outwardly extending flange 50. The flanges 49 and 50 of the two meeting rails are adapted to overlap in the closed position of the sashes and thus cover the joint therebetween. The metal weatherstrips 37' are sprung into the channels in the framing members of the sashes B⁴ and thus serve to weatherproof the joints between the meeting rails of the sashes and the joints between said sashes and the window frame.

It is noted that the herein described arrangement permits a maximum number of framing members of the same cross-sectional size and shape to be used with windows of different types and reduces to a minimum the number of specially formed framing members required for each type of window. It also permits windows of different types to be combined in the same opening by using side and head framing members of the same cross-section, the shape of the sill member depending upon the manner of mounting the sashes.

It is also noted that the frame members of the sash and window frames are of such cross-sectional shape that they cannot be formed by a rolling or pressing operation. However, these members are well suited for production by extrusion. By such process, the metal, which is usually heated to a fairly plastic condition, is forced under high pressure through an aperture of the shape to be produced. By resorting to this extrusion process, parts of unusual cross-section can be produced cheaply. On account of the high pressure under which the metal is extruded, its structure becomes more compact and its strength is increased. The surfaces of said metal are smooth and free from flaws or other defects. The dimensions of such extruded shapes can be gaged with great accuracy so that they can be used directly without additional finishing. The use of extruded aluminum parts is preferable by reason of their light weight and their resistance to rust and corrosion.

Obviously, numerous changes may be made without departing from the invention and I do not wish to be limited to the precise constructions shown.

What I claim is:

1. A metal window framing member of substantially channel-shaped section, the web of the channel being formed with a longitudinal recess and an undercut rib and the flanges thereof being formed with undercut grooves.

2. A metal window framing member of substantially channel-shaped section, one flange of said channel being of less depth than the other flange thereof terminating in a flange portion which extends in the direction of said other flange.

3. A window frame comprising metal jamb members, and hollow metal sash weight casings, said jamb members and said casings having interfitting undercut tongue and groove portions for connecting them together.
4. A window frame comprising hollow one-piece metal jamb members of the same cross-sectional size and shape, and hollow metal sash weight casings, said jamb members and said casings having interlocking undercut groove and rib portions forming slidable connections therebetween.
5. A window frame having slideways, a sash slidably mounted in said slideways and having integral rib portions near one edge thereof, and resilient metal weatherstrips secured to said frame and having grooved portions cooperating with the integral ribs on said sash.
6. A metal window comprising a window frame and a sash frame therein, the sash frame comprising one-piece metal framing members of substantially channel-shaped section, and resilient weatherstrips adapted to be sprung into said channels and having resilient sealing flanges adapted to seal the joints between said window frame and said sash.
7. A metal window stop comprising a strip of metal of substantially H-shaped section.
8. A metal window stop or moulding comprising a strip of metal having channels on its opposite sides, the channel on one side of said strip being of greater depth than the channel on the opposite side thereof.
9. A metal window comprising a metal window frame having slideways, metal sashes mounted in said slideways, and having integral rib portions near one vertical edge thereof, resilient metal weatherstrips secured to the jamb members of said frame along one margin and having grooved free marginal portions cooperating with the ribs on said sashes, one horizontal rail of a sash being formed with a channel, and resilient metal weatherstrips adapted to be sprung into said channels and having resilient sealing flanges adapted to engage the window frame in the closed position of said sashes.
10. A double casement window comprising a metal window frame, and a pair of metal sashes mounted in said frame for horizontal swinging movement, said metal sashes comprising top, bottom, inner-side and meeting rails of substantially channel-shaped section, said meeting rails having portions adapted to overlap in the closed position of said sashes, and resilient metal weatherstrips mounted in said sash rails, said weatherstrips having resilient sealing flanges adapted in the closed position of said sashes to yieldably engage the head, jamb and sill members of the window frame and the opposing surfaces of the meeting rails of said sashes.
11. A metal frame comprising metal framing members of substantially channel-shaped section, adjacent members at each corner of said frame being arranged with the web of one member extending across the web of the other member and provided with two openings, said other member having an apertured extension extending through one of said openings, and wedges extending through the other of said openings and said apertured extension and bearing against the adjacent webs of said framing members for rigidly holding said members together at the corners of said frame.
12. A double hung window comprising a frame and metal upper and lower sashes slidably mounted therein, the meeting rail of the lower sash being of substantially channel shaped cross-section, a removable plate for covering said channel, and a weather strip having one margin clamped between one edge of said channel and said cover plate and a depending free marginal portion adapted to cooperate with a groove provided therefor in the meeting rail of said upper sash.
13. A metal sash weight casing comprising a doubly channeled member whose side marginal portions are provided with undercut ribs, the portion between said channels being provided with an undercut groove.
14. A window frame having a slideway, a sash mounted in said slideway and having integral rib portions near the side edges thereof, and metal weatherstrips secured to said frame and adapted for slidable engagement with the integral ribs on said sash.
15. A metal window comprising a metal window frame, a sash mounted therein for vertical sliding and vertical swinging movement, the sash opposing surfaces of the jamb members of said frame being provided with longitudinal grooves, slide blocks in said grooves, means for pivotally connecting said sash with said slide blocks, and members secured to said jamb members adjacent to the longitudinal grooves therein, said members having portions which cover the longitudinal grooves in said jamb members and constitute stops for limiting the inward swinging movement of the sash and means for retaining the slide blocks in the grooves in said jamb members.

Signed at St. Louis, Missouri, this 10th day of July, 1925.

ALFRED M. LANE.