

No. 770,512.

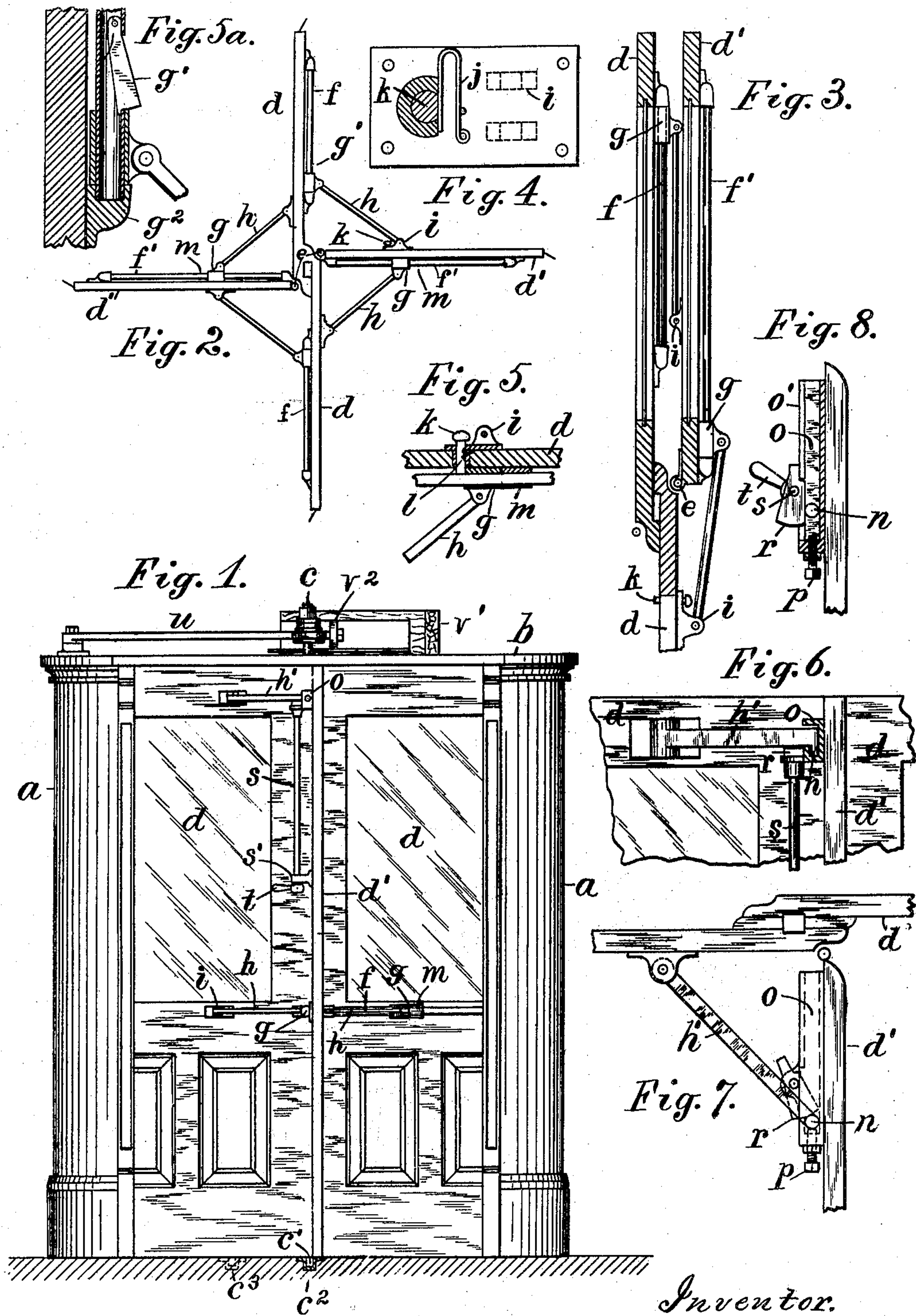
PATENTED SEPT. 20, 1904.

T. VAN KANNEL.
REVOLVING DOOR STRUCTURE.

APPLICATION FILED OCT. 31, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



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Fig. 10.

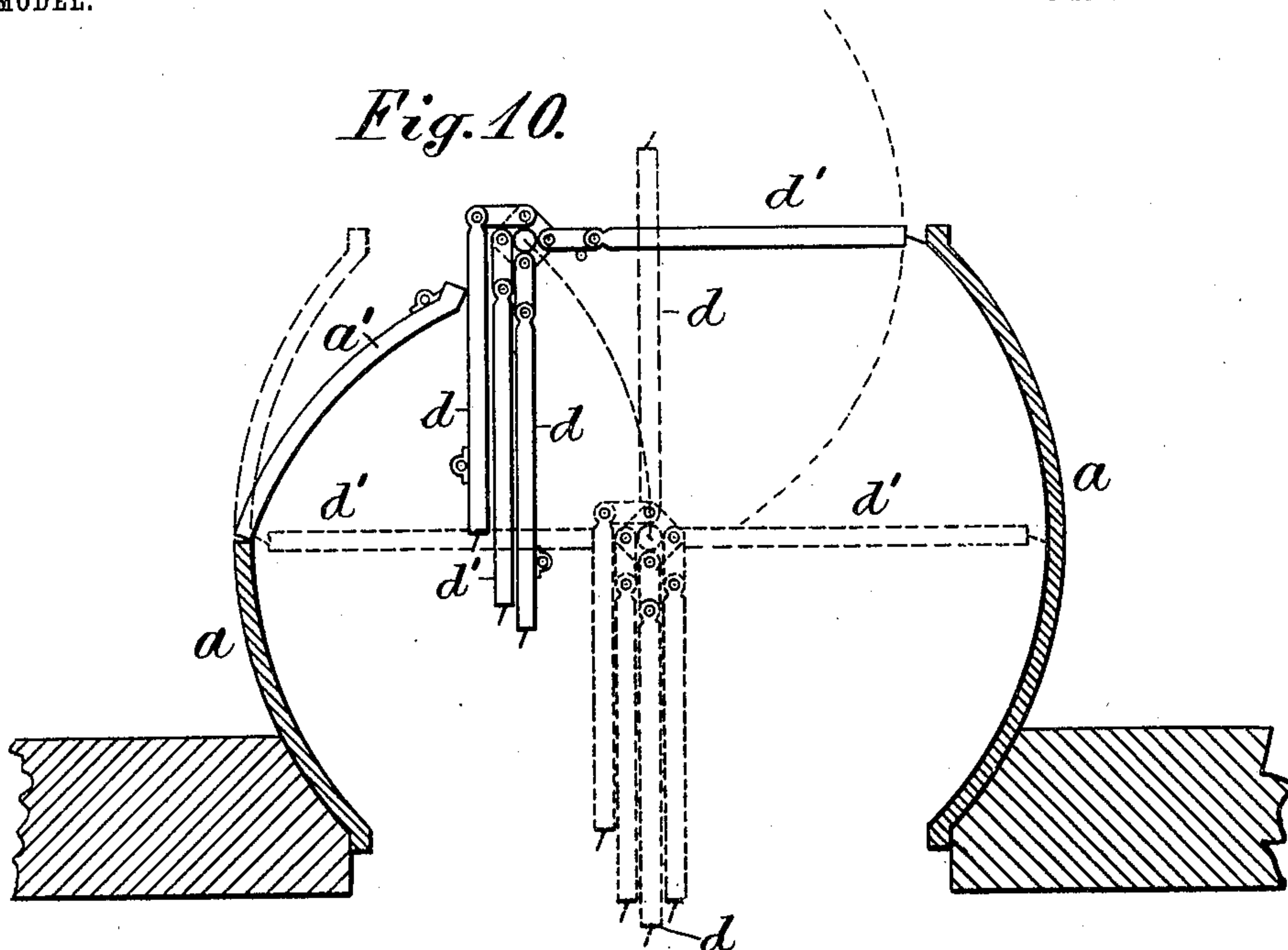


Fig. 13.

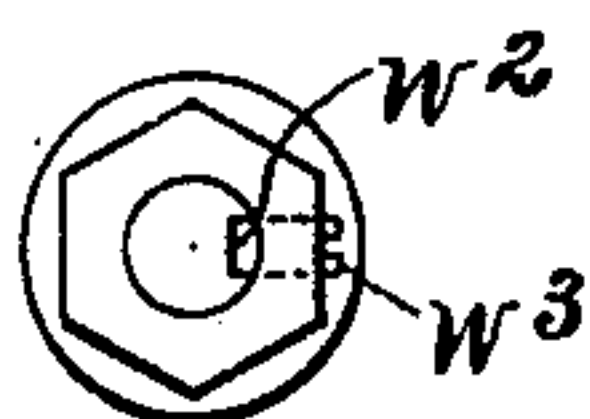


Fig. 14.

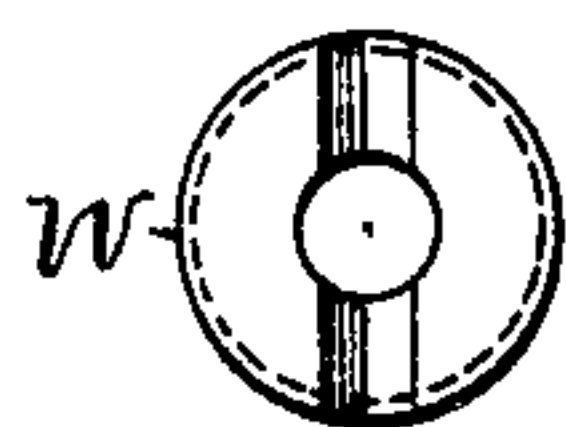


Fig. 15.



Fig. 9.

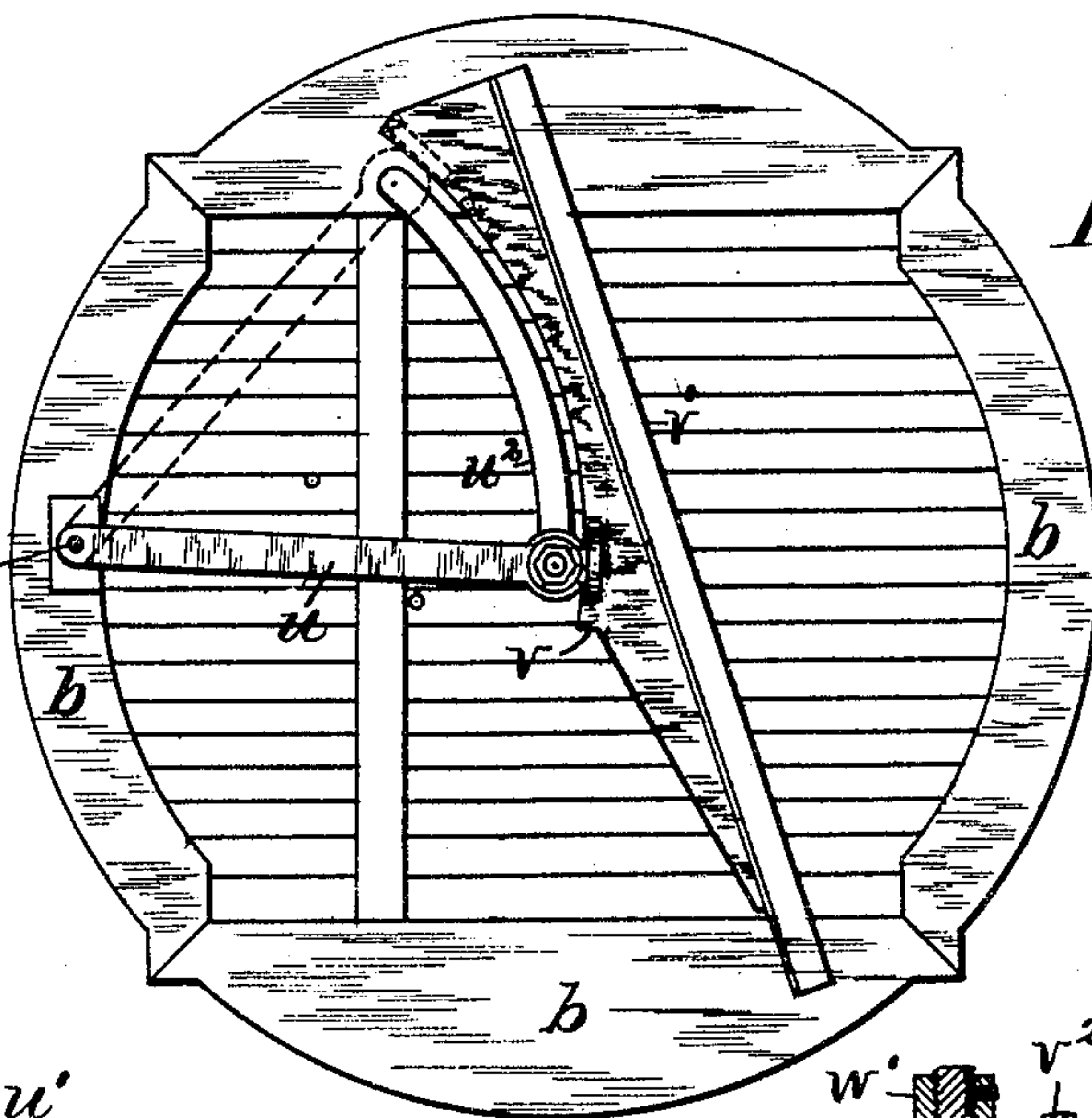


Fig. 12.

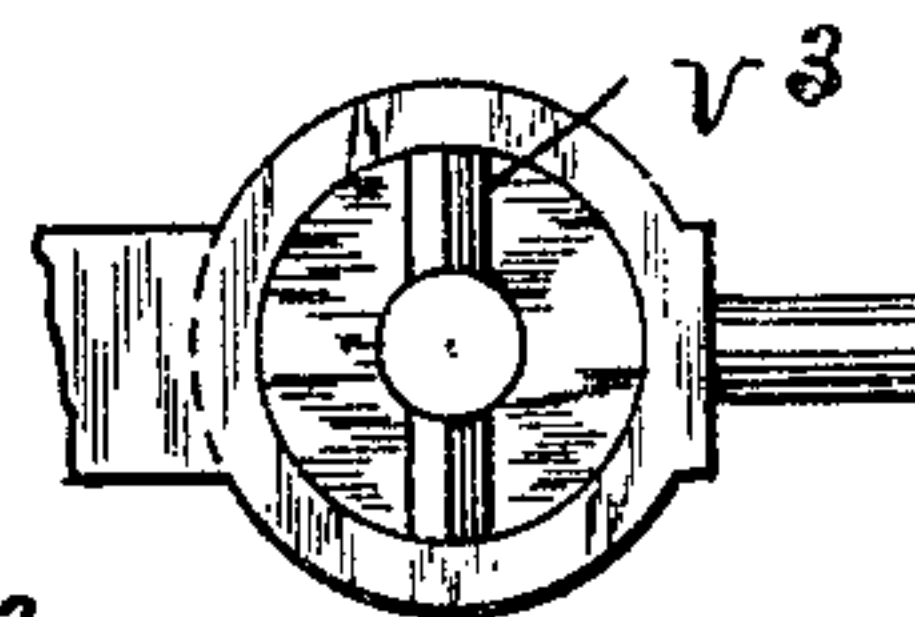


Fig. 11.

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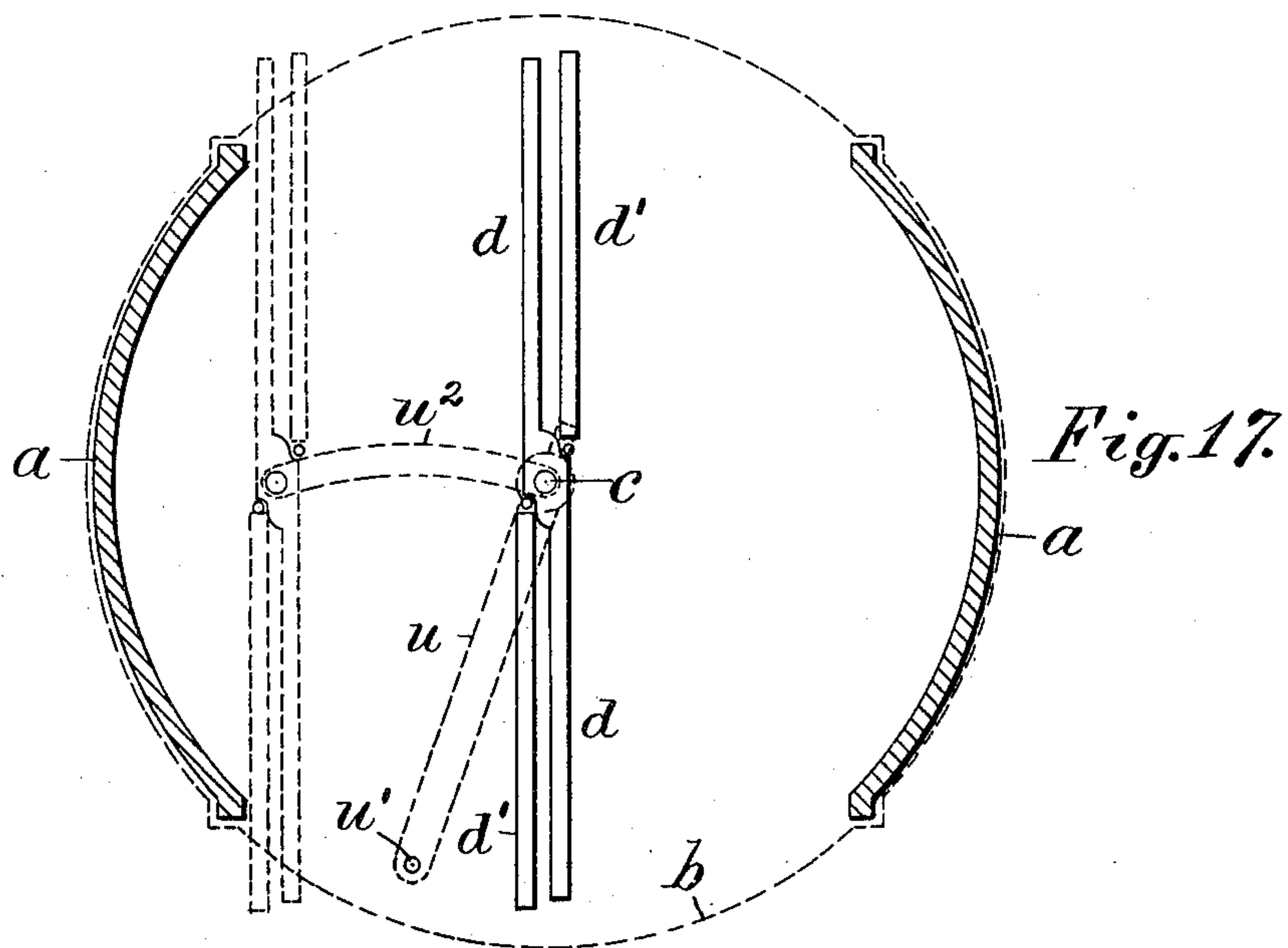
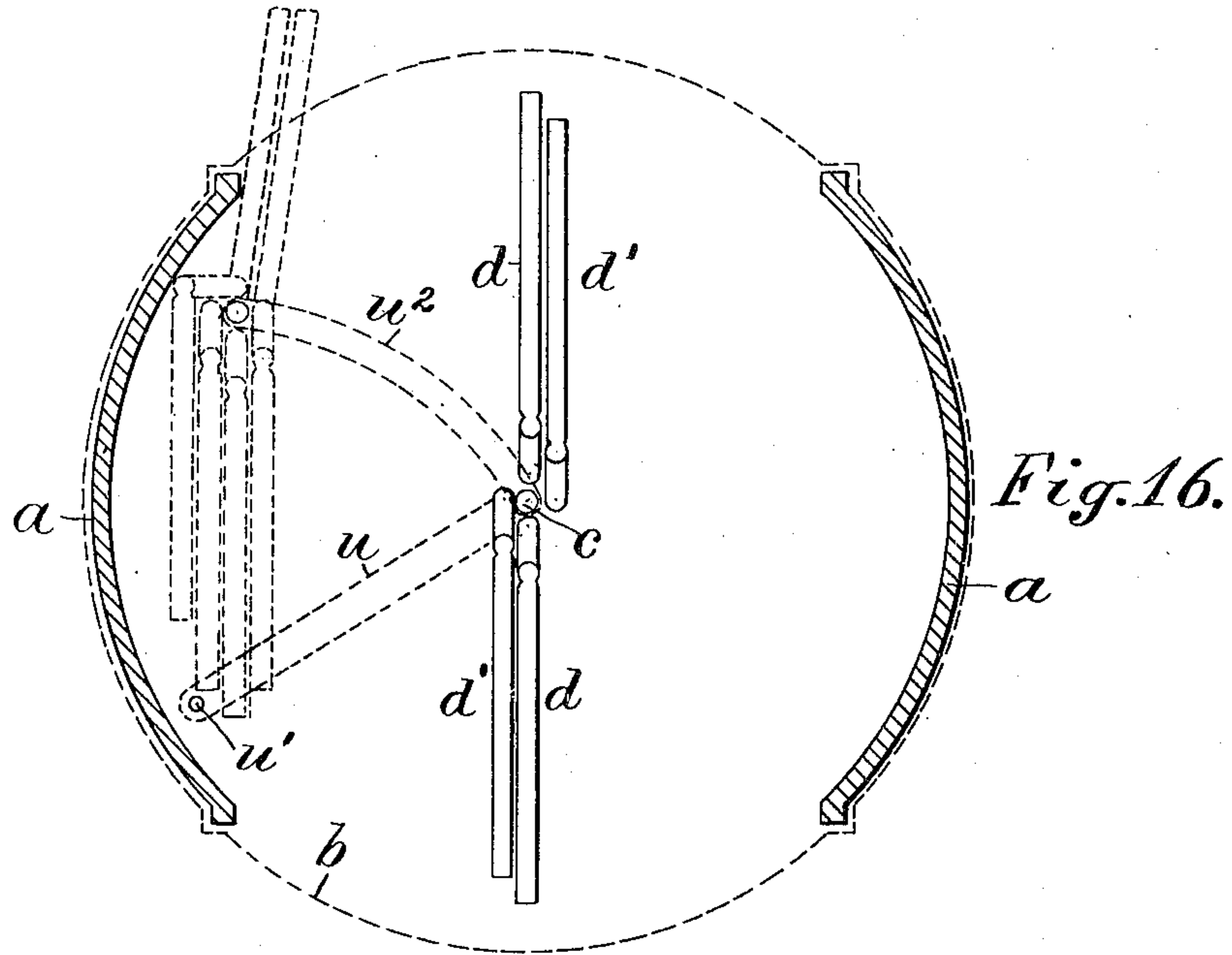
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3 SHEETS—SHEET 3.



Attest:
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UNITED STATES PATENT OFFICE.

THEOPHILUS VAN KANNEL, OF BEDFORD PARK, NEW YORK, ASSIGNOR
TO VAN KANNEL REVOLVING DOOR COMPANY, OF NEW YORK, N. Y.,
A CORPORATION OF WEST VIRGINIA.

REVOLVING DOOR STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 770,512, dated September 20, 1904.

Application filed October 31, 1902. Serial No. 129,563. (No model.)

To all whom it may concern:

Be it known that I, THEOPHILUS VAN KANNEL, a citizen of the United States, residing at Bedford Park, county of New York, and State of New York, have invented certain new and useful Improvements in Revolving Door Structures, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The present invention relates to that class of revolving door structures in which the door-wings forming the revolving portion are connected to a pivotal center pin and king-bolt and may therefore be collapsed or folded upon one another to permit free passage through the door-casing.

The invention relates partly to the means for holding the door-wings extended at right angles to one another when in operation and partly to the means for shifting the king-bolt, with the door-wings, from the central part of the casing to furnish a freer passage through the same.

Heretofore it has been common to extend the head of the king-bolt through a slot in the ceiling of the door-casing and to swivel it upon a wheeled carriage or truck adapted to shift the bolt and door-wings to the side of the casing.

To avoid the expense of a wheeled truck, I provide in the present invention a guide-arm having one end pivoted upon the ceiling of the door-casing and the other end provided with a roller to run upon a supporting-rail.

The king-bolt is swiveled in the guide-arm adjacent to the roller, so as to be moved in a curved slot to the desired position, and is supported by a self-adjusting bearing to avoid straining the bolt. The pivot of the guide-arm may be mounted in any desired relation to the center of the door-casing so as to move the bolt laterally, and thus transfer the folded wings to the side of the casing or forwardly, so as to bring one of the wings in line with the doorway to be used for temporarily closing the passage when desired. The door-wings are placed at opposite sides of the king-bolt when moving them to the side of the pas-

sage, so as to balance the load upon the bolt. The lower pivot of the revolving structure is arranged to slide vertically and is fitted movably to a floor-socket, and such pivot would be fitted to a supplementary socket in the new position to which the wings are moved, the wings being then held at both top and bottom, and bolts are provided upon the tops of the wings to lock them to the ceiling of the casing when adjusted to clear the passage-way.

The invention includes a brace pivoted at one end upon one of the wings and having a pivoted slide at the other and fitted movably to the hand-rail upon the adjacent wing. The hand-rail is provided with a stop or pawl to fasten the brace in a suitable position when the wings are extended for operation, and the detachment of such pawl permits the wings to be folded by the movement of the slide upon the hand-rail.

The invention also includes an upper brace for the tops of tall wings, one end of the brace being pivoted upon one of the wings, a channel-way being fixed radially upon the adjacent wing, and the free end of the brace having a head or stud fitted movably in such channel-way. A stop or pawl movable into the channel-way serves to hold the brace extended when desired to secure the wing in an operative position. The head of the brace in its engagement with the channel-way operates substantially the same as the slide fitted movably upon the hand-rail.

The invention will be understood by reference to the annexed drawings, in which—

Figure 1 is a front elevation of the door-casing with the wings in their operative position. Fig. 2 is a plan of the wings extended and secured by braces applied to the hand-rails. Fig. 3 shows two of the wings having the brace fitted to the hand-rail and folded parallel to one another. Fig. 4 is a section adjacent to the inner side of the pivot and lock plate for one of the braces, and Fig. 5 is a section of the wing and device for locking the slide. Fig. 5^a is a section of a hand-rail with pawl adjacent to the slide. Figs. 3 and 5 are upon a larger scale than Fig. 2, and Fig.

4 is upon a still larger scale. Fig. 6 shows a part of the wings at the top with the upper brace thereon, and Fig. 7 is a plan of the same. Fig. 8 is a horizontal section of the channel-way near the top edge of the same. Fig. 9 shows the ceiling of the door-casing. Fig. 10 is a section of the segmental walls just below the ceiling with the wings shown in different positions in full and dotted lines. Fig. 11 is a cross-section of the ceiling and guide-arm supporting the center king-bolt of the wings upon a scale twice as great as Fig. 9. Fig. 12 is a plan of the hanger-socket upon the guide-arm with the axle for the roller. Fig. 13 is a plan of the means for locking the adjusting-nut above the ball-races. Fig. 14 shows the under side of the hanger for the ball-races, and Fig. 15 an edge view of the same. Figs. 16 and 17 show alternative constructions.

The casing is shown with side segments *a* and ceiling *b*, the king-bolt *c*, which supports the wings, being extended through one end of a slot in the ceiling. In Fig. 2 the wings *d* are attached rigidly together, and the wings *d'* hinged thereto at the hinges *e*. Hand-rails *f* are shown of the usual length on two of the wings, and upon the other wings hand-rails *f'*, extended closer than usual toward the hinge of the wing. A slider *g* is fitted movably to each hand-rail and jointed to a link or brace *h*, which is hinged to the adjacent door by a pivot *i*. The hand-rails are hollow, and a pawl *g'* is shown in Fig. 5^a projected normally from within the rail to lock the slider against one of its supports *g*². Fig. 3 shows one of the hinged wings *d'* folded parallel with one of the wings *d*, such movement of the hinged wing operating to press the slider outwardly upon the wing *d* and to draw the slider inwardly upon the wing *d'*. The hand-rails serve as guide-bars for the free ends of the braces *h*, and any means of locking the slide thereon serves to hold the brace extended to secure the hinged wing *d'* firmly in an operative position. Figs. 4 and 5 show another means for locking the slider in a sliding bolt *k*, fitted movably in the foot-plate of the pivot *i* at right angles to the guide-bar or hand-rail upon the opposite side of the wing. A spring *j* is shown fitted to notches *l* in the side of the bolt to restrain it from movement when set in an operative or inoperative position. Fig. 4 shows the bolt set in contact with the hand-rail, so as to lock the slider against a stop *m* upon the hand-rail. Such stop is formed as a bearing fixed to the door-wing, as shown in Fig. 1, to sustain the hand-rail at the middle of its length, where it supports the thrust of the brace. The use of such braces permits the hinged wings to be instantly released and thrown into their inoperative position, where they may be secured by any suitable means.

The upper brace, as shown in Figs. 1, 6,

and 7, consists of a link *h'*, pivoted upon one of the wings, similarly to the brace *h*, and having a projection or stud *n* upon its free end adapted to fit in a channel-way *o* upon the adjacent wing. The channel-way is formed with an outer rib *o'*, which holds the stud *n* movably, and a set-screw *p* is shown at one end of the channel-way to arrest the stud or head of the link when the hinged wing is operatively adjusted. A portion of the rib *o'* is removed adjacent to the set-screw, and a pawl *r* is mounted upon a spindle *s* to fill the place of such rib and to be turned into the channel-way when desired, as shown in Fig. 7. When in such position, the pawl locks the stud or head of the link *h'* against the set-screw and holds the attached wing rigidly. The spindle *s* is shown in Fig. 1 extended downward through a bearing *s'* upon the face of the hinged wing and provided with a handle *l* for turning the pawl, so that it may be withdrawn from the channel-way, as shown in Fig. 8, which permits the hinged door-wing to be folded.

It is obvious that the bolt *k* and the slider *g* perform the same functions for the head of the brace as the pawl *r* and stud *n*, and the bolt *k* may therefore for the purposes of this invention be termed a "pawl" and is included in the generic term "pawl" where used in the claims as a means for holding the head of the brace. The retraction of the bolt and the turning of the pawl occupy only a moment's time, and thus set the upper and lower parts of the hinged wing free to be turned to an inoperative position.

Fig. 10 shows an old construction for the door-wings, illustrated in Van Kannel's patent, No. 656,062, granted August 14, 1900, for a revolving door, by which all the wings may, if desired, be folded together at one side of the post. The dotted lines *d d' d'* show the operative position of the wings, and they are also shown in dotted lines folded together in the center of the passage. Figs. 9 and 11 show the means for shifting the king-bolt when the doors are thus turned out of the direct passage-way through the casing, the king-bolt being shown in Fig. 10 moved to the doorway at one edge of the casing, so that one of the wings may be used for temporarily closing the passage-way. A portion *a'* of the casing is shown hinged, so as to be shifted inwardly against the remaining wings to prevent the movement of air through the casing when closed by the door-wings, as shown in the figure. The king-bolt *c* is shown swiveled in the guide-arm *u*, which is pivoted at one end upon a fulcrum *u'*, attached to the ceiling. A curved slot *u*² extends through the ceiling concentric with such fulcrum, and a curved track *v* is shown sustained adjacent to the slot by a beam *v'*. A roller *v*² is journaled upon the arm, and a socket in the top of the arm adjacent to the roller is furnished with knife-

edges v^3 to support a notched hanger w , which carries ball-races sustained upon the head of the bolt. One of the ball-races x is supported upon the hanger, and the other is adjusted upon the king-bolt by a nut w' , which is used to adjust the bolt vertically with the wings. A keyway w^2 is shown in the king-bolt within the nut, and a lock-screw w^3 is inserted through the side of the nut in such keyway, by which the nut can be locked after any rotation. The nut forms an adjustable collar.

Fig. 1 shows the center pin at the bottom of the wings, provided with a vertically-movable bolt c' , fitted to a socket c^2 in the floor, and another socket c^3 is indicated by dotted lines in the position to which the lower pivot would be moved when shifted by the guide-arm, as shown in Figs. 9 and 10.

Figs. 16 and 17 show positions different from that of Fig. 10 into which the door-wings may be moved to clear the passage, Fig. 16, showing an arrangement of the curved slot u^2 and the guide-arm u to place the wings all in one group within one side of the segmental casing.

Fig. 17 shows two of the door-wings secured rigidly together and the intermediate wings folded flat upon their opposite faces, the whole being moved sidewise almost in a direct line across the center of the casing to place them against one of its segmental sides. In Figs. 16 and 17 the wings are shown in full lines in the center of the passage folded so as to extend one-half upon each side of the supporting king-bolt, which perfectly balances the load upon the bolt. With this arrangement no resistance is offered to the movement of the wings to a new position, as they are suspended from the guide-arm, and the guide-arm is supported movably by the roller v^2 .

When the bolt c' is withdrawn from the floor-socket c^2 and the wings folded together, as shown in Figs. 16 and 17, they may be readily pushed into the direction in which they are guided by the pivoted guide-arm u , the king-bolt moving through the slot u^2 until arrested by the end of the slot, when the bolt c' would be inserted in the floor-socket c^3 , which locks the center pin and holds the wings in their new positions. During such shifting of the wings it is important to avoid any wrench of the king-bolt, which is the sole support for the wings, and I have therefore provided the hanger w , sustained upon the knife-edges v^3 , so as to rock readily upon the guide-arm. These knife-edges are disposed transversely to the guide-arm and permit the wings to swing if pressed transversely to the slot u^2 . As there is no resistance to movement in the direction of the slot, the hanger does not need to rock in that direction; but the guide-arm is adapted also to yield in that direction by a peculiar joint with the pivot-pin u' upon the ceiling of the casing.

The end of the guide-arm is formed with a flared socket, the small part of such socket

being fitted to the pivot-pin and the arm being thus adapted to twist in either direction upon the pin. It will be observed by reference to Figs. 1 and 11 that the guide-arm u occupies very little vertical head-room, and thus furnishes a means of shifting the wings to an operative position in cases where the head-room is limited. The application of the braces to the hand-rails furnishes a means of securing the wings with very little additional mechanism, and the upper brace upon the wings reinforces the support which is furnished by the hand-rail braces, and thus renders the whole structure more rigid and less liable to derangement.

It is obvious that guide-bars precisely similar to the guide-rails can be used to brace the door-wings at any point in their height and that, if desired, a brace for the lower portion of the door-wing may be made similar to the upper brace shown in Figs. 6 and 7, although the construction of those figures is particularly adapted for an inaccessible part of the wing in which the pawl requires to be operated by a projecting rod.

Both of the methods for hinging the wings together which are shown in the annexed drawings are common, as is shown in patents already issued to me, and the particular method employed is immaterial to the present invention, as the guide-arm operates the same to shift the king-bolt and the supported wings whatever be their connection with one another and with the bolt. In like manner the operation of the braces is the same whether two of the wings be attached rigidly together, as shown in Figs. 2 and 17, or all the wings be jointed to their support, as shown in Figs. 10 and 16.

Having thus set forth the nature of the invention, what is claimed herein is—

1. A revolving door structure having at the top a center king-bolt with wings suspended therefrom, and a guide-arm swiveled to the king-bolt and pivoted upon the ceiling of the door-casing to transfer the wings from an operative to an inoperative position.

2. A revolving door structure having a casing with ceiling at the top of the wings, a king-bolt extended upward through the casing with hinged wings suspended therefrom and adapted to fold all at one side of the center, a guide-arm having one end pivoted upon the ceiling and the other end provided with a bearing-roller, a journal for the king-bolt upon the arm with collar upon the bolt to support the weight, and the ceiling having a slot concentric with the arm-pivot and a track adjacent to the slot to support the roller, for transferring the wings from an operative to an inoperative position.

3. A revolving door structure having at the top a central king-bolt with hinged wings suspended therefrom, and a guide-arm swiveled near one end to the king-bolt and having at

the other end a flared socket, with a pivot-pin upon the ceiling of the door-casing fitted to the smaller part of said flared socket, substantially as and for the purpose set forth.

5 4. A revolving door structure having a segmental side casing, and a ceiling fitted to the top of the wings, and a guide-arm having one end pivoted upon the said ceiling, the other end provided with a horizontal stud or axle
10 having roller thereon, and an adjacent bearing swiveled to the head of the king-bolt, a supporting-beam on the top of the ceiling, and an angle-plate secured thereto forming a track for the rail concentric with the arm-pivot.

15 5. In a revolving door structure having hinged wings adapted to fold together, the combination, with a brace pivoted upon one of the wings, of a hand-rail serving as a guide-bar upon the face of the adjacent wing, a
20 slider jointed to the brace and fitted movably to the hand-rail, a pawl to retain the slider in an operative position and a holder or support for the hand-rail adjacent to the slider to resist the thrust of the brace.

25 6. In a revolving door structure having opposite wings secured rigidly together at the center and lateral door-wings hinged thereto, said wings being provided respectively with the short and long hand-rails as set forth, the
30 combination, with each of such lateral wings, of the braces h attached at the ends respectively to the middle wing and the lateral wing, and having each at one end a pivoted slider fitted movably to one of the said hand-rails, and
35 pawls adapted to hold one of the sliders extended, and the other retracted, when holding the lateral wing in its operative position, substantially as herein set forth.

40 7. An upper brace for the hinged wings of revolving door structures, comprising the brace-arm h' pivoted at one end to one wing and having at the opposite end a projecting stud, a channel-way fixed radially upon the adjacent wing and fitted to such arm and stud, a pawl to

engage the stud when the wing is adjusted for 45 operation, and a rod extended downward upon the wing for operating such pawl.

8. In a rotary door, the combination, with a casing having opposite segmental side walls, of a suspended rotatable door, a boom supporting 50 said door, and means supporting said boom to swing with said door, substantially as set forth.

9. In a rotary door, the combination, with a casing having opposite segmental side walls, of a suspended rotatable door, a boom supporting 55 said door, and means for supporting said boom and guiding the movement of the same, substantially as set forth.

10. In a rotary door, the combination, with a doorway-casing having opposite segmental 60 side walls and a ceiling portion, of a rotatably-suspended door, a boom pivotally mounted in said ceiling portion, a shaft rotatably suspended on said boom, said door being rigidly secured to said shaft to rotate therewith, and means for 65 guiding said boom and supporting said door, substantially as set forth.

11. In a rotary door, the combination, with the ceiling portion of a doorway-casing, of a chord-beam arranged in juxtaposed diamet- 70 rical position, a boom pivoted at its outer end to said casing and resting on said beam, an anti-friction-roller on said boom between the same and said beam, a rotatably-suspended foldable-turnstile winged door, said door being sus- 75 pended centrally of said casing on the inner end of said boom and adapted to swing with the same laterally into juxtaposition with the side portion of said casing, substantially as set forth. 80

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

THEOPHILUS VAN KANNEL.

Witnesses:

L. LEE,
THOMAS S. CRANE.