

No. 705,699.

Patented July 29, 1902.

T. OHNO.

AUTOMATIC FIRE PROTECTING SHUTTER.

(Application filed Jan. 17, 1902.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

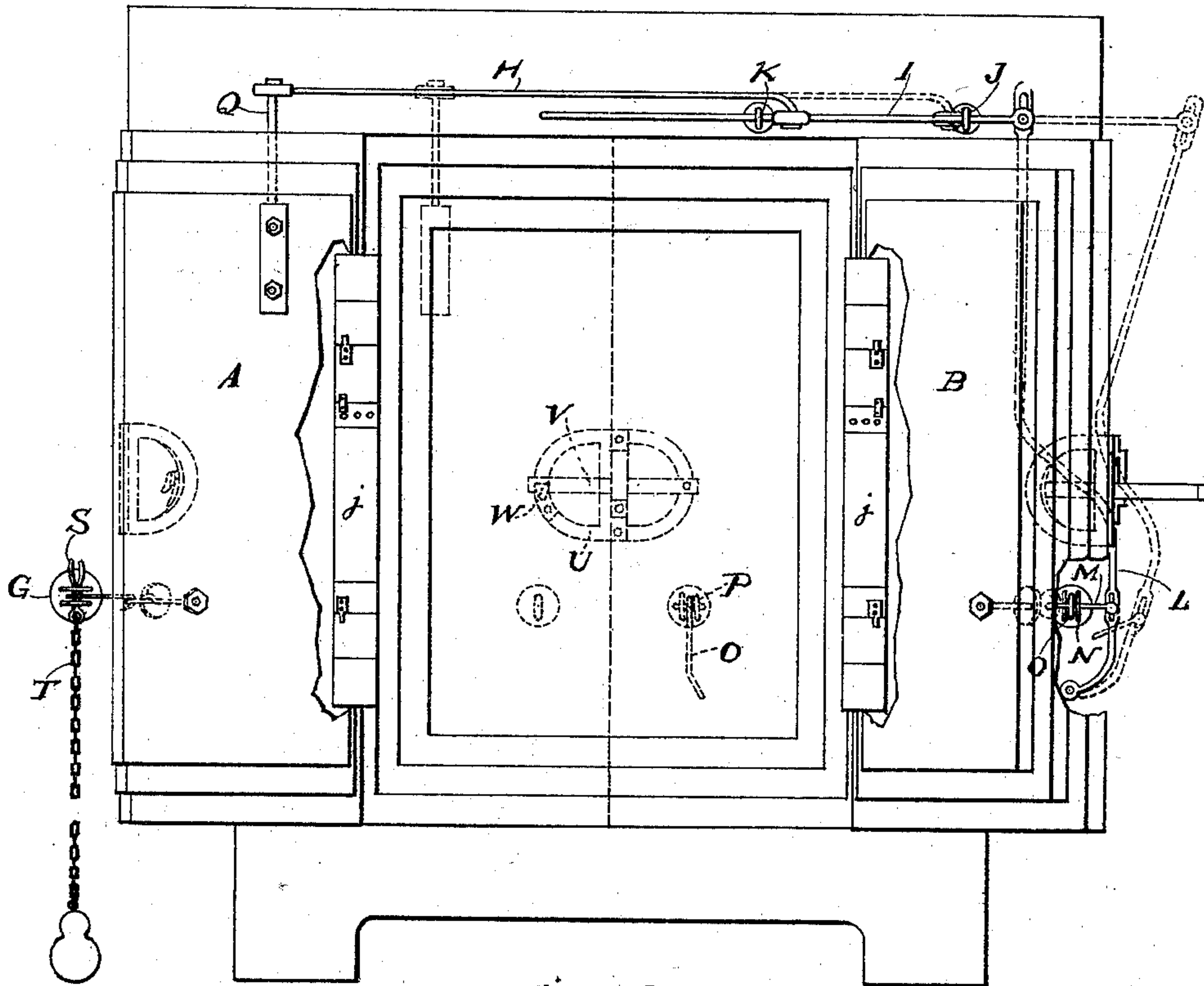
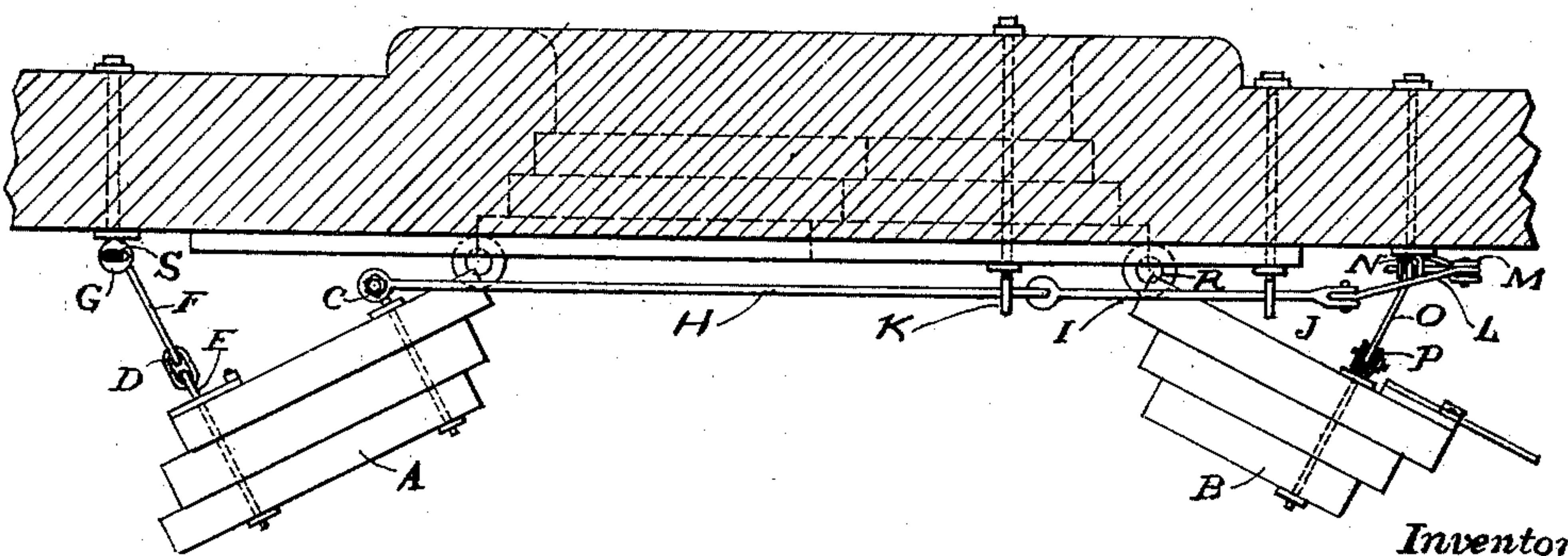


Fig. 2.



Inventor.

Witnesses.

Hiroshi Mori
Ludwig Fum

Tadaschi Ohno
by J. H. Singer
Att'y.

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Fig. 3.

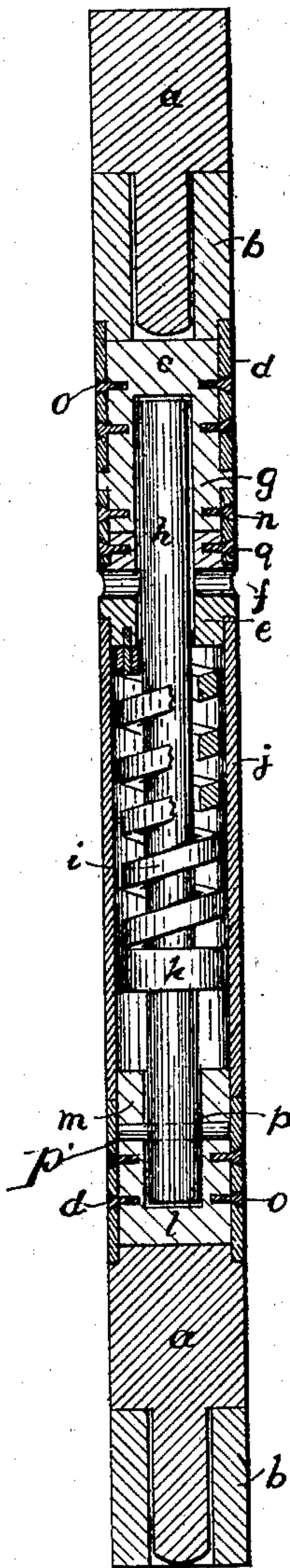
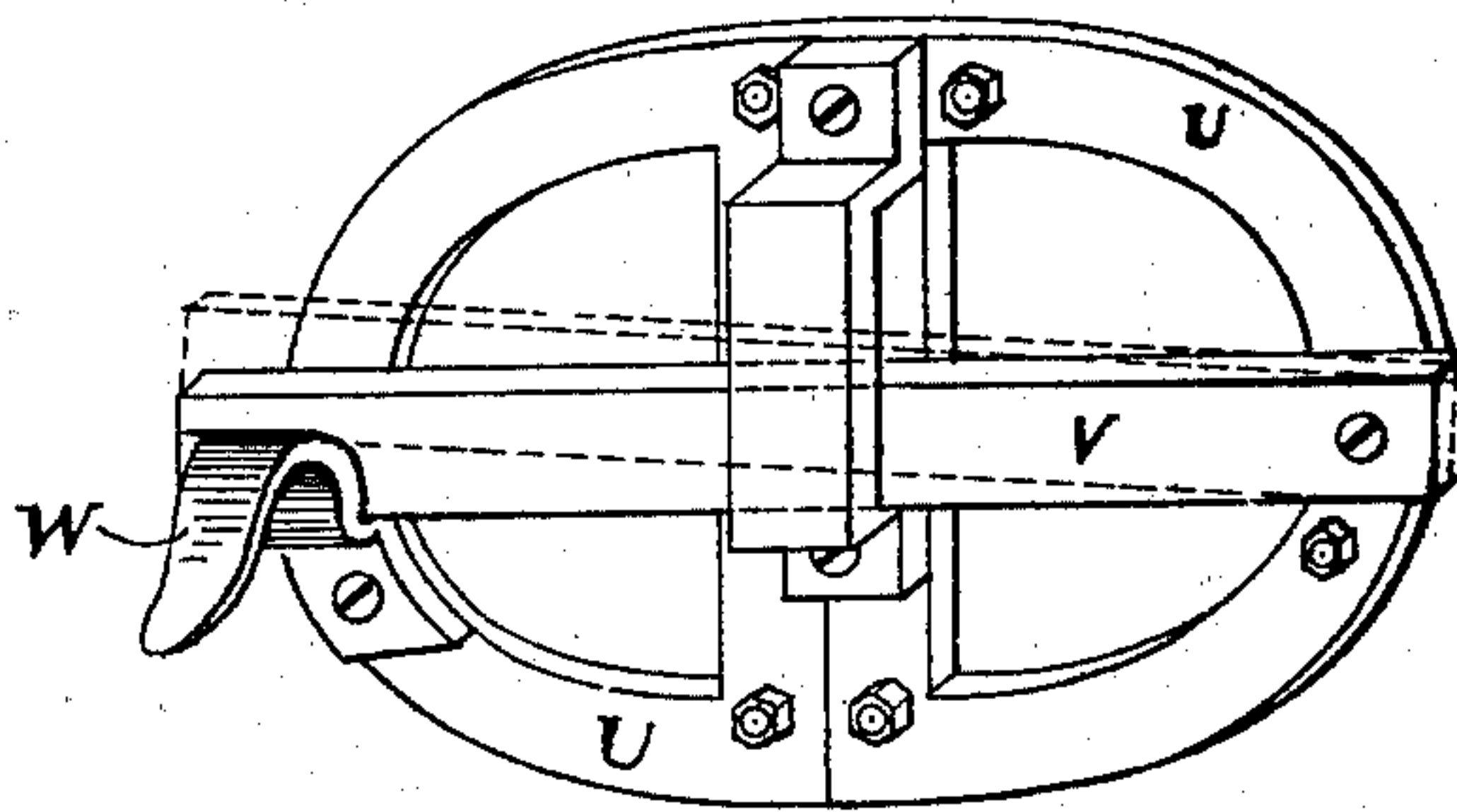


Fig. 4.



Witnesses.

Hiroshi Mori
Ludwig Flum

Inventor.

Tadaschi Ohno
by P. J. Singer
Atty.

UNITED STATES PATENT OFFICE.

TADASHI OHNO, OF TAKAGI, JAPAN.

AUTOMATIC FIRE-PROTECTING SHUTTER.

SPECIFICATION forming part of Letters Patent No. 705,699, dated July 29, 1902.

Application filed January 17, 1902. Serial No. 90,126. (No model.)

To all whom it may concern:

Be it known that I, TADASHI OHNO, manufacturer, a subject of the Emperor of Japan, residing at No. 16^b Nishi-Kaisho street, village of Takagi, county of Nakakubiki, prefecture of Niigata, Japan, have invented certain new and useful Improvements in Automatic Fire-Protecting Shutters, of which the following is a specification.

10 This device relates to an automatic fire-protecting shutter adaptable to the two wings of a door of a storehouse or similar building requiring protection from fire. A hinge-joint of a door, by means of which the door may
15 easily be closed or opened, is regulated by a spiral spring or other similar resilient device, so that the wing can be swung inward automatically. At the same time the door is kept open against its resiliency by a ring or a link
20 made of metal of a low melting temperature or other suitable materials and which connects a staple-bolt fitted to the door and another staple-bolt fitted to the wall of the building. The connecting part will be melted and
25 severed when heated by fire, and as soon as one wing of the door is shut automatically in this way the other wing is also made to move itself to its place.

30 The object of this invention is, first, to automatically shut the door when near fire with regularity and precision, so as to make it serve the purpose of a perfect fire-protector, and, second, to make the shutting of the door by hand a very simple and easy process.

35 In the accompanying drawings, in which the invention is represented in connection with the double-winged door or shutter of a storehouse, Figure 1 is a front elevation of the apparatus partly broken away to ex-
40 pose the door-hinges and representing in full lines the doors open and in dotted lines the doors when closed. Fig. 2 is a top plan view of the apparatus with the doors open and secured by the releasing apparatus. Fig. 3 is
45 an enlarged detail, in longitudinal section, of one of the door-hinges; and Fig. 4, an enlarged detail of the door-latch.

Referring now to Figs. 1 and 2, the forked eyebolt G is fitted to the wall opposite to a
50 left-hand wing A of the shutter or door of the storehouse, and another eyebolt E is fitted to

the door. These two bolts are connected when the door is to be held open upon its hinge by a ring D and a link F, which are made of a very easily melting metal or similar suitable
55 materials, and through the eyebolt G and the link F a split pin S with a forked end is put, a string being hung down from its lower end. A standard Q is fitted to the door A, and its upper end is loosely fitted to the eye at the
60 left-hand end of a horizontal rod H. The right-hand end of this rod H is bent downward to fit loosely to an eye at the middle part of a rod I, which passes into and is
65 guided by two eyebolts J and K, fixed to the right-hand part of the wall. At the right-hand end of the rod I is jointed by a pin-joint the upper end of a lever L, the lower end of which is hinged to the wall, the upper part
70 being freely movable. This lever L has its lower portion curved outward like a bow, and in that curved portion an eye end of a short locking-pin M is jointed. The other end of
75 this pin M is passed through eyes in the forked head of a bolt N, fixed to the wall, and an eye in the end of a link O, which has another eye at its farther end jointed to the
80 forked head of an eyebolt P, fixed at the lower part of the right-hand wing B, thereby holding it open upon its hinge.

Now passing to Fig. 3, which represents in enlarged section one of the hinges upon which the doors A and B are mounted and which effect the closure of the doors that turn there-
85 on when the latter is released, the hinge-sockets *b* are fixed to the wall of the storehouse like the sockets of an ordinary gate-hinge in order to receive the pintles *a a'* of the door or door-wing. An inverted socket *c* is securely fixed to the bottom of the upper
90 hinge-socket, so as to be immovable therein, by means of the plates *d* and fasteningscrews *o*, and a revoluble sleeve *e*, which has a circumferential series of radial holes *f* to receive pins whereby it may be turned, is de-
95 tachably fastened to said socket *c* by means of connecting-plates *n* and screws *q*. A cylindrical bore is carried axially through the revoluble sleeve and into the inverted socket to receive the head of a central rod *h* and
100 permit it to turn freely therein. Fitting into a circumferential rabbet at the lower edge of

the revoluble sleeve, but otherwise unattached thereto, is a cylindrical housing *j*, which extends downward to a like connection with the upper end of a block *m*, secured by plates *d'* and screw *o'* to the lower pintle *a'* of the door or door-wing, so as to rotate with said pintle. Block *m* has a socket *l*, in which the lower end *p* of the central rod *h* is secured in such manner—for instance, by pin *p*—as to cause said rod to rotate with said block and pintle. Inclosed within the housing and surrounding the rod *h* is a strong coiled spring *i*, the upper end of which is secured fast to the revoluble sleeve and the lower end to the collar *k*, fixed to said rod. The tension of this spring is adjusted by releasing the revoluble sleeve from the upper rod-socket *c* and giving it a sufficient number of turns to reach the desired degree, then making it fast to said socket again. The direction in which the spring is wound is such as always to resist the opening of the door or door-wing. Therefore when the wings are in the position indicated in Fig. 2 there is always a strong spring force tending to return them, so that when released they are automatically closed by such force.

In Fig. 4 I have indicated a fastening device for automatically locking the doors when closed. Two straps or plates *U* and *U'* of elliptical shape when placed together are bolted the first to the front and center of the wing *A* and the second to the front and center of the wing *B* where the two meet each other. A horizontal bar *V* is loosely fitted to the plate *U'* by its one end, the other end being free to be held by a catch *W*, attached to plate *U*, which catch has a recess to receive the free end of the bar, the front end of said catch projecting outward to make a sloped surface.

By this invention, as above described, doors are left to adjust by themselves with no need of human agency in shutting them, when a fire breaks out. When the flames approach the device and the ring *D* becomes heated, it melts even in a very low temperature. The door *A*, now being set free from its attachment to the wall, is automatically closed by the action of the special spring *i*, provided in the hinge-joint. With this closing movement of the door *A* the rod *H* moves to the right and shifts the rod *I* and lever *L* in turn to the right, so that the short pin *M*, which passes through the eyes at the joint of the staple-bolt *N* and the link *O*, is withdrawn from said eyes, thereby disengaging the link from the bolt. The door *B* is thus released from its attachment to the wall and by the action of the spiral spring in the hinge-joint shuts itself a little later than the door *A*. At the same time the bar *V* of the door *B* closes into the recess of the catch *W*, fixed to the plate *U* on the door *A*, thus latching the doors. When the door is to be shut by hand, the string *T*, which is hung under the split pin *S*, is pulled downward, and in consequence the split pin is

drawn out of the eyes at the joining-point of staple-bolt *G* and the connecting-link *F*, disengaging the link from the bolt, and the door *A* shuts itself by its self-acting hinge just as if the connecting-ring *D* were melted and severed by heat, but leaving the latter intact. All this is done with such regularity and precision as to effect completely the object of protection from fire.

It is evident that the wing *A* may constitute a door or shutter by itself if the opening to be guarded is sufficiently small.

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

1. A fire-protecting shutter, in combination with a spring-inclosing hinge upon which it opens against the stress of the spring, an eye projecting from the outer side of said shutter, an easily-fusible ring connected to said eye, a link connected to the ring, and an eye secured to the exterior wall of the building, to which said link is hinged, whereby the shutter is held open by connection with the wall until released by the fusing of the ring and then closed by the action of its spring-hinge.

2. A fire-protecting shutter, in combination with a spring-inclosing hinge upon which it opens against the stress of the spring, an eye projecting from the outer side of said shutter, an easily-fusible ring connected to said eye, a link connected with said ring, an eye secured to the exterior wall of the building, and a readily-removable pin connecting the link to said eye, whereby the door may be released by hand, and allowed to close without destruction of said ring.

3. In automatic fire-protecting apparatus, the combination of two coacting door-wings or shutters opening upon spring-inclosing hinges against the stress of said springs, a connection readily destructible by heat holding one of said shutters open, and connections between said shutter and the other whereby the latter is concurrently held open, said connections being actuated by the first shutter in its closing movement to release the other and permit it to close immediately following the first.

4. In automatic fire-protecting apparatus, the combination of two coacting door-wings or shutters opening upon spring-inclosing hinges and against the stress of the springs therein, a connection readily destructible by heat holding one of said shutters open, a locking-pin holding the second shutter open, connections between the first shutter and said pin, actuated by said shutter in its closing movement to withdraw said pin and cause the second shutter to close immediately following the first, a catch upon the outer face of the first shutter and a latch-bar upon the outer face of the second shutter, whereby the shutters are latched as they close.

5. In an automatic fire-protecting apparatus, the combination of the shutters *A* and *B*,

their spring-hinges, the fusible ring D, the
eyebolt E on shutter A, the link F, the forked
eyebolt G connected to the wall, coupling-
pin S uniting said link and bolt, standard Q,
5 rods H and K, lever L, locking-pin M jointed
to said lever, the forked eyebolt N into which
the locking-pin takes, the link O matching
into said latter eyebolt and coupled thereto
by the locking-pin and the forked eyebolt P

on shutter B, and to which the other end of
said link O is hinged.

In testimony whereof I affix my signature
in presence of two witnesses.

TADASHI OHNO.

Witnesses:

KINBEI FOYODA,
JOHN MCLEAN.