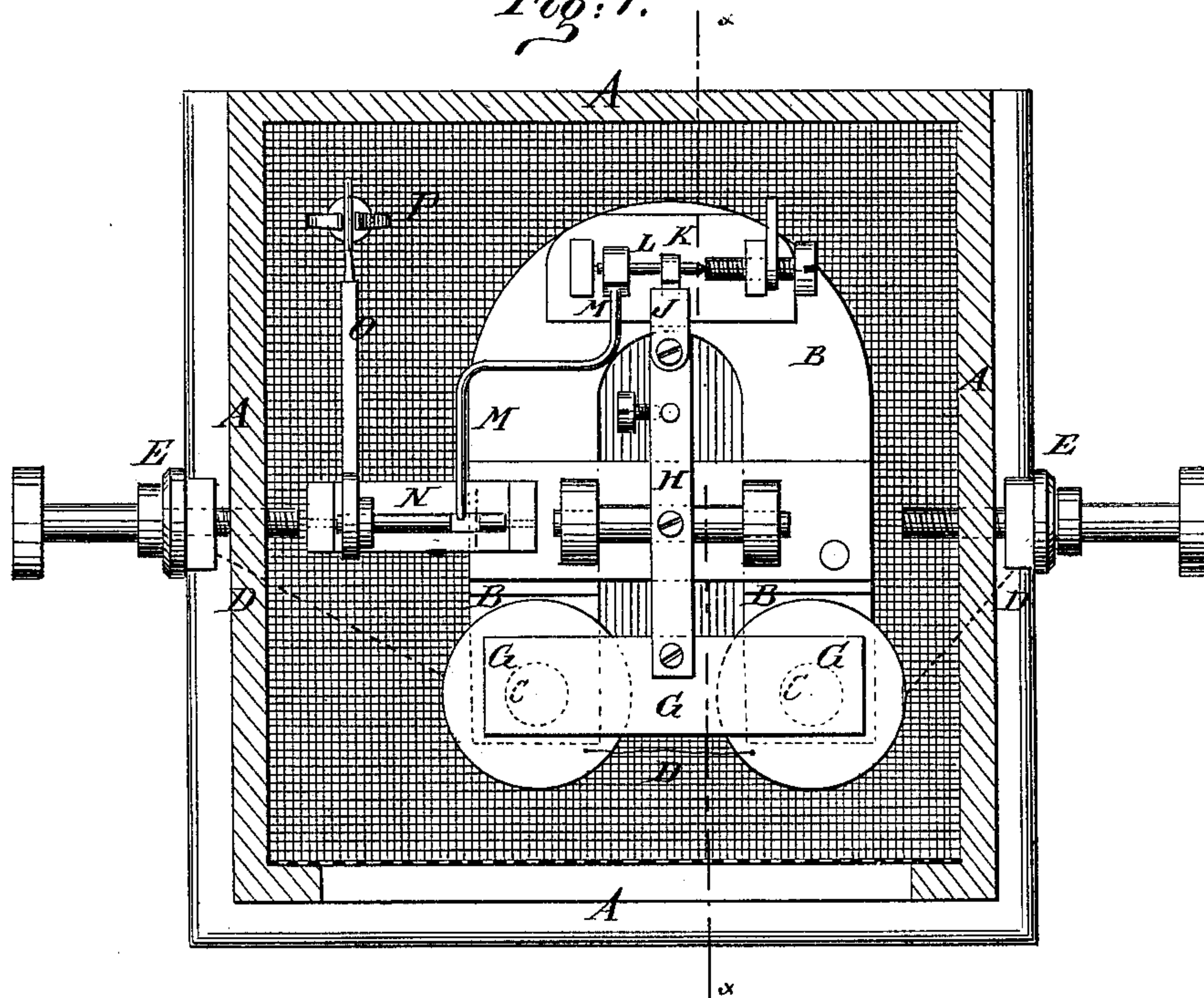
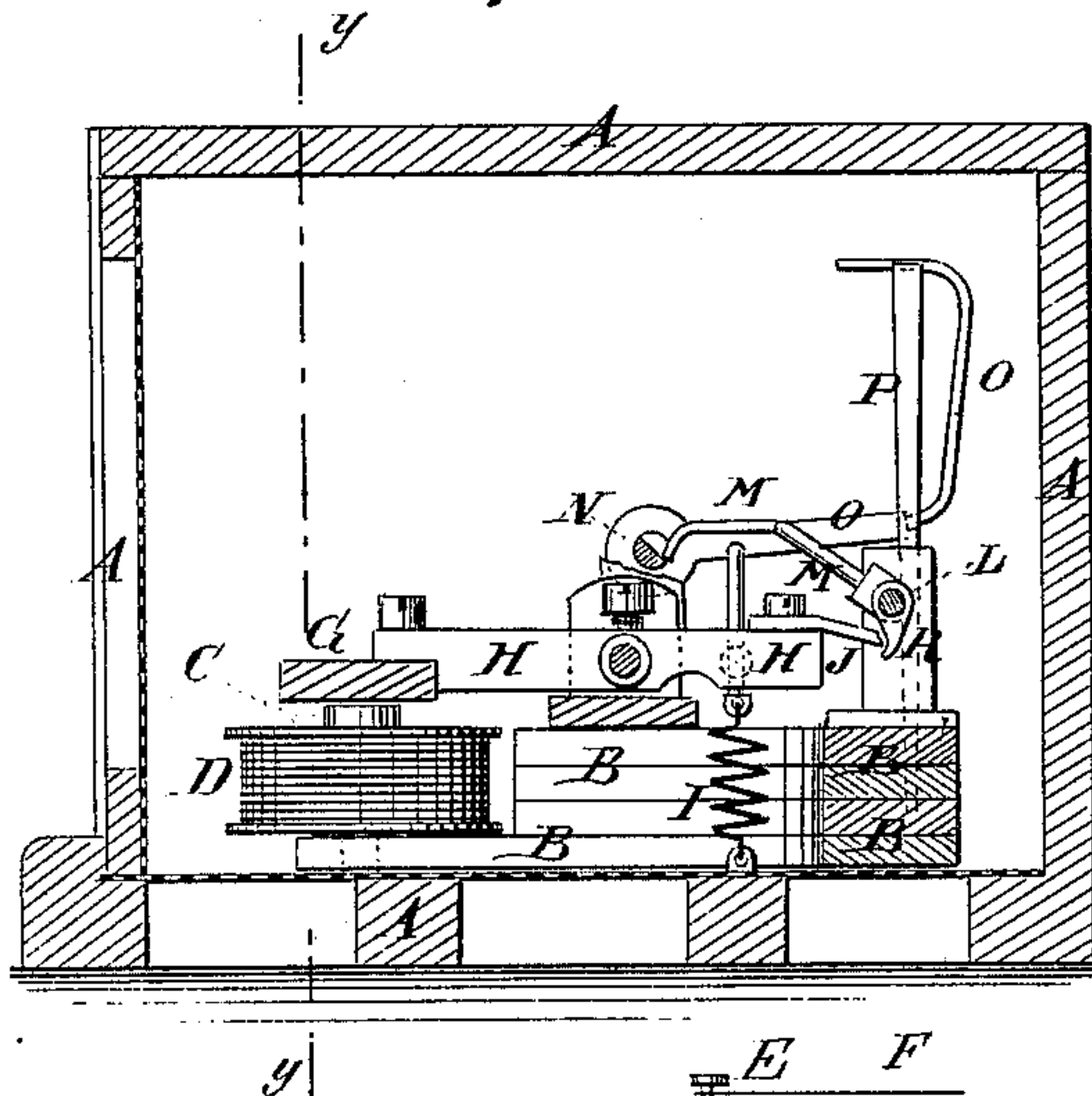


A. S. HICKLEY.  
 Magneto-Electric Fire-Alarm and Signaling Apparatus  
 No. 200,723.      Patented Feb. 26, 1878.

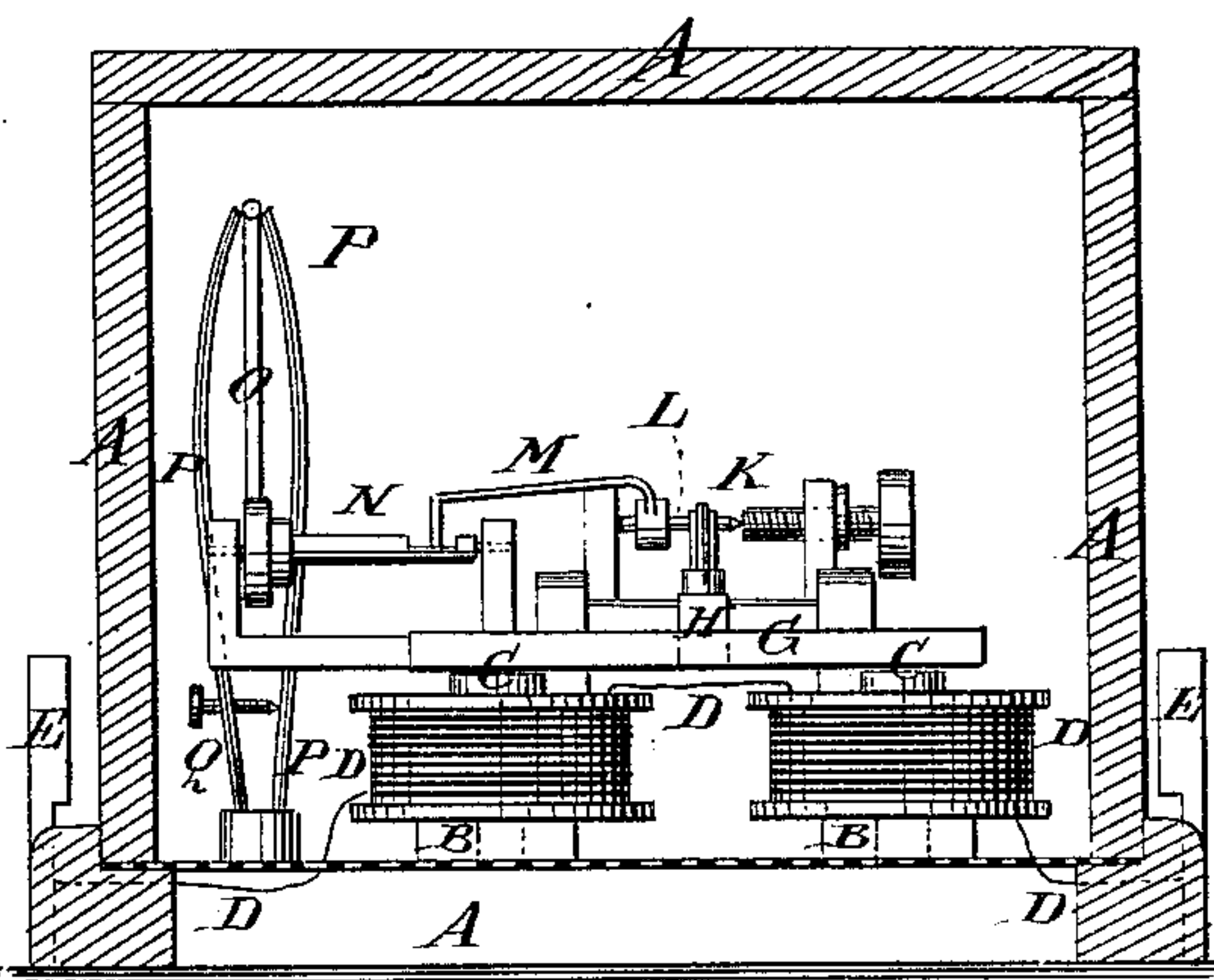
*Fig: 1.*



*Fig: 2.*



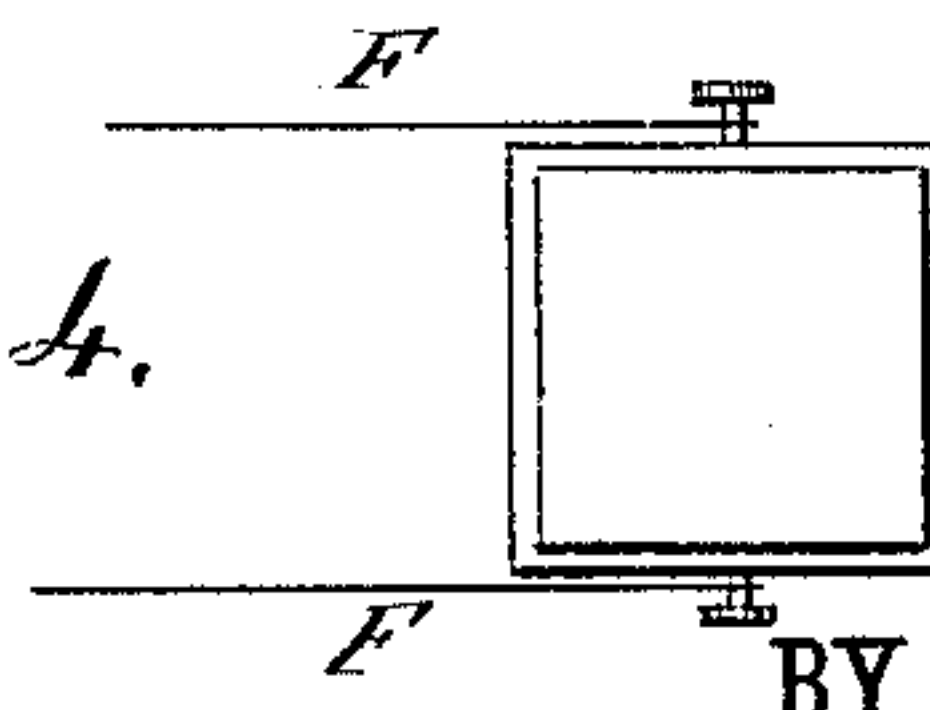
*Fig: 3.*



WITNESSES:

*Chas. Nida*  
*J. H. Scarborough.*

*Fig: 4.*



INVENTOR:

*A. S. Hickley*

BY

*Munn & Co.*

ATTORNEYS.



# UNITED STATES PATENT OFFICE.

ARTHUR S. HICKLEY, OF LONDON, ENGLAND.

## IMPROVEMENT IN MAGNETO-ELECTRIC FIRE-ALARM AND SIGNALING APPARATUS.

Specification forming part of Letters Patent No. **200,723**, dated February 26, 1878; application filed November 2, 1877.

### *To all whom it may concern:*

Be it known that I, ARTHUR SAMUEL HICKLEY, of London, in the county of Middlesex, England, have invented a new and useful Improvement in Magneto-Electric Fire-Alarm and Signaling Apparatus, of which the following is a specification:

Figure 1 is a top view of my improved apparatus, the case being shown in horizontal section. Fig. 2 is a vertical section of the same, taken through the line *x x*, Fig. 1. Fig. 3 is a vertical section of the same, taken through the line *y y*, Fig. 2. Fig. 4 is a view illustrating the mode of connecting the apparatus with the bell.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish an improved magneto-electric apparatus for releasing the clock-work of an alarm or signal-bell or other indicator, to allow it to sound, without its being necessary to use a voltaic or galvanic battery.

The invention consists in the combination of the axes of the magnetic field, and, whether re-enforcing magnets be used or not, the coils, the armature, and the pivoted lever with each other, for operating an electric alarm-bell; and in the combination of the magnet having rods attached to its ends, and, whether re-enforcing-magnets be used or not, the coils, the armature, the lever, the spiral spring, the arms and rod, the rod and arm, and the clamps with each other, for operating an electric alarm-bell automatically upon an increase of temperature, as hereinafter fully described.

A is the case of the instrument, which has openings formed through it, covered with wire-gauze and silk or other suitable fabric, to allow heated air to pass through, while keeping out dust, &c. To the bottom of the case is secured a horseshoe or bar magnet, B, which may be re-enforced, if desired, by other similar but shorter magnets, and to the ends of which, and at right angles with its plane, and in the axes of the magnetic field, are secured the ends of two rods, C, of iron or steel, which thus become the poles of the magnets. Upon the rods C are placed coils of insulated wire D, which are connected together at one end, making the

coils a continuous wire. The other ends of the wire D are connected with the clamps E, attached to the case of the instrument, and by which are held the ends of the wires F, leading to the bell, as indicated in Fig. 4.

G is the armature, which is attached to the end of the lever H. The lever H is pivoted at its middle part to a support attached to the magnets B, in such a position that the armature G may be lowered to and raised from the ends of the rods C by the oscillations of the said lever H. The rear end of the lever H is held down, holding the armature G raised, by a spiral spring, I, one end of which is attached to the bottom of the case A, and its other end is attached to the said rear end of the lever H. To the rear end of the lever H is attached, or upon it is formed, a toe, J, which, when the armature G is in contact with the ends of the rods C, engages with the notch in the side of a short arm, K, rigidly attached to the pivot-rod L, the ends of which are pivoted to supports attached to the magnets B, or to center-screws attached to said supports. To the pivot-rod L is rigidly attached the end of an arm, M, which is bent into such a shape that its end may engage with a shoulder formed upon a rod, N, the ends of which are pivoted to supports attached to the supports that carry the lever H. To the pivoted rod N is rigidly attached an arm, O, which projects to the rearward, and is bent into such a shape that its end may pass between and be held by the ends of the clamp-bars P. The lower ends of the bars P are attached to a standard or support attached to the bottom of the case A, and their tension or force is regulated by a hand-screw, Q, which passes through one of said bars P, with its forward end resting against the other bar P. The outer part of each of the bars P is formed of a metal or an alloy that is very slightly expanded by heat, and its inner part is formed of a metal or an alloy that is very easily and greatly expanded by heat.

Any ordinary electric clock-work alarm-bell may be used.

In setting the instrument the armature G is lowered into contact with the ends of the rods C, the toe J of the lever H is placed in the shoulder or notch of the arm K, the end of the

arm M is placed upon the shoulder of the rod N, and the end of the arm O is placed between the jaws of the clamp P.

With this arrangement, should the temperature increase, the expansion of the inner parts of clamps P will release the arm O, and allow the spiral spring I to operate the lever H and raise the armature G away from the ends of the rods C. This sends a current or pulsation of electricity through the wires F, or changes the electrical state, so as to release the clock-work and allow it to sound the bell.

If desired, the arrangement of magnets and coils may be duplicated when greater force is required. The lever H may also be provided with a handle, so that the alarm may be sounded by hand.

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

The combination of the magnet B, having rods C attached to its ends, and, whether reinforcing-magnets be used or not, the coils D, the armature G, the lever H, the spiral spring I, the arms and rod K M L, the rod and arm N O, and the clamps P with each other, for operating an electric alarm-bell automatically upon an increase of temperature, substantially as herein shown and described.

ARTHUR SAMUEL HICKLEY.

Witnesses:

JAMES T. GRAHAM,  
C. SEDGWICK.