

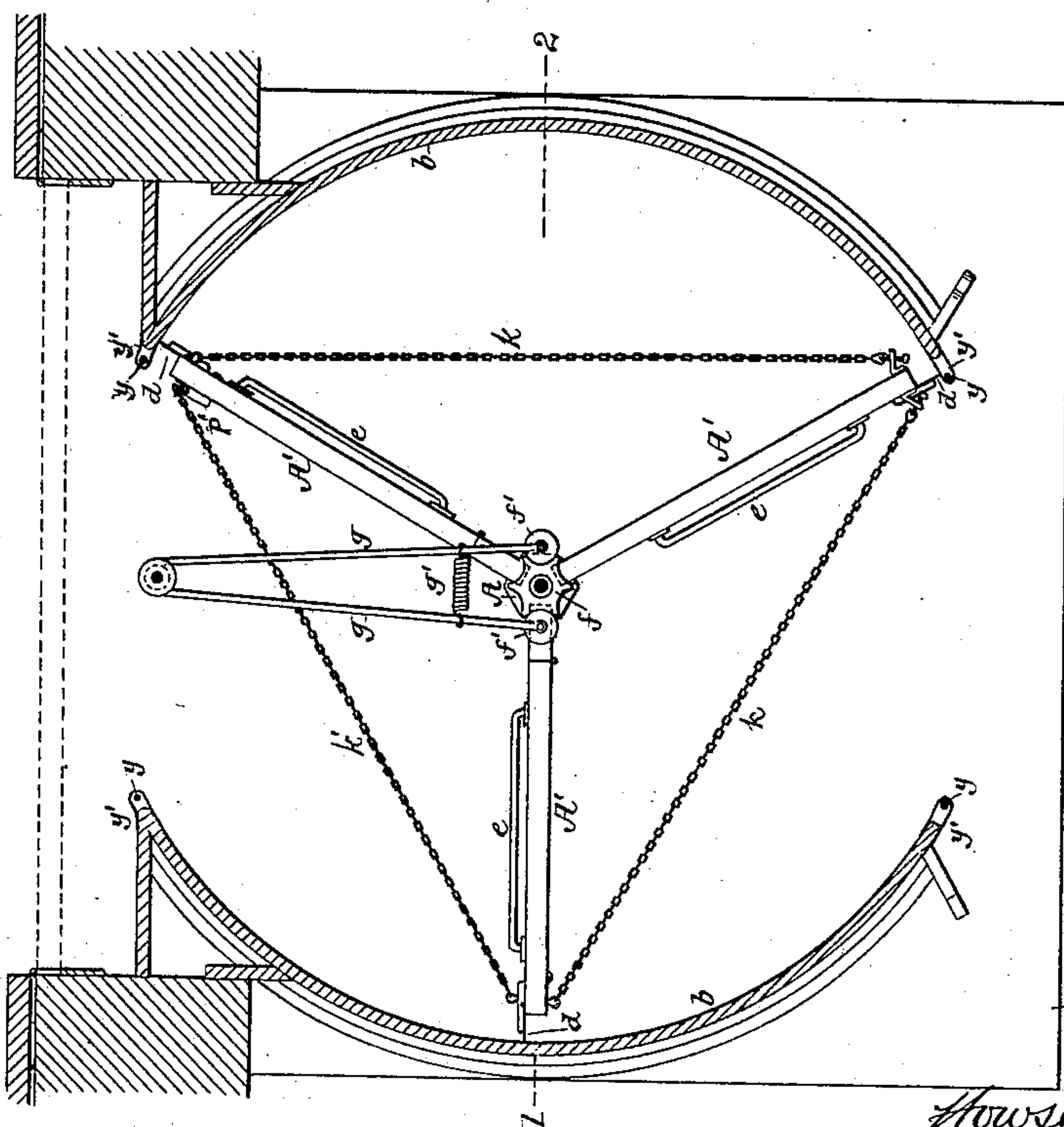
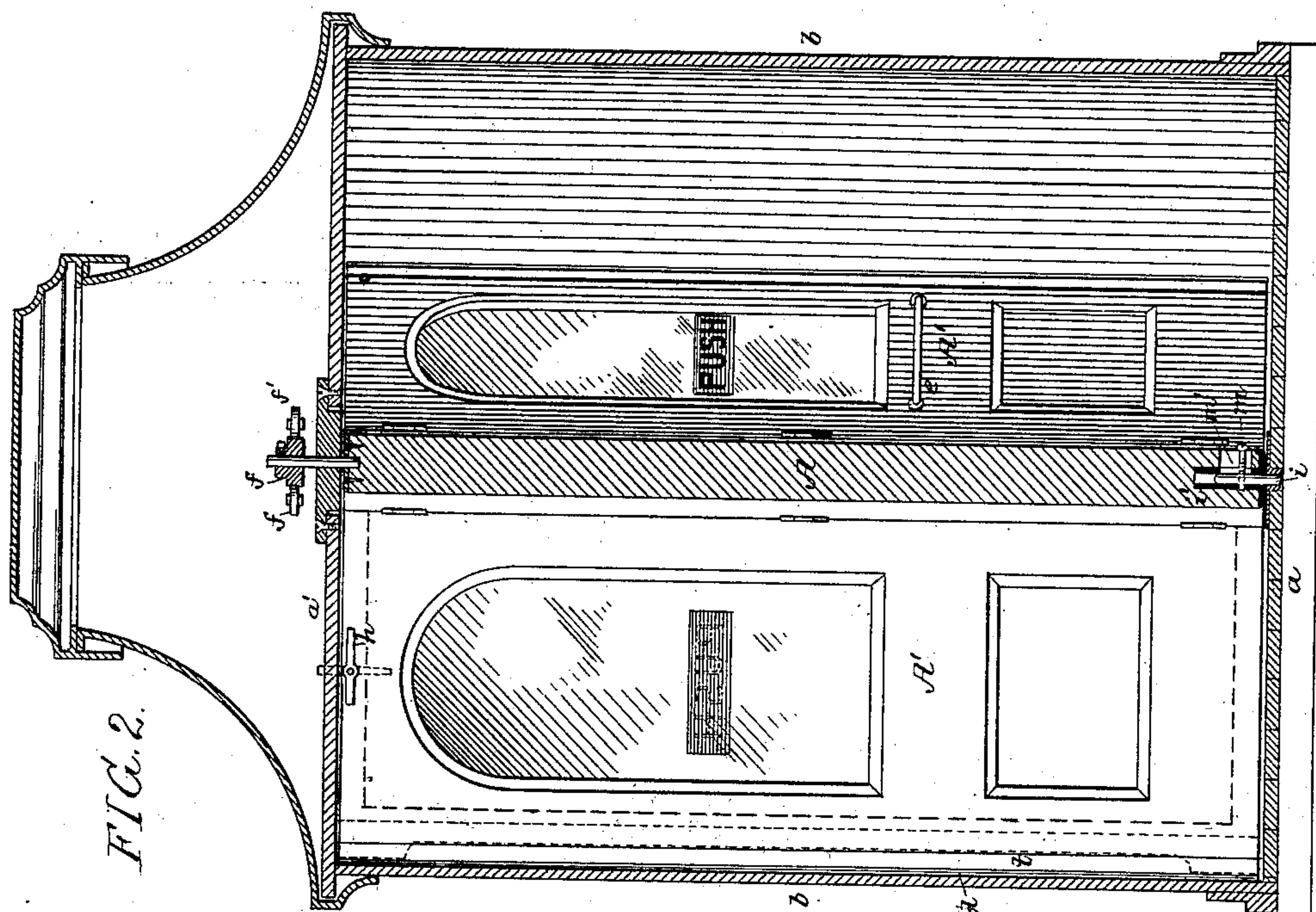
(No Model.)

2 Sheets—Sheet 1.

T. VAN KANNEL.
STORM DOOR STRUCTURE.

No. 387,571.

Patented Aug. 7, 1888.



Witnesses:
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Inventor:
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by his Attorneys

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FIG. 3.

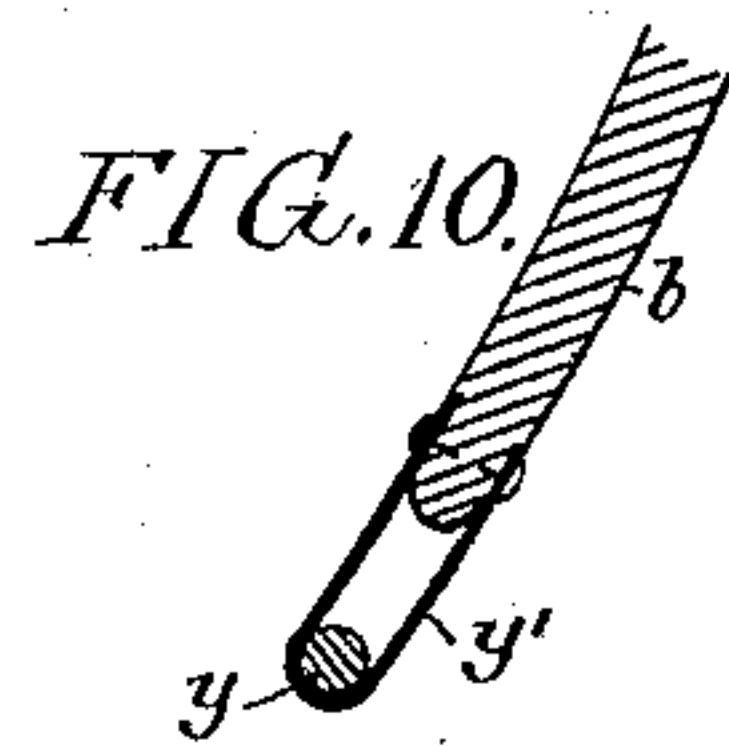
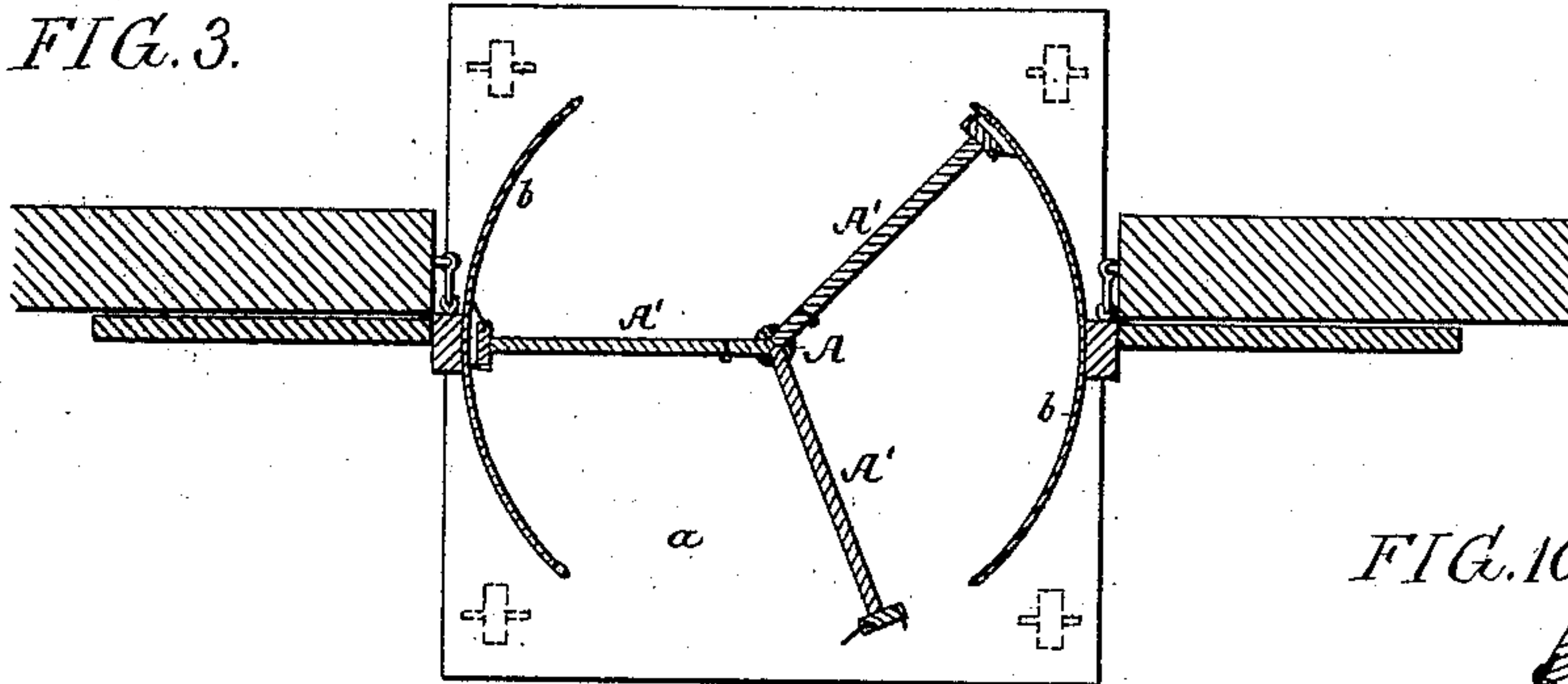


FIG. 6.

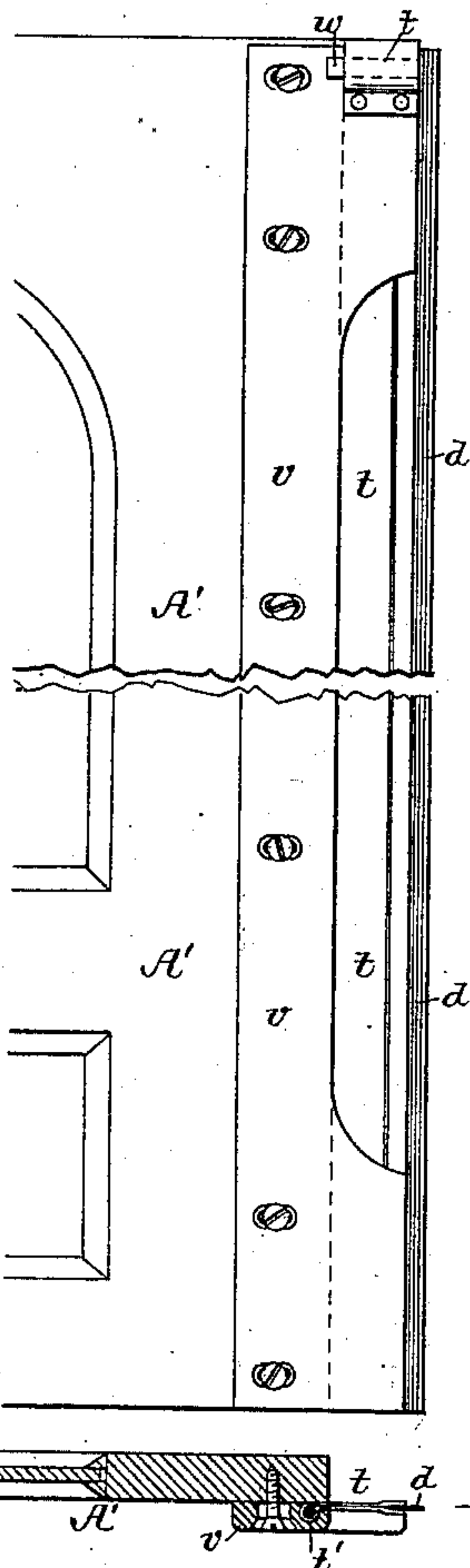


FIG. 7.

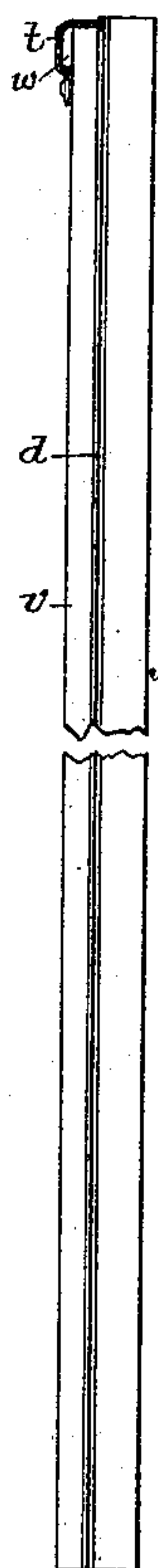


FIG. 5.

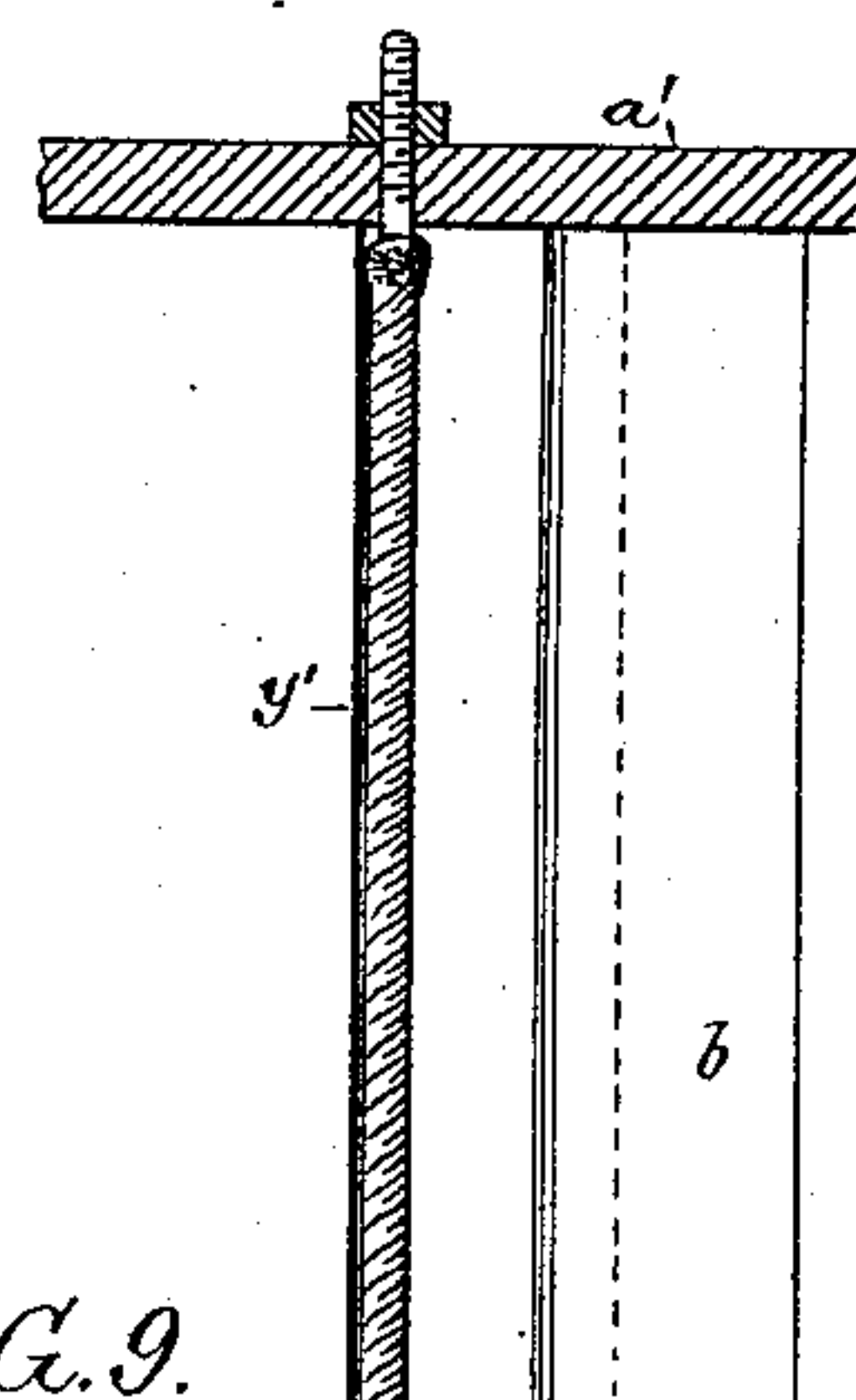
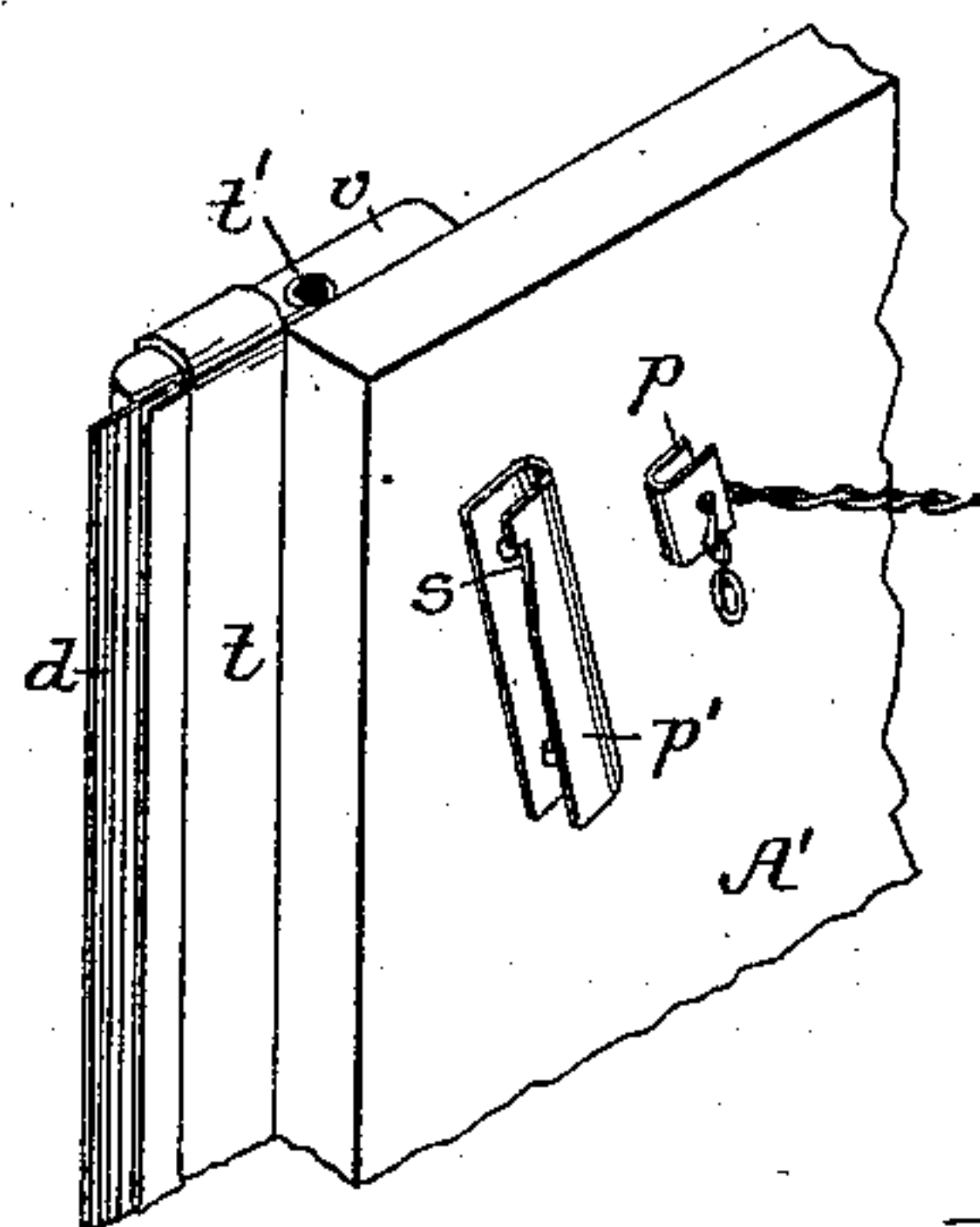


FIG. 9.

FIG. 4.

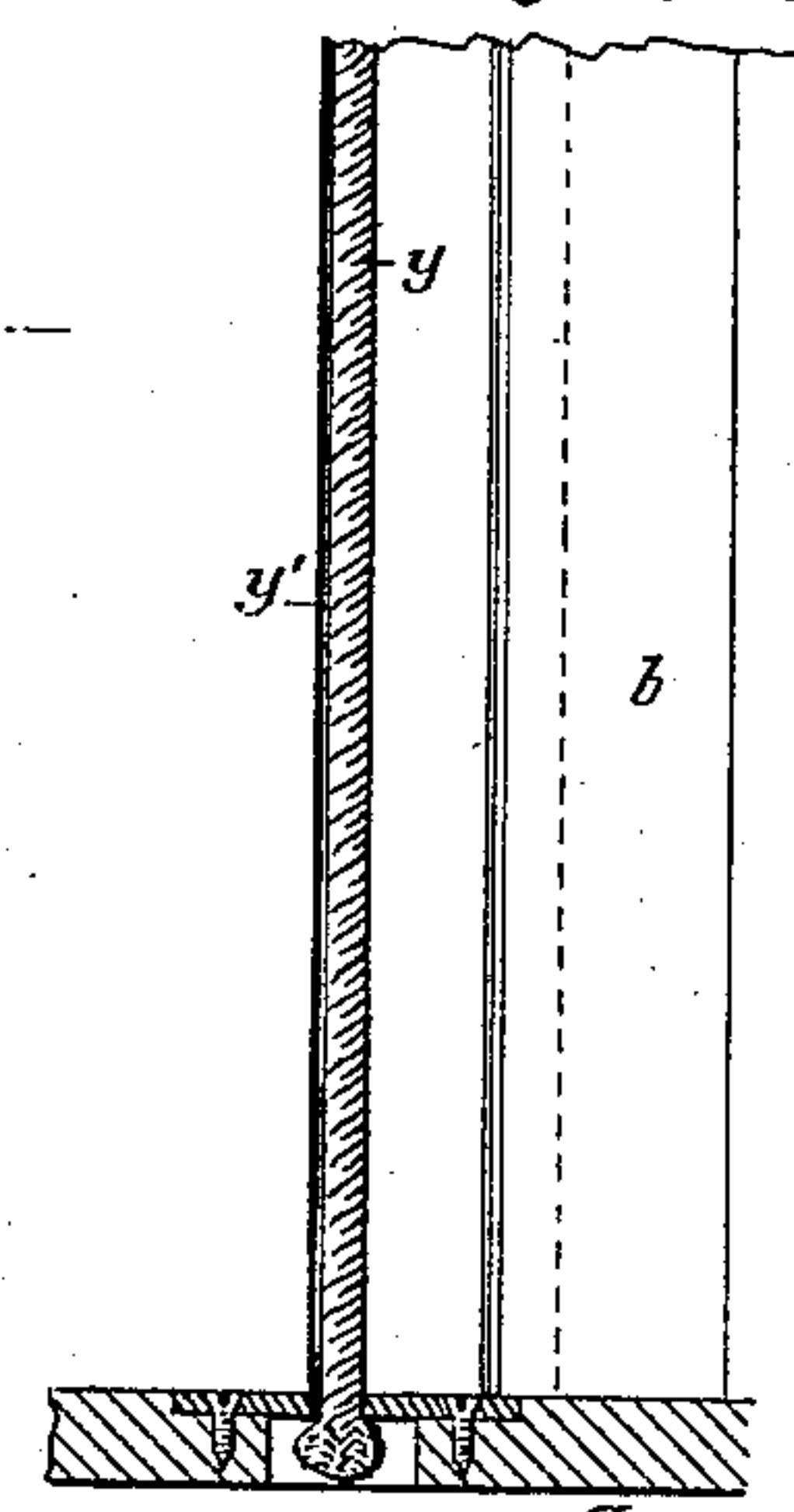
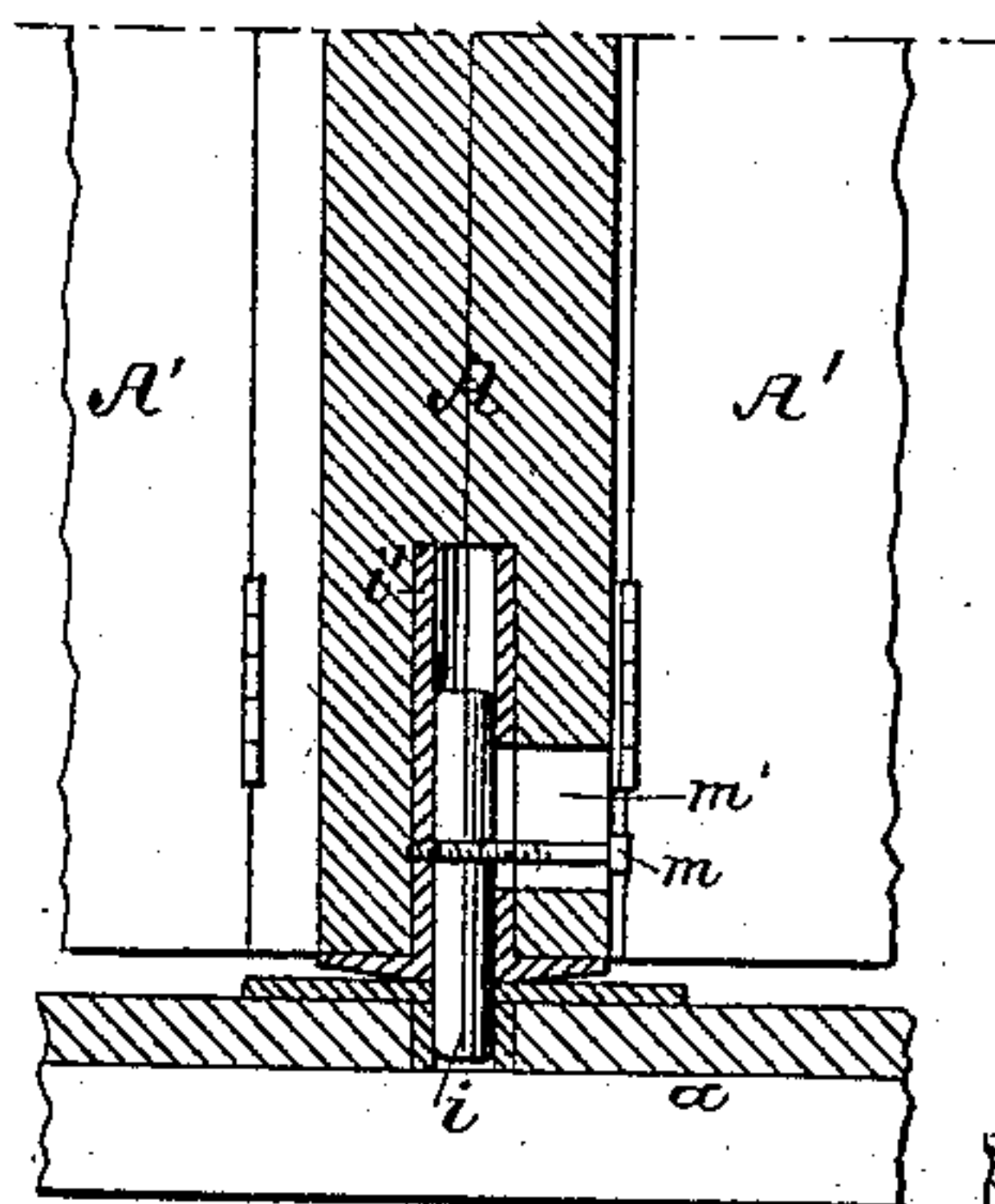


FIG. 8.

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UNITED STATES PATENT OFFICE.

THEOPHILUS VAN KANNEL, OF PHILADELPHIA, PENNSYLVANIA.

STORM-DOOR STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 387,571, dated August 7, 1888.

Application filed February 10, 1888. Serial No. 263,630. (No model.)

To all whom it may concern:

Be it known that I, THEOPHILUS VAN KANNEL, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Storm-Door Structures, of which the following is a specification.

The object of my invention is to construct a storm-door structure of a more acceptable character than the usual swinging-door structure, the features of my invention and the advantages of the same being too fully set forth hereinafter to demand any extended reference thereto in this portion of the specification.

In the accompanying drawings, Figure 1 is a sectional plan view of my improved storm-door structure placed outside of the building, the top of the fixed structure being removed. Fig. 2 is a vertical section of the same on the line 1 2, and Figs. 3 to 10 views illustrating details of construction or special features of the invention.

The fixed portion of the structure comprises the base *a*, top plate or ceiling, *a'*, and opposite segmental side plates, *b b*, and pivoted to the top and base of the fixed structure is the central post or standard, *A*, of the door, the latter having in the present instance three radiating and equidistant wings, *A'*, which extend vertically from the base to the top of the fixed part of the structure and fit snugly thereto, being, if desired, provided with weather-strips or equivalent means to insure a snug fit.

The segmental side portions of the fixed structure are in horizontal extent equal to or slightly in excess of the space between the two wings, the latter being preferably provided at their outer edges with yielding or elastic strips *d*, bearing against the inner faces of said segmental side portions of the structure.

The door is preferably provided at the top or bottom, or both, with a retaining-pawl or equivalent device, so that said door can move in but one direction, this direction being preferably forward on the right, and the face of each wing is provided with a suitable hand-rail, *e*, and with a sign indicating the proper direction of movement of said wing.

It will be evident that a storm-door structure of the character shown and described possesses numerous advantages over a hinged-door structure of the usual character, for, as the

door fits snugly in the casing, it is perfectly noiseless in its operation and effectually prevents the entrance of wind, snow, rain, or dust either when it is closed or when persons are passing through it. Moreover, the door cannot be blown open by the wind, as the pressure is equal on both sides of the center of motion, and the door can be moved without noticeable resistance, as it requires no springs or weights to restore it to its closed position or any bumpers to prevent slamming. Further than this, as the door moves in but one direction, there is no possibility of collision, and yet persons can pass both in and out at the same time.

The excluding of the noises of the street renders the structure of special advantage at the doors of churches, lecture-rooms, libraries, theaters, and the like.

The structure may be used throughout the whole year, the door having solid or glazed wings during the winter season and gauze or lattice wings during the summer.

To insure the maintenance of the door in the proper position of rest when persons are not passing through the doorway, I prefer to provide the upper end of the pivot-post *A* of the door with a star-wheel, *f*, with which engage rollers *f'*, carried by opposite arms *g*, pivoted to a suitable stud on the top of the fixed portion of the structure and acted upon by a spring, *g'*, which tends to cause the rollers to enter the notches in the wheel *f*, the wings of the door in such case occupying the position shown in Fig. 1, and the spring-arms, in connection with the star-wheel or notched disk, tending to restore the doors to this position if they happen to be left in any other position by persons passing in or out, so that the entrance to the structure, either from the inside or outside, is always free and unobstructed.

The door may, if desired, be locked to the fixed portion of the structure when it is desired to prevent ingress or egress through the latter—for instance, in Fig. 2 I have shown one of the wings *A'* provided with a pivoted bolt, *h*, which can be turned so as to engage with a slot or opening in the top *a'* of the fixed portion of the structure, and such a bolt, or an equivalent of the same, may be used on each wing or on one or both sides of the wing, if desired. I also prefer to hinge one or more

of the wings to the central post, or at a point near the same, so that said wings can be thrown back against the fixed wing, thereby providing a clear opening through the structure to permit the carrying of a long object in or out through the same, and also to provide for the circulation of air in the event of the occurrence of a suddenly warm day in the spring or fall, after the solid wings have been applied to the door; and I prefer that the entire wing should swing, although, if desired, said wing might have a rigid outer frame and a swinging inner portion, as shown, for instance, by dotted lines in Fig. 2, this inner portion being locked to the outer portion or frame by a suitable bolt or catch when it is not desired to open it.

In some cases it may be desirable to remove the entire door from the fixed casing, and for this reason I make the bearing-plate for the upper pivot of the door detachable and the lower pivot-pin, *i*, of the door adjustable vertically, so that it can be withdrawn from engagement with the lower bearing-plate, the pin in the present instance being free to slide in a socket, *i'*, in the lower end of the post A, and being secured in position after adjustment by means of a set-screw, *m*, adapted to a slot, *m'*, in said post, as shown in Fig. 4.

There are cases when the structure may only be intended for temporary use, and in such cases the entire structure may be removable. For instance, in Fig. 3 I have shown a structure the base of which is mounted on suitable wheels or casters, the structure being moved up to the doorway and secured thereto, if desired, by suitable hooks, catches, or other fastenings, a structure of this character being especially available for use at the doors of churches, theaters, and halls, so that it can be moved entirely out of the way to permit free exit when the audience or congregation is leaving the building. Where a temporary structure of this sort is used, the fastenings whereby the same is attached to the doorway should be of such a slight character that they can be readily broken or torn from their places in the event of a sudden rush against the door-structure from the inside of the building, so that no obstacle to free egress will be afforded in the event of a panic. When one or more of the doors is hinged, it becomes necessary to brace the same, so that the door structure will preserve proper rigidity under ordinary circumstances, and although a rigid brace may be used for this purpose, such brace would have to be detached when the doors were swung back; hence I prefer to use as braces chains or ropes, which, being flexible, can hang down when the hinged doors are swung back, so that only one of the chains need be detached in order to free both doors.

The chains *k k* between the hinged doors and the rigid door of the structure are preferably provided at one end with a tightening device, by which they may be held taut; but the other chain, which connects the two piv-

oted doors, is provided at one end with a hooked catch-plate, *p*, which is applied to an inclined retaining-rib, *p'*, on one of the doors, (see Fig. 5,) the hooked catch-plate being pushed upward on this retaining-rib, so as to gradually tighten the chain *k'*, and said plate finally entering a notch, *s*, near the upper end of the retaining-rib, so as to prevent accidental descent of the plate and loosening of the chain.

The flexible strip at the outer edge of each door, for bearing against the inner face of the segmental side of the fixed portion of the structure, is preferably constructed as shown in Figs. 6, 7, and 8, the strip being confined between the outer edges of a flexible sheet, *t*, made by folding a piece of oil-cloth, leather, or equivalent material around a rope or cord, *t'*, which is contained in a groove in a strip, *v*, secured to the edge of the door, this groove preventing the lateral withdrawal of the sheet *t*, and yet permitting the ready longitudinal stretching of the same, so that it can be kept under tension, the lower end of the flexible sheet *t* being secured to the strip *v*, but its upper end being lapped over the upper end of the strip before being secured thereto, so as to form a loop for the insertion of a wedge, *w*, or other equivalent tightener.

The space between the segmental side of the casing and the outer edge of the door and its strip *v* is preferably of such width as to prevent the pinching or catching of the fingers of the hand between the segmental side piece and the outer edge of the door, the flexible projecting strip serving to prevent injury from this cause.

As a further precaution, I in some cases provide the segmental side portions of the fixed casing of the door with flexible jambs, as shown in Figs. 9 and 10, a rope, cord, or other flexible band, *y*, being stretched from the top to the base of the structure, and a folded strip or sheet, *y'*, of rubber, leather, textile fabric, or like material, extending from the band to the rigid portion of the segment.

When it is desired to enlarge the openings for ingress and egress in the fixed portion of the structure, the doors may be provided at their outer ends with projecting segments, as shown in Fig. 3, so that the opposite segmental sides of the fixed structure can be made considerably less in extent than when the plan shown in Fig. 1 is adopted.

The strip *v* on each wing of the door is preferably slotted, as shown in Fig. 6, for the reception of the retaining-screws, so that it can be adjusted radially to compensate for wear upon the flexible strip *d*.

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

1. The combination, in a storm-door structure, of the fixed portion having opposite segmental sides, with the pivoted door composed of wings, each fitting snugly to the segmental sides of the fixed structure, the latter being

of a width equal to or greater in extent than the distance between the outer ends of adjacent wings of the door, all substantially as specified.

2. The combination, in a storm-door structure, of the fixed portion having top, base, and opposite segmental sides, with the pivoted door composed of wings, each fitting snugly to the top, base, and segmental sides of the fixed structure, said segmental sides being of a width equal to or greater in extent than the distance between the outer ends of adjacent wings of the door, all substantially as specified.

3. The combination of the outer or inclosing casing, having opposite segmental sides, with a pivoted door structure having radiating wings, one or more of which are hinged, in whole or in part, so as to be thrown back out of the way, all substantially as specified.

4. The combination of the pivoted door having radiating wings, some of which are hinged, with bracing-chains connecting the wings, one of said bracing-chains being detachable, all substantially as specified.

5. The combination of two of the wings of the door, one of which is hinged, with a bracing-chain connecting said wings and having a catch-plate, and an inclined bearing-rib on

one of the wings for engagement with said catch-plate, all substantially as specified.

6. The combination of the fixed structure, having opposite segmental sides, with the door, the wings of which have projecting flexible strips provided with means of adjustment, whereby they are held taut, all substantially as specified.

7. The combination of the wing of the door and the grooved strip secured thereto with the outer flexible strip and the flexible carrier therefor, consisting of a strip or sheet secured to the outer strip and folded around a cord confined in the groove of the door-strip, all substantially as specified.

8. The combination of the door having radiating wings with the casing structure having opposite segmental sides with flexible jambs, all substantially as specified.

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

THEOPHILUS VAN KANNEL.

Witnesses:

WILLIAM D. CONNER,
HARRY SMITH.