No. 842,404. PATENTED JAN. 29, 1907.

F. C. KASCH & W. EBERHARD.

SELF CLOSING HINGE FOR SHUTTERS.

APPLICATION FILED MAY 25, 1904.

3 SHEETS—SHEET 1.

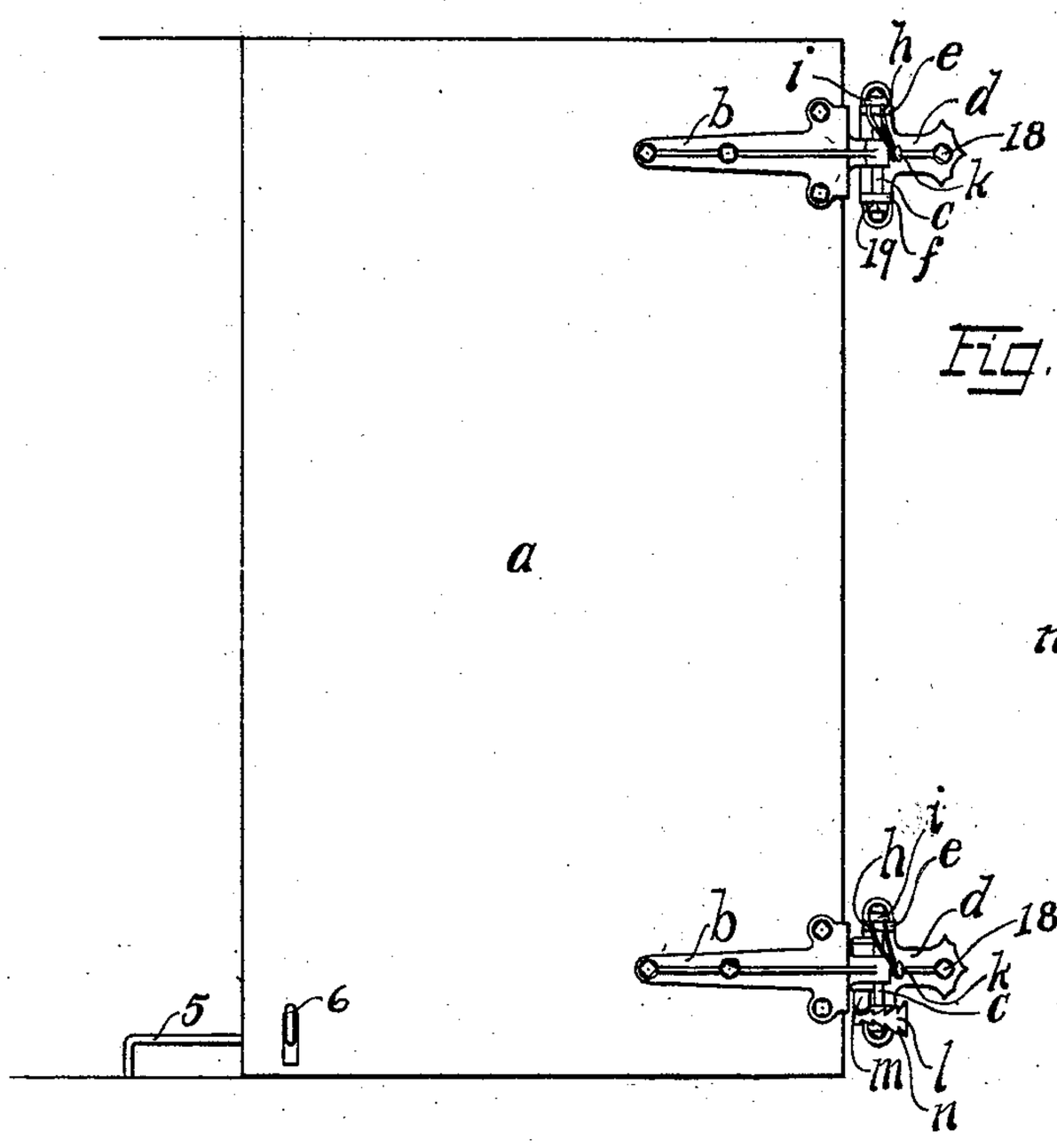


Fig. I.

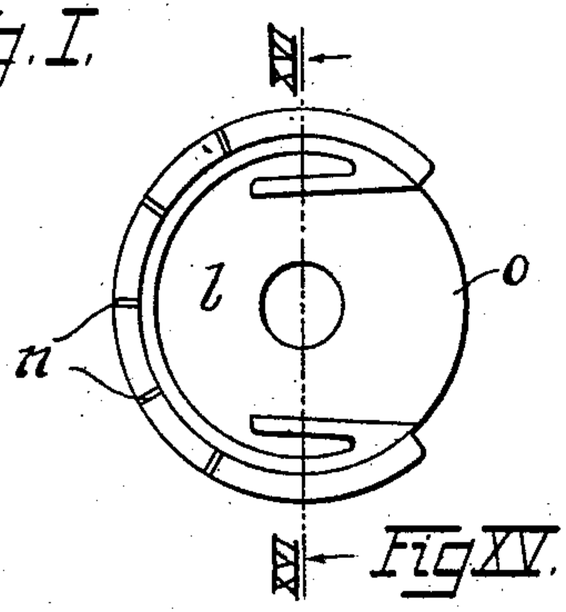


Fig. XV.

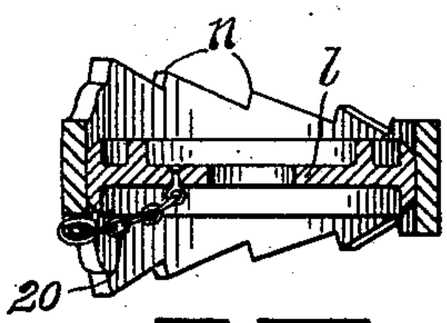


Fig. XVI.

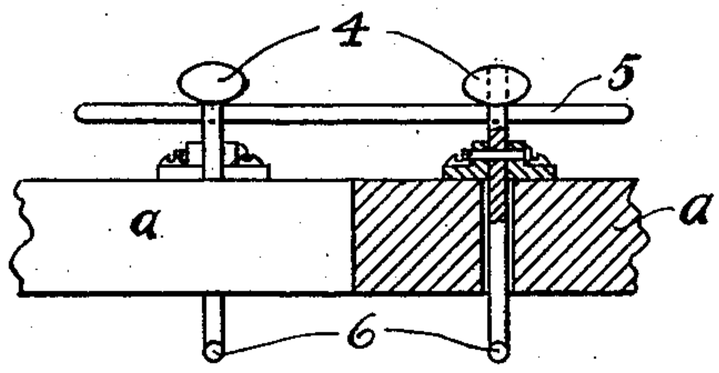


Fig. III.

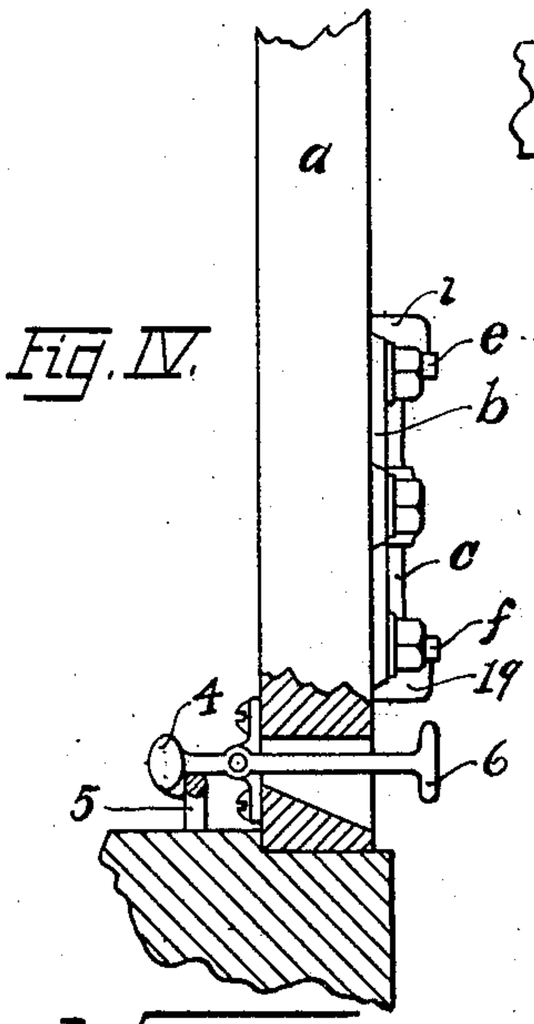
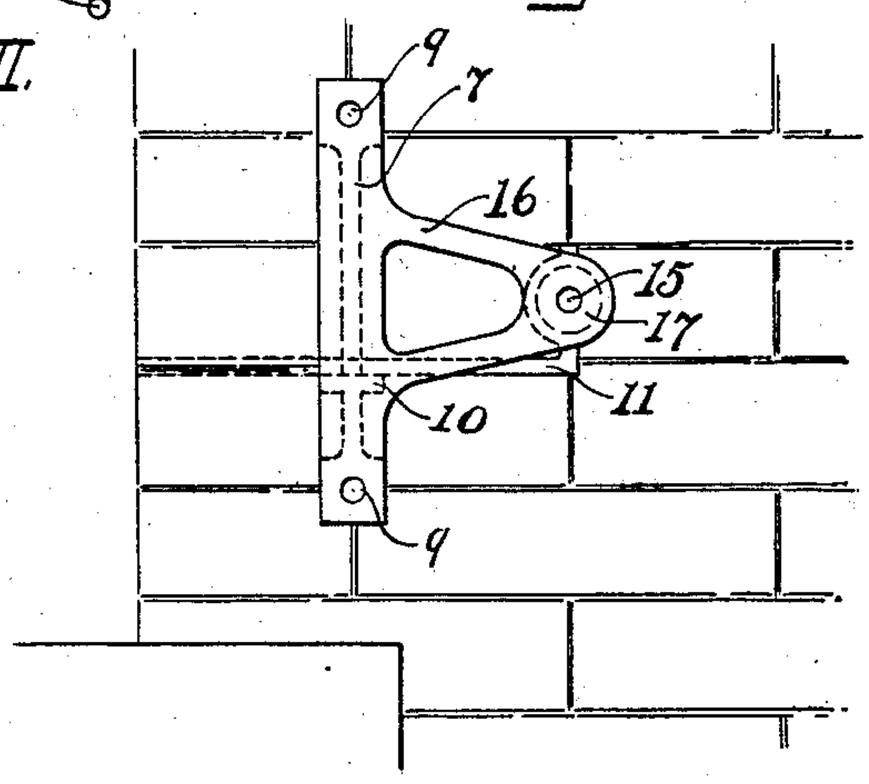


Fig. IV.

Fig. II.



Witnesses:
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and William Eberhard.
By Luther K. Hopper,
Attorney.

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Fig. V.

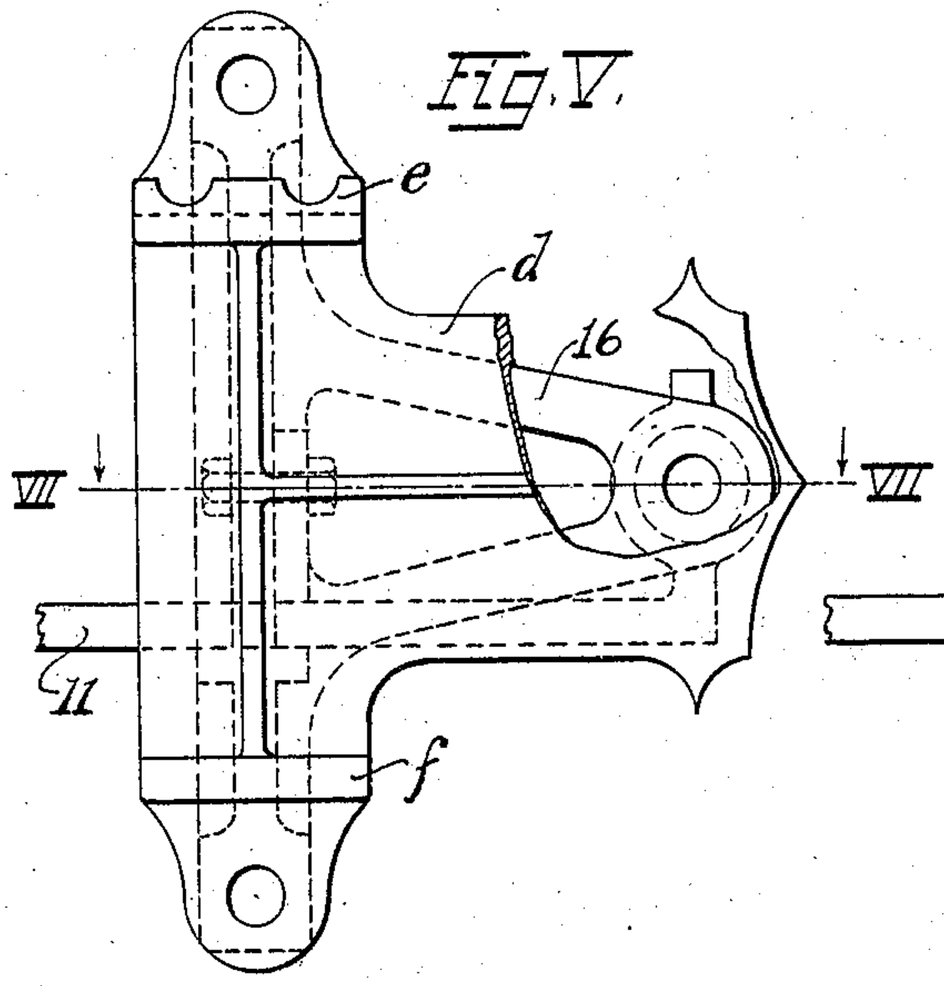

Fig. VI

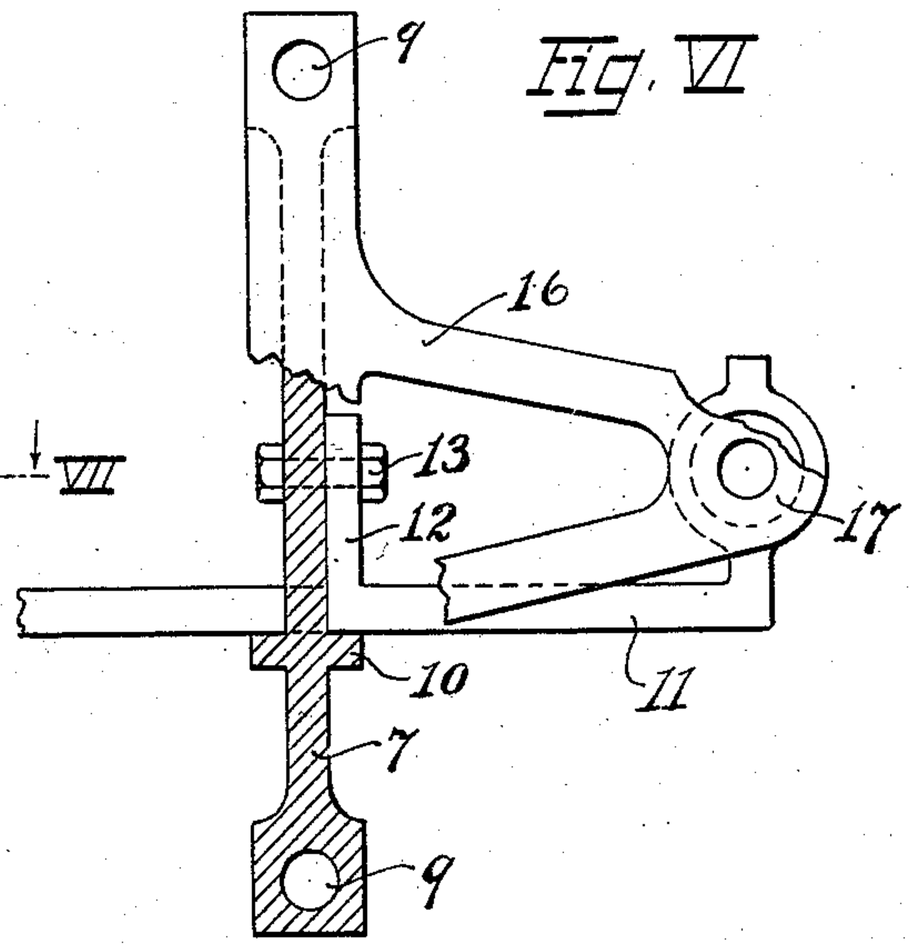

Fig. VII

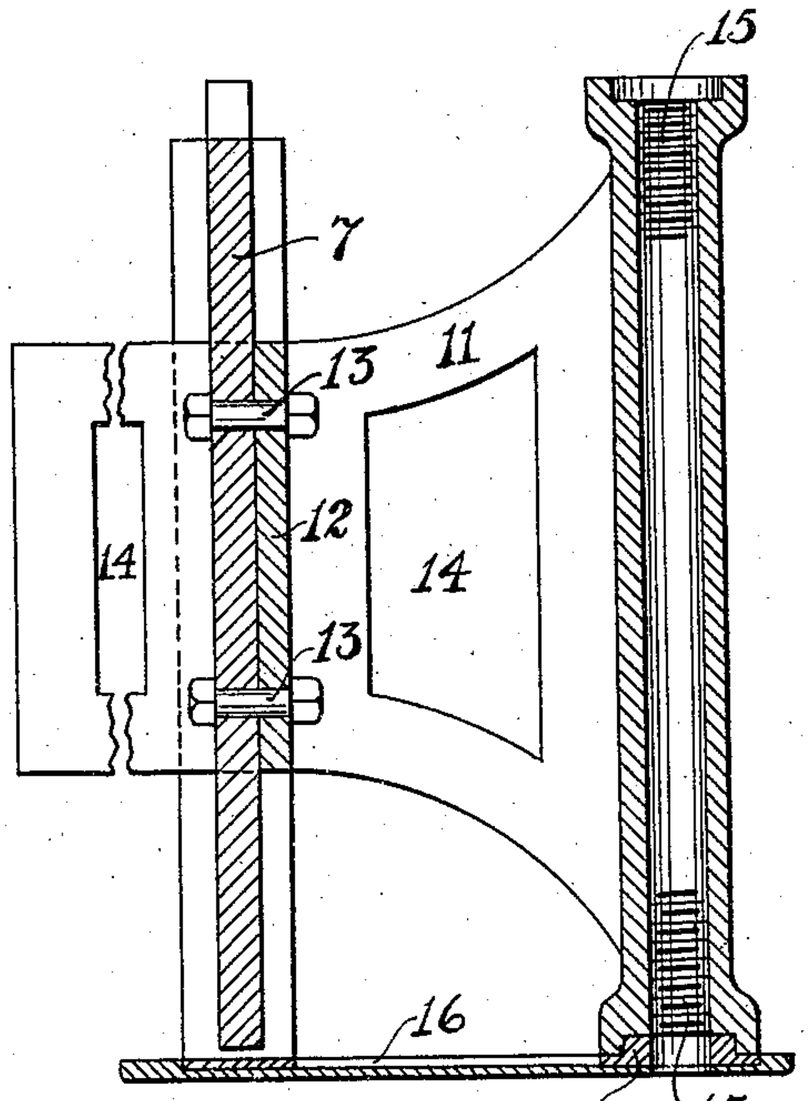

Fig. VIII.

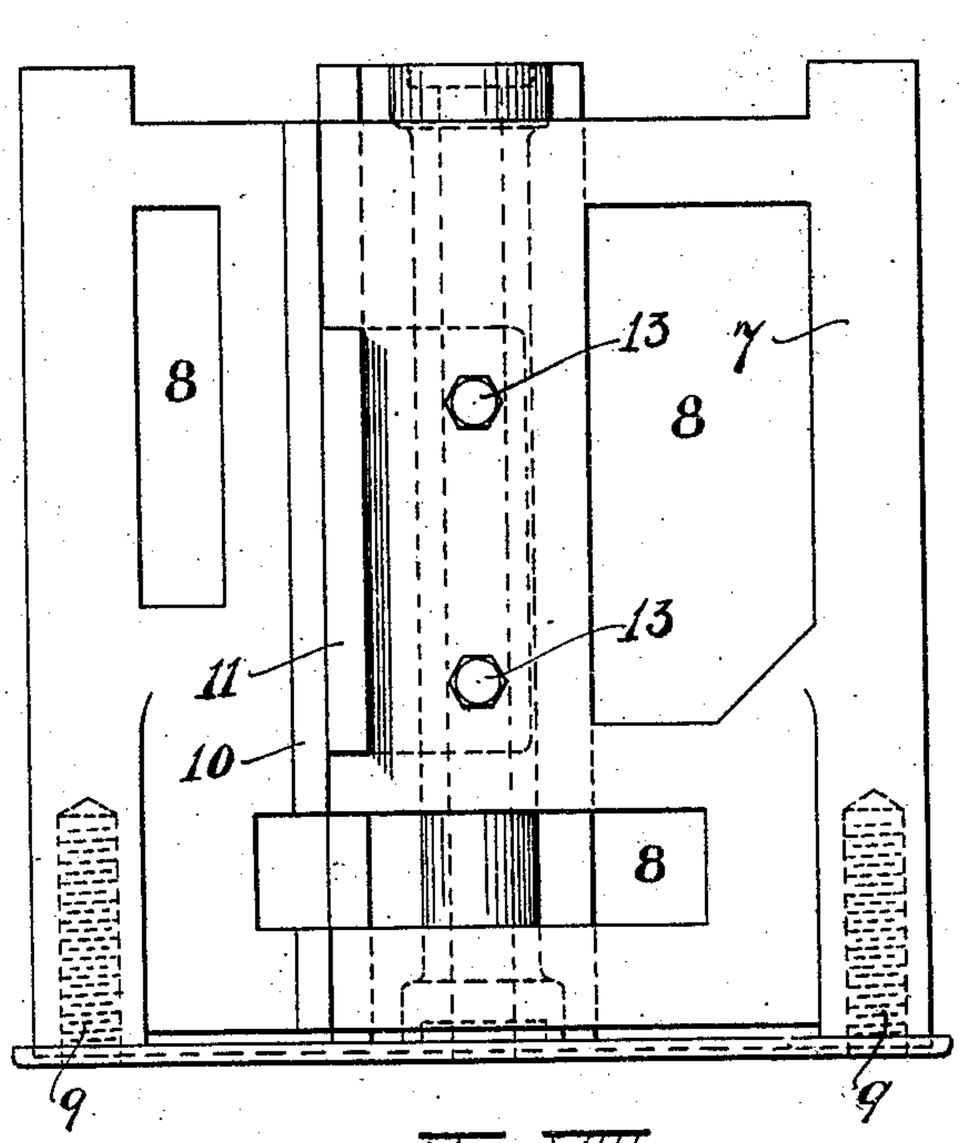

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Fig. IX

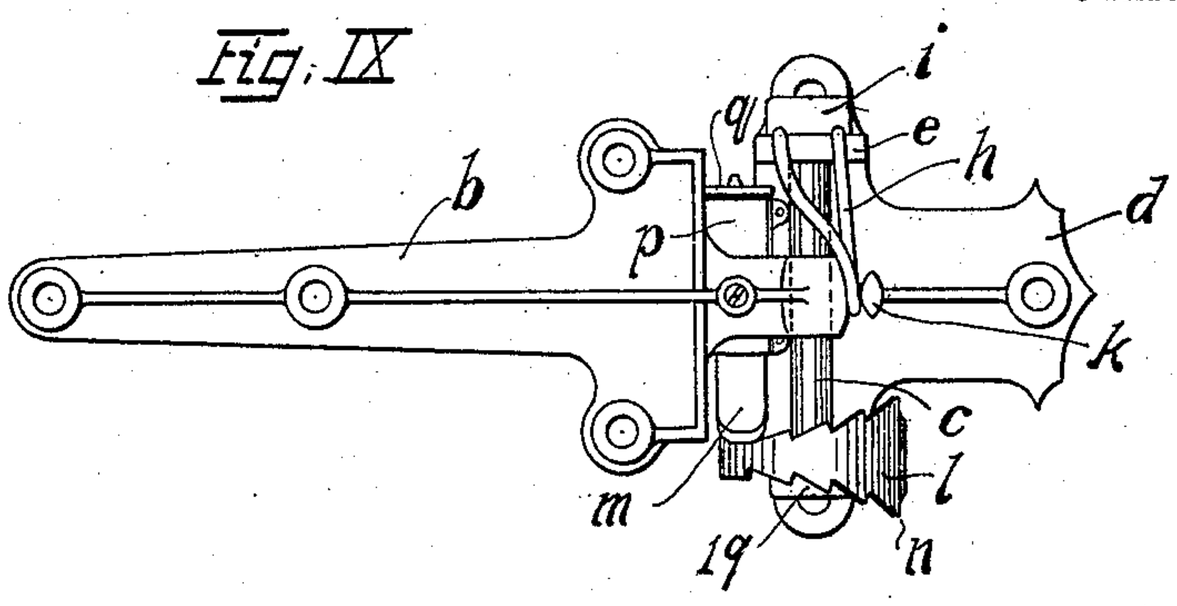


Fig. X

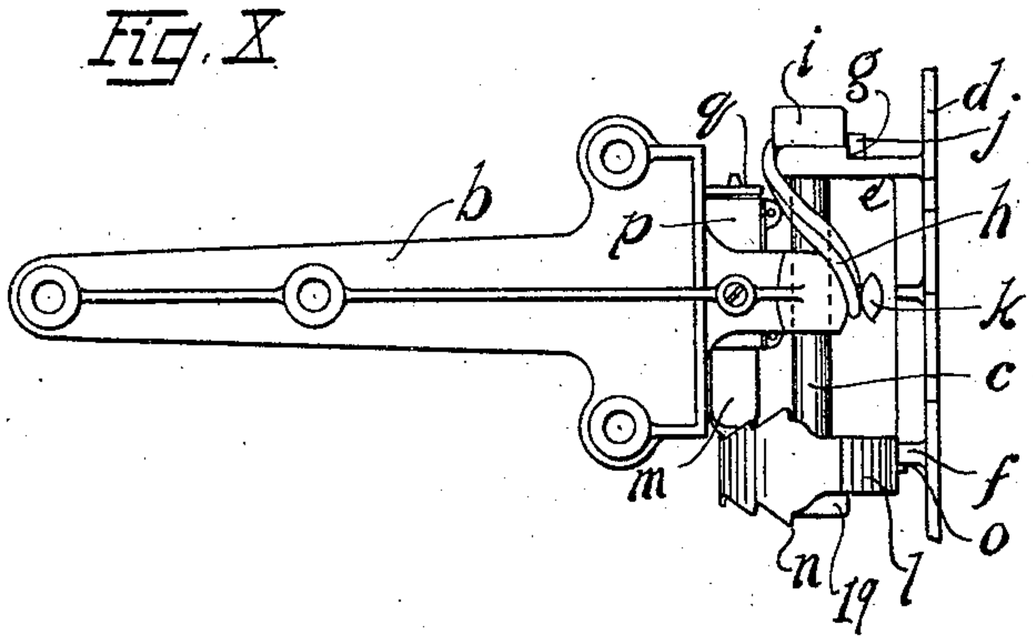
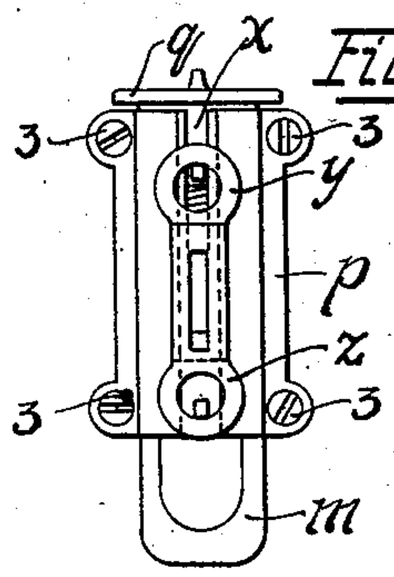
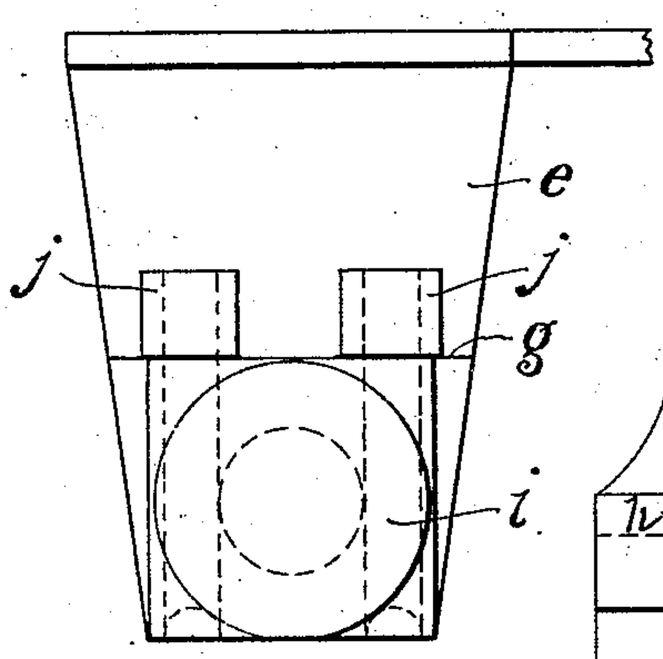


Fig. XIII.





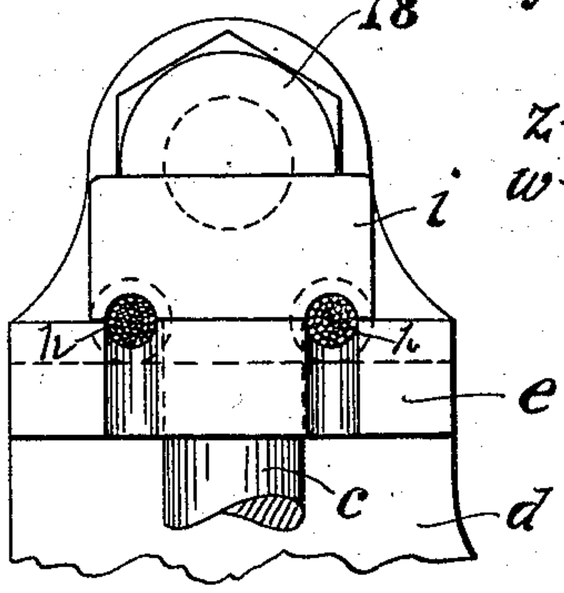


Fig. XIV.

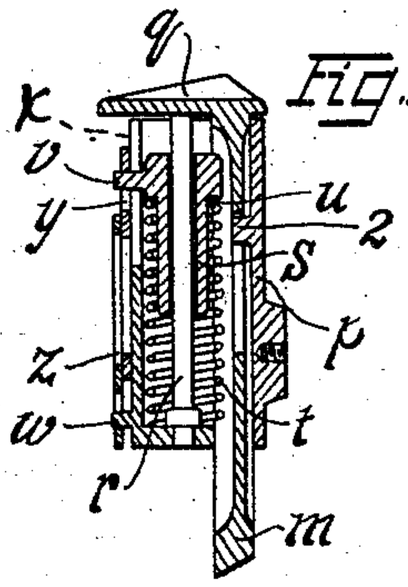


Fig. XI.

Fig. XII.

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UNITED STATES PATENT OFFICE.

FREDERICK C. KASCH AND WILLIAM EBERHARD, OF AKRON, OHIO, ASSIGNORS TO THE KASCH ROOFING COMPANY, OF AKRON, OHIO, A CORPORATION.

SELF-CLOSING HINGE FOR SHUTTERS.

No. 842,404. Specification of Letters Patent. Patented Jan. 29, 1907.

Application filed May 25, 1904. Serial No. 209,647.

To all whom it may concern:

Be it known that we, FREDERICK C. KASCH and WILLIAM EBERHARD, citizens of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Self-Closing Hinges for Shutters, of which the following is a specification.

The present invention relates to fireproof shutters for the windows and doors of buildings. Its object is, primarily, to provide a shutter which will close automatically and remain closed in the event of a fire occurring in its vicinity and also which may normally be opened to any angle desired, locked automatically in such opened position or when closed, and readily unlocked either from the inside or outside.

Further objects are to provide hinges and anchor-plates therefor which will not only be firm and durable, but also interchangeable for right or left handed shutters and interlocking, so as to insure the accurate fitting together of the parts.

To these ends our invention consists in the features and combinations hereinafter described and claimed, an embodiment thereof being illustrated in the accompanying drawings, in which—

Figure I is an outside elevation of a fire-shutter. Fig. II is an elevation of a portion of the face of a wall, showing the anchor-plates set therein. Fig. III is a plan view, partly in section; and Fig. IV is a sectional elevation of a portion of a fire-shutter, showing the latch. Fig. V is an elevation of the wall hinge-plate, partly broken away, showing the anchor-plates. Fig. VI is a front view, partly in section, of the anchor-plates. Fig. VII is a section taken on line VII VII of Fig. V. Fig. VIII is a side view of the plates shown in Fig. VII. Fig. IX is an outside view of the lower hinge as it would appear upon a closed shutter, and Fig. X shows the hinge as it would appear upon a shutter opened at right angles with the wall. Fig. XI is a plan view, and Fig. XII is a front elevation, of the upper portion of the hinge and cable fastening. Fig. XIII is a front view of the inner side of the pawl and its casing, and Fig. XIV is a section taken on the center line of Fig. XIII. Fig. XV is a plan view of the ratchet. Fig. XVI is a section taken on line XVI XVI of Fig. XV.

The reference-letter *a* indicates a fire-shutter which may be of the usual or any suitable type having two or more hinge-plates *b* bolted or otherwise securely fastened thereto and provided, respectively, with rearward projections bored to receive the upright hinge-bolts *c* and fit loosely thereon. The stationary or wall hinge-plates *d* are firmly secured to the wall of the building by bolts 18 and have outwardly-projecting lugs or brackets *e* and *f* to receive the hinge-bolts *c*, as shown. The upper hinge-lug *e* has a shoulder formed upon its upper face at *g*, and two parallel grooves extend, one upon each side of the hinge-bolt aperture, from said shoulder outward and down the outer edge of the lug. The end portions of a flexible cable *h*, preferably of fine tinned-steel wires, are laid, respectively, in said grooves, and corresponding grooves are formed in the under side of the head *i* of the hinge-bolt *c* to fit over said cable. The cable is also provided with sleeves *j*, soldered or brazed upon its ends, which are designed to bear against the shoulder *g* and the bolt-head *i* and prevent the cable ends drawing through the grooves. Upon the hub of the hinge-plate *b* a short projecting shank *k* is formed and provided with a head. This shank or button is designed to rest in the bight of the cable *h*, as shown, and the hubs of the plates *b* being much shorter than the distance between the lugs *e* and *f* the cables *h* are made of such length that they act as hangers and uphold the weight of the shutter. When the shutter is closed, the flexible hangers *h* assume the position plainly shown in Fig. IX, and as the shutter is swung open the said hangers wrap around their respective hinge-bolts *c*, which raises the plates *b* upon the hinge-bolts and lifts the shutter through a distance proportioned to the angle of its opening. It is therefore evident that the shutter will close by gravity unless means are provided to hold it open.

For the purpose of holding the shutter open under normal conditions at any desired angle a ratchet *l* and gravity-pawl *m* is provided, usually upon the lower hinge; but it should be placed upon the hinge which is most conveniently accessible. The ratchet *l* consists of a disk having a circular rim thereabout, upon which is soldered a circular segment *n*, provided with gradually-rising teeth adapted

to engage the pawl *m* and a central aperture to receive the lower end of the hinge-bolt c_1. The rim is notched at *o* to fit over the lower hinge-lug *f*, and it is held in place against the lower face of said lug by the nut 19 on the lower end of the hinge-bolt, as shown in Figs. IX, X, XV, and XVI. The ratchet is made double-faced, as shown, so that it can be used for either right or left handed hinges. A light chain 20 may be employed, connecting the segment *n* to the disk *l*, so that in case fire should occur and melt the solder the said segment will only drop the length of said chain from the disk *l*.

The gravity-pawl *m* is adapted to reciprocate vertically in an open-topped casing *p*, its lower edge being beveled to correspond to the ratchet-teeth and its upper end being formed into a head *q*, overlapping the said casing, as shown in Figs. XIII and XIV. A stop 2 should be provided to prevent the pawl being lifted out of the casing. The casing *p* is bolted to the inner side of the hub-arm of the hinge-plate *b*. Thus it will readily be understood that as the shutter is swung open the pawl *m* slides over and engages consecutively with the teeth on the segment *n* to hold the shutter open in any desired position and that the head of the pawl may be grasped and lifted by the hand, whereupon the shutter will close by gravity.

Set into the bottom of the pawl-casing *p* and standing upright therein is a guide-rod *r*, upon which a sleeve *s* is slidably mounted. A spiral spring *t* fits loosely in the casing *p*, resting upon the bottom thereof, and the lower part of the sleeve *s* is inserted in the upper end of said spring. The upper part of the sleeve *s* is larger in diameter than the part within the spring, thus providing a square shoulder at *u* for the latter to bear against. A vertical slot *x* is made in the upper part of the front of the casing *p*, through which a lug *v*, carried by the sleeve *s*, projects. A similar lug *w* projects from the front face of the casing near its lower end, the function of the lugs *v* and *w* being to receive and engage the respective ends of a fusible link to hold the spring *t* compressed in the casing. The said fusible link may be of the usual or any suitable design, consisting, essentially, of two parts *y* and *z*, held together with solder which fuses at a comparatively low temperature. Therefore while the pawl *m* engages the ratchet-teeth on the segment *n* to hold the shutter open under ordinary conditions should a fire occur in the vicinity of the device the resulting high temperature would soften the solder in the fusible link, whereupon the spring *t* would be released and raise the sleeve *s* with such force and impact against the under side of the pawl-head *q* that the said pawl would be suddenly released from and held above the ratchet-teeth, thus permitting the shutter to close by gravity, and in case the pawl should fail to be released the solder holding the ratchet-segment *n* would soon be melted, and thus release the shutter.

A latch 4, Figs. I, III, and IV, is hinged upon the inside of each shutter *a*, its inner end being weighted, beveled, and shouldered to ride over and engage with a staple or other suitable means 5, and it should be provided with a handle 6, extending through the shutter, so that it may be released from the outside, all as plainly shown in the drawings.

Since the walls of fireproof buildings are usually constructed of bricks, it is essential in equipping such buildings with fire-shutters to provide firm and durable means for their attachment, which we will proceed to describe. Set vertically in the wall, preferably the width of a brick thereof from the window or door aperture, is an anchor-plate 7, having openings 8 therein to be filled in with mortar and provided with tapped holes 9 in its front edge to receive, respectively, the upper and lower fastening-bolts 18 of the wall hinge-plate *d*. Ribs 10 are formed on the plate 7 to support a horizontal anchor-plate 11, which is inserted through an aperture in said vertical plate and provided with an upright flange 12, through which it is secured to the vertical plate by bolts 13. The plate 11 has openings 14 for receiving mortar and is flanged upward and widened at its outer end. A tapped hole 15 is formed in said outer flange for receiving the outer bolt 18 of the hinge-plate *d*, and said hole is counterbored, as shown. The plate 11 is preferably made with its inner and outer sides alike, as shown, so that it can be used upon either the right or left side of the shutter. A thin flange 16 is carried by the plate 7, designed to set close against the outer face of the wall, and extending rearwardly is provided with a boss 17, surrounding the bolt-hole and adapted to fit into the counterbore in the plate 11. Thus are the anchor-plates locked together and the proper positions of the hinge-bolt holes assured. The hinge-plate *d* is countersunk underneath, as shown in Fig. V, to fit over the flange 16, so that its outer edges fit against the wall, and whereby it is held more firmly in place.

Having now so fully described our invention that those skilled in the art to which it appertains can make and use it either in the form shown herein or under some modification thereof, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination of a stationary hinge-piece, an upright hinge-pin secured in said stationary hinge-piece, a swinging hinge-piece slidably mounted upon said hinge-pin, and a flexible hanger depending from said stationary hinge-piece and adapted to uphold said swinging hinge-piece, substantially as set forth.

2. The combination with a shutter, of a stationary hinge-piece, an upright hinge-pin secured in said stationary hinge-piece, a swinging hinge-piece secured to said shutter and slidably mounted upon said hinge-pin, and a flexible hanger depending from said stationary hinge-piece adapted to uphold said swinging hinge-piece and wrap around the hinge-pin as the shutter is opened, substantially as set forth.

3. The combination with a shutter, of a stationary hinge-piece, an upright hinge-pin secured in said stationary hinge-piece, a swinging hinge-piece secured to said shutter and provided with a hub slidably mounted upon said hinge-pin, and a flexible hanger depending from said stationary hinge-piece and supporting the hub of said swinging hinge-piece, said hanger being so disposed that it is wrapped around the hinge-pin by the opening of the shutter, substantially as set forth.

4. The combination with a shutter, of a hinge-piece adapted to be secured to the wall and having lugs projecting therefrom, an upright hinge-bolt mounted in said lugs, a flexible hanger depending from the upper one of said lugs having its ends secured thereto by said hinge-bolt, and a hinge-piece secured to the shutter provided with a hub slidably mounted upon said hinge-bolt and having a suitable button projecting therefrom adapted to be supported in the depending bight of said hanger, substantially as set forth.

5. The combination of a stationary hinge-piece, an upright hinge-pin secured in said stationary hinge-piece, a swinging hinge-piece slidably mounted upon said hinge-pin, a flexible hanger depending from said stationary hinge-piece and adapted to uphold said swinging hinge-piece, a circular ratchet upon said stationary hinge-piece, and a pawl carried by said swinging hinge-piece adapted to engage the teeth of said ratchet, substantially as set forth.

6. The combination with a shutter, of a stationary hinge-piece, an upright hinge-pin secured in said stationary hinge-piece, a swinging hinge-piece secured to said shutter and slidably mounted upon said hinge-pin, a flexible hanger depending from said stationary hinge-piece adapted to uphold said swinging hinge-piece and wrap around said hinge-pin as the shutter is opened, a pawl carried upon said swinging hinge-piece, and a ratchet upon said stationary hinge-piece having teeth concentrically disposed about said hinge-pin and adapted to consecutively engage said pawl as the shutter is opened, substantially as set forth.

7. The combination of a stationary hinge-piece, an upright hinge-pin secured in said stationary hinge-piece, a swinging hinge-piece slidably mounted upon said hinge-pin, a flexible hanger depending from said stationary hinge-piece adapted to uphold said swinging hinge-piece and wrap around the hinge-pin, a suitable ratchet carried by said stationary hinge-piece, a pawl-casing secured to said swinging hinge-piece, and a gravity-pawl mounted to slide vertically in said casing and engage consecutively the teeth of said ratchet, substantially as set forth.

8. The combination with a shutter, of a wall hinge-piece provided with an upright hinge-pin, a swinging hinge-piece secured to said shutter and slidably mounted upon said hinge-pin, a flexible hanger depending from said wall hinge-piece adapted to uphold said swinging hinge-piece and wrap around said hinge-pin as said shutter is opened, a suitable ratchet carried by said wall hinge-piece, a pawl-casing secured to said swinging hinge-piece, a pawl slidably mounted in said casing adapted to normally engage the teeth of said ratchet, and means adapted to disengage said pawl from said ratchet upon the temperature of said means reaching an abnormally high degree, substantially as set forth.

9. In a fire-shutter, the combination of a wall hinge-piece provided with an upright hinge-pin and a suitable ratchet, a hinge-piece secured to said shutter and slidably mounted upon said hinge-pin, flexible means for suspending said shutter from said wall hinge-piece adapted to raise the shutter as it is opened, a pawl adapted to swing with said shutter and normally engage with said ratchet, and means for releasing said pawl from said ratchet adapted to be thrown into operation by excessive heat, substantially as set forth.

10. In a fire-shutter, the combination of a wall hinge-piece provided with an upright hinge-pin and a suitable ratchet, a hinge-piece secured to said shutter and slidably mounted upon said hinge-pin, flexible means for suspending said shutter from said wall hinge-piece adapted to raise the shutter as it is opened, a pawl adapted to swing with said shutter and normally engage with said ratchet, spring-operated means for disengaging said pawl from said ratchet, and a fusible link adapted to hold said disengaging means out of operation, substantially as set forth.

11. In a self-closing shutter, the combination of a suitable stationary ratchet, a pawl-casing adapted to swing with the shutter, a gravity-pawl adapted to engage said ratchet slidably mounted in said casing and provided with a suitable head, a releasing-piece mounted to slide vertically in said casing under the head of said pawl, a spring under said releasing-piece, and a fusible link outside of said casing connecting the latter to said releasing-piece and holding said spring in compression, substantially as set forth.

12. The combination with a shutter hav-

ing a hinge-plate attached thereto, of a vertical wall anchor-plate, a horizontal wall anchor-plate extending through and secured to said vertical anchor-plate, and a wall hinge-plate adapted to be attached to both of said anchor-plates, substantially as set forth.

13. The combination with a shutter having a hinge-plate attached thereto, of a vertical wall anchor-plate provided with a flange adapted to lie against the wall-face, a horizontal wall anchor-plate extending through and bolted to said vertical anchor-plate and interlocking with said flange, and a wall hinge-plate adapted to fit over said flange and be bolted to both of said anchor-plates, substantially as set forth.

14. In a fire-shutter, the combination of a wall hinge-piece provided with an upright hinge-pin, a shutter hinge-piece mounted to swing upon said hinge-pin, a pawl adapted to swing with said shutter, a ratchet center piece secured to said wall hinge-piece, and a circular segmental ratchet soldered to said center piece and provided with teeth to engage said pawl, substantially as set forth.

In testimony whereof we affix our signatures, in the presence of two subscribing witnesses, at Akron, Ohio, this 2d day of May, 1904.

FREDERICK C. KASCH.
WILLIAM EBERHARD.

Witnesses:
PETER THEKEN,
W. R. MCNABB.