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PATENTED JAN. 24, 1905.

P. A. TRACY.
METALLIC WINDOW FRAME AND SASH.
APPLICATION FILED APR. 15, 1904.

3 SHEETS—SHEET 1.

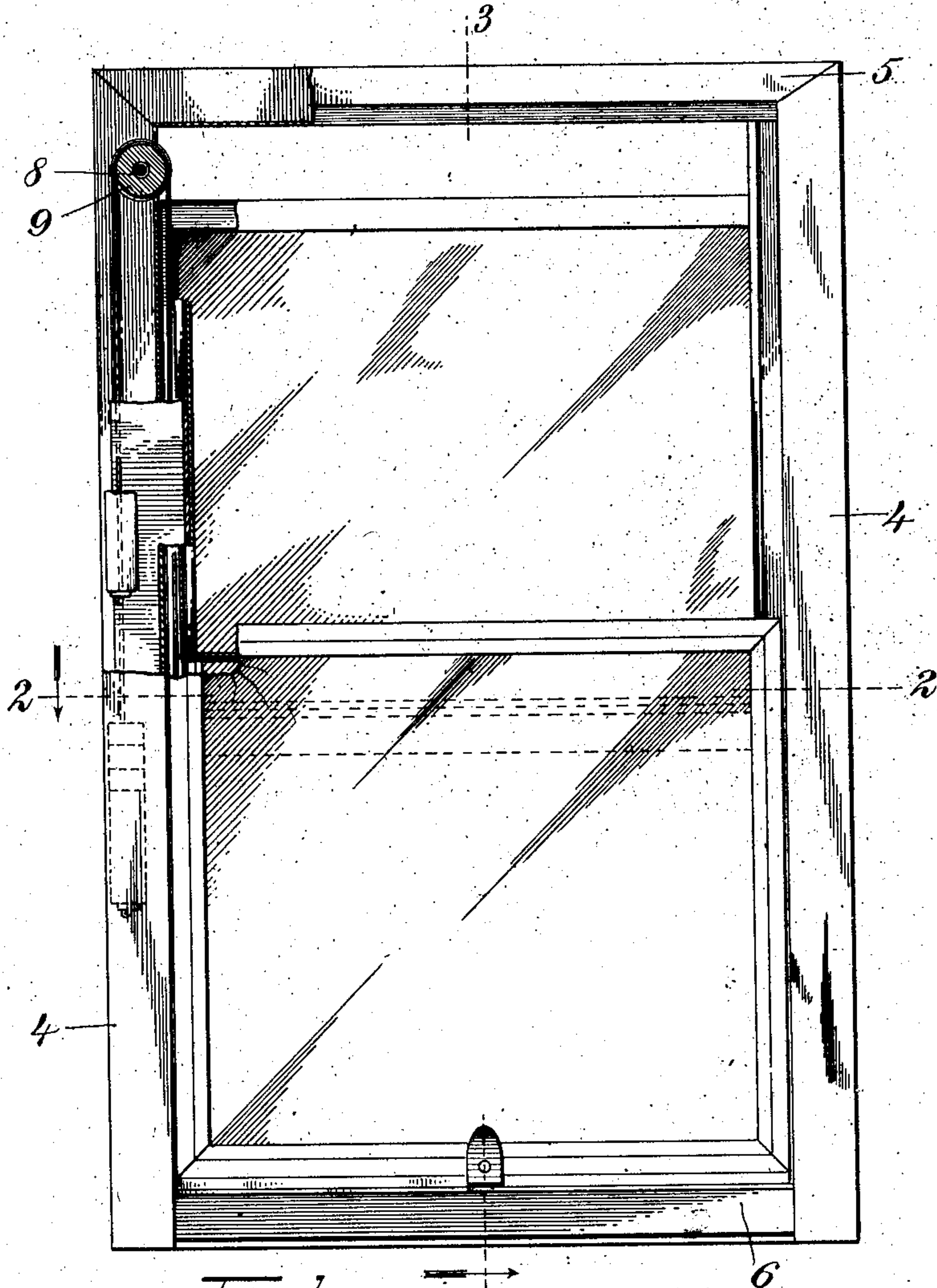


Fig 1

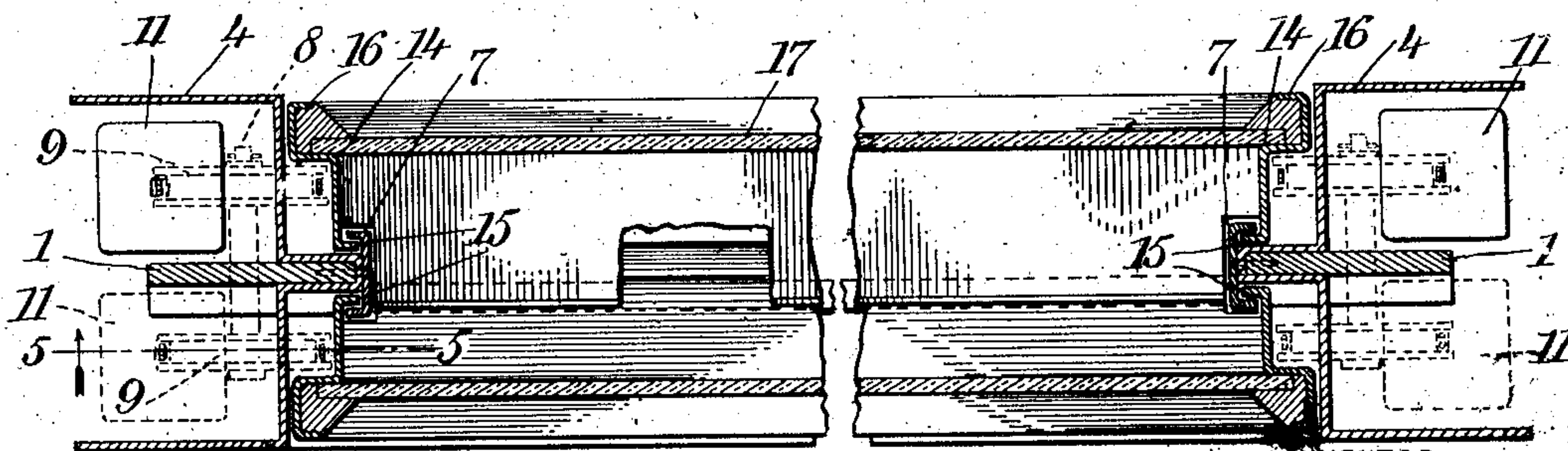


Fig 2

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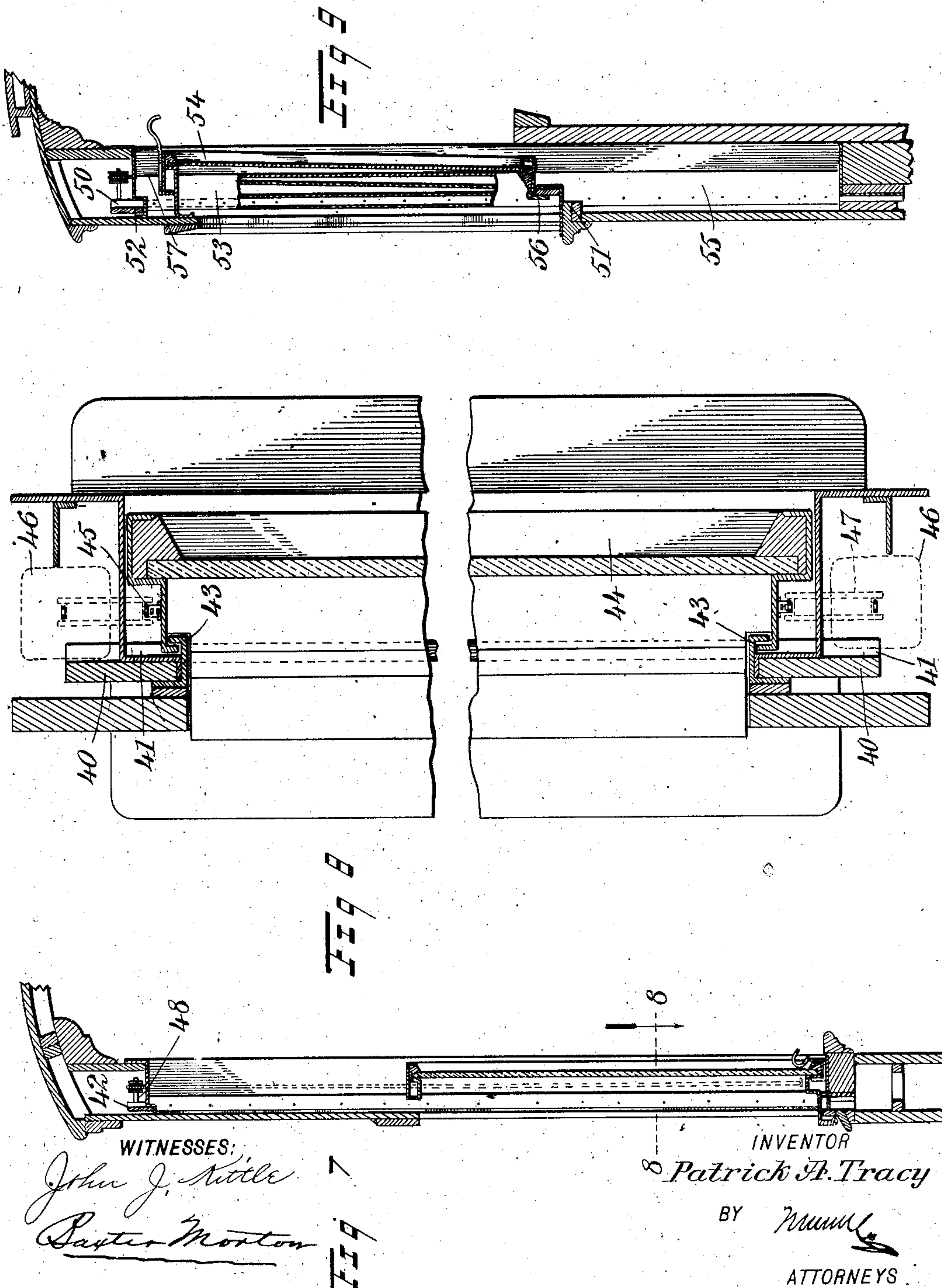
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3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

PATRICK AUGUSTINE TRACY, OF NEW YORK, N. Y.

METALLIC WINDOW FRAME AND SASH.

SPECIFICATION forming part of Letters Patent No. 780,840, dated January 24, 1905.

Application filed April 15, 1904. Serial No. 203,344.

To all whom it may concern:

Be it known that I, PATRICK AUGUSTINE TRACY, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Metallic Window Frame and Sash, of which the following is a full, clear, and exact description.

This invention relates to metallic window sashes and frames, and has for its object, the provision of a thoroughly-fireproof window-frame and sashes cooperating therewith of durable and simple construction, in which the parts are so designed and arranged that the window-frame occupies a minimum amount of space and is adapted for use under a great variety of conditions.

With the object above stated and others of minor character in view, as will appear when the invention is fully disclosed, the same consists in the novel construction, combination, and arrangement of parts hereinafter fully described and having the novel features thereof specifically pointed out in the appended claims, it being understood that various changes in the exact form of the elements of the invention and of their mode of assemblage may be made without departing from the spirit thereof.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a view chiefly in elevation, but partly in section, taken from the inside of the window. Fig. 2 is a horizontal sectional view upon the line 2 2 of Fig. 1 looking in the direction indicated. Fig. 3 is a vertical sectional view upon the line 3 3 of Fig. 1 looking in the direction indicated. Fig. 4 is a side elevational view of the window, showing the sash-weights and the guides in which they are arranged to travel. Fig. 5 is a sectional detail view showing the position of one of the sash-weight pulleys in the window-frame. Fig. 6 is a fragmentary horizontal sectional view through a double window having a mullion. Fig. 7 is a vertical sectional view through

a portion of a car and a window having a single sash, which is arranged to open by upward movement. Fig. 8 is a transverse sectional view upon the line 8 8 of Fig. 7, the view being taken upon a much larger scale than Fig. 7; and Fig. 9 is a vertical sectional view through a portion of a car and a car-window having a single sash adapted to open by downward movement.

In a window constructed in accord with this invention the window-frame is made up of a skeleton frame and a casing supported thereby to conceal the sash-weights and afford guideways for the movement of said weights. The skeleton frame consists, preferably, of vertical side members 1 1, a top cross-piece 2, and a bottom cross-piece 3, the side members and the cross-pieces being all arranged in the plane of the window, as best seen in Fig. 3. The casing carried by the skeleton frame includes side members 4 and top and bottom members 5 and 6, respectively. The side casing members 4 4 are secured upon the side members 1 1 of the skeleton frame, and each of the members 4 4 projects outward and inward from the side member 1 of the skeleton frame upon which it is secured, forming guides for the sash-weights, as above stated. The top member 5 of the window-frame casing is similar in structure to the side members 4 4, but varies somewhat in dimensions from the side members, as shown in Fig. 3. The bottom member 6 of the window-frame casing covers the cross-piece 3 at the bottom of the skeleton frame upon its outer face and extends inward at both the top and bottom of the said cross-piece. The inward extension at the top of the cross-piece 3 forms a sill 6^a for the window-frame, and the inward extension at the bottom of the cross-piece 3 is upturned slightly to hold the casing member 6 in association with the skeleton frame member 3.

The side uprights 1 1 of the skeleton frame of the window project forward to a considerable extent and serve as the parting-beads which separate the window-sashes. These parting-beads are each provided with a channel-bar 7, which is rigidly secured in position, as shown in Fig. 1, projecting both inward

and outward from the parting-bead and presenting at its margins rearwardly-disposed flanges which engage with coacting flanges upon the window-sashes to hold the latter in proper relation to the window-frame.

At each side of the window-frame near the top a shaft 8 is mounted in horizontal position in one of the side pieces 1 of the skeleton frame, and near each end of each of the shafts 8 a grooved pulley 9 is rotatably mounted. The grooved pulleys 9, mounted upon the shafts 8, have light chains 10 or other flexible members arranged to travel thereover to support the sash-weights 11 and the upper and lower sashes 12 and 13, respectively. The shafts 8, upon which the pulleys are mounted, are so situated in the side members 11 of the skeleton frame that the pulleys 9 project forward from the casing members 44 of the window-frame to a considerable extent, suitable openings being provided in the casing members 44 for that purpose.

The upper sash 12 and the lower sash 13 of the window are somewhat similar in construction, each having its sides composed of angle-bars 14 of peculiar cross-section, each of said bars 14 being provided at one margin with a flange 15 for engagement with one of the marginal flanges of one of the channel-bars 7, mounted upon the parting-beads of the window-frame, and being provided at its other margin with a flange 16 to afford a seat for the putty or other plastic material by means of which the glass 17 is retained in the sash. Adjacent to its flange 15 each of the side members 14 of the window-sashes is spaced at a sufficient distance from the adjacent side member 4 of the window-frame casing to permit the free rotation of the corresponding pulley 9 without interference from the window-sash. The space provided in this way also permits the extension of the chains 10 downward to the bottoms of the sashes, by which arrangement the sashes are caused to move more readily within the window-frame.

The bottom of the upper sash 12 and the top of the lower sash 13 are made up of reversely-arranged angle-bars 18 and 19, which are of precisely similar cross-section, each being provided at one margin with a flange to cooperate with the flange upon the other bar to form an air-tight joint when the window is closed. The bottom of the upper sash is preferably strengthened, especially when the window is one of considerable width, by a reinforcing-bar 20, arranged beneath the bottom member 18 of that sash. The top of the upper sash 12 is an angle-bar 21, which is somewhat narrower than the bottom member 18 to permit the sash to pass upward into the space outside of the rib formed along the middle of the under surface of the top member 5 of the window-frame casing. The bottom of the lower sash 13 is an angle-bar 22 of peculiar

cross-section, which is provided at its outer margin with a downwardly-disposed curl 23, which engages with the outer face of the window-sill to form an air-tight joint therewith, thus serving as a weather-strip. The member 22 is preferably reinforced by a bar 25 arranged beneath it, and a hook 24 or other device of similar character is preferably attached to the lower sash at the bottom to afford a handhold in raising the sash.

In the mullioned window illustrated in Fig. 6 the structure is precisely the same as that above described, except as regards the mullion, which is designated as 30. The mullion is formed around the adjacent parting-beads of the two window-sections, and the casing of the mullion is formed by simply connecting two of the casing members 4, so as to form a single casing sufficiently large to receive and guide four sash-weights. The adjacent side members of the two window-sections are spaced a slight distance apart, as shown, to permit free access to the weights inclosed in the casing of the mullion, and an opening 31 is formed in the casing of the mullion for the same purpose.

From the foregoing description and the drawings illustrative of the invention it will be seen that I am enabled to dispense with all beads upon the window-frame except the parting-bead and that the dimensions of the frame-casing members are determined by the form and dimensions of the sash-weights. The casing members are merely made large enough to permit the free movement of the sash-weights within the spaces afforded on both sides of each parting-bead.

As the window-sashes and all parts of the window-frame are constructed wholly of metal, the structure is perfectly fireproof and is also characterized by superior hygienic qualities, there being no crevices between wooden surfaces to facilitate the development of disease-germs therein. Comparatively few interstices are left in the window structure of the kind described in this application, and these interstices being between metallic surfaces or between surfaces of glass and metal any bacteria which may lodge therein do not multiply, but are soon destroyed, as it is well known that bacteria do not survive for considerable periods upon glass or metal surfaces.

A special feature of the window construction which forms the present invention is found in the complete exclusion of air and moisture by the window when closed. It will be noted that the marginal flanges of the sashes coact with the flanges of the channel-bars on the parting-beads of the window-frame to form lapped joints, and in like manner the top and bottom members of the lower and upper sashes, respectively, lock to form a lapped joint. The upper sash when raised to its fullest extent fits in a recess at the up-

per part of the frame, as shown in Fig. 3, and the lower sash member when it rests upon the window-sill forms an exceedingly close joint therewith on account of the engagement of the curl 23 at the outer margin of the bottom member of the sash with the outer face of the window-sill.

In the foregoing paragraphs I have described the invention as embodied in windows adapted primarily for buildings and each having at least two sashes. It is obvious, however, that the invention may be embodied in windows having a single sash only and that such windows may be used to advantage in railway and tram cars. Windows of these types are illustrated in Figs. 7, 8, and 9, both the upwardly and downwardly opening types being illustrated.

Referring to Figs. 7 and 8, 40 designate the side members of the frame for a window which opens by the upward movement of the sash. 41 designates the sill, which is secured upon the inner faces of the two side members of the frame, and 42 designates the top or head piece. At the inner edges of the two side pieces 40 I provide channel-bars 43, as in the forms of windows already described; but as a single sash only is provided in the window now to be described the channel-bars 43 are so fixed upon the side members 40 of the window-frame that one of the flanges of each channel lies in contact with the side member to which the channel-bar is secured, and the other flange only is spaced from the side member to serve as a guide and retainer for the sash, which is designated 44. The sash 44 is, in general, very similar to the sashes already described and is supported by chains 45, connected with counterweights 46, the chains being passed over pulleys 47, supported upon shafts 48, mounted in the side members of the window-frame.

In the form of window shown in Figs. 7 and 8 the side members of the window-frame are extended upward a considerable distance above the normal position of the sash, so that the window may be raised by sliding the sash upward into the space left for that purpose, and when raised the sash will be sustained in any position by means of the counterweights 46.

In Fig. 9 a window is illustrated in which the frame is composed of side members 50, a sill 51, and a top piece 52. The side members 50 are provided with channel-bars 53, and the sash 54 is arranged to slide downward from its normal position into a pocket 55, provided to receive it. In order to hold the sash in its normally closed position, the channel-bars 53 have the flanges thereof that engage with the sash spaced at a considerable distance from the side members 50 of the frame to permit the sash to have a certain amount of play to and fro in the frame, and

the sash is provided at the bottom with a flange 56, which is adapted to engage with the front or outer face of the sill of the frame. In order to lower the sash to open the window, it must be raised slightly, and space is provided at 57 to permit this initial upward movement by means of which the flange 56 is lifted above the sill 51 and the inward movement of the sash to permit it to pass downward into the pocket 55 is made possible. When the sash is raised slightly and drawn inward from its normal position, it lies in a vertical plane and may be easily lowered into the pocket 55; but when the window is closed the sash is swung slightly forward or outward at the bottom, causing it to occupy the oblique position shown in Fig. 3. In this form of window the sash is supported by chains attached to counterweights and passing over the pulleys in precisely the same way as shown in Figs. 7 and 8. Hence further description thereof appears to be unnecessary.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with a skeleton window-frame, comprising vertical side members and horizontal top and bottom members, all of said members being disposed substantially in the plane of the frame, of a casing secured to the skeleton frame, said casing presenting guideways for sash-weights upon both the inside and outside of said frame, a transversely-disposed shaft secured in the upper portion of each side member of said skeleton frame, and a pair of pulleys mounted upon each of said shafts upon opposite sides of the frame member in which the shaft is secured, said pulleys being disposed in the guideways for the sash-weights.

2. The combination with a metallic window-frame having a parting-bead provided with backwardly-turned and longitudinally-disposed flanges, of sashes having flanges extending between the flanges upon the parting-bead to hold said sashes in proper relation to the window-frame.

3. The combination of a skeleton window-frame, comprising vertical side members and transverse top and bottom members, all of said members being disposed substantially in the plane of the frame, said side members of the frame constituting a parting-bead, a casing applied to said skeleton frame, sashes slidably arranged upon the inside and outside of said skeleton frame, and members carried by the side members of the skeleton frame and coacting with portions of said sashes to hold said sashes in proper relation to said skeleton frame and said casing.

4. The combination with a metallic window-frame, of a casing covering said frame and projecting inward and outward therefrom, sashes slidably mounted upon both the inside and outside of said frame which furnishes a

parting-bead, said sashes being provided with
longitudinally - disposed flanges and having
their faces flush with the faces of said casing,
and flanged strips secured upon the side mem-
5 bers of said frame and coacting with the flanges
upon said sashes to hold the sashes in proper
relation to said frame.

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

PATRICK AUGUSTINE TRACY.

Witnesses:

WILLIAM S. CONNELL,
EDWARD L. MIDDLETON.