(No Model.) 2 Sheets—Sheet 1.

A. A. HAGEN.

FIRE SHIELD FOR BUILDINGS.

No. 472,479. Patented Apr. 5, 1892.

Fig. 1.

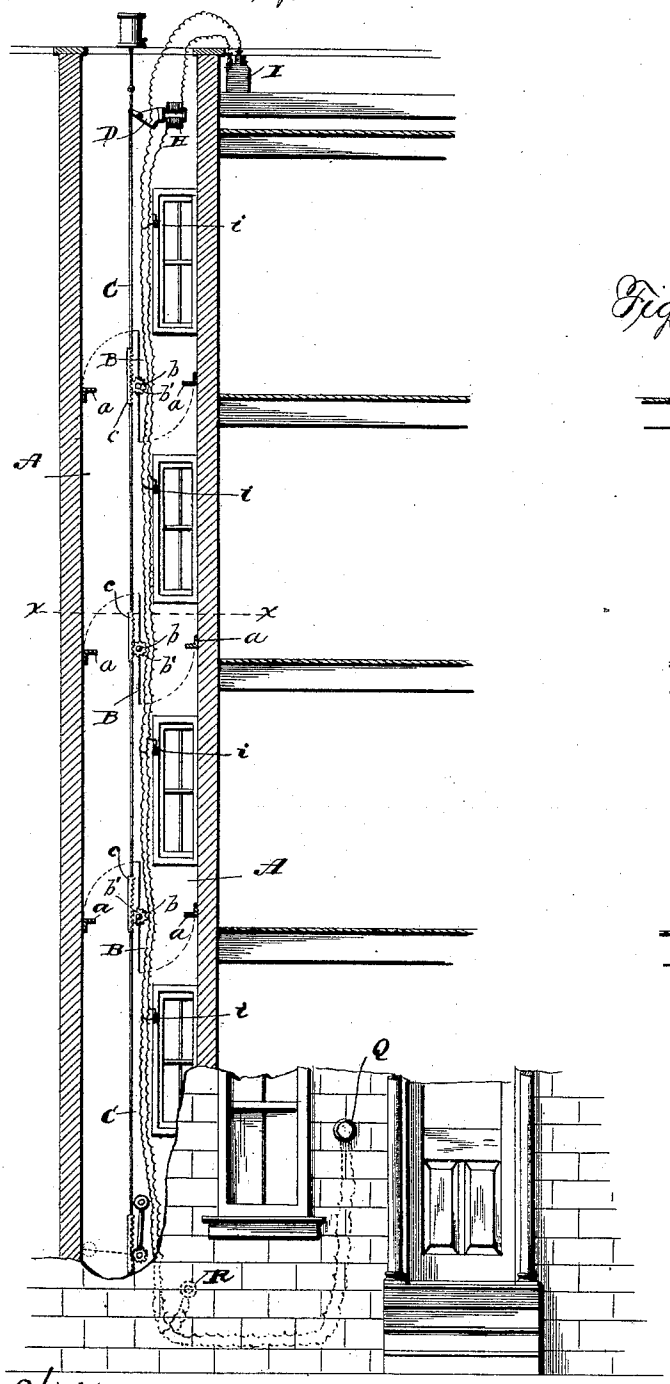
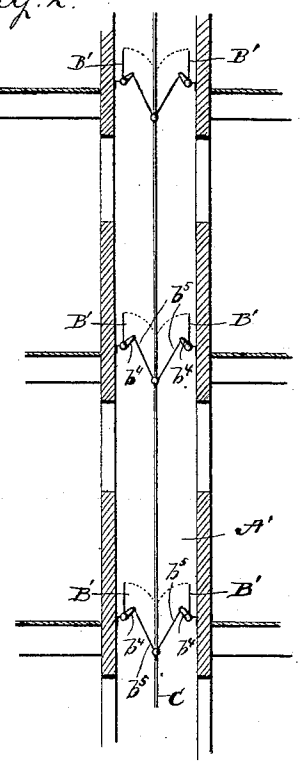


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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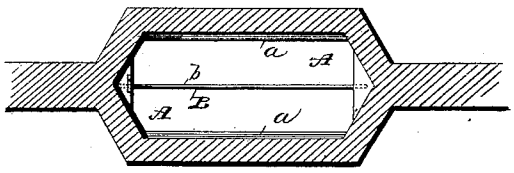
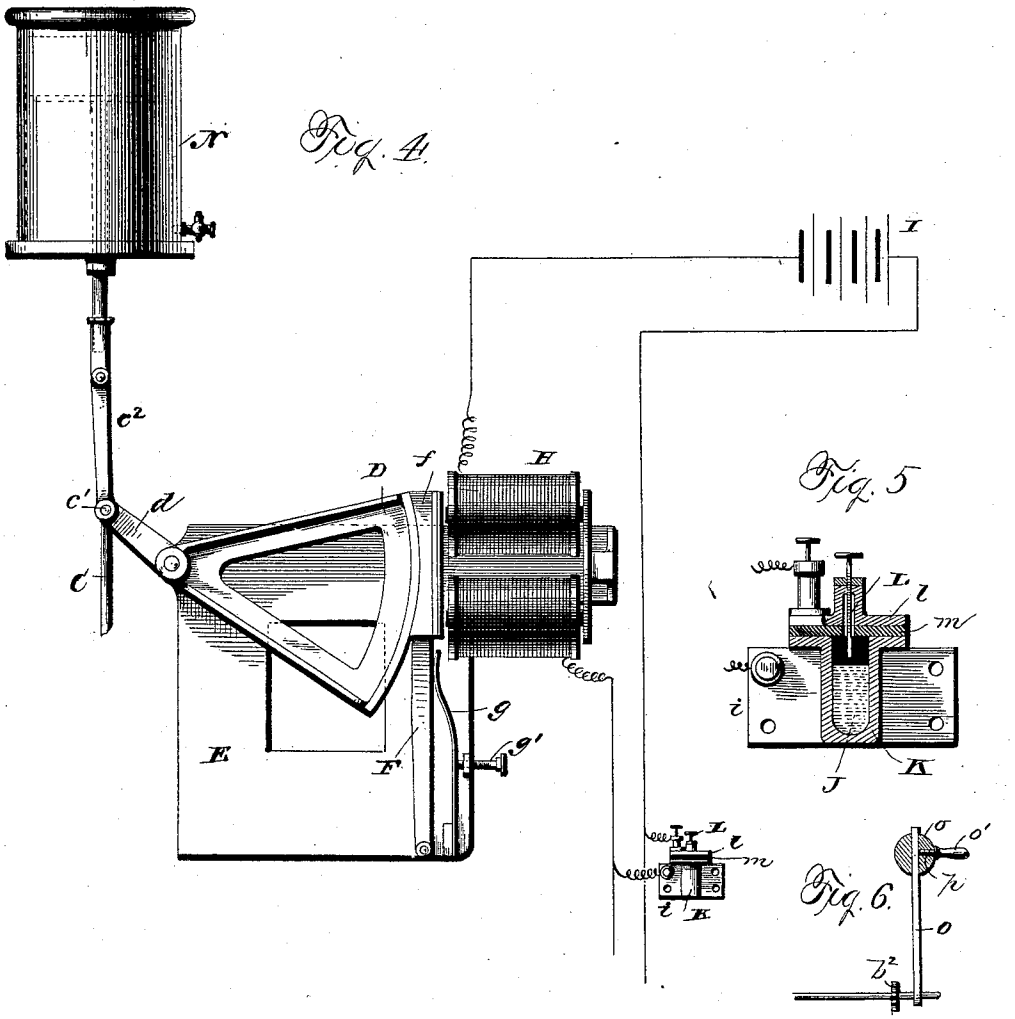
Fig. 3.





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UNITED STATES PATENT OFFICE.

AUGUSTUS A. HAGEN, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, OF SEVEN-EIGHTHS TO FRITZ STORSBERG, OF NEWARK, NEW JERSEY.

FIRE-SHIELD FOR BUILDINGS.

SPECIFICATION forming part of Letters Patent No. 472,479, dated April 5, 1892.

Application filed May 19, 1891. Serial No. 393,314. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS A. HAGEN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Fire-Shields for Buildings, of which the following is a specification, reference being had therein to the accompanying drawings.

The design of my invention is to provide means whereby the vertical air and light shafts, found particularly in high buildings, may be so closed at the outbreak of a fire in the structure as to entirely obviate any contribution on the part of such shafts by way of draft to the increase or prolongation of the conflagration.

To this end said invention consists in a series of screens or partitions which normally are open, but are adapted to be closed automatically after the orignation of a fire by the effect of the fire itself upon suitable appliances connected with the screens, all as will be more fully hereinafter specified.

In the drawings, Figure 1 is a vertical section of a structure having its air-shaft equipped with the preferred form of my improved apparatus. Fig. 2 is a like view showing an air-shaft of different form provided with screens or partitions and an operating device therefor different from what is shown in Fig. 1. Fig. 3 is a horizontal section on the line $x\,x$ of Fig. 1. Fig. 4 is a view of my partition or screen-controlling mechanism. Fig. 5 is a vertical section through a thermostat I propose to use, and Fig. 6 is a detail view.

In the structure shown in Fig. 1, the shaft A is one provided between two buildings adjacent to each other. In such shaft, at points preferably on a level or approximately on a level with each floor, I provide a screen or partition, which under ordinary circumstances is open, and in no degree interferes with the use of the shaft for its designed purposes, but which, on the occurrence of a fire in the structure, is adapted to close the shaft where it is placed. As shown in Fig. 1, such screen consists of a metal plate B, having a width and length agreeing with the like dimensions of the shaft A, which at its center is hung on a horizontal pivot-shaft b, disposed at the transverse center of shaft A. On this pivot it is adapted to make one-quarter turn from a vertical open position to a horizontal closed position, being, when it has reached the latter, limited by stops $a\ a$, arranged on opposite sides of shaft A, and against which the opposite edges of said plate strike. A pinion b' at one end of each pivot-shaft B, whose teeth are engaged by those of a rack-bar section c, forming a part of a vertically-movable rod 6, which extends from the roof of the structure to a point at or near the ground, furnishes the means for rotating each partition or screen.

Movement of the rod C to operate the screens is controlled by the following described mechanism, viz: In the top of the shaft near the roof is a lever or segment D, pivoted at the upper left-hand corner of a rectangular supporting-plate E, from which segment extends a radial arm d, that is pivotally connected to the rod C at c'. Conforming in curvature to and bearing against the curved face of the segment is the upper end f of a vertical bar F, pivoted at its lower end to the lower edge of the plate E near its right-hand side. Said upper portion f of the bar F constitutes a brake-shoe, and it is caused to bear against the curved face of the segment with such pressure as to prevent its rocking on its pivot, and consequently movement of the rod C and the screens by means of a flat spring g, secured also to the plate E adjacent to the pivot of the bar F. The degree of pressure of the spring may be varied by an adjustable screw g', which engages said spring.

Mounted upon the supporting-plate E in such proximity to the portion f of the brake-bar as to enable the same to be attracted by it is an electro-magnet H. The latter when energized will draw the brake-bar from contact with the segment, and the same will then be free to move on its pivot. Said magnet is in a circuit formed by wires arranged, as shown in Fig. 1, in the shaft A, which extends from the top (at which point, preferably, I locate a battery I) to the bottom thereof, and being at suitable intervals provided with automatic circuit-closing devices i, adapted to be called into action by such a rise in the tem-

perature as a fire in the vicinity of the device might cause. Any suitable device of this description may be used; but I prefer the one shown, which consists of a small body of mercury J, contained in a suitable receptacle K, into whose upper end extends a portion of an adjustable conductor L, that is supported on a block *l* above said receptacle. A piece of insulating material *m* is interposed between the receptacle and the block *l*, and suitable binding-posts are provided by which to connect the two insulated parts to the circuit-wires.

Under ordinary circumstances, of course, the level of the mercury in the receptacle is such as to place it out of contact with the conductor L and so keep the circuit open, and, too, their distance apart should be such that they will only come into contact on such a rise in the temperature as might be consequential upon a fire. The receptacle K is provided with wings or extensions by which the whole device may be secured at the desired point in the shaft A. I have shown the shaft A as provided with a circuit-closing device *i* for each floor; but it is to be understood that more or less of these may be employed, and they may be located elsewhere than in the shaft itself.

At its upper end the screen-operating rod C is connected by a link c^2 to the piston-rod of a dash-pot N, suitably supported at the top of the shaft A, while the lower end of said rod has a rack-section c^3, meshing with the pinion b^2 on a shaft extending parallel with the screen pivot-shafts. On said shaft is a radially-projecting arm or lever O, which when the screens are open extends upward, a little out of a perpendicular in the direction opposite to that in which the screens turn to close. Said lever is weighted, as at *o*, where is provided a block or ball capable of adjustment along the same.

The block or ball is held in its adjusted position by means of a screw *p*, which is tapped through the same to abut against the lever. As being a convenient arrangement, I provide the screw with a handle portion *o'*, by which the lever may be manipulated by hand. The handle enables the block or ball to be adjusted along the lever by the use of one hand simply, as it is necessary simply to turn it to loosen the screw part and then slide the block by it to the position desired for the block, and then to tighten the screw against the lever.

The operation of the apparatus as above described is as follows: Under usual circumstances the screens or partitions will be kept open by the friction of the brake device upon the segment connected to the screen-operating rod, and the magnet be inoperative because of the open condition of the circuit at the several thermostats. Should a fire break out in the vicinity of the latter and raise the temperature, the mercury of the thermostats will be expanded until the circuit is closed and the magnet energized. On this occurring the brake-lever will be instantly drawn from the segment, and the rod C being freed from restraint, will, by reason of its gravity, descend and by the rack and pinion or other connection with the screens, move the latter to close the shaft A. Too rapid descent of the rod will be prevented by the dash-pot, and in order to prevent too great retardation thereby by the compression of the air therein after the rod has moved a portion of its distance, the weighted lever O is employed, whose arrangement is such that at the outset of the rod's movement it offers no impediment, yet at the time the dash-pot begins to offer greatest resistance it is in a position to exert its greatest power to overcome that of the dash-pot. The circuit, as shown, is formed of a main line or conductor from which branch wires run to each thermostat, so that on the operation of any one of the latter the circuit will be closed and the magnet energized to effect the release of the screens or partitions. In the circuit is a push-button-closing device Q, located at a convenient height on the front wall of the building, which is provided to enable the shutting of the shaft by the screens before the circuit is closed by one of the thermostats—as, for instance, upon the discovery of a fire before the latter affects the thermostats by some person outside the building. Said device may have a glass cover, which will have to be broken to permit access to the button, as is sometimes a provision in similar devices. Buttons, of course, may be placed at convenient points inside of the building, for the same purpose; also, in the circuit at some suitable point, as on one of the inner walls of the shaft A near the first floor, a circuit-closer R is provided for use to temporarily withdraw the brake-shoe from the brake-segment to permit the screens or partitions to be opened again after being closed.

The opening of the screens or partitions is effected simply by turning the weighted lever, hereinbefore described, to its nearly vertical position.

Preferably the dash-pot cylinder is provided with a valve or cock at its lower end to regulate the discharge of air and so the rate of movement of the descent of the rod C and the closing of the partitions or screens. In Fig. 2 I show a form of screen or partition which I also contemplate using with my controlling mechanism. In this form each partition is composed of two plates B' B', pivoted in the same plane on opposite walls of the shaft A', whose open position is a vertical one. Projecting inwardly and upwardly from each pivot is a short arm b^4, and extending downwardly and inwardly from each of the latter is a link b^5, pivoted thereto at its upper end and at its lower end pivotally connected to the operating-rod C. The same controlling mechanism described in connection with my other form of screen can be used, and upon the release of the rod C the latter of its gravity

will descend and shut the screens or partitions.

As indicated hereinbefore, other forms of automatic circuit-closing devices than the thermostat shown may be employed, and, too, the particular form of partitions and their operating means may be varied without departure from my invention.

What I claim is—

1. The combination of an air-shaft, closing partitions arranged at each floor, a gravitating rod connected to the partitions to positively close them when it falls, a dash-pot, a piston working in this dash-pot and connected to said gravitating rod, a pivoted segmental lever connected to said gravitating rod, a movable lever normally engaging said segmental lever, an electro-magnet to withdraw said movable lever and free the segmental lever, thermostats placed at various points in the air-shaft, and an electric circuit in which the thermostats and electro-magnet are placed, substantially as described.

2. In combination with a shaft and a series of shaft-closing devices therefor, said devices being adapted to extend across the shaft at each floor, of a vertically-movable gravitating rod connecting the closing devices and adapted to hold the same open when in a raised position, a frictional brake mechanism for holding said rod in a raised position, and electrically-controlled means for releasing said brake mechanism, as and for the purpose described.

3. In combination with a series of screens or partitions, the vertically-movable rod to operate the same, the pivoted segment attached to said rod, the pivoted brake-shoe bearing against such segment, the magnet to act on said shoe, and circuit-closing devices to energize said magnet, substantially as described.

4. In combination with the series of screens or partitions, the vertically-movable rod to operate the same by its gravity, the dash-pot to regulate its descent, and the pivoted weighted lever swinging from a vertical or approximately vertical to a horizontal or approximately horizontal position to counterbalance the increased resistance of the dash-pot during the latter portion of the rod's movement, substantially as described.

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

AUGUSTUS A. HAGEN.

Witnesses:

LEON LEWIN,

SOLOMON GERBER.