

(No Model.)

2 Sheets—Sheet 1.

S. W. LUDLOW.
FIRE ALARM.

No. 591,408.

Patented Oct. 12, 1897.

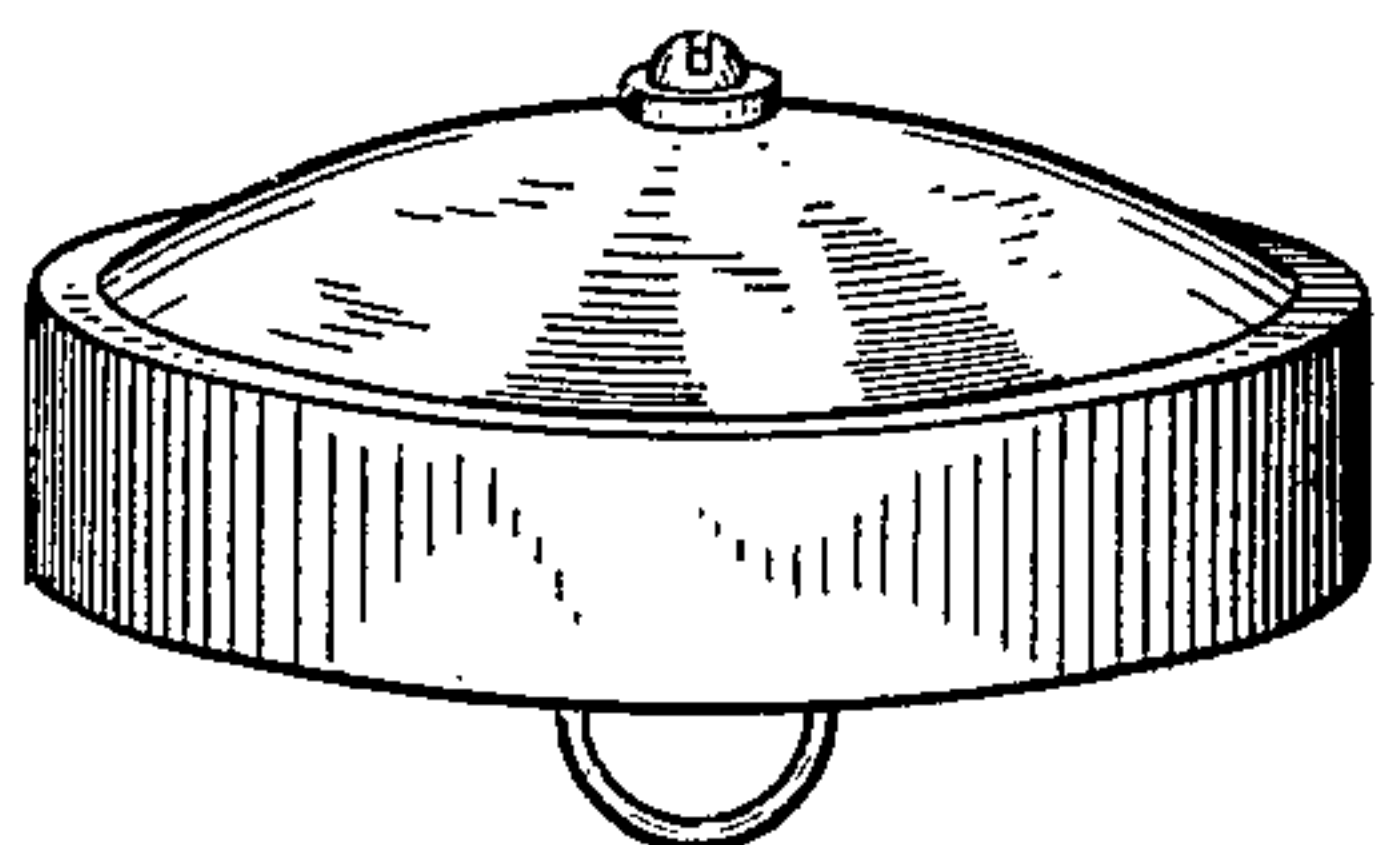


Fig. 1

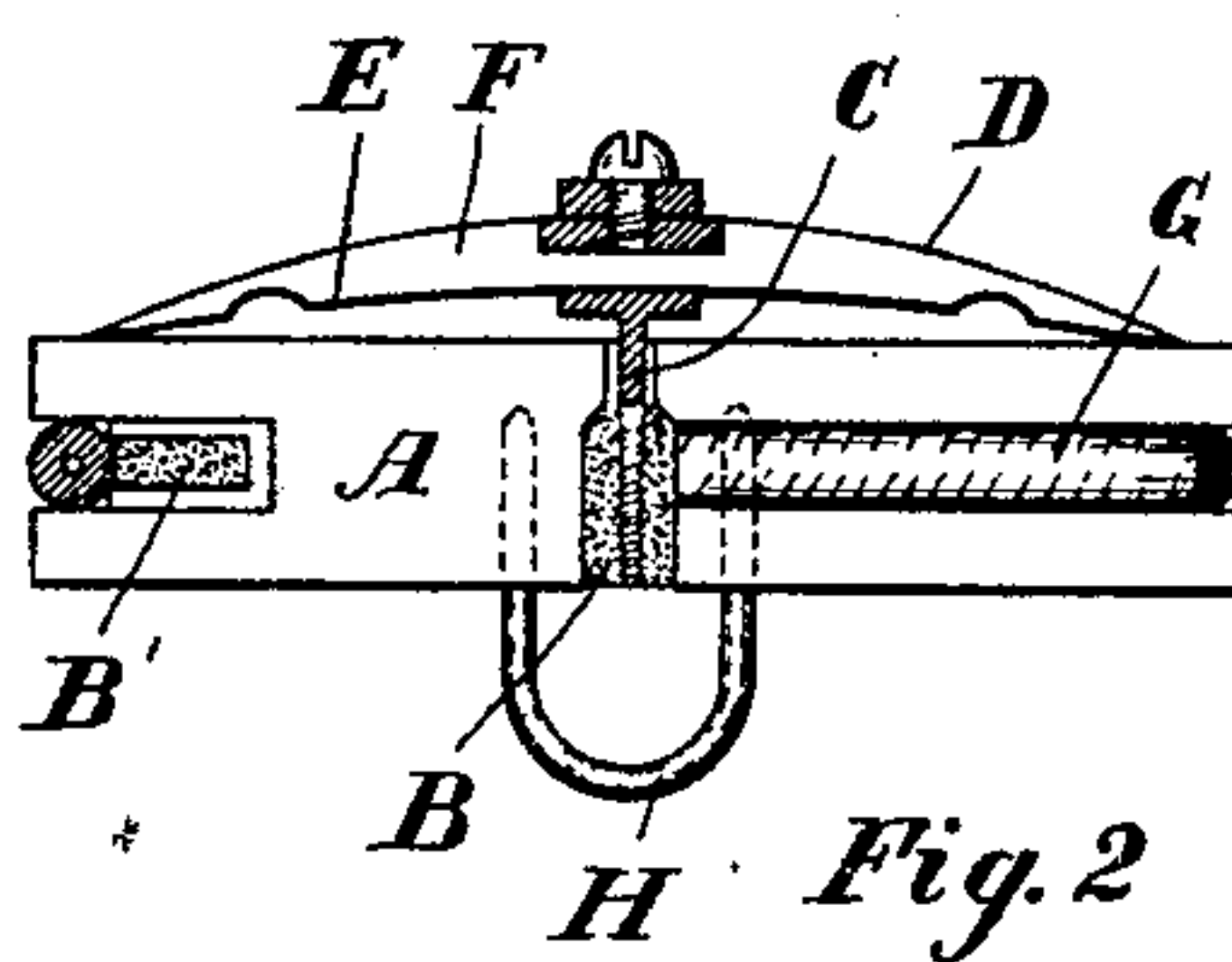


Fig. 2

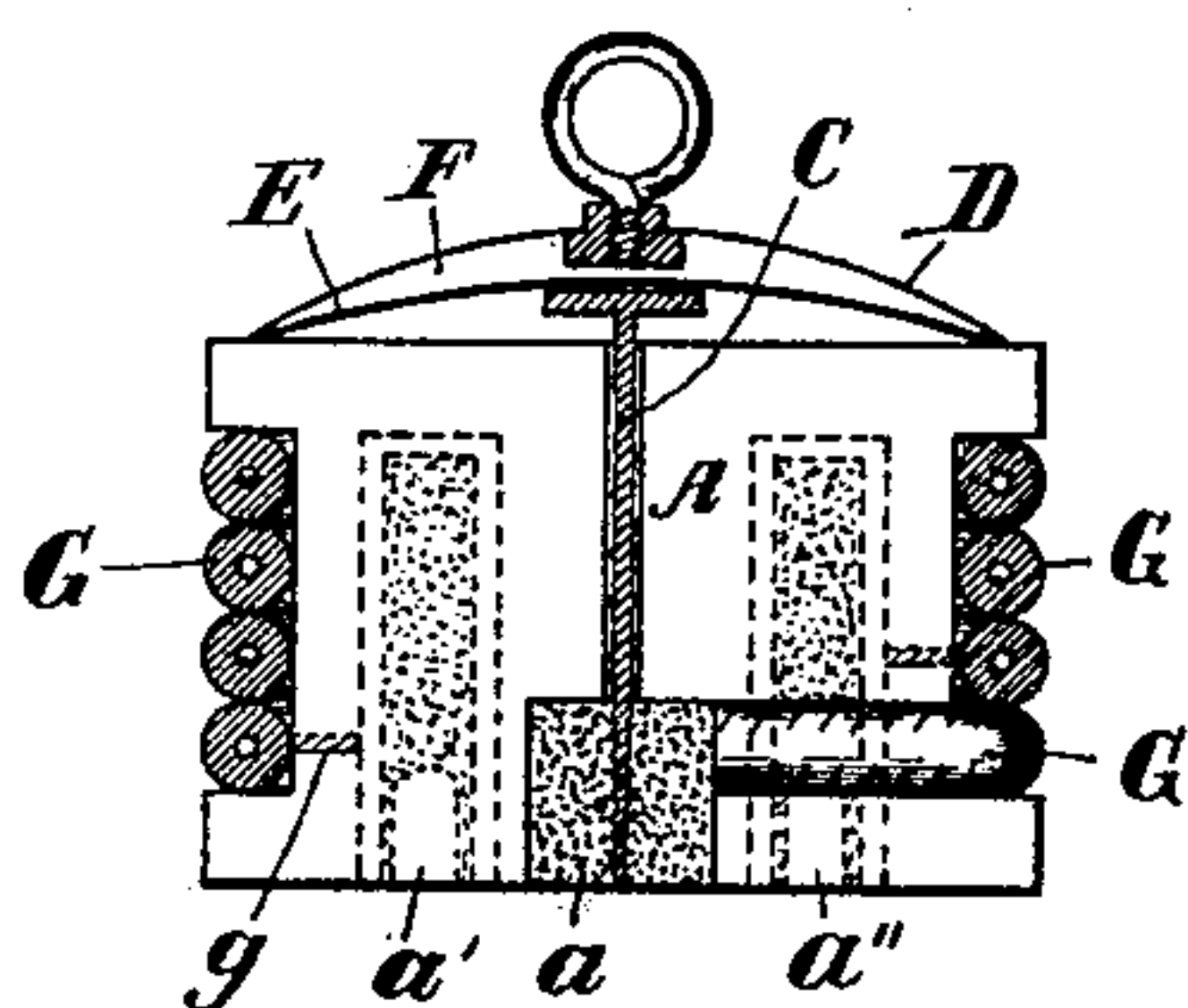


Fig. 4

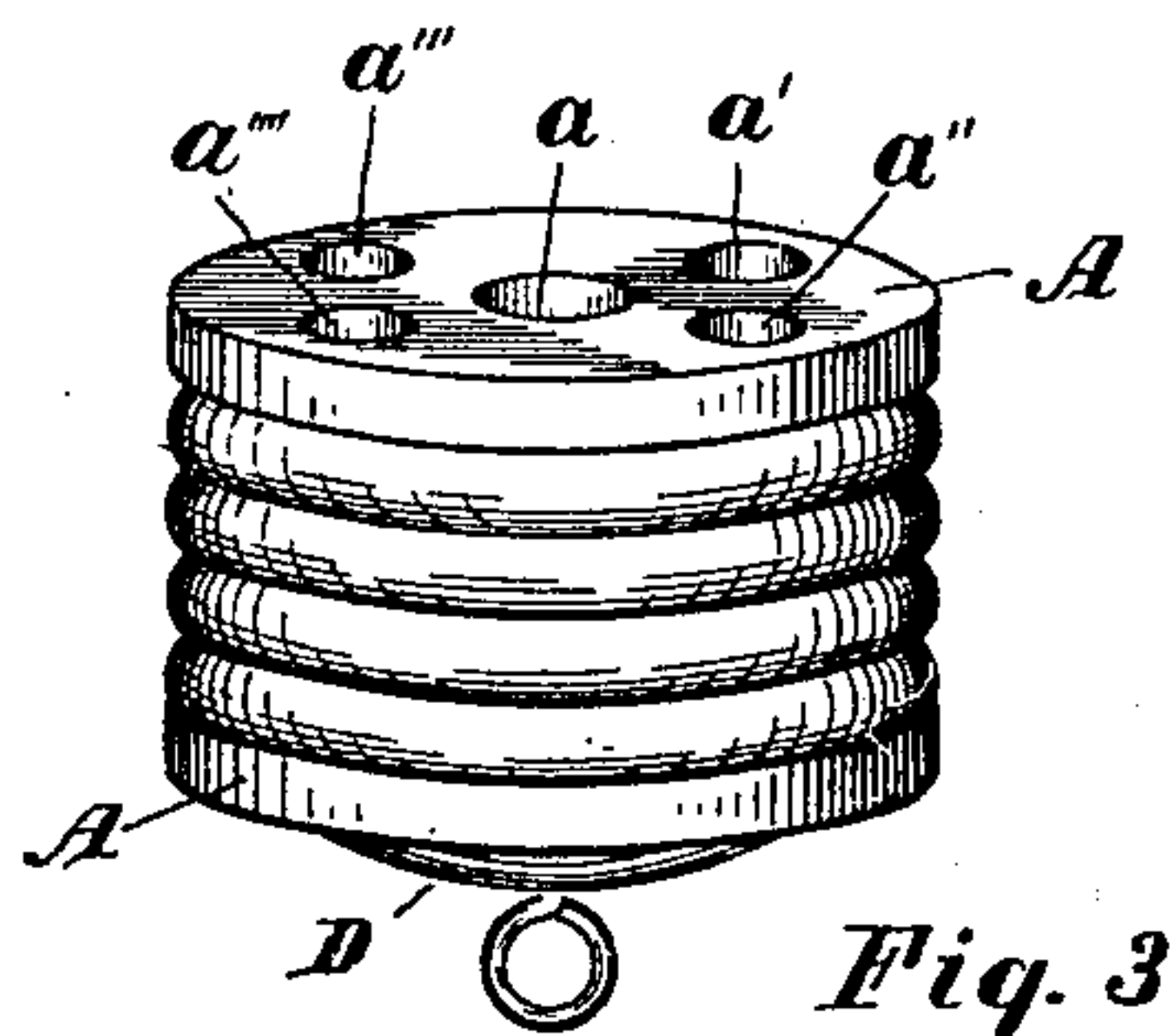


Fig. 3

Witnesses
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Inventor
Samuel W. Ludlow
By his Attorney *William Shatto*

(No Model.)

2 Sheets—Sheet 2.

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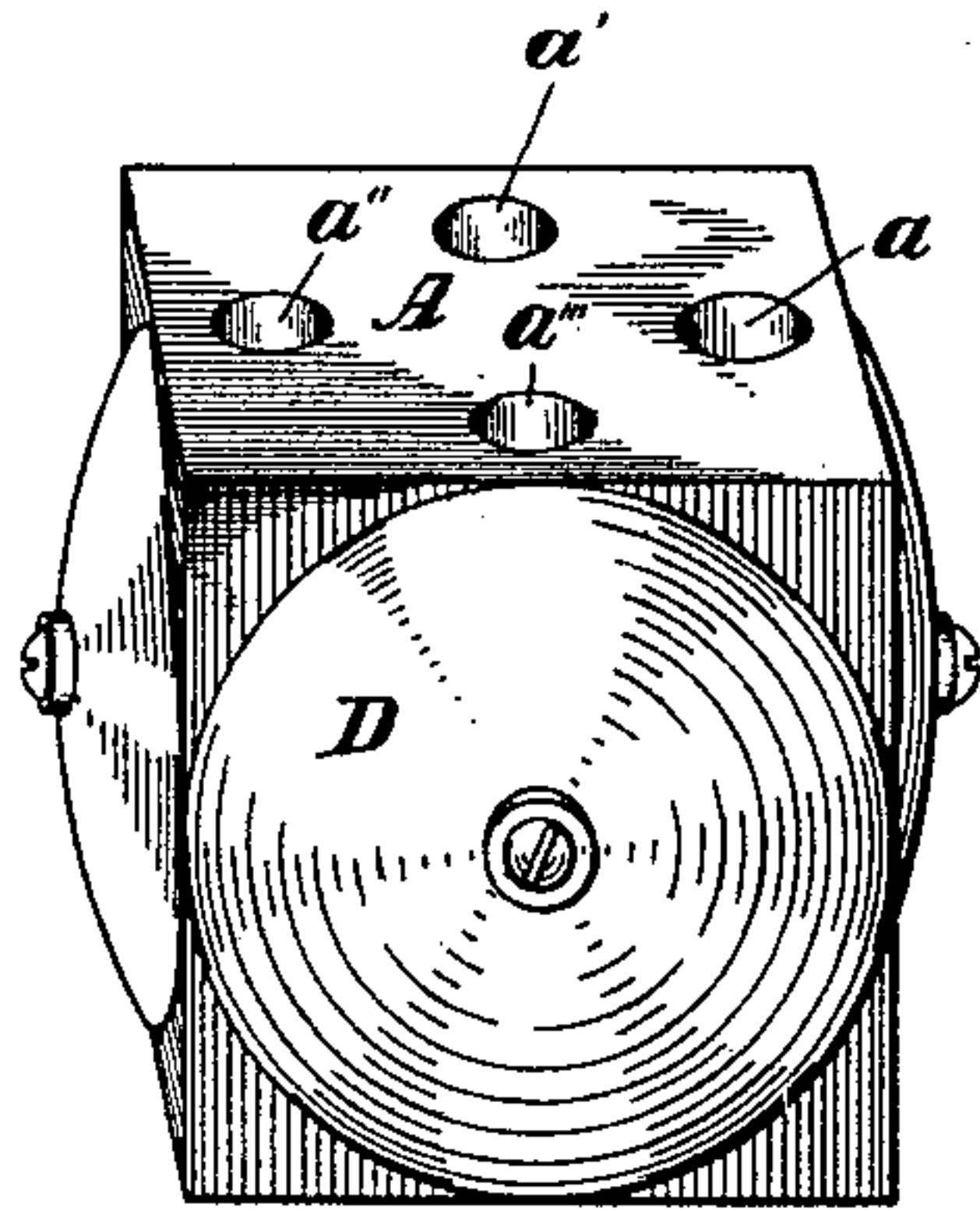


Fig. 5

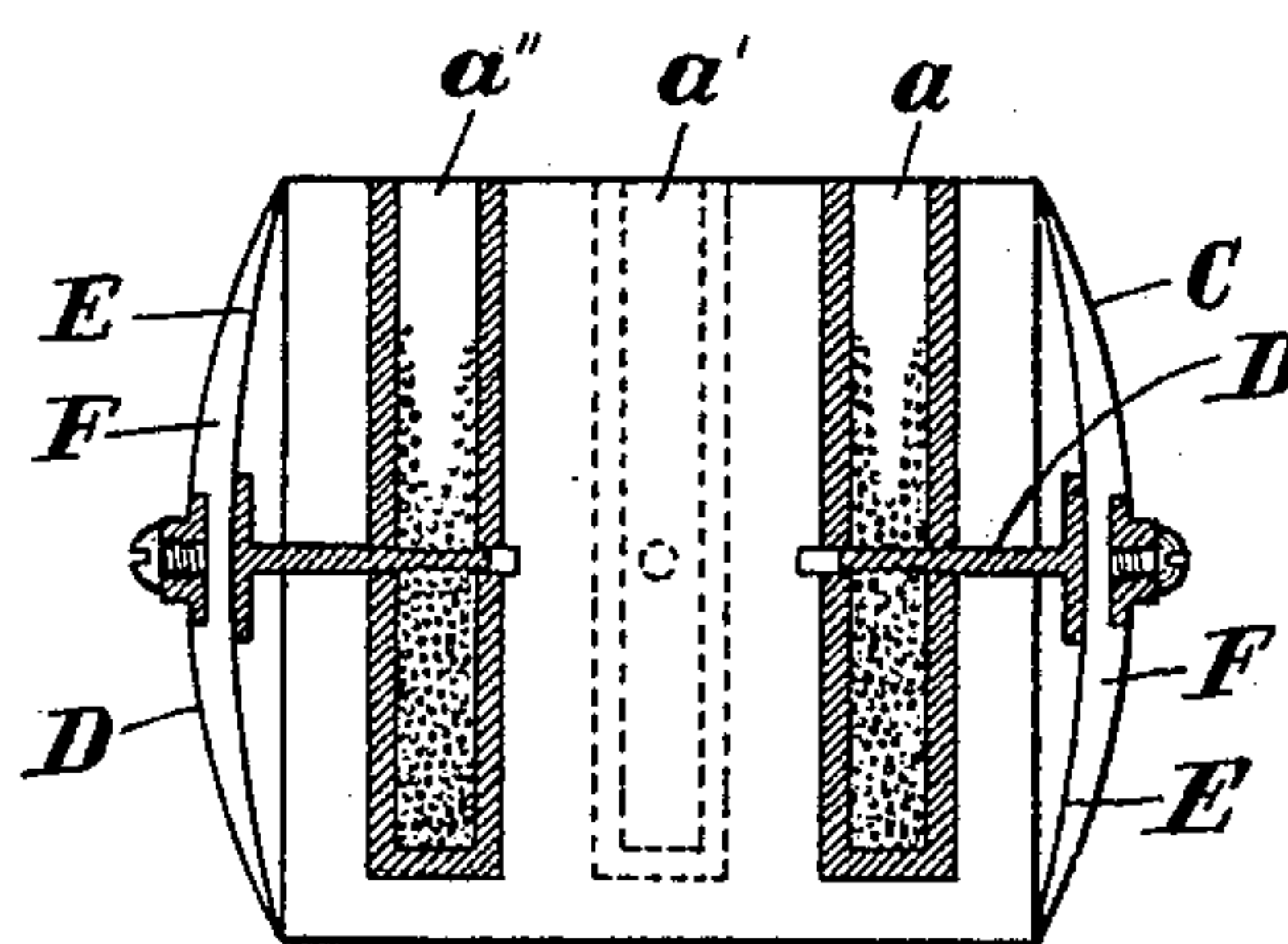


Fig. 6

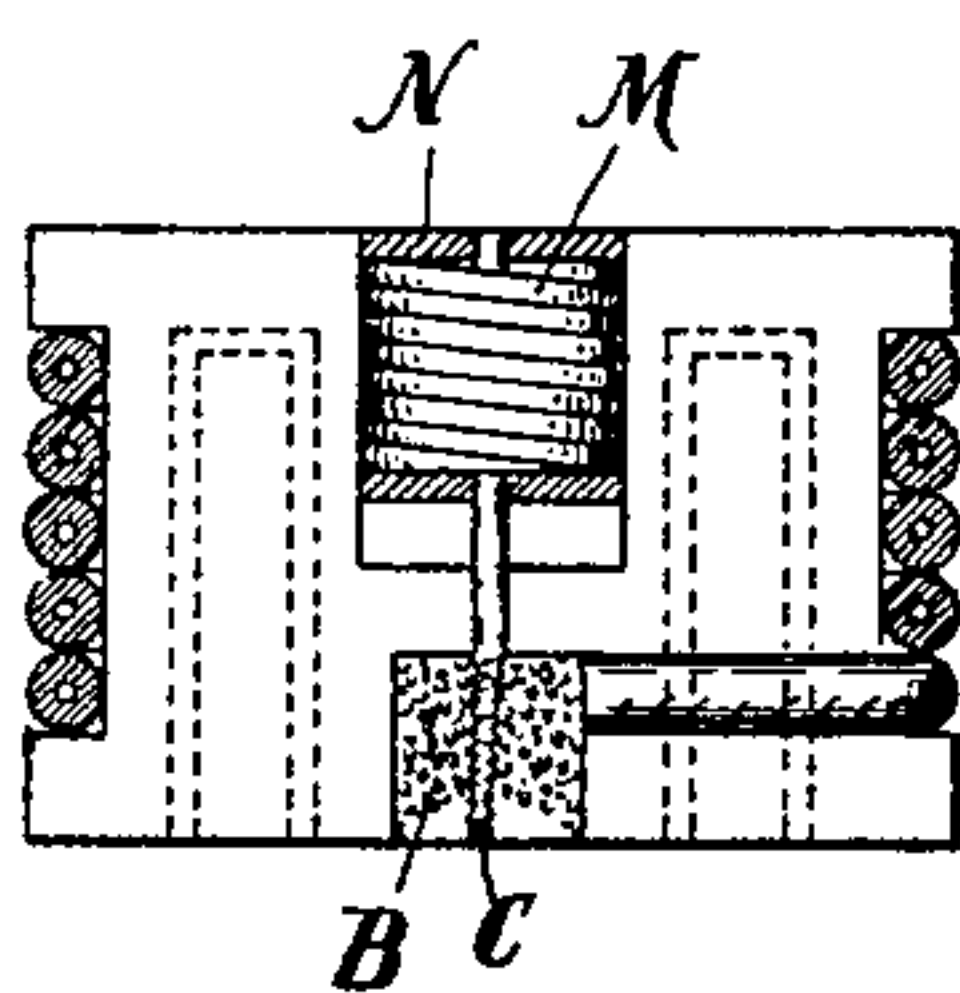


Fig. 7

Witnesses
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Harvey Edwards.

Inventor

Samuel W. Ludlow

By his Attorney William Shaw

UNITED STATES PATENT OFFICE.

SAMUEL W. LUDLOW, OF CINCINNATI, OHIO.

FIRE-ALARM.

SPECIFICATION forming part of Letters Patent No. 591,408, dated October 12, 1897.

Application filed November 20, 1896. Serial No. 612,899. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL W. LUDLOW, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Automatic Fire-Alarms, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to automatic fire-alarms; and it consists in the construction and arrangement of the parts, as more fully hereinafter described, and illustrated in the accompanying drawings.

The objects of my invention are to provide, first, an automatic fire-alarm of simple and inexpensive construction adapted to be attached to the ceiling of a room or any convenient place and provided with a chamber containing a volatile substance which will boil at a comparatively low temperature of heat and upon boiling produce a discharge or alarm or a series and succession of them, calling attention to the fact that the temperature in the room has reached a prearranged degree.

In the accompanying drawings, Figure 1 is a perspective view of one form of my alarm, and Fig. 2 a vertical cross-section of same. Fig. 3 is a side view of one form arranged to produce five different explosions or alarms in succession, and Fig. 4 a vertical cross-section of same. Fig. 5 is a perspective of another form arranged to produce four discharges, and Fig. 6 is a vertical cross-section of the same. Fig. 7 is a cross-section of one form in which a spring is released and put in action by the fusion of an easily-fusible metal.

In the form shown in Fig. 2, A is a base or body, preferably constructed of wood, though any suitable material will answer, in which are two chambers B and B'. These chambers are filled with a fulminate easily ignited by friction. In the chamber B extends a pin or rod C. The end of it, which is surrounded by the fulminate, is made rough, so that any motion of this rod in the chamber will produce sufficient friction to explode the fulminate. On the outside of the base or body A is a thin sheet of metal D, segmental spherical in form, whose edges are firmly attached

to the base A. E is a similar sheet of metal smaller, so as to leave between the two sheets D and E a chamber F. This chamber F is filled with any suitable highly-volatile substance—as bisulfid of carbon, ether, or ammonia. Bisulfid of carbon boils at about 112°, but as that is rather too low a temperature at which to cause an explosion I prefer to use a substance that will boil at about 140°. The segmental spherical form of the plate D is such that it will resist very considerable pressure outwardly, whereas, on the contrary, the sheet or plate E, which is made of thin metal, will not resist much pressure, but will easily buckle inward under the pressure caused by the boiling of the contents of the chamber F and the release of the volatile gases. The moment the sheet E is forced downward toward the base A by the expansion of the contents of the chamber F it moves the pin C with it and produces sufficient friction to explode the fulminate in the chamber B and give an alarm. The explosion in the chamber B ignites the fuse G, which is laid in a groove passing around the body A and connecting with the chamber B'. When the fuse has burned around to the chamber B', it explodes the fulminate contained therein and causes a second alarm. H is a staple for suspending the apparatus from the ceiling. Of course it can be attached to any part of the room by any convenient means.

Figs. 3 and 4 show another form, in which the base A is provided with five chambers a a' a'' a''' a'''' . The boiling of the contents of the chamber F causes the rod C to move and by the friction thus produced to discharge the fulminate in the center chamber a and produce an alarm. At the same time it ignites the fuse G, which passes around the base A and in turn ignites the fulminate in the chamber a' through the touch-hole g , also filled with fulminate; thence the burning fuse passes on around to ignite the contents of the chamber a'' , and so on until the five chambers have been discharged. The period between these various discharges depend, of course, upon the rapidity of the burning of the fuse G and can be adjusted as desired.

In Figs. 5 and 6 I have shown another form, in which there are four chambers a a' a'' a''' , filled with the fulminate to be exploded, and

each independently connected with the chambers F containing the volatile substance, and constructed in the same way with the double sheets D and E and operating a pin or rod C to discharge the fulminate in the various chambers. As will be seen, these chambers are not connected, no fuse is used, and they may be discharged all at once, though that is not likely, unless a high degree of heat is suddenly brought in contact with the apparatus.

In Fig. 7 instead of using the volatile substance contained in a closed chamber and to be expanded by the heat I provide a spring M, held attached to the rod C and held under tension by a plate N, of fusible metal or solder, so constructed that it will melt at a low degree of temperature and which when it melts releases the spring M, which moves the rod C and causes the first explosion in the chamber B.

I have found, further, that where it is not desired to have the explosion occur at a relatively low temperature that air alone inclosed within the chamber F, between the sheets or diaphragms, will be expanded sufficiently by the heat striking the outer plate to cause the inner plate E to buckle inward sufficiently to cause the movement of the pin and the consequent explosion. The sheet D, by reason of its form and shape, may be made very thin and still resist pressure from within, so that the air within the chamber F is readily affected by heat and expanded.

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

1. An automatic fire-alarm provided with a suitable base having a chamber or chambers containing a fulminate, in combination with a chamber produced by two thin sheets of

metal of segmental spherical form one smaller than and within the other, so arranged that the outer one will resist the pressure from within, while the inner one will readily yield to such pressure, said chamber containing a volatile substance which will expand at a low temperature and the inner or yielding diaphragm forming the chamber operating a friction-pin to ignite and discharge the fulminate, substantially as and for the purpose described.

2. An automatic fire-alarm consisting of a suitable base, provided with several chambers containing fulminate and with a fuse connecting all these chambers and in one of these chambers a friction-pin for igniting the fulminate operated by the expansion of the contents of an outer chamber filled with a volatile substance and exposed to the outer temperature, substantially as shown and described.

3. An automatic fire-alarm provided with a suitable base and having a chamber or chambers containing a fulminate in combination with a chamber produced by two thin sheets of metal of segmental spherical form, one smaller than and within the other, so arranged that the outer one will resist the pressure from within while the inner one will readily yield to such pressure, said chamber containing air which will expand by the action of heat on the outer metal sheet and buckle or collapse the inner or yielding diaphragm forming the chamber and move a friction-pin to ignite and discharge the fulminate, substantially as shown and described.

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Witnesses:

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