

(No Model.)

G. H. CROWELL.
AUTOMATIC DAMPER.

No. 395,382.

Patented Jan. 1, 1889.

Fig. 1.

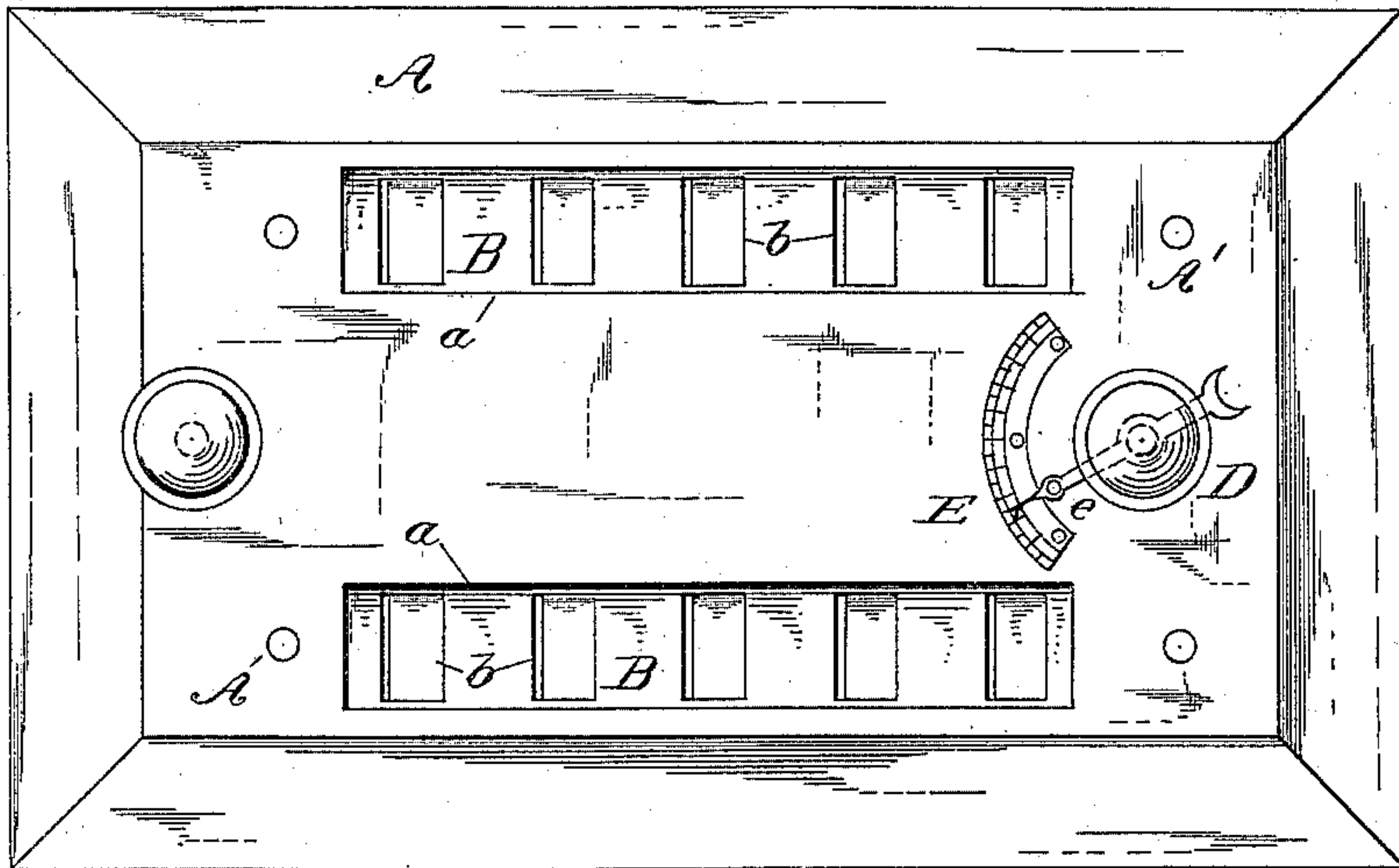


Fig. 3.

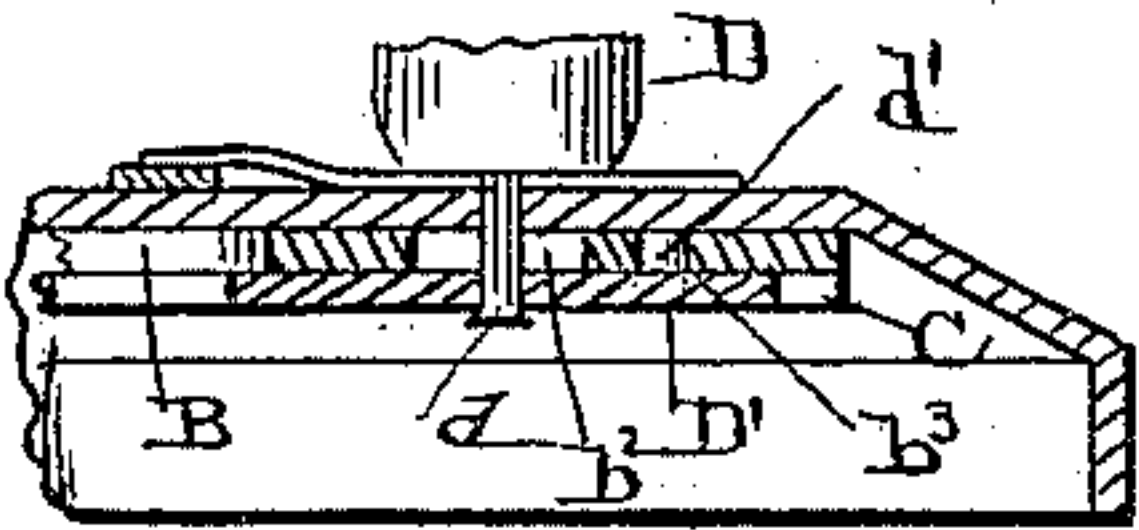


Fig. 2.

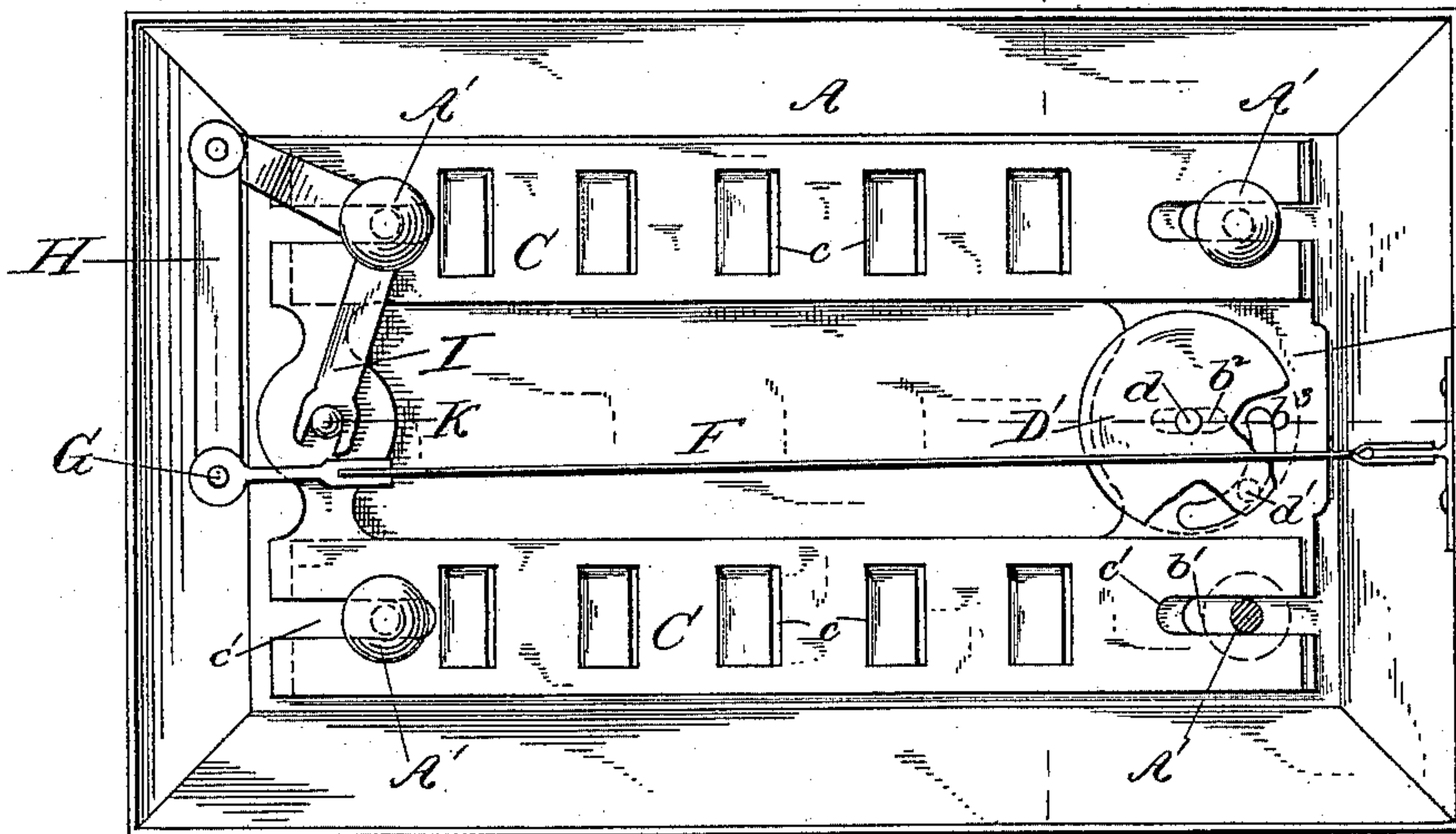
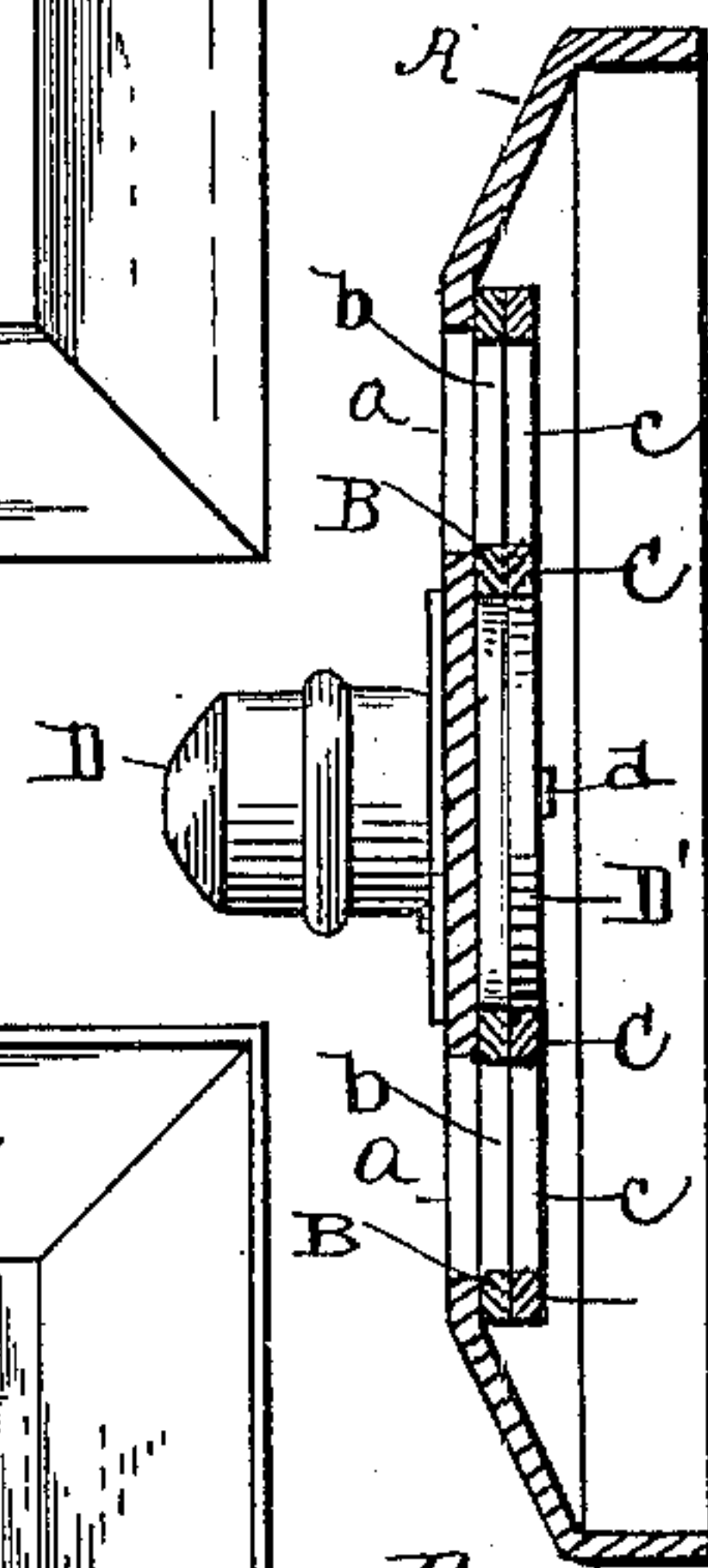


Fig. 4.



Witnesses

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GEORGE HENRY CROWELL, OF BERLIN FALLS, NEW HAMPSHIRE.

AUTOMATIC DAMPER.

SPECIFICATION forming part of Letters Patent No. 395,382, dated January 1, 1889.

Application filed April 4, 1888. Serial No. 269,568. (No model.)

To all whom it may concern:

Be it known that I, GEORGE HENRY CROWELL, a citizen of the United States, residing at Berlin Falls, in the county of Coos and State of New Hampshire, have invented certain new and useful Improvements in Automatic Dampers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to dampers, and more especially to that class known as "automatic dampers," which are opened and shut by devices that are sensitive to the changes of temperature to which they are subjected.

My invention is applicable to all kinds of dampers, but is particularly adapted for ovens. It is arranged in a suitable opening in the door or in the wall of the oven. As ordinarily constructed, these dampers operate in connection with a stationary slotted base-piece or gridiron, the extent of opening being always the same for any given degree of temperature. In my invention, however, I make the gridiron adjustable, and thereby am enabled to vary the extent to which the damper will open at any given temperature, ranging from wholly open to nearly or entirely closed.

In the drawings, Figure 1 is a front elevation of my device; and Fig. 2 is a rear elevation, upside down from the position shown in Fig. 1. Fig. 3 is a horizontal section, and Fig. 4 is a vertical section.

A is a shallow box or casing, deep enough to contain the sliding damper and the thermostatic devices. The front of the casing has one or more slots, *a*, for the admission of air to the oven, the casing being fastened over an opening preferably in the oven-door. I have shown two slots, *a*, in the drawings, though it is evident that the number may be varied, as desired. Inside the casing is an adjustable gridiron, B, consisting of a sheet of metal covering, the slots *a*, and provided with a series of rectangular openings, *b*, opposite the slots *a*. The solid portions between the openings *b* are about one and one-half time as wide as the openings themselves.

Superposed upon the gridiron B is the damper C, consisting of a sheet of metal provided with a series of rectangular openings, *c*, of substantially the same size and shape and arrangement as the openings *b* in the gridiron, and adapted to register with them. At each end of the gridiron and damper are two slots, *b' c'*, through which pass headed studs A', projecting from the casing A. The length of the slots *c'* governs the range of movement of the damper C.

To enable the gridiron B to be moved at will, a knob, D, is provided on the outside of the casing, mounted on a short shaft, *d*, that passes through the gridiron B and carries on its inner end a disk, D'. A slot, *b²*, in the gridiron permits the passage of the shaft *d* and allows the gridiron to move back and forth. The disk D' carries a wrist-pin, *d'*, which enters a curved slot, *b³*, formed in the gridiron B eccentric to the shaft *d*. Upon turning the shaft *d* by means of the knob D, the pin *d'* causes the gridiron to move. An index, *e*, traveling over a graduated scale, E, enables the gridiron to be set at any desired point in the range of movement, which is equal to one-half the width of one of the openings *b*.

The damper C is arranged to be moved automatically by the following means: Fastened to the inside of the casing A is one end of a thermostatic bar, F, composed of two strips of dissimilar metal—such as brass and steel—having unequal rates of expansion under heat. The strips are riveted firmly together, and to the free end of the bar thus formed is secured a jaw, G, in which is pivoted one end of a link, H, connecting the jaw with one arm of a bell-crank lever, I, fulcrumed on the stud A'. The other arm of the lever is forked, and engages with a pin, K, projecting from the damper C. When the bar F is expanded by heat, its free end moves down, owing to the greater expansion of the upper strip of metal. This movement is communicated to the lever I, and causes the damper to slide toward the right in Fig. 2. The openings *b c* in the gridiron and damper are so related that when both are at their extreme left-hand position the openings will not register, but when at their extreme right-hand position the openings will register. Further-

more, when the damper C is in its extreme left-hand position the gridiron B can be shifted to either limit of its movement without opening a passage through the damper.

5 Now, when the gridiron and damper are both at the left hand it requires but a moderate degree of heat to expand the bar F enough to fully open the damper, thereby admitting cool air to relieve the temperature of the oven.

10 If, however, the gridiron B is set at the right-hand limit, it will require a considerable expansion of the bar to open the damper, since the damper must slide a greater distance toward the right in order to cause the open-

15 ings *b c* to register; but since the gridiron B can be set at various intermediate positions it follows that the damper C can be required to move to a greater or less distance from its extreme left-hand position before the slots *b c*

20 will register. In this way the degree of heat required in the oven can be closely regulated between certain extremes and the oven kept at a predetermined temperature.

The index *e* and scale E enable the gridiron

25 B to be set at any point and indicate the temperature which exists inside the oven. If the oven becomes too hot, the damper gradually opens to admit cool air and gradually closes as the temperature lowers toward the prede-

30 termined point. It is obvious that my improvement can be applied to automatic damp-

ers of various kinds, and may be varied in detail without departing from the spirit of the invention.

I am aware that it is not new to use an adjustable gridiron with an automatic damper, and that a pin engaging with a slot is an old adjusting device. I do not claim any of these parts separately, but merely in combination, for the purpose set forth.

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

The combination, with the casing A, having the studs *A'* and slots *a*, of the reciprocating gridiron B, having openings *b*, straight slots *b'* and *b²*, and eccentric slot *b³*, the shaft *d*, passing through the slot *b²*, and carrying disk *D'*, provided with pin *d'*, engaging with slot *b³*, the reciprocating damper C, having the open-

50 ings *c* and superposed upon the gridiron B, the thermostatic bar F, and the bell-crank lever I, engaging with the damper C and connected with the bar F, all combined and operating substantially as and for the purpose set forth.

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

GEORGE HENRY CROWELL.

Witnesses:

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VALENTINE GRAY.