

No. 881,256.

PATENTED MAR. 10, 1908.

E. H. McCLOUD.
AUTOMATIC FIRE SHUTTER.
APPLICATION FILED FEB. 25, 1907.

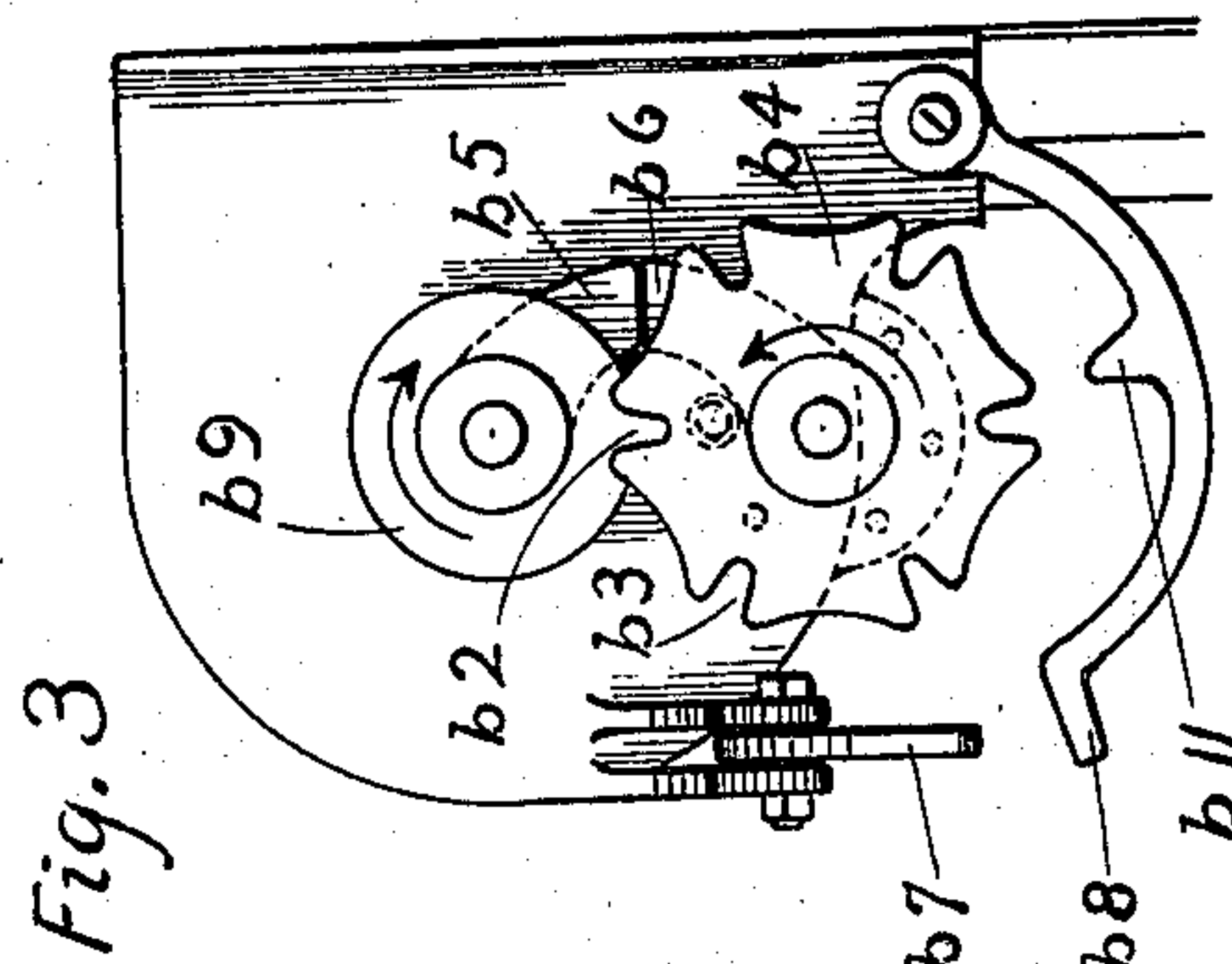
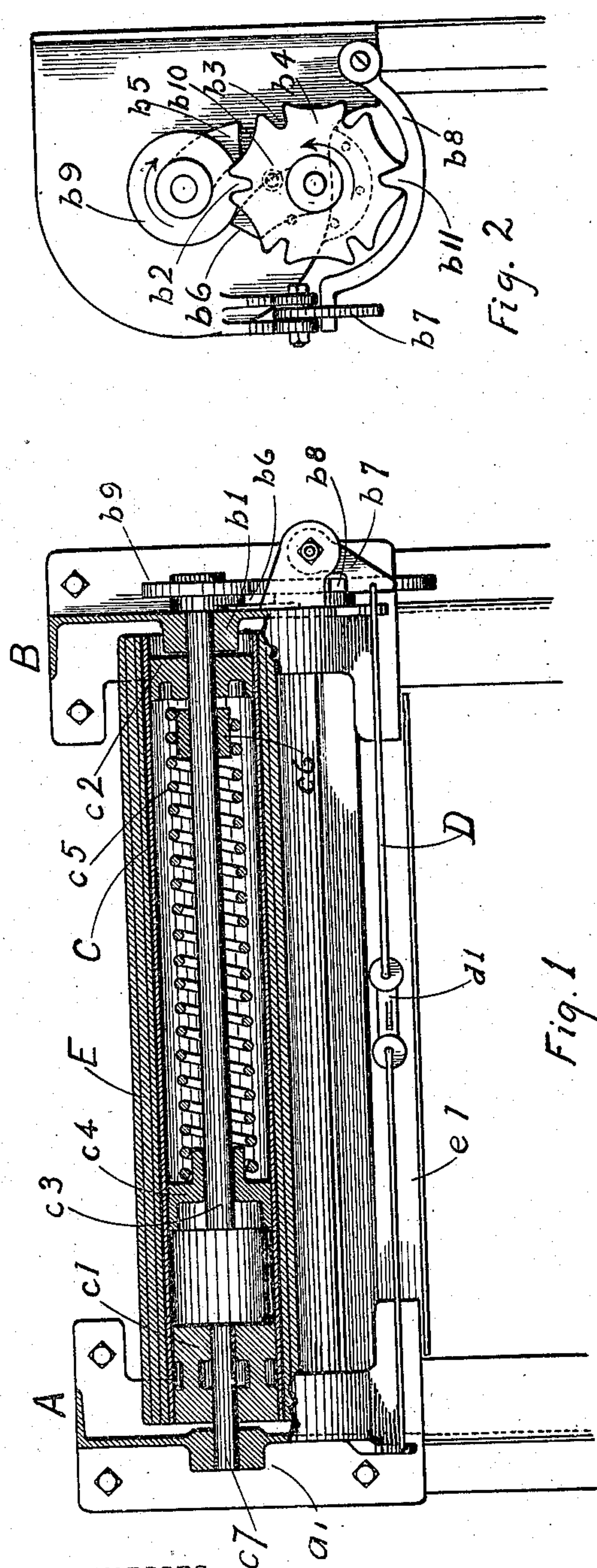
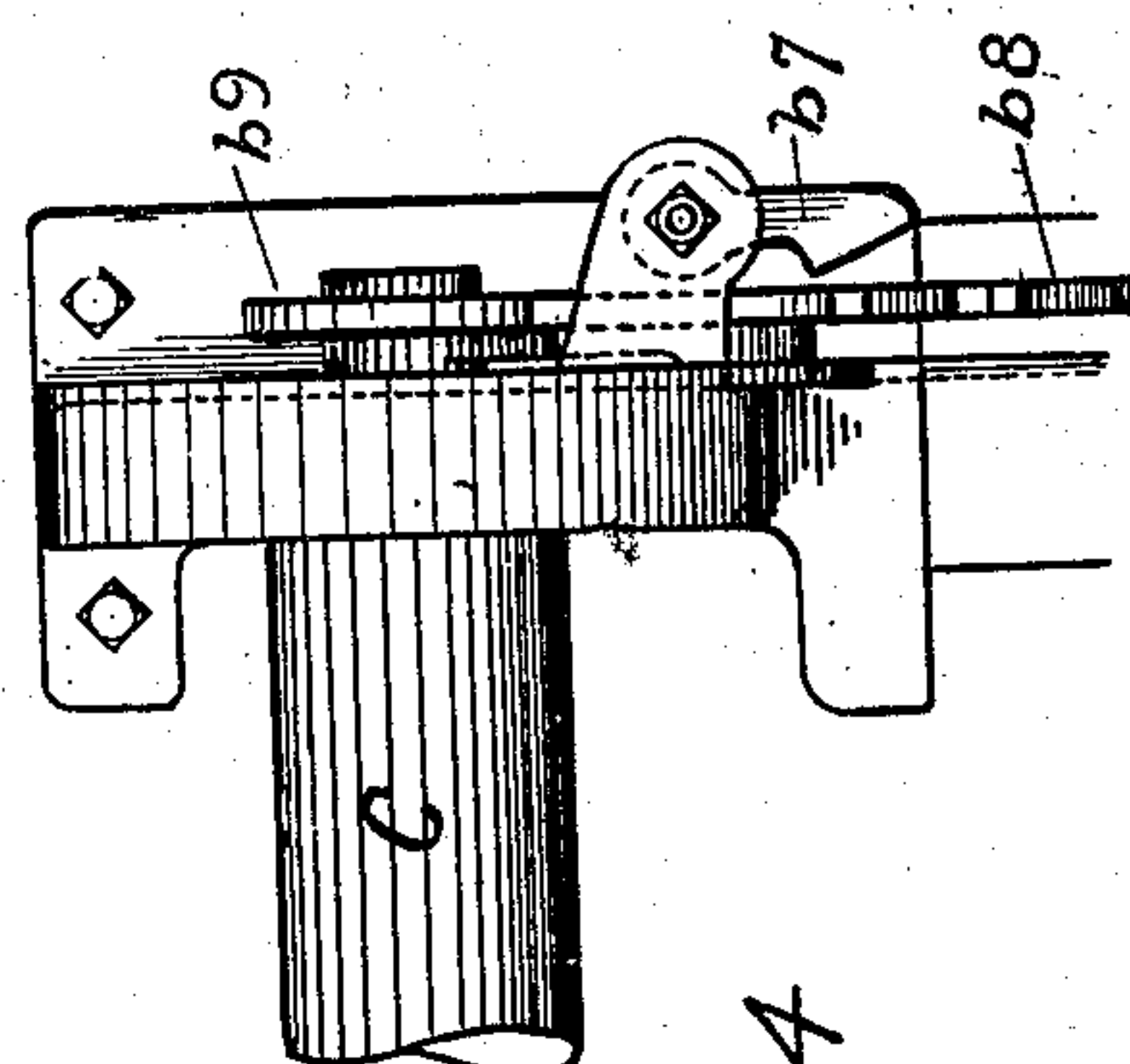


Fig. 3



WITNESSES:

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AUTOMATIC FIRE-SHUTTER.

No. 881,256.

Specification of Letters Patent.

Patented March 10, 1908.

Application filed February 25, 1907. Serial No. 359,196.

To all whom it may concern:

Be it known that I, EDWARD HARRISON McCLOUD, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented new and useful Improvements in Automatic Fire-Shutters, of which the following is a specification.

My invention relates to a class of fire shutters, which close automatically, upon a dangerous rise of temperature in the immediate vicinity.

The object of my invention is to provide a shutter of this character, which can be wholly or partly re-opened with the assistance of its counterbalance, and to provide simple means of adjusting and re-adjusting the counterbalance, whereby the impact of the descending shutter can be graduated and minimized. I attain these objects by the mechanism illustrated in the accompanying drawings, in which

Figure 1 is a longitudinal vertical section, through the curtain, barrel and supporting brackets. Fig. 2 is an end view of one of the supporting brackets with the releasing device closed. Fig. 3 is an end view of the same bracket with the releasing device open. Fig. 4, a front elevation of the bracket with the device open.

Similar letters and numerals refer to similar parts throughout the several views.

The barrel C is mounted on and secured to the pieces c^1 and c^2 ; the pieces c^2 and c^4 rotate upon the shaft c^3 ; the periphery of c^4 is secured to the barrel C; one end of the spring c^5 connects to the shoulder on c^4 ; the other end connects to the piece c^6 , which in turn is fixed to the shaft c^3 ; the shaft c^7 projecting from the center of c^1 is free to rotate in the bearing a^1 on the bracket A. The arm b^6 is attached to the gear b^4 which is loosely mounted on a stud; the arm b^5 is attached to the gear b^9 which is rigidly mounted on the shaft c^3 ; the shaft c^3 is rotatable in the bearing b^1 on the bracket B, but is held stationary by the intermittent gears b^9 and b^4 and levers b^7 and b^8 , these are retained in position by the wire D and the fusible connection d^1 . The end of the spring which is connected to c^6 remains stationary, the opposite end connected to c^4 rotates with the barrel when the shutter is drawn down, thereby causing the spring to exert a torsional resistance which counterbalances the weight of the shutter.

The shutter E is coiled upon the barrel except the hanging portion e^1 ; it is held in position by the tension of the spring which just exceeds the weight of suspended portion e^1 . The tooth on gear b^9 meshes with the notches b^3 and is employed in rotating the gear b^4 bringing into engagement the arms b^5 and b^6 , thereby preventing further rotation of the shaft c^3 . The levers b^7 and b^8 are designed to open by gravitation upon the separation of the fusible connection d^1 .

The mode of operation is as follows: Upon a dangerous rise in temperature, the fusible connection d^1 separates; the lever b^7 swings back to a perpendicular, and the lever b^8 swings downward, freeing the projecting part b^{11} from the notch b^3 , permitting the shaft c^3 and the end of the spring fastened thereon to rotate, thus the spring is rendered unresistive or inoperative, and the shutter descends, impelled by its own weight, exerting through the spring, power enough to rotate the gear b^9 ; with each rotation the gear b^4 is turned through a fractional part of its circumference, equal to the spacing of the notches b^3 . This action continues until the extending arms b^5 and b^6 are brought together, when the rotation of the shaft c^3 and the end of the spring, fastened thereon, is stopped. This, however, does not prevent further rotation of the barrel, which continues until the shutter is down; with the stoppage of the shaft c^3 , the spring is brought completely into action, thereby offering a torsional resistance to the momentum of the descending shutter, and reducing the impact with which it would strike. To accomplish the results here described the number of revolutions made by the gear b^9 will be less than that made by the barrel C: the relation being variable and adjusted by the initial setting of the gears b^9 and b^4 with respect to the arms b^5 and b^6 .

The particular advantage I claim for this method of releasing the spring in its entirety is that there is absolutely no resistance from it to impede the shutter at the commencement of its descent. The resistance offered in rotating the intermittent gear is comparatively small and occurs after the shutter is under way; the final resistance is sufficient to moderate the striking blow of the shutter, and will enable persons who might be imprisoned in a burning building to raise the same. The distance which the shutter can

be raised will be governed by the amount of tension reserved in the spring after the arms b^5 and b^6 have locked.

I am aware that there are inventions of similar nature; those using a single spring, reserving a portion of its power for the purpose already described, are only automatic in their action; those that are automatically closed, and ordinarily operative by other means, utilize two or more springs.

It will be observed that my invention provides means automatically operating upon a dangerous rise of temperature, and in ordinary use, manually, either by a handle placed in the bottom of the shutter or a chain-carrying sprocket mounted on a projecting shaft c^7 .

The inventions heretofore referred to have no means of determining, after the spring has been released, the exact number of initial turns that were placed upon it, which can only be correctly ascertained by trial, whereas my invention eliminates this difficulty, and the spring can be reset to its original state by turning the gear back until the arm b^6 comes in contact with the screw b^{10} .

What I claim and desire to secure by Letters Patent is:—

1. In combination with a fire shutter, a shutter-carrying barrel, supports therefor, a counterbalance for said shutter, means automatically acting on a dangerous rise in temperature of successively rendering the counterbalance in operative, and re-rendering a part of said counterbalance operative.

2. In combination with a fire shutter, a shutter-carrying barrel, supports therefor, a counterbalance therefor, means actuated by a rise in temperature of rendering said counterbalance in-operative, and means of subsequently rendering a portion of said counterbalance operative, and means whereby that

portion of said counterbalance subsequently rendered operative, can be adjusted.

3. In connection with a fire shutter, brackets supporting a rotatable barrel, a spring counterbalance, therein, a shaft rotatable in one of said brackets, a rotatable shaft temporarily held in other said bracket; means for liberating upon a dangerous rise in temperature; the rotatable shaft temporarily held, and means of subsequently arresting the rotation of said shaft.

4. In a rolling fire shutter, a barrel for carrying said shutter, supporting brackets therefor, a rotatable shaft supported by one of said brackets, a rotatable shaft temporarily held, supported by other said bracket, a spring connecting the rotatable shaft temporarily held, and the rotatable barrel; means for automatically, upon a dangerous rise in temperature, liberating the rotatable shaft temporarily held and means adjustable for subsequently arresting the rotation of said shaft.

5. In connection with a fire shutter, a rotatable barrel with shafts projecting from the ends thereof, journaled in supporting brackets, said barrel containing a spring or springs therein, and connected thereby to one of said shafts, having fixed thereon a gear with a projecting arm; said gear engaging a gear with projecting arm, mounted on one of said brackets, and held stationary by levers, and an element fusible on a dangerous rise in temperature.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD HARRISON McCLOUD.

Witnesses:

CHARLES MORTEN,
CHAS. BRASHEAR.