

(No Model.)

2 Sheets—Sheet 1.

J. J. BYRNE.

THERMOSTAT FOR FIRE ALARMS.

No. 322,417.

Patented July 21, 1885.

FIG. 1.

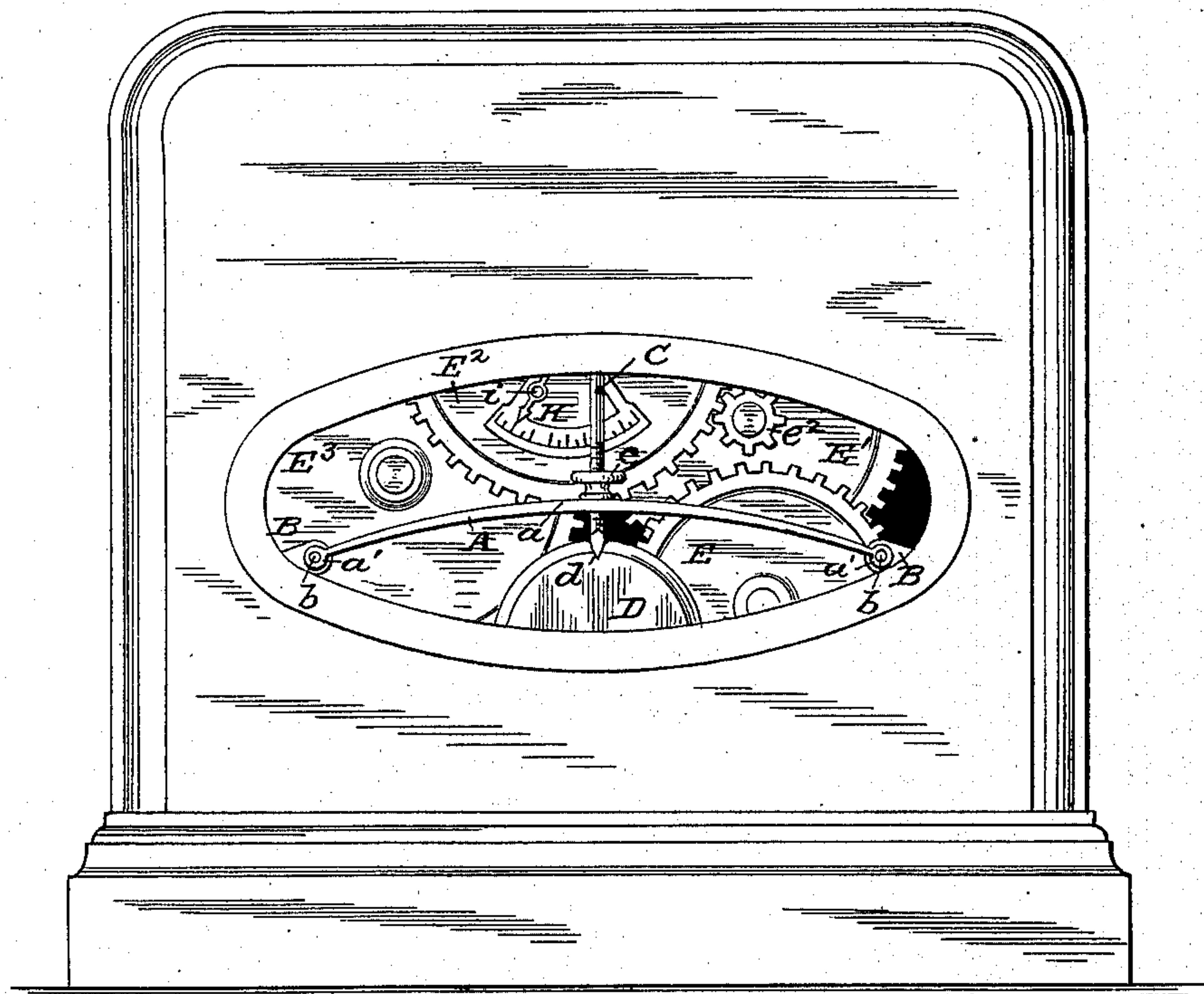


FIG. 5.

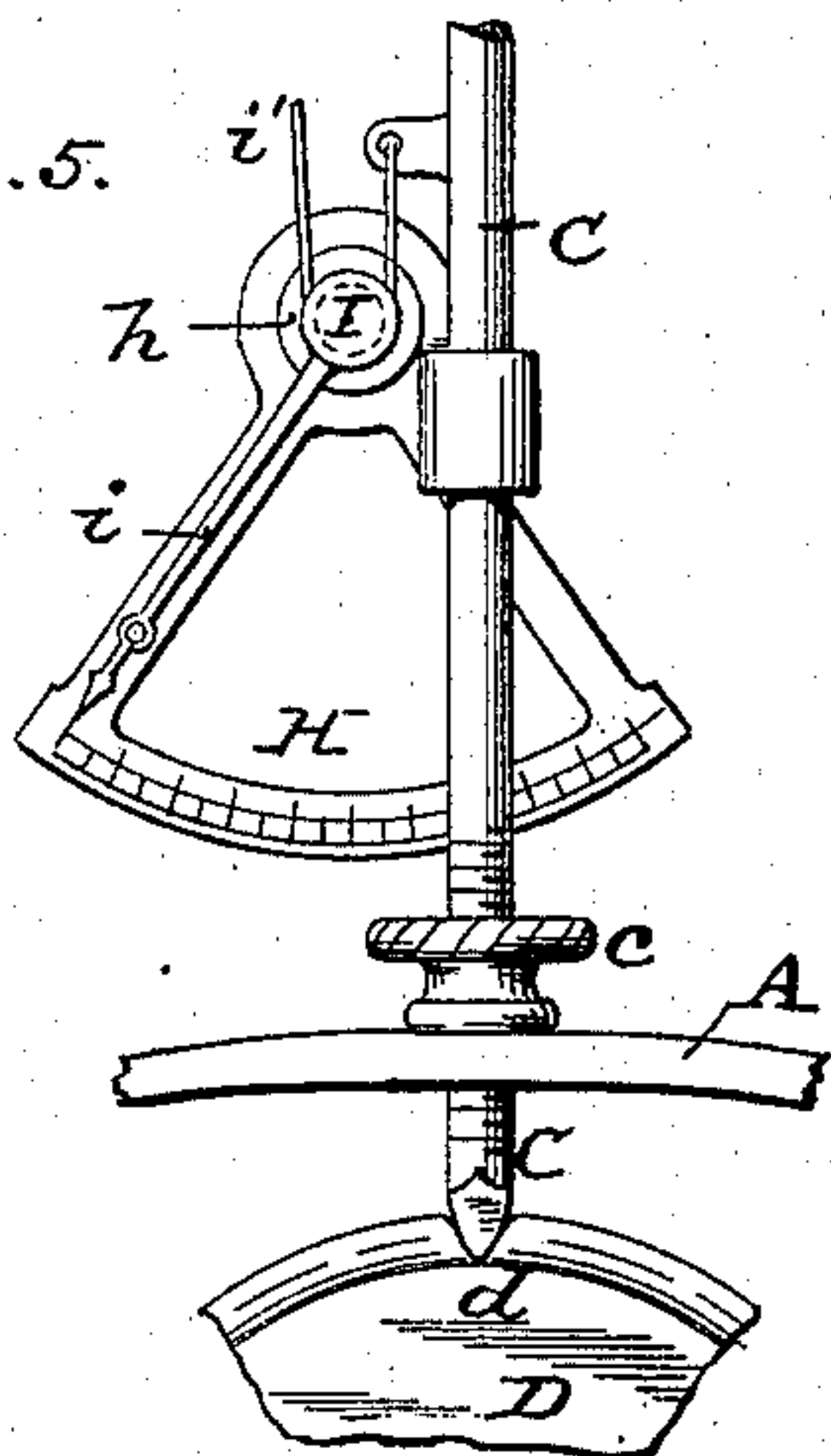


FIG. 6.

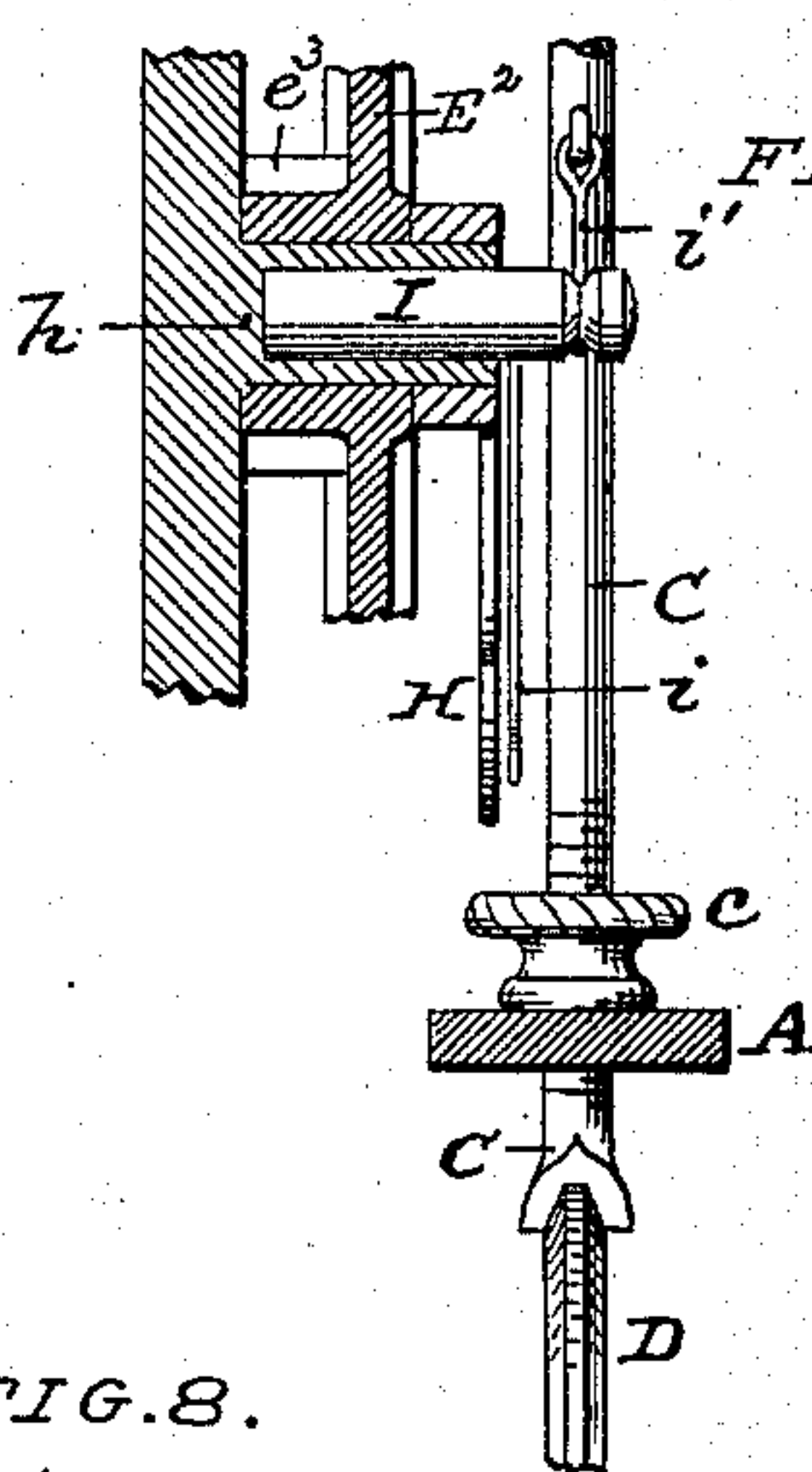
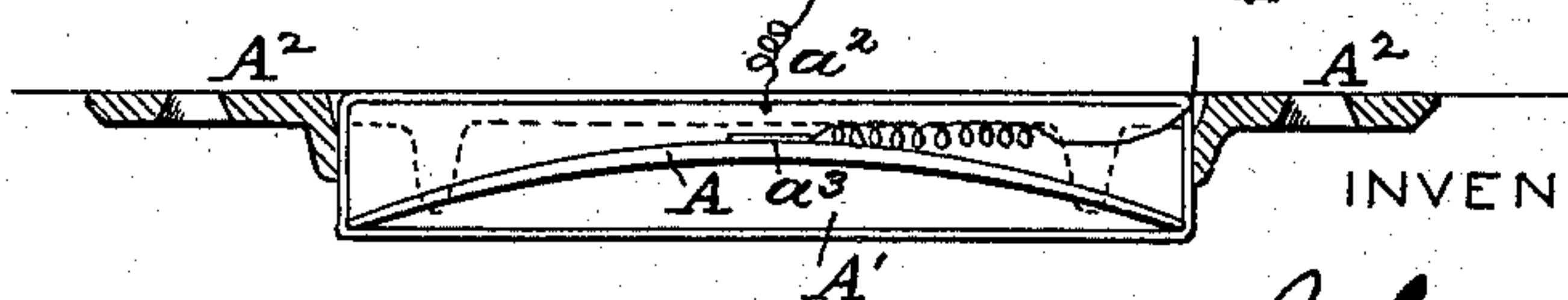


FIG. 8.



ATTEST:

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2 Sheets—Sheet 2.

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FIG. 2.

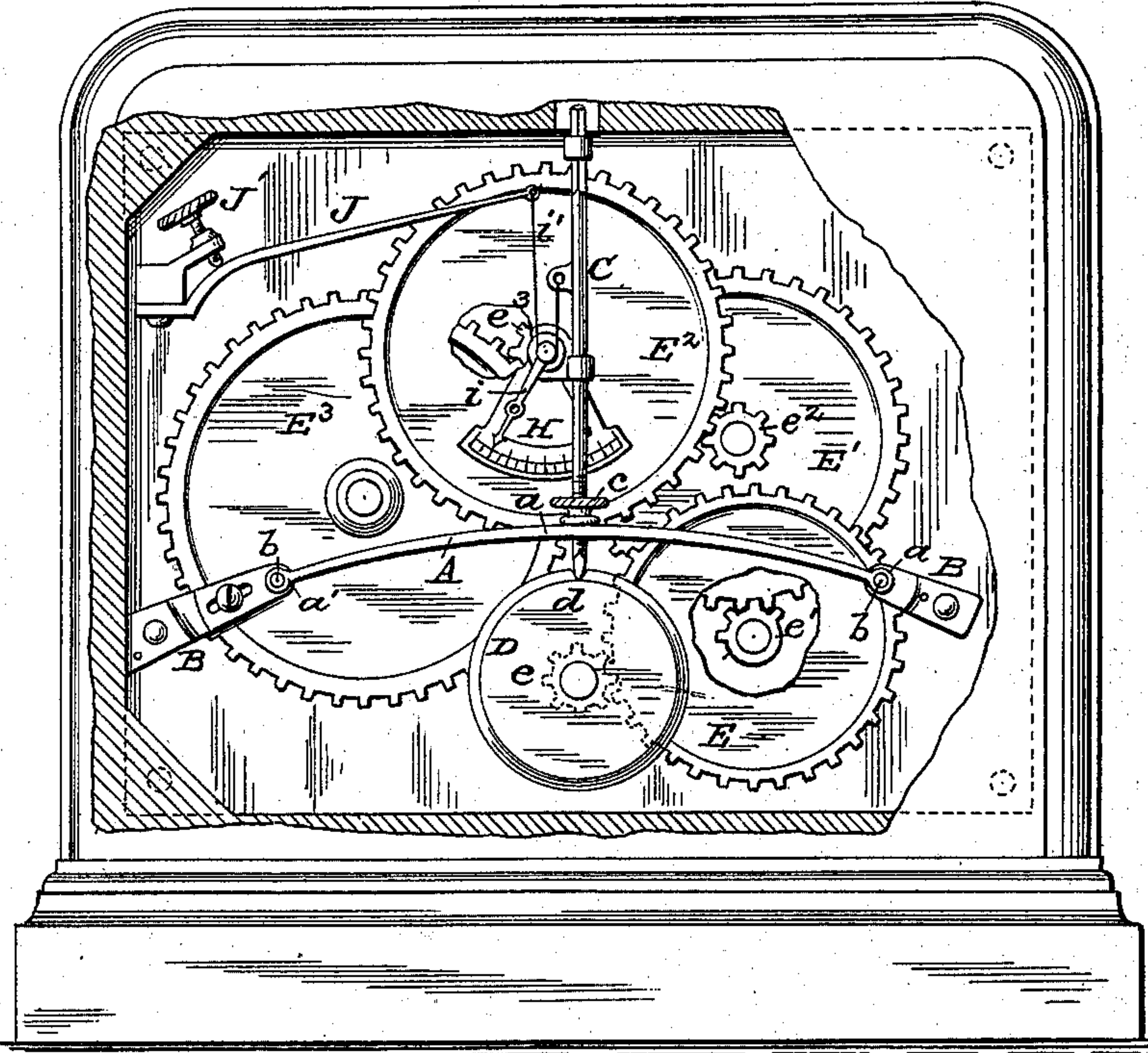


FIG. 3.

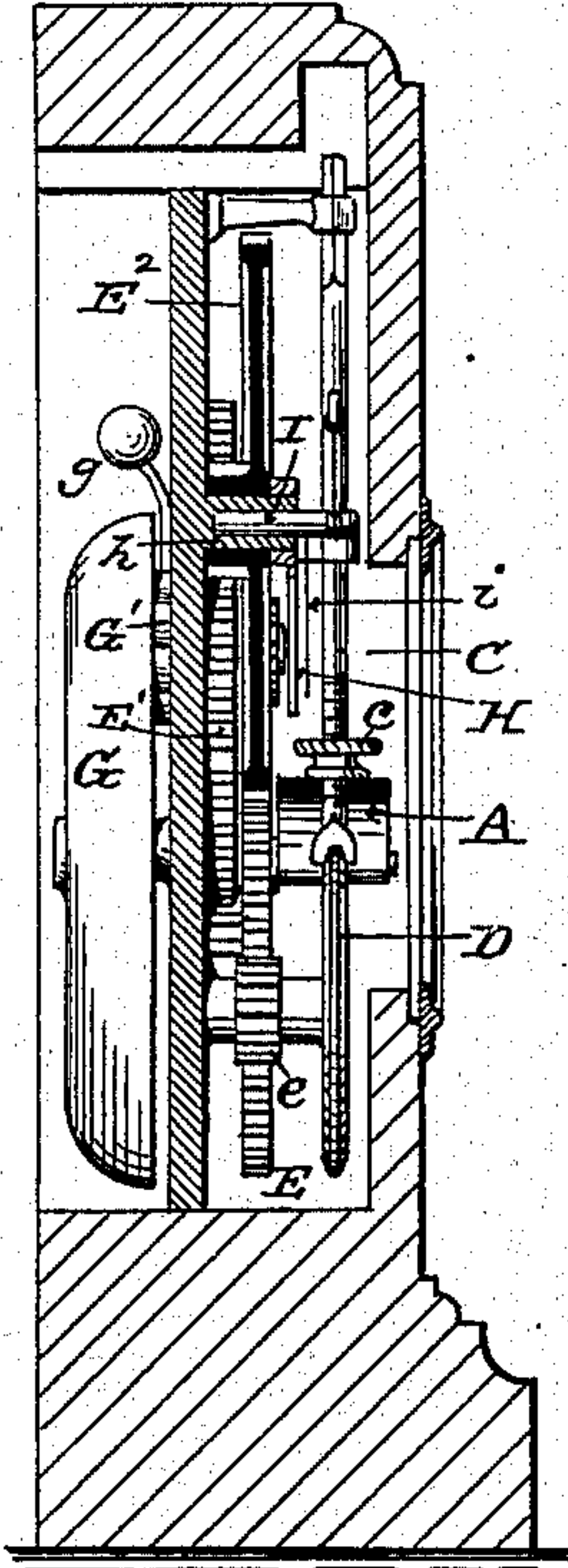


FIG. 4.

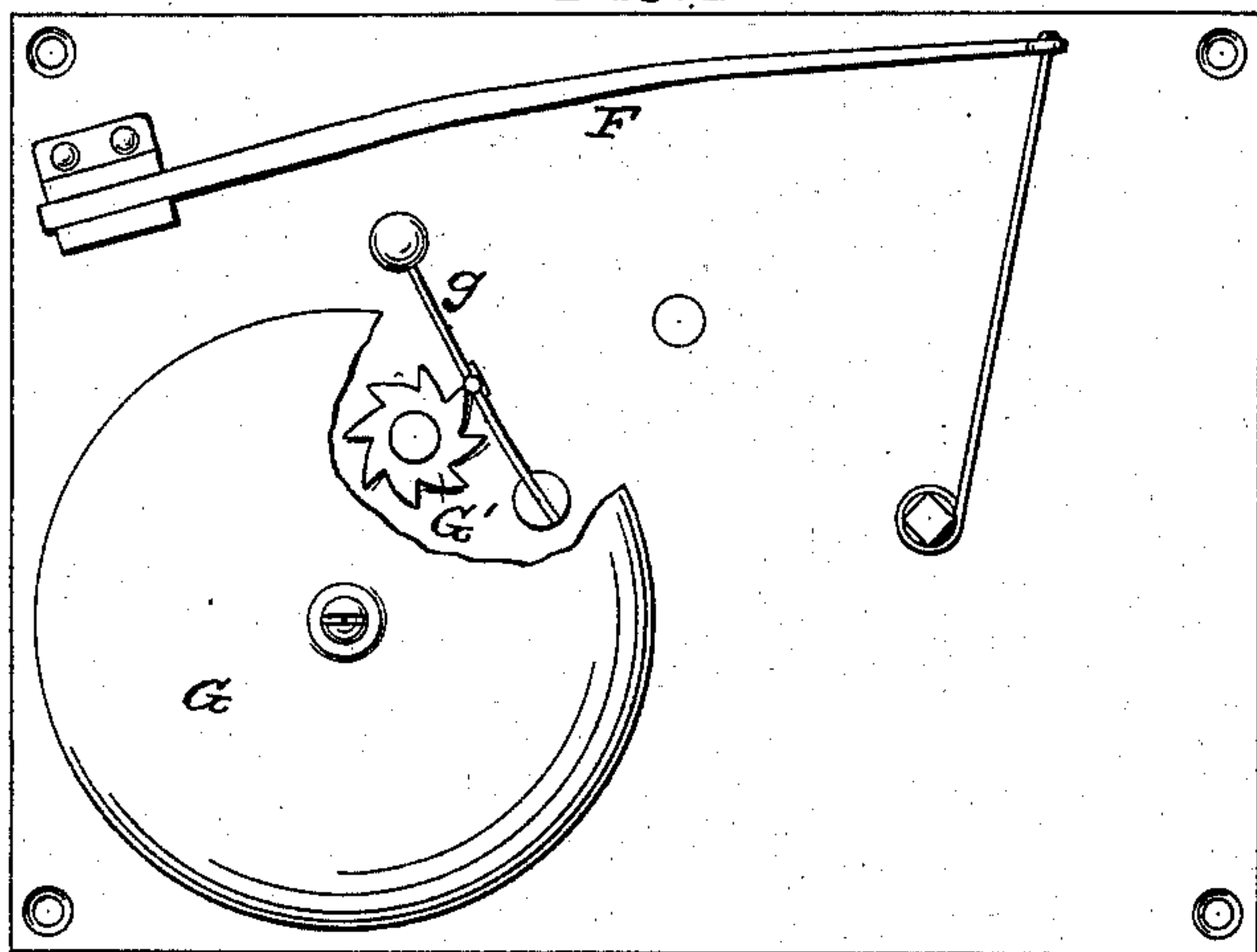
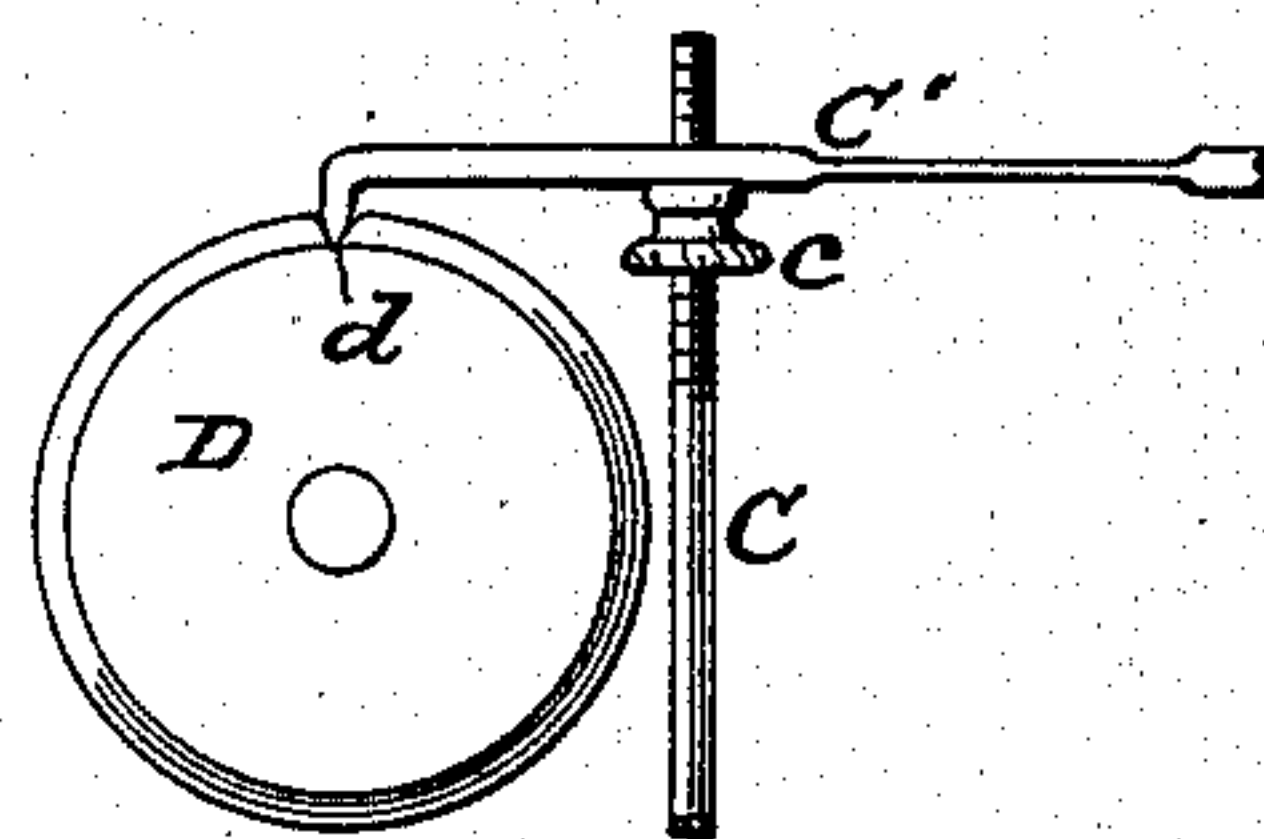


FIG. 7.



ATTEST:

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UNITED STATES PATENT OFFICE.

JOHN J. BYRNE, OF CHICAGO, ILLINOIS.

THERMOSTAT FOR FIRE-ALARMS.

SPECIFICATION forming part of Letters Patent No. 322,417, dated July 21, 1885.

Application filed February 27, 1885. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. BYRNE, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Thermostats for Fire-Alarms, &c.; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to that class of thermostats for fire-alarm and other purposes in which a bar or body of metal or other suitable material is employed, the expansion of which, by an increase of temperature, acts to release a suitable alarm mechanism or make an electric connection and indicate or sound an alarm; and this invention has for its objects, first, to provide a simple, cheap, and very sensitive form of thermostat for making either an electric connection or releasing a train of alarm-gearing; second, to afford a simple and effective mechanism for releasing a train of gearing to give an alarm; third, to provide means for "throwing out" of gear the escapement-wheel and its driving-connections after the train of alarm-gear has been released; fourth, to furnish an improved arrangement for operating the index or pointer that indicates the temperature to which the thermostat is exposed, and which also serves as a guide in setting the apparatus to give an alarm when a predetermined temperature is reached; and, fifth, to furnish a simple and effective means for setting or adjusting the releasing mechanism so that an alarm will be given when a predetermined temperature is reached. I attain such objects by the construction and arrangement of parts illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation illustrating my improvements adapted to a single-acting mechanical fire-alarm; Fig. 2, a similar view, with parts of the casing removed; Fig. 3, a transverse section of same; Fig. 4, a rear elevation of the frame of the driving-gear, showing the operating-spring and the mechanism for ringing the alarm-bell; Fig. 5, an enlarged detail elevation of the indicator dial and pointer and

the means for operating the same; Fig. 6, an enlarged transverse section of the same; Fig. 7, a detail elevation of a modified form of the releasing mechanism, and Fig. 8 a longitudinal sectional elevation illustrating my improvement arranged as an electric thermostat.

Similar letters of reference indicate like parts in the several views.

My invention, in the main, relates to the construction and arrangement of the thermostat A, which, in the present improvement, consists of a bar or rod, A, slightly bowed or arched, as shown, and secured at each end to fixed abutments B B.

The thermostatic bar A is made of some thickness at its center and tapers toward its ends, as shown, as I find that such form of bar is as sensitive as a thin strip of uniform thickness, and at the same time causes the bar to retain its proper bow or arched shape under the varying conditions as to temperature and strain to which it is exposed.

The manner of connecting the ends of the thermostatic bar A to the abutments B is as follows: I provide the bar A with an eye, a' , at each end to engage a stud or pin, b , on the abutments B. It is also preferable to make one of the abutments B adjustable, as indicated in Fig. 2, so as to effect the preliminary adjustment of the bar A in putting the parts together.

In use I prefer to form the thermostatic bar A of hard rubber, vulcanite, or analogous material, as I find by practical experiment that such substances possess expansive properties of a very high order.

C is the escapement-releasing bar or rod, moving in suitable guides, as shown, and connected to the center or crown of the arched thermostatic bar A, its end engaging in a notch, d , in the escapement wheel or disk D, which is in connection with a train of driving-gear, (see Fig. 2,) the connection being, by pinions and gears e E e' E' e^2 E² e^3 with the shaft of the driving-gear E³, that receives motion from a spring.

In the drawings I have shown a plate or leaf spring, F, for imparting movement to the train of gearing, yet I do not limit my invention to such form of spring, as a volute or other

form of spring may be employed instead to attain a like result.

e is a thumb-nut upon the screw-threaded portion of the rod C, to form an adjustable rest for said rod upon the thermostatic bar A, the purpose being to regulate the depth of the engagement of the end of said rod in the notch d of the escapement-wheel D, and consequently the degree of temperature required to withdraw said rod from such notch and release the escapement-wheel.

While I prefer to make connection between the rod C and the escapement-disk D direct, yet, in cases where a more sensitive arrangement is required, the rod can act through a spring-lever, C' , to lock or engage said disk, as indicated in Fig. 7. The driving-gear E^3 will be secured to its shaft by a ratchet-wheel and pawl (not shown) in manner usual to clocks, &c., so as to admit of the winding up of the spring when required.

In order to throw the escapement-disk D, with its driving pinion and gear e E, out of engagement with the rest of the train of gearing after the same has been released, I make the pinion e' of a mutilated form, as shown in Fig. 2, so that after a certain amount of rotation has been imparted to the escapement-wheel the parts will move out of engagement, and thus remove a portion of the work or resistance to be overcome by the spring, and leaving it free to expend its entire force in ringing the alarm-bell G, which is arranged at the back of the supporting-frame of the train of gearing, its striker g being operated by a ratchet-wheel, G' , upon the shaft of the gear-wheel and pinion $E' e^2$, as indicated in Fig. 4.

The dial or indicator for indicating the temperature to which the apparatus is exposed consists of a dial, H, secured to the post or stud h , upon which the gear and pinion $E^2 e^3$ turns, and a hand or pointer, i , secured to an arbor or spindle, I, turning in said post, as clearly indicated in Figs. 2, 3, 5, and 6, motion being communicated to said spindle by a cord or wire, i' , which engages in a circumferential groove in said spindle, and has one end connected to the escapement-releasing bar C, and the other end to a spring, J, as clearly indicated in Figs. 2 and 5.

J' is a temper-screw bearing against the spring J, and by means of which the tension or movement of the spring is regulated and adjusted. By this connection of parts it will be seen that the spring, in addition to keeping the cord or wire i' taut, also acts to keep the escapement-bar C in contact with the thermostat A.

In Fig. 8 I illustrate my invention arranged as an electric thermostat for making, on a predetermined increase of temperature, an electric connection, so as to send an alarm. In this the arched thermostatic bar A is preferably arranged within a casing, A' , of glass, in order that it may be hermetically sealed so as to exclude dust, &c., and is provided

with metallic contacts $a^2 a^3$, placed in the electric circuit, as indicated.

A^2 is a metallic housing or casing to receive and hold the glass casing A' and furnish means for securing the apparatus in place upon a wall or ceiling of a building.

While in the drawings I have shown the thermostatic bar A arranged singly, yet it is evident that a pair of the same can be used in conjunction and arranged in reversed directions to each other. In this case the one bar would carry the alarm mechanism, and the other operate the escapement-releasing bar C; and in the case of the electric thermostat the one would carry one electric pole, and the other the opposite electric pole. It is also evident that the mechanical alarm apparatus can be so arranged as to transmit an alarm to some central station, as well as giving a local alarm at the place where it is located, by means of wire and bell-crank connections from the local apparatus to a main central apparatus, where the alarm is again given and recorded.

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

1. A thermostat for fire-alarms, &c., consisting of an arch-shaped bar, A, provided with eyes a' , and arranged between fixed abutments B, provided with pivot-pins b for the eyes a' , substantially as set forth.

2. A thermostat for fire-alarms, &c., consisting of a bar, A, thickened at its center and tapering toward its ends, in combination with fixed abutments B B for confining the ends of said bar, substantially as set forth.

3. A thermostat for fire-alarms, &c., consisting of an arch-shaped bar, A, of hard rubber or other analogous material, provided with eyes a' , in combination with fixed abutments B B, provided with journal-pins b , substantially as set forth.

4. The combination, in a fire-alarm, of a train of gears provided with a striking mechanism, and an escapement-disk, D, with the arched thermostat A, fixed abutments B B, and escapement-releasing bar C, substantially as set forth.

5. The combination, in a fire-alarm, of the arch-bar A, abutments B B, rod C, adjustable thumb-nut e , and the escapement-disk D of a train of alarm-gear, essentially as and for the purpose set forth.

6. The combination of the arched thermostat A, fixed abutments B B, and bar C with cord or wire i' , spindle I, spring J, pointer i , and dial H, substantially as and for the purpose set forth.

7. The combination of the arched thermostat A, having fixed abutments B B, with the bar C, cord i' , spindle I, spring J, temper-screw J' , pointer i , and dial H, substantially as and for the purpose set forth.

8. In a fire-alarm apparatus, essentially as set forth, the fixed stud h , forming a journal

for the gear and pinion $E^2 e^3$, and provided
with an axial recess for the spindle I, in com-
bination with the pointer i , dial H, secured to
said stud, and means, essentially as herein de-
scribed, for operating said pointer.

5 9. In a fire-alarm apparatus, essentially as
set forth, the combination of a train of driv-
ing-gear, an alarm-bell striker, and an escape-
ment device, in combination with a mutilated

driven pinion, e' , inserted between the alarm- 10
striker and the escapement device, essentially
as described.

In testimony whereof witness my hand this
23d day of February, 1885.

JOHN J. BYRNE.

In presence of—

ROBERT BURNS,
M. E. BYRNE.