

J. A. CARRUTHERS.

ELECTRIC CLOCK.

APPLICATION FILED OCT. 10, 1902.

NO MODEL.

Fig. 1

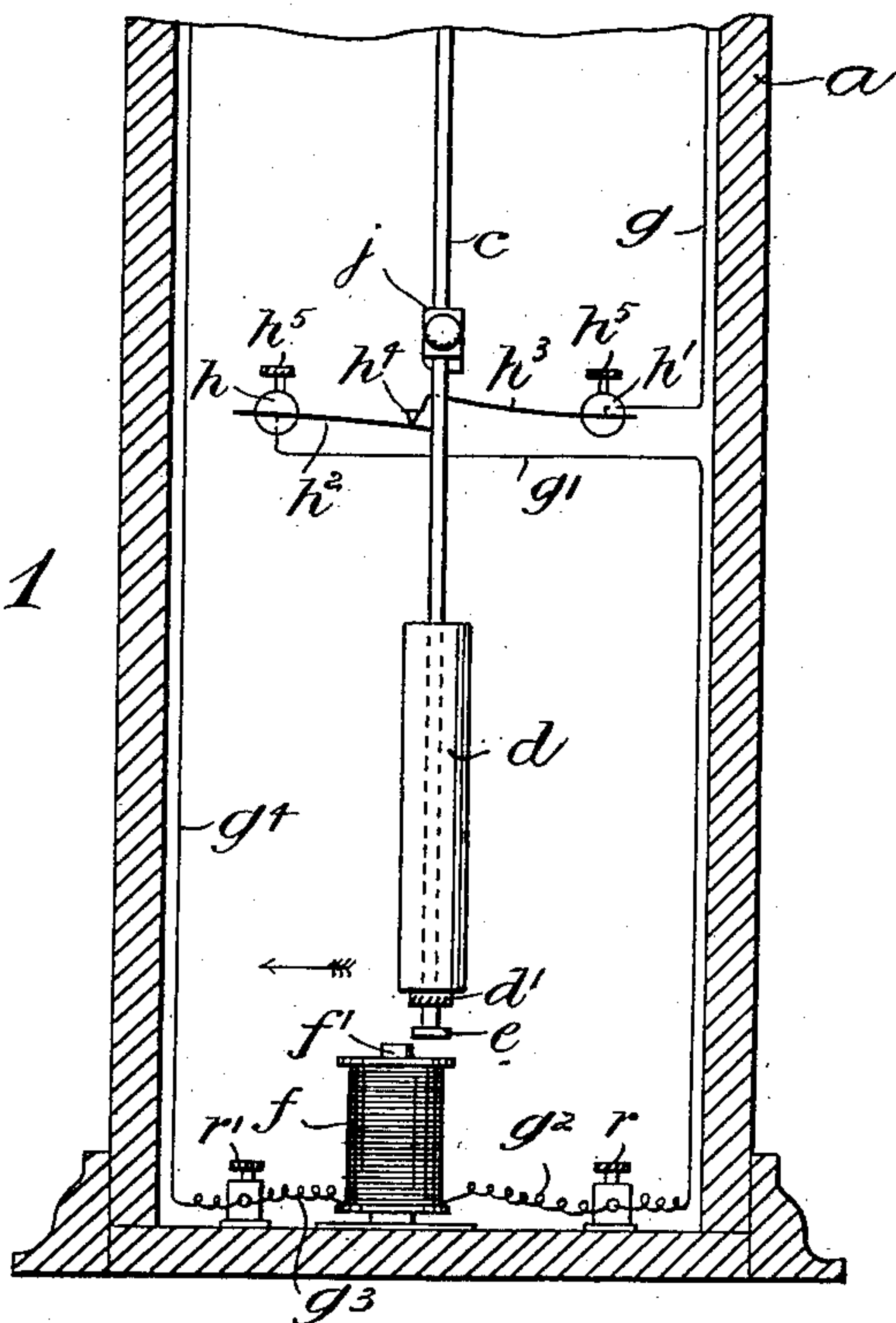


Fig. 2.

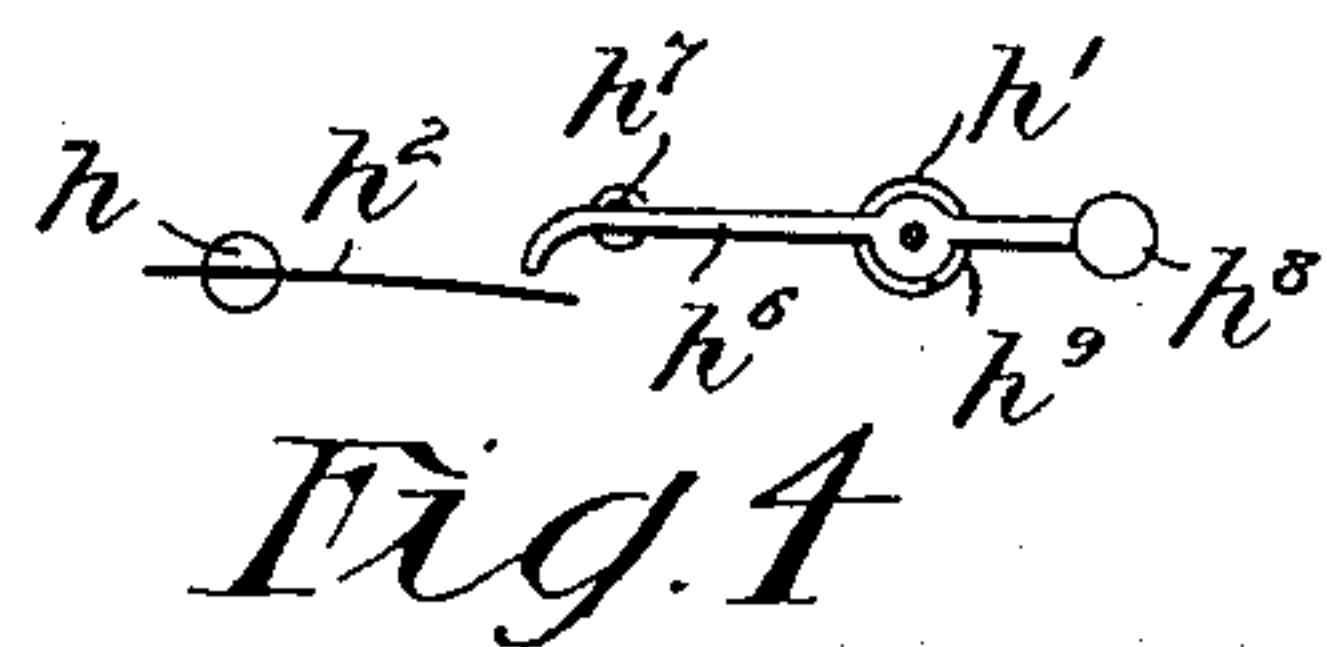
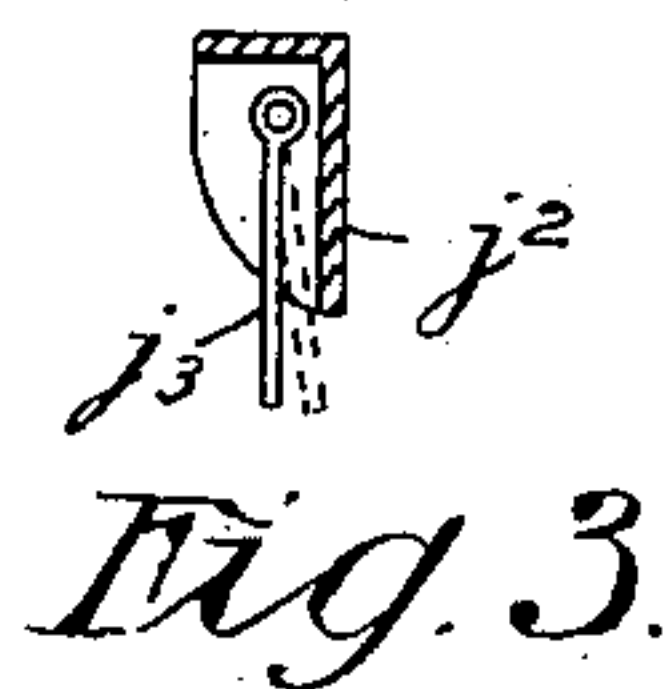
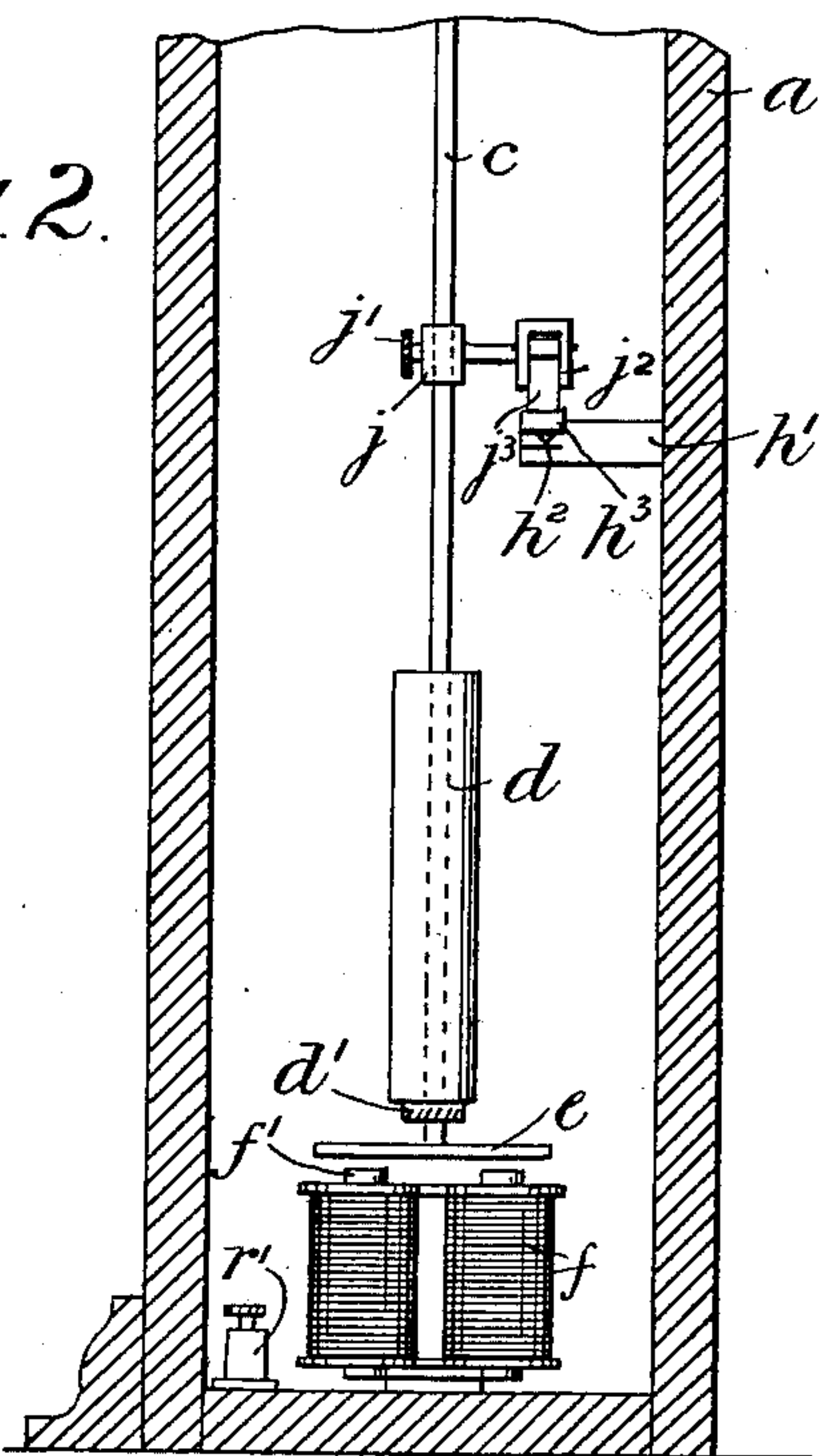


Fig. 4

Witnesses:  
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By Wright, Brown & Lumley  
Atty.



# UNITED STATES PATENT OFFICE.

JOSEPH ALEXANDER CARRUTHERS, OF ST. JAMES, VICTORIA, AUSTRALIA.

## ELECTRIC CLOCK.

SPECIFICATION forming part of Letters Patent No. 731,279, dated June 16, 1903.

Application filed October 10, 1902. Serial No 126,659. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH ALEXANDER CARRUTHERS, a subject of the King of Great Britain, residing at High street, St. James, in the State of Victoria, Australia, have invented certain new and useful Improvements in Electrically Actuated and Controlled Clocks and other Time-Recording Apparatus, of which the following is a specification.

My invention provides mechanism by means of which the swing of the pendulum will cause the make and break of an electrical circuit to actuate a clock or other time-recording apparatus.

Figure 1 shows front elevation of the mechanism set in a case; Fig. 2, side view of same with part in section. Fig. 3 shows section of contact-making plate drawn to a larger scale, and Fig. 4 shows an alternative form of a part of the mechanism.

*a* represents casing of clock or other time-recording apparatus. Within the casing is hung in the ordinary manner pendulum *c*. This pendulum carries cylinder or weight *d*, that is adjusted by milled screw *d'*, and the pendulum terminates with a soft armature *e*. The armature of the pendulum is arranged to swing within the field of an electro magnet or magnets *f*, that have soft cores *f'* to be energized and deenergized on the make and break of the electrical circuit, as hereinafter described.

From the casing *a* two brackets or arms *h h'* project, and these carry at their ends, which are split, spring-plates *h<sup>2</sup> h<sup>3</sup>*, both of which are provided with platinum contact-points at *h<sup>4</sup>*. The spring-plates *h<sup>2</sup> h<sup>3</sup>* are adjustable into their correct position in the slots of the brackets and are held by the thumb-screws *h<sup>5</sup>*.

The pendulum *c* carries sliding frame *j*, with screw-nut *j'* for adjusting its level, and at the end of said frame is an open box *j<sup>2</sup>*, in which is hinged a plate *j<sup>3</sup>*, the object of the construction being to cause the said plate *j<sup>3</sup>* to impinge upon and depress the spring *h<sup>3</sup>* to form contact with the spring *h<sup>2</sup>* at the required times and to allow it on the return motion to ride over without exerting a pressure upon the spring-plate *h<sup>3</sup>*. The spring *h<sup>3</sup>* has wire *g* leading to an electrical cell or battery, and the spring *h<sup>2</sup>* has wire *g'* led to terminal *r*. This

wire is in circuit with the electromagnet-wires *g<sup>2</sup> g<sup>3</sup>*, the latter being in circuit (at terminal) *r'* with wire *g<sup>4</sup>*, leading to battery. As an alternative to the spring-plate *h<sup>3</sup>*, I may employ a lever *h<sup>6</sup>*, that is pivoted to bracket *h'* and carries weight *h<sup>8</sup>*, a stop *h<sup>9</sup>* being formed on the bracket to limit fall of weighted end of lever. This lever, as also the spring *h<sup>3</sup>*, may carry a roller *h<sup>7</sup>* to receive the impact of the hinged plate *j<sup>3</sup>*.

The operation is as follows: Assume the pendulum to be in the position shown in Fig. 1 and moving in the direction of arrow. At this moment the hinged plate *j<sup>3</sup>* will bear upon the spring-plate *h<sup>3</sup>*, being stopped against the box *j<sup>2</sup>*, causing it to form contact with the spring-plate *h<sup>2</sup>*, so completing the electrical circuit and energizing the electromagnet so that it will exert an attractive force on the armature *e*; but before the pendulum will have moved to a position directly over the electromagnet the contact will be broken at *h<sup>4</sup>* by the plate *j<sup>3</sup>* passing beyond the spring-plate *h<sup>3</sup>*, and the energy given to the pendulum will carry it to its extreme position, traveling in the direction of the arrow, and the momentum thus given to it will carry it back in the opposite direction to its extreme position. The hinged plate *j<sup>3</sup>* during this backward travel being free of the box will pass idly over the plate *h<sup>3</sup>*, and the pendulum will on its return to the position (approximately) shown on Fig. 1 again be exerted forward as before.

The employment of roller *h<sup>7</sup>* will minimize friction in the pendulum action, and it will also enable a shorter contact to be made, and so reduce electrical action in the battery.

It will be seen that the electromagnets will be energized once only on the full stroke of the pendulum, so that the cell or battery will only be drawn upon at such times as the contact is made, and will thus last a very considerable time before being exhausted.

I have described the invention as being controlled by a single electrical cell, but it will be understood that the power might be obtained from any other suitable electrical source. The cell or battery, which may be either of the "wet" or "dry" system, when employed may be placed in any convenient position, such as in a box at top of or be-



neath the clock-casing, the battery-wires  $g$   $g^4$  being led away to such battery in the most convenient manner.

By the means above described a continuous  
5 oscillating movement of the pendulum is obtained, and from this movement the mechanism of a clock or other time-recording mechanism can be actuated and controlled.

Having now particularly described and as-  
10 certained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In electrical clocks and other time apparatus, a pendulum having at its base an  
15 armature, an electromagnet set beneath the said armature, a hinged plate supported directly by the pendulum, means for preventing the hinged plate from swinging on its axis during movement of the pendulum in one di-  
20 rection, spring contact-plates one of which is adapted to be depressed by said spring-plate in one direction of travel of the pendulum

and to pass idly over the plate on the return movement and circuit connections between said spring-plates and the magnet.

2. In combination, a pendulum - rod, a  
25 bracket  $j$  adjustable thereon, box  $j^2$  on said bracket, a hinged plate  $j^3$  within the box, the side of the box forming a stop to prevent the hinged plate from swinging on its axis during  
30 movement of the pendulum in one direction, spring-plates  $h^2$   $h^3$  set beneath said hinged plate, electrical wire connections with the spring-plates and cell or battery and an electromagnet for actuating the pendulum sub-  
35 stantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH ALEXANDER CARRUTHERS.

Witnesses:

A. O. SACHSE,  
A. HARKER.