

No. 883,999.

R. G. WINTER.
HINGE.

PATENTED APR. 7, 1908.

APPLICATION FILED MAR. 20, 1906.

2 SHEETS—SHEET 1.

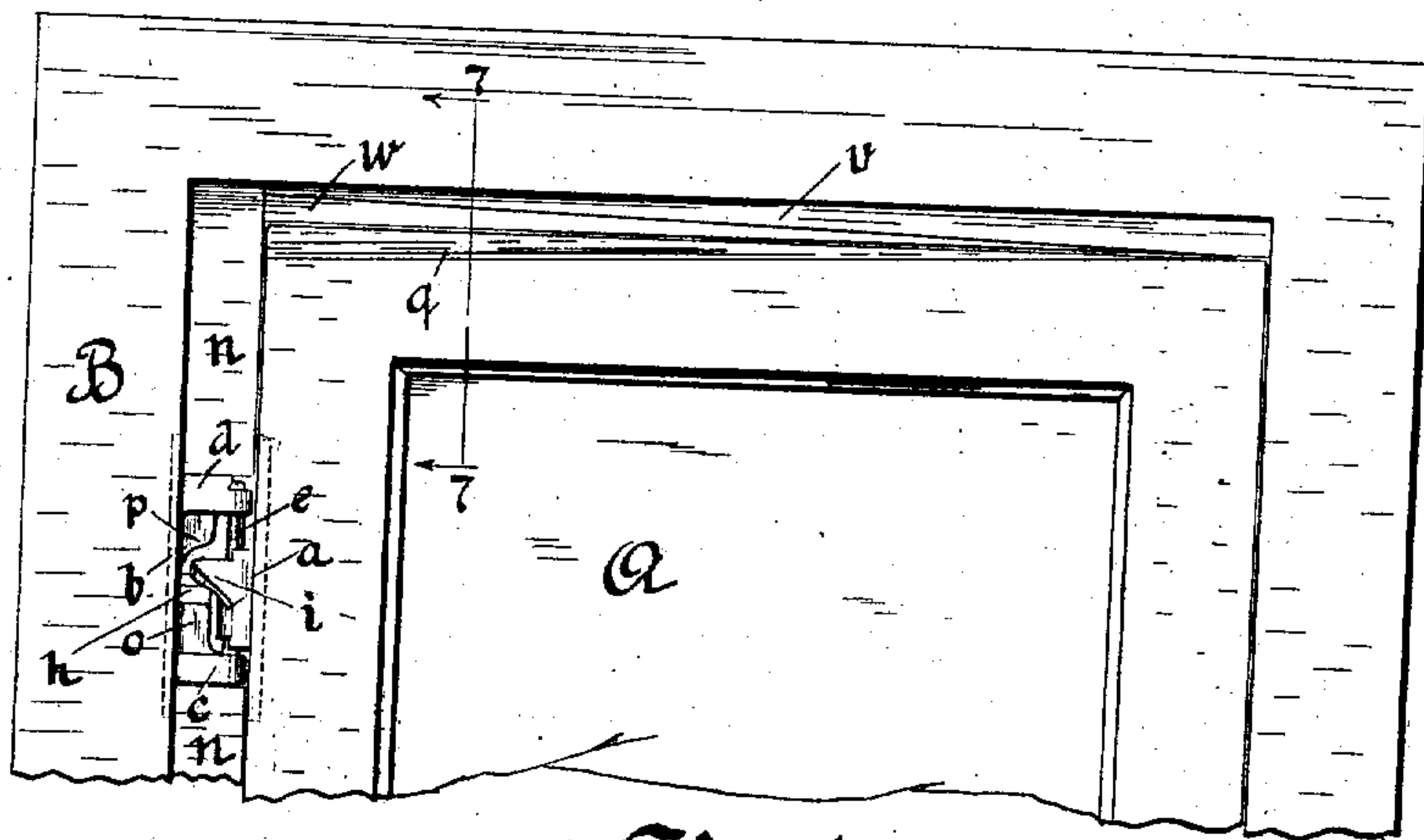


Fig. 1

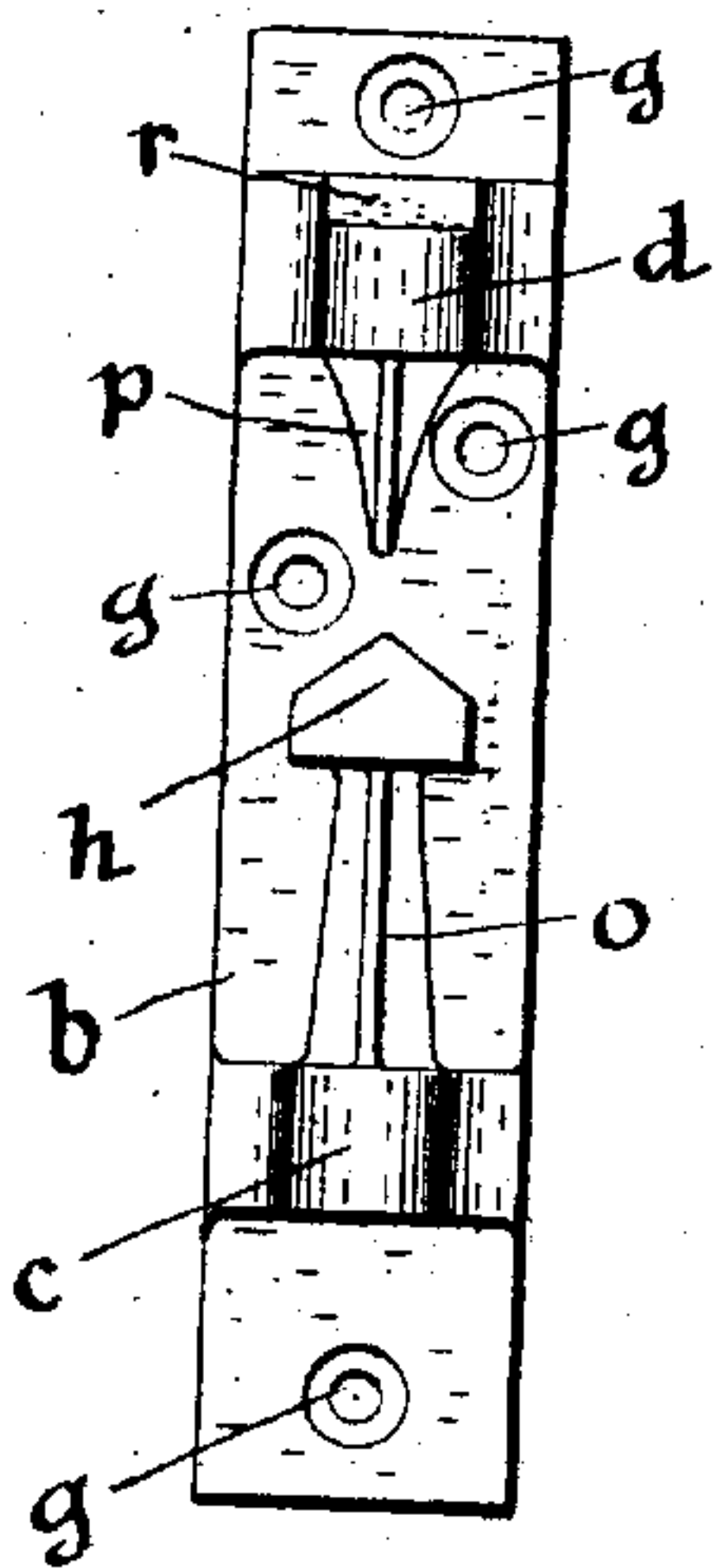


Fig. 3

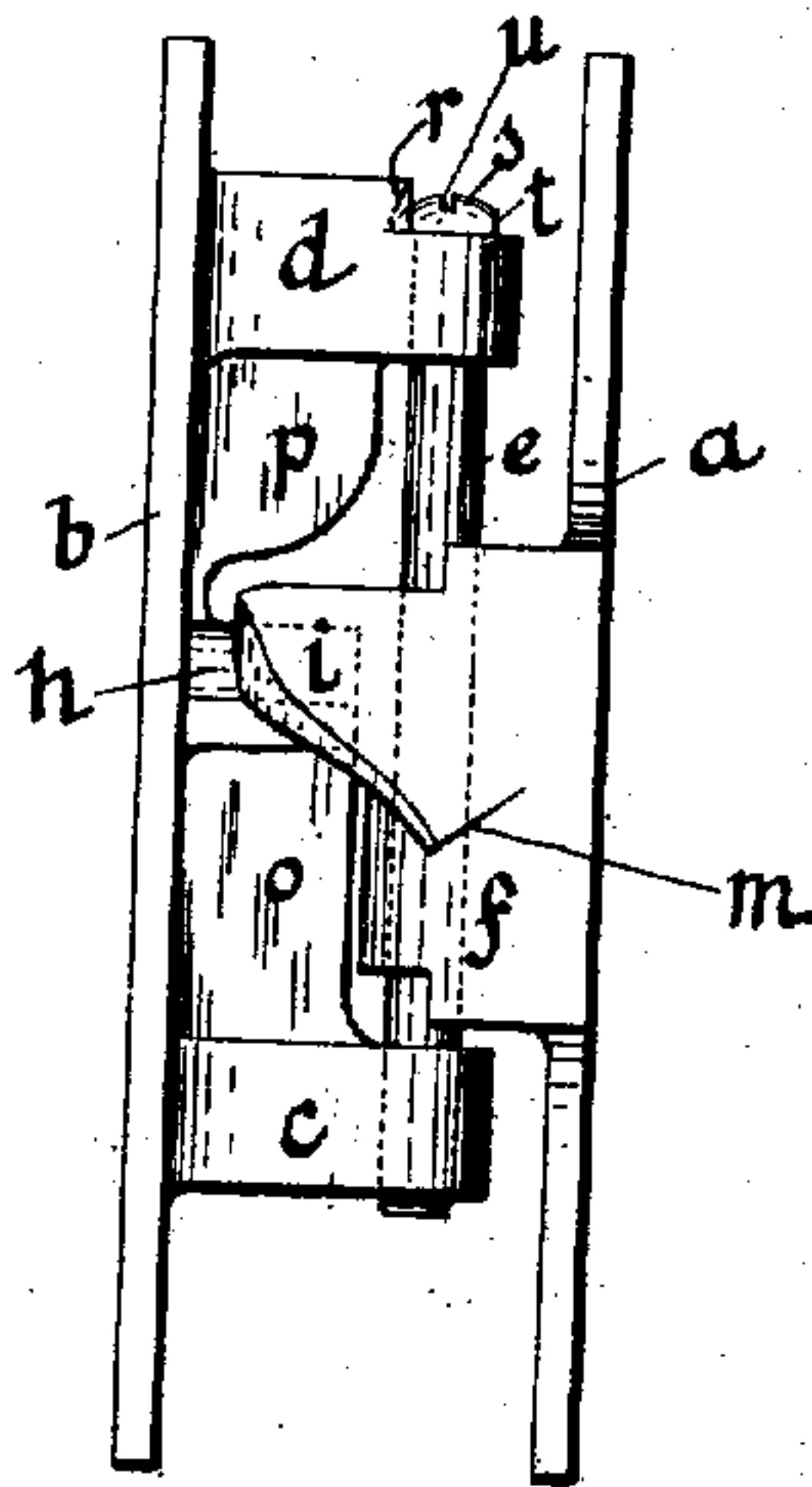


Fig. 2

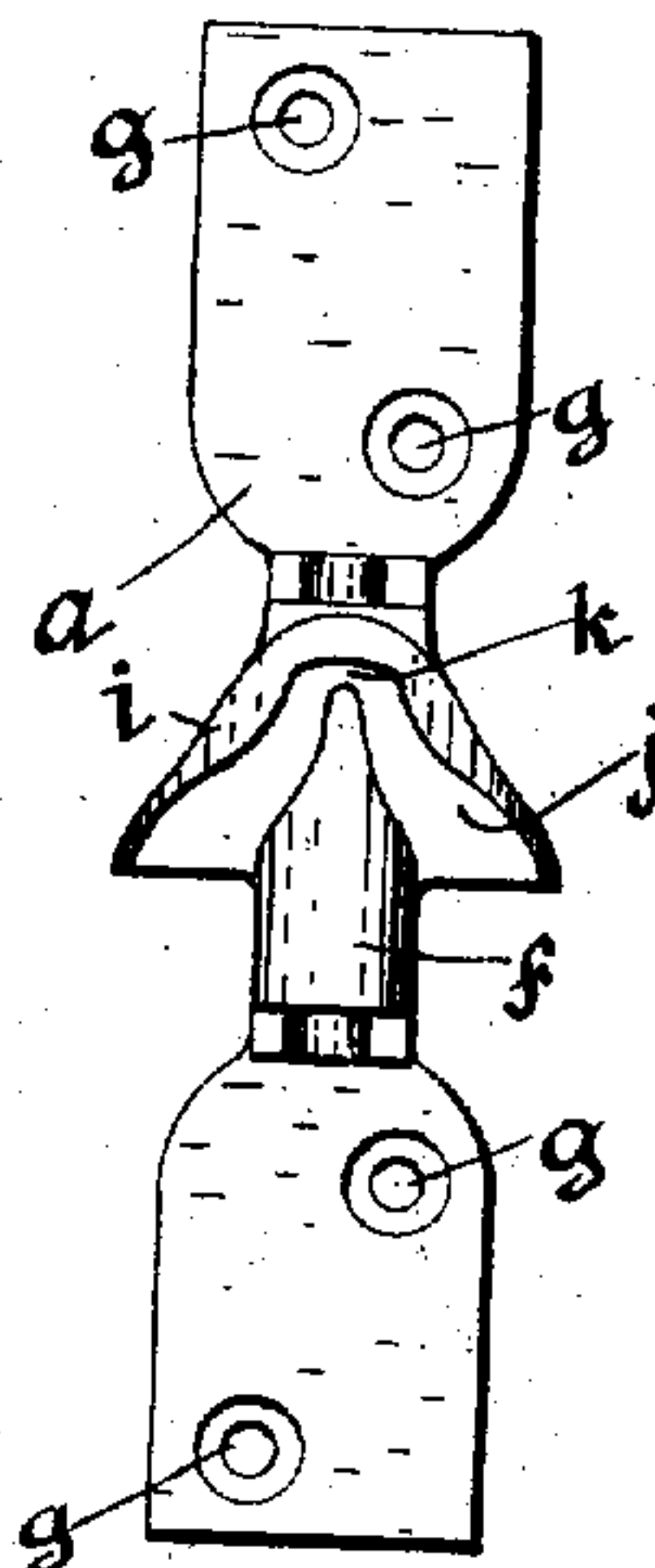


Fig. 4

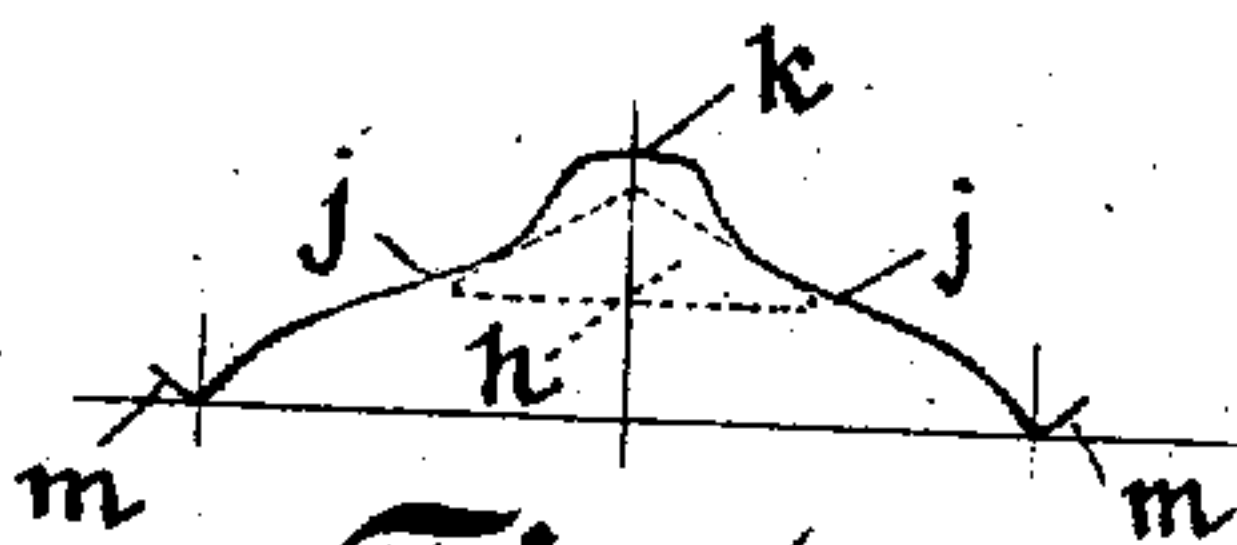


Fig. 6

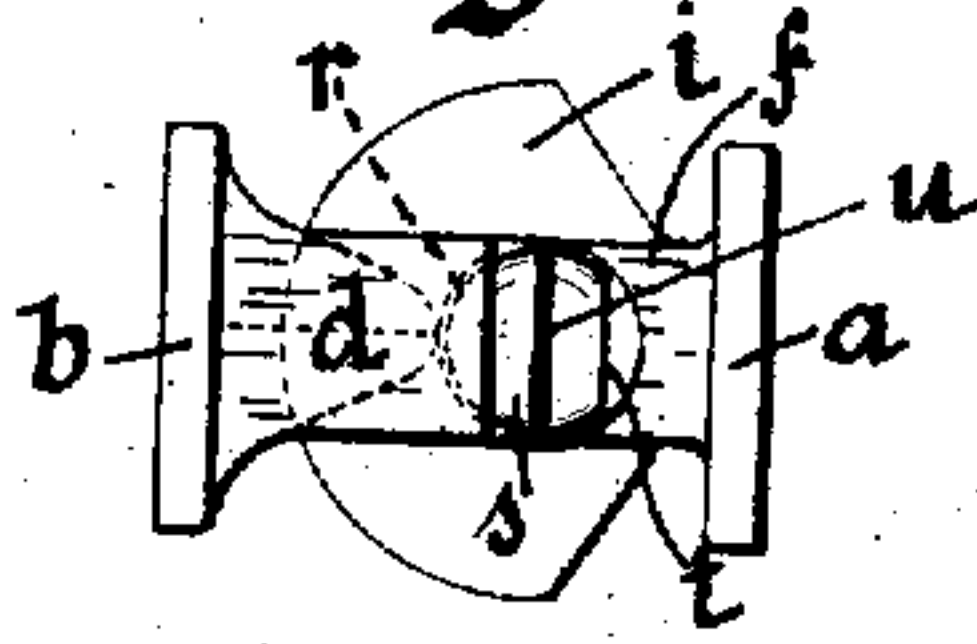


Fig. 5

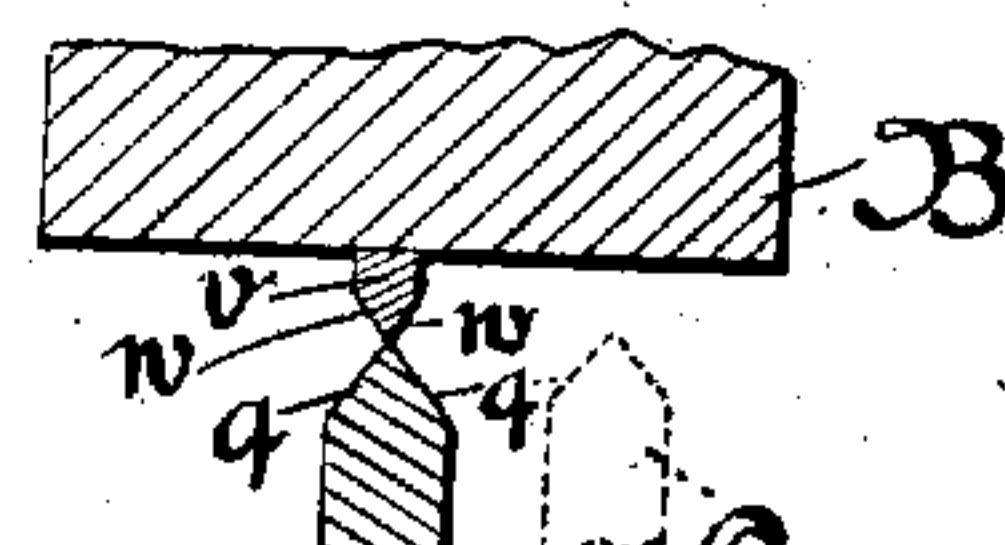


Fig. 7

Rudolph G. Winter, Inventor

Witnesses

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2 SHEETS—SHEET 2.

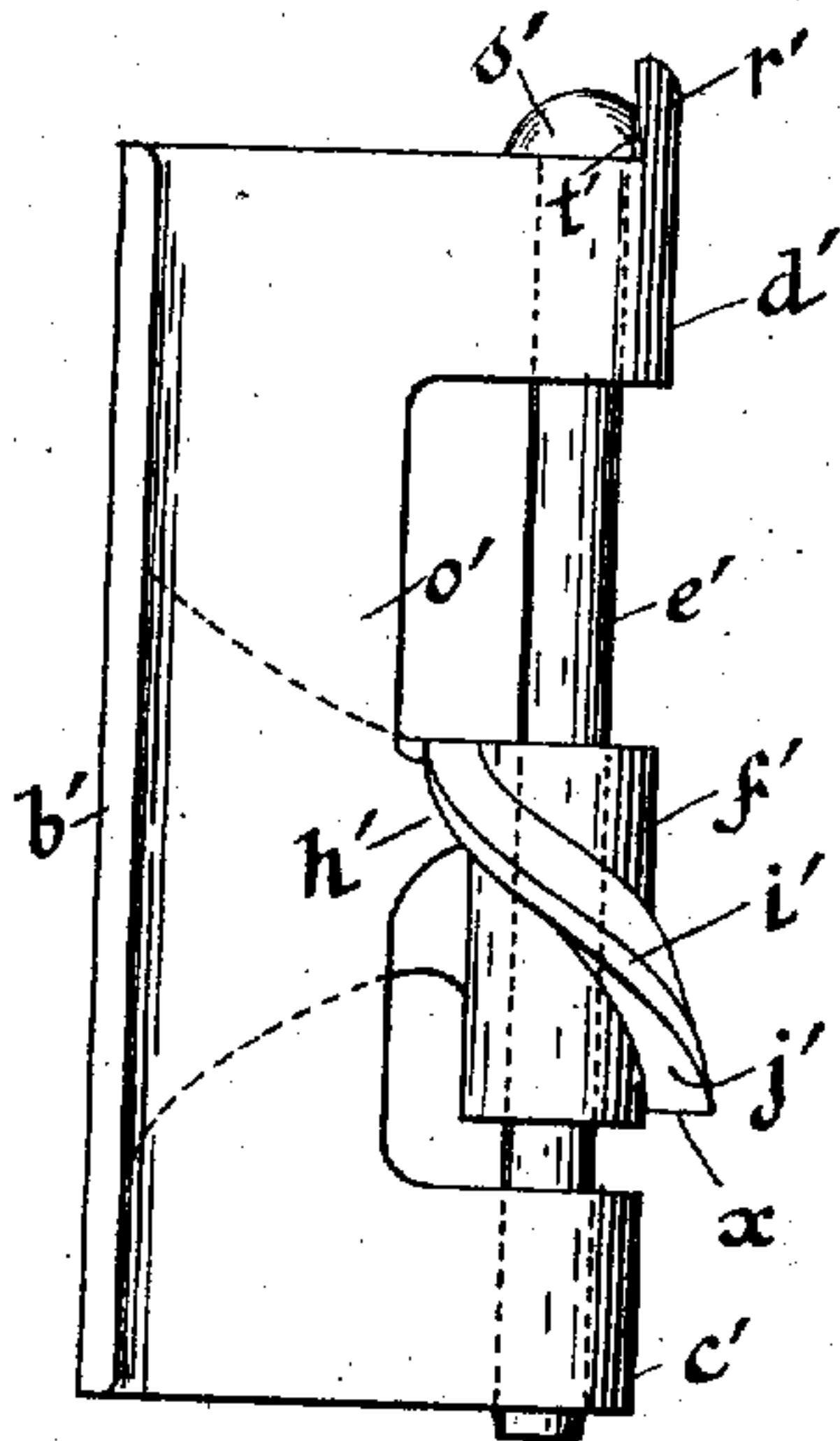


Fig. 8

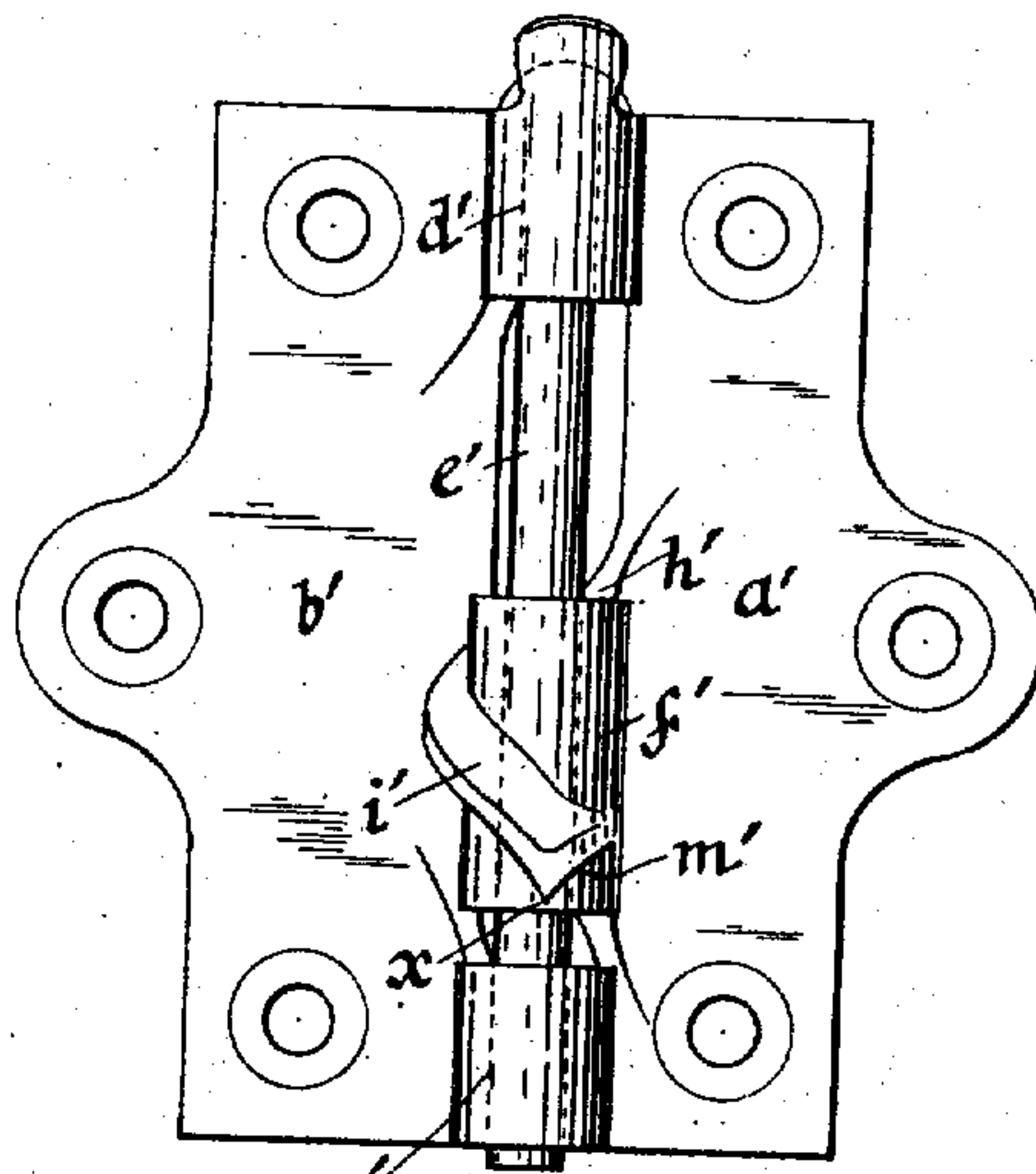


Fig. 9

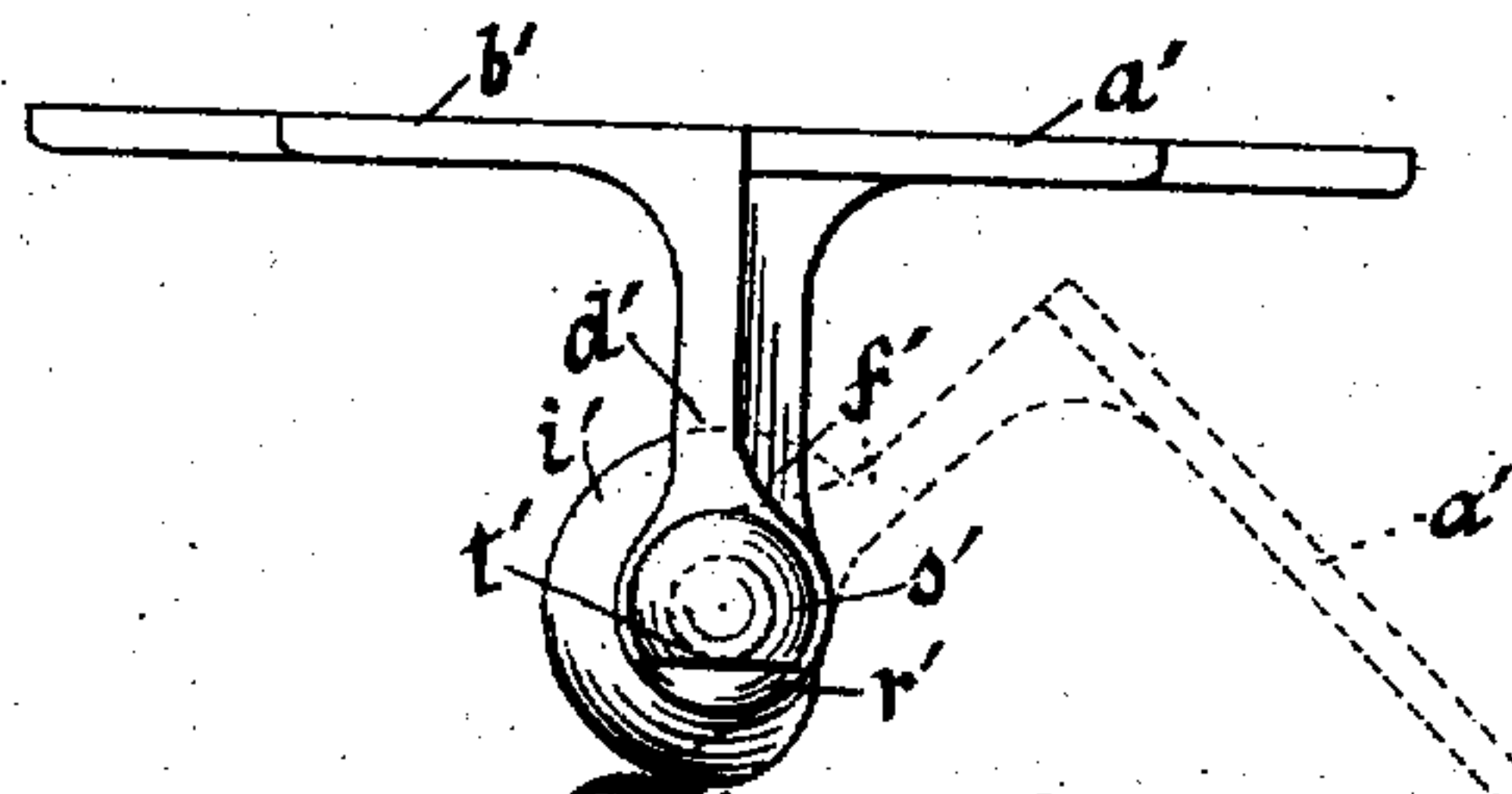


Fig. 10

Witnesses

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UNITED STATES PATENT OFFICE.

RUDOLPH G. WINTER, OF MILWAUKEE, WISCONSIN.

HINGE.

No. 883,999.

Specification of Letters Patent.

Patented April 7, 1908.

Application filed March 20, 1906. Serial No. 306,952.

To all whom it may concern:

Be it known that I, RUDOLPH G. WINTER, of Milwaukee, Wisconsin, have invented a Hinge, of which the following is a specification.

This invention relates to gravity-hinges and embodies an improved form of the gravity-hinge described and claimed in my Patent No. 785,143, granted March 21, 1905, partly also as described in my concurrent application No. 264,396, filed June 9, 1905.

The object of my present invention is to construct the hinge so that it will run more easily and frictionlessly than the hinges previously invented, by so arranging the cam-surfaces that they shall be set apart at a distance from the pintle or pivot of the hinge, and in other ways as will be understood from the following description. I aim more particularly to produce a practical form of double-acting hinge suitable for swinging-doors, such as are customarily used in vestibules, bars and like places so as to entirely replace the use of springs or other means for causing the door to shut.

My hinge may best be understood from a consideration of the following description thereof, taken in connection with the accompanying drawings, wherein

Figure 1 is a side elevation of the upper portion of a door and frame, showing a double-acting hinge according to my invention applied thereto; Fig. 2 is a side elevation of the same hinge on an enlarged scale in the closed position of the door; Figs. 3 and 4 are front elevations of the respective hinge-leaves separately; Fig. 5 is a plan view of the hinge, Fig. 6 shows a form of the cam-curve and cooperating lug developed upon a plane; Fig. 7 is a cross-section on the line 7 of Fig. 1 through the upper part of the door-frame and door; Figs. 8, 9 and 10 are respectively a side, a front and a plan view of a single-acting hinge according to my invention.

In these drawings every reference letter refers always to the same part.

Describing first the double-acting form, in Fig. 1 the door is designated A and the door-jamb B, and the respective hinge-leaves *a* and *b*. The hinge-leaf *b* is herein shown as the fixed leaf and is provided with two pintle-lugs *c* and *d*, which carry the pintle or bolt *e*

of the hinge; while the swinging-leaf *a* has a single central pintle-lug *f* with a longitudinal perforation through which the bolt *e* passes. Each leaf is provided with screw-holes *g* for securing it to the door or frame. Opposite the lug *f* on the leaf *a* is a cam-lug *h*, which, as shown, is sloped or pitched downwardly on each side. Coöperating with this lug on the hinge-leaf *a*, and carried by the pintle-lug *f* thereof, is a fin *i*, the form of which is, generally speaking, a double helicoid, described about the bolt *e* as a center, and it has the cam surface *j* on its underside which rests upon the lug *h*. The form of the cam-surface *j* is best shown in Figs. 4 and 6. It in reality comprises two helicoidal surfaces which come together at the center, which is hollowed out as at *k* sufficiently so that this central point does not touch the lug *h*, but when the door is in closed position as shown in Figs. 1, 2 and 5, the lug *h* supports the oblique helicoidal flanks of the surface *j*. Also the lower ends of the surface *j* are more steeply pitched than the intermediate part, as shown; and at its ends, which represent an opening of the hinge of about 90° in either direction, the surface *j* is replaced by two oppositely sloping surfaces *m*.

When the door is opened, it will be readily seen that gravity acting upon the coöperating cam-lug *h* and cam-surface *j* tends in any position to throw it into the central or closed position, and when in the closed position the force tending to hold it closed and prevent it from opening slightly is positive and greater than when it is partly open. The greater obliquity of the surface *j* at the ends thereof also tends to give the door a more rapid acceleration when it is widely open and thus to close it in about the same time as if it was less widely open, and should the door be opened more than 90°, so that the cam-lug *h* passes off the surface *j*, it thereupon runs upon the surface *m*, and the latter, being of opposite obliquity, tends to open the door further and swing it back, thus acting as a check or hold-back for the door.

For the purpose of closing as far as possible any opening between the door and frame at the point where the hinge is attached, I may insert wooden or metal strips *n* which are attached preferably to the jamb and run from

top to bottom with the exception of the place occupied by the hinges, and I also prefer to fill the space between the lower lug *c* and the lug *h* by a web *o*, and the space between the fin *i* and the upper lug *d* by a web *p* which is made thin at the edge so as not to interfere with the turning and lifting of the fin *i*. The top edge of the door is lower than the lintel by the amount of rise of the door in opening, and the intervening space is filled with a thin strip *v*, which has an oblique bevel *w*; while the upper edge of the door is also obliquely beveled at *q*. This construction enables the door to operate freely, yet leaves no open space when the door is closed. I have also herein shown a novel construction of bolt *e* with means for preventing its rising out of place. The hinge-lug *d* is provided with an undercut shoulder *r* under which the edge of the bolt-head *s* projects, so that it cannot ordinarily rise from its position. To enable the bolt to be inserted, one side is flattened as at *t* and the bolt may also be provided, if thought desirable, with a nick *u* so as to enable it to be rotated by a screw-driver when set in place until the flat *t* no longer registers with the shoulder *r*.

The single-acting form of hinge shown in Figs. 8, 9 and 10 embodies the same principles but is for use with doors which open in one direction only. The hinge-leaves *a'* and *b'* are here formed somewhat differently than the leaves of the other form so that their bases lie in the same plane for attachment on the inner faces of the door and jamb respectively. The hinge-leaf *b'* carries the pintle-lugs *c'* and *d'*, and the hinge-leaf *a'* carries the pintle-lug *f'*, which swings on the pintle *e'* passing through all of said lugs. The pintle-lug *f'* carries a helicoidal fin *i'* which has on its lower side the cam-surface *j'*, this cam surface coming to a point at its lower or front end as shown at *x*, and beyond that distance being replaced by a cam-surface *m'* which slopes in the opposite direction. On the leaf *b'* there is a web *o'* connecting the pintle-lugs *c'* and *d'* and having near the center thereof opposite the lug *f'* a projecting cam-lug *h'* which serves as a rest for the fin *i'* and conforms to the shape of the cam-surfaces *j'* and *m'*, in like manner to the lug *h* in the previous form. It will be seen that the action is similar in both cases, for when the door is swung open, the leaf *a'* (here assumed to be the swinging-leaf) revolving on the pintle *e'* is raised until the point *x* passes over the top of the lug *h'*, and the surface *m'*, then tends to swing the door further open. The surface *j'* should, in like manner to the surface *j*, be more steeply pitched at its ends than in the center as shown. This form of hinge shows also a different arrangement for holding the pintle *e'*

in place, the shoulder *r* being replaced by an upwardly projecting snug *r'* which prevents the pintle *e'* from rotating by engaging the side of a flat *t'* formed on the head *s'* thereof.

I do not wish it understood that my invention is limited to the use of all the above described features and constructions, for some may be omitted and others may be varied or modified in various ways, as will readily occur to those skilled in the art. It will of course be understood, for example, that the two leaves can be reversed so that the leaf *a* is the fixed and the leaf *b* the swinging leaf, in which case the bolt *e* would be inserted from the opposite side and the lug *c* provided with a shoulder *r*, or both lugs *c* and *d* might be provided with such shoulder for alternative use. The bevels *q* and *w* might be straight instead of oblique, and so on.

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

1. A gravity-acting hinge comprising a hinge-leaf having a pair of pintle-lugs at the ends thereof, a pintle mounted on said lugs, a second hinge-leaf having a central pintle-lug pivoted and longitudinally movable on said pintle, a helicoidal fin projecting radially around said central lug and having a cam-surface, and a cam-lug carried by said first-named leaf and coacting with said surface.

2. A gravity-acting hinge comprising a hinge-leaf having a pair of pintle-lugs at the ends thereof, a pintle mounted in said lugs, a second hinge-leaf having a central pintle-lug pivoted and longitudinally movable on said pintle, a helicoidal cam-lug projecting radially around the exterior of said central lug and having a cam-surface, a cam-lug carried by said first-named leaf and coacting with said surface, and an oppositely sloping cam-surface on the extremity of said helicoidal lug corresponding with the wide-open position of the door whereby to maintain the door in said open position.

3. A gravity-acting hinge, comprising a hinge-leaf having a pair of pintle-lugs at the ends thereof, a pintle mounted in said lugs, a second hinge-leaf having a central pintle lug of substantially cylindrical form centrally perforated to receive said pintle and pivoted and longitudinally movable thereon, a helicoidal fin projecting radially around said central lug and having a cam surface on its lower side, and a cam-lug carried by said first-named leaf and coacting with said cam-surface.

4. A gravity-acting hinge, comprising a hinge-leaf having a pair of pintle-lugs at the ends thereof, a pintle mounted in said lugs, a second hinge-leaf having a central cylindrical pintle-lug perforated to receive said pintle and pivoted and longitudinally movable

thereon, a fin projecting radially from the cylindrical surface of said central lug and having its middle portion horizontal and its two end-portions helicoidal in opposite directions, the under side of said fin forming a cam-surface, and a horizontally projecting lug extending from the approximate center of said first-named leaf and having its upper surface of reverse V-section and coacting with the cam-surface of said helicoidal fin. 10

In witness whereof I have hereunto set my hand this seventeenth day of March, 1906.

RUDOLPH G. WINTER.

In presence of—

LORENZ F. WAGNER,

GEORGE W. COLLES.