(No Model.)

N. H. REYNOLDS.

AUTOMATIC SHUTTER FOR FIRE PROTECTION.

No. 574,002. Patented Dec. 29, 1896.

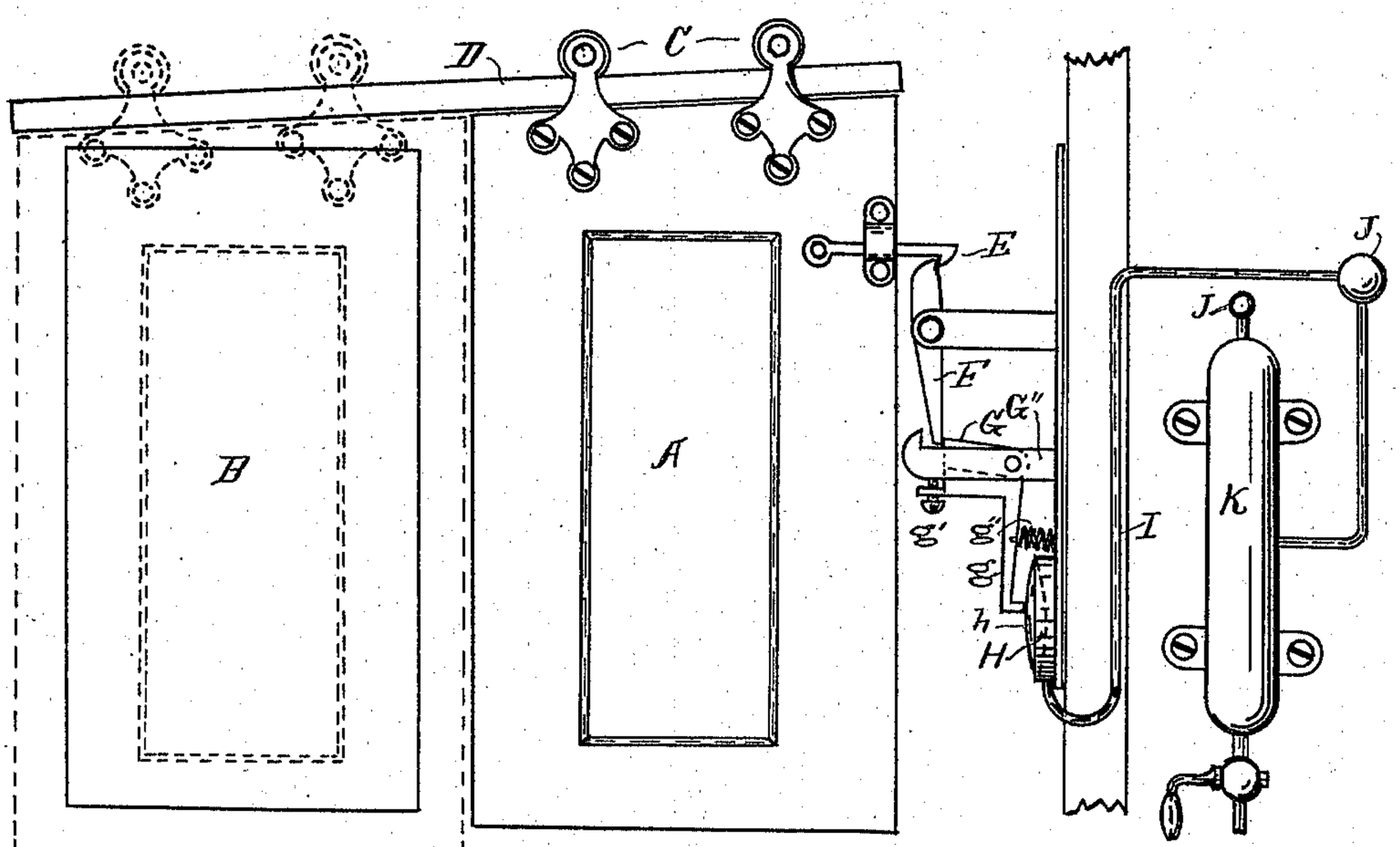

Fig. 1.

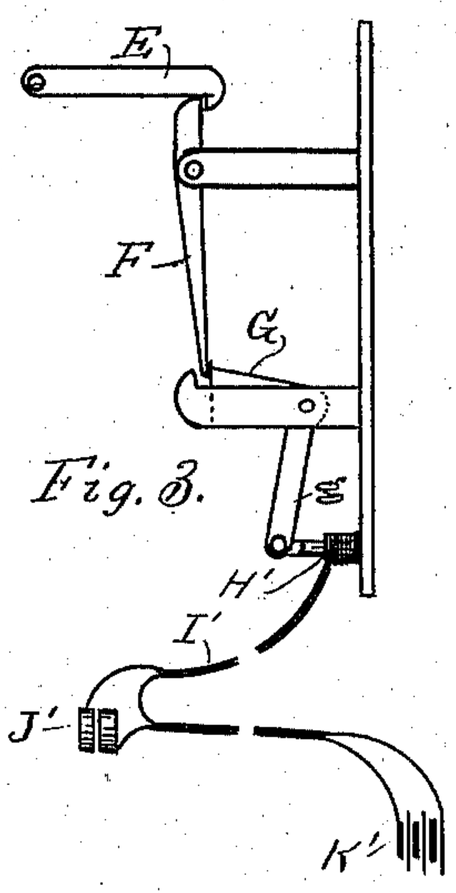

Fig. 3.

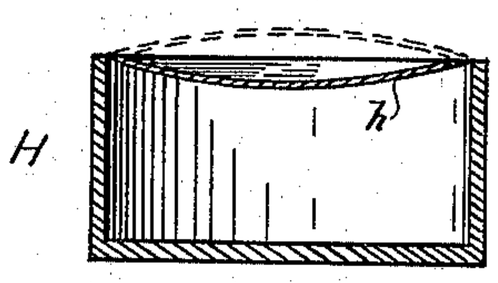

Fig. 2.

Witnesses.

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UNITED STATES PATENT OFFICE.

NOAH H. REYNOLDS, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR OF ONE-HALF TO CHARLES W. DAVIDSON, OF SAME PLACE.

AUTOMATIC SHUTTER FOR FIRE PROTECTION.

SPECIFICATION forming part of Letters Patent No. 574,002, dated December 29, 1896.

Application filed September 17, 1895. Serial No. 562,812. (No model.)

To all whom it may concern:

Be it known that I, NOAH H. REYNOLDS, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Automatic Shutters for Fire Protection, of which the following is a specification.

My invention relates to improvements in door and window shutters for use on fireproof buildings; and its objects are, first, to provide an appliance that will close the shutters automatically from the effects of unusual heat in any portion of the building, and, second, to provide an appliance for automatically closing fire-shutters that may be operated either with air, electricity, water, or heat, or any other desirable element. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 shows my appliance upon an enlarged scale and a shutter and opening upon a smaller scale, to show more completely the manner of applying the same. Fig. 2 is a cross-section of the diaphragm that actuates the levers to release the latch that holds the shutter open; and Fig. 3 shows my levers, &c., as actuated by electricity.

Similar letters refer to similar parts throughout the several views.

A is the shutter.

B is the opening to be closed.

C are the rollers that support the shutter, and D is the track upon which the rollers C travel.

E is a latch that is pivoted at one end to the shutter and the other end arranged to engage with the latch F to hold the door to the position shown in Fig. 1. This latch is pivoted to the support G′, and its lower end is in position to engage with the end of the angle lever or catch G which is pivoted to the support G″. The lower arm *g* of this angle-lever presses against the flexible cover *b* of the chamber H, which is designed to receive air under pressure, and is secured in such a position that when the compressed air is admitted therein the cover is thrown to the position shown in Fig. 1 and indicated by the dotted lines in Fig. 2, and the arm G will be held to the position shown in Fig. 1 and will hold the latch F to place; but if the air is exhausted from the auxiliary chamber the flexible cover will collapse to the position shown in Fig. 2 and indicated by the dotted lines in Fig. 1, and will allow the arm *g* to be drawn back by the spring *g*″ and the arm G to be drawn down, so that the latch F may be thrown over by the weight of the door upon its opposite end and will release the door and allow it to move to position over the opening B. (See Fig. 1.)

I place a screw *g*′ through the end of the arm G in position to bear upon the support G″ for the purpose of regulating the necessary travel of the arm G to draw it off from the arm F and free the latch and allow the shutter to close.

I provide for inflating the auxiliary chamber by the use of an air-chamber K, which I fill with air to the requisite pressure and connect it with the auxiliary chamber by a pipe I, so that a free passage is provided for the air from the one to the other and for the escape of the air from the chambers by inserting a number of fusible plugs J at points most likely to be affected by an excess of heat produced by a fire in any portion of the building, so that the air will escape and allow the flexible head to collapse with the results hereinbefore stated.

In Fig. 3 I have indicated how this appliance may be actuated by electricity. In this view H′ represents a temporary magnet, which may be of any of the well-known forms available for the purpose. I′ is the conductor-wire ordinarily used for the purpose. J′ is a thermostat, and K′ is an electric battery. The completion of the electric circuit is effected by the expansion of the metals of which the thermostat is made sufficiently to bring them in contact in the usual manner or it may be effected in any other available manner, as the releasing of a metal by the melting of some easily-melting substance and allowing it to come in contact with a companion metal conductor.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination with a fire-shutter, of a latch pivoted at one end to the shutter, a

second latch pivoted to stand at right angles therewith, a lever to hold said latch in contact with the first latch, an air-chamber, an auxiliary chamber having a flexible cover in position to actuate said lever, an air-pipe connecting said chambers, and fusible plugs in said chambers and pipe, substantially as and for the purpose set forth.

2. The combination in a fire-shutter of a series of latches for securing the shutter open, an angle-lever for locking said latches to place, a set-screw for adjusting said angle-lever, an air-chamber, an auxiliary air-chamber having a flexible cover, a spring upon one arm of said angle-lever to draw it toward the flexible cover, pipes connecting said chambers, and apertures in said chambers and pipes that will be opened by excessive heat and allow the air to escape, substantially as and for the purpose set forth.

3. In combination with a fire-shutter, a latch pivoted at one end to the shutter, a second latch to engage the free end of said latch, an angle-lever to control said second latch, a set-screw to adjust said lever, and means for releasing said lever and latches by the action of heat, substantially as specified.

Signed at Grand Rapids, Michigan, September 12, 1895.

NOAH H. REYNOLDS.

In presence of—
CHAS. W. DAVIDSON,
I. J. CILLEY.