N° 3236 A.D. 1912

Date of Application, 8th Feb., 1912—Accepted, 20th June, 1912

COMPLETE SPECIFICATION.

Improvements in or relating to Electrically Driven Clocks.

I, PERCIVAL ARTHUR BENTLEY, Clock and Watch Maker, of Forest Gate, Clarendon Park Road, Leicester, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to electrically driven clocks and has particular reference to clocks having a ratchet or escape wheel driven by a pendulum acted upon by a magnet or solenoid and provided with a dead-beat escapement in the form of a toothed wheel on the spindle of the escape wheel. The invention also relates to electrically driven clocks in which one of the wheels of the train is provided with pins or the like to operate a contact-maker for controlling one or more secondary dials.

According to this invention the toothed wheel which co-operates with a pivoted arm to form the dead-beat escapement is furnished with pins or projections which operate the contact-maker.

In the preferred construction the ratchet or escape wheel is driven from the pendulum through pawls pivoted on a bar or frame and suspended by pivoted links in the manner more particularly referred to hereinafter.

In the accompanying drawings:—

Figure 1 is an elevation of one construction of clock movement according to this invention, parts being removed for the sake of clearness.

Figure 2 is a side elevation, and

Figure 3 is a view similar to Figure 1, but showing the parts in another position.

Like letters indicate like parts through the drawings.

The movement comprises a frame A and a train B which need not be described in detail, as in themselves they form no part of the present invention. In gear with the train and forming part of it in the usual way is a ratchet or escape wheel C which is driven round at each half swing of the pendulum, by pawls D. These pawls are pivoted to a bar or frame E suspended by links E^1 pivoted to extensions A^1 of the frame A. The bar E is provided with a central fork E^2 which engages with a pin F^1 on the pendulum F. This pin and a portion of the pendulum are only shown in Figure 2 for the sake of clearness. It will be understood that the point of suspension of the pendulum will preferably be in the same horizontal line as the upper pivots of the links E^1 and that it may be of any convenient length and driven by some known electromagnetic arrangement. It is convenient to employ a seconds pendulum and to arrange that the ratchet wheel is driven round for the space of one whole tooth for each complete oscillation of the pendulum.

Mounted upon the spindle C^1 of the ratchet wheel C is a toothed wheel G provided with V-shaped teeth adapted to be engaged by a detent in the form of a small roller H^1 mounted upon an arm H pivoted at H^2 to one of the frame extensions A^1. Supposing the ratchet wheel C to have say, thirty teeth and

to be driven round through a distance corresponding to the length of one tooth for each complete oscillation of the pendulum, *i.e.*, half a tooth for each swing; then the wheel G would have sixty teeth so that the detent H, H^1, co-operating with the wheel G would hold the ratchet wheel and its spindle in a definite position after it had been moved forward by one of the pawls D and until it was moved forward on the next swing of the pendulum by the other pawl D.

Figure 1 shows the position which the escapement would occupy just at the end of the swing of the pendulum from left to right. The upper pawl D has been pushing the ratchet wheel C round and the lower pawl has just moved up ready to push forward the tooth with which it is in engagement: It will be seen that there is a space between the end of the upper pawl D and the face of the adjacent tooth. This space has been formed by the action of the detent H, H^1 upon the wheel G, the teeth of that wheel and of the ratchet wheel C being so arranged that the work of driving the clock is done by the pendulum through the pawls on the ratchet wheel C until the roller H^2 is lifted up and over the crest of a tooth in the wheel G; then, as the detent descends it drives the wheel G and the ratchet wheel C forward slightly in advance of the pawl. This ensures a very definite and dead-beat escapement.

In Figure 3 the mechanism carrying the pawls D is shown in the position which it would occupy just towards the end of the swing of the pendulum from right to left. The lower pawl D has driven the ratchet wheel C and the toothed wheel G during the swing and has just raised the roller H^1 to the top of a tooth. When the swing is continued a very small distance further to the left the detent H H^1 will descend and will carry the wheels C and G forward into the dead-beat position. The pawl D having fallen down on to the next tooth will be ready to commence its driving action on the ratchet wheel C as the pendulum starts its return swing from left to right.

In order to control the circuits of one or more synchronized dials, a contact-maker is provided operated from the wheel G. This contact-maker comprises two springs J provided with platinum or other suitable contacts J^1. The springs are connected to terminals K and are normally separated from each other. They are mounted in a block of insulating material L and near the top part of that block is pivoted a lever M. The lower portion of this lever is furnished with a cross arm M^1 and the upper extremity of the lever terminates with an inclined face M^2 upon which one or more pins G^2 set in the side of the wheel G can operate. In Figure 3 one of the pins G^2 is shown as just having moved the upper end of lever M outwards the effect of this movement being to cause the cross arm M^1 to push one of the springs J forward, so that its contact piece J^1 is brought into rubbing contact with the contact piece on the other spring J. It will be noticed that the two contact pieces J^1 are made of stout wire, one of them being set vertically and the other horizontally. A good electrical contact is thus ensured. Set screws N and N^1 are provided by means of which the initial positions of one of the springs J and the lever M can be regulated.

It is to be understood that various details of construction may be modified without departing from the spirit of this invention, for example, instead of the detent H falling by gravity a light spring may be used to force it down or the roller H^1 might be mounted in a block capable of sliding up and down in some suitable guide, the block being caused to fall either by gravity or by a spring. Again, the application of the dead-beat escapement described is not limited to a clock having the particular swinging support for the driving pawls described and illustrated, but may be employed with any electrically driven clock in which the pendulum drives a ratchet or escape wheel.

Only two pins G^2 have been shown in the construction illustrated and such an arrangement would be used in a master clock intended to give impulses to its synchronized dials at intervals of half a minute, but obviously if it should be desired to give such impulses at smaller intervals any suitable number of pins may be spaced around the wheel.

Bentley's Improvements in or relating to Electrically Driven Clocks.

Having now particularly described and ascertained 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 an electrically driven clock the combination with a ratchet or escape wheel driven by the pendulum of a toothed wheel such as G mounted upon the spindle of the escape wheel and co-operating in the manner described with a pivoted arm H and roller H^1 to form a dead-beat escapement and one or more pins or projections on the toothed wheel acting to move a contact-maker for controlling a secondary clock.

2. An electrically driven clock as claimed in Claim 1 in which the ratchet or escape wheel is driven by the pendulum through pawls D pivoted on a bar or frame suspended by pivoted links E^1 as set forth.

3. The complete mechanism for an electrically driven clock substantially as described and illustrated in the accompanying drawings.

Dated this 7th day of February, 1912.

B. E. DUNBAR KILBURN,
Agent for the Applicant.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1912.

A.D. 1912. Feb. 8. No. 3236.
BENTLEY'S Complete Specification.

(1 SHEET)

[This Drawing is a reproduction of the Original on a reduced scale.]

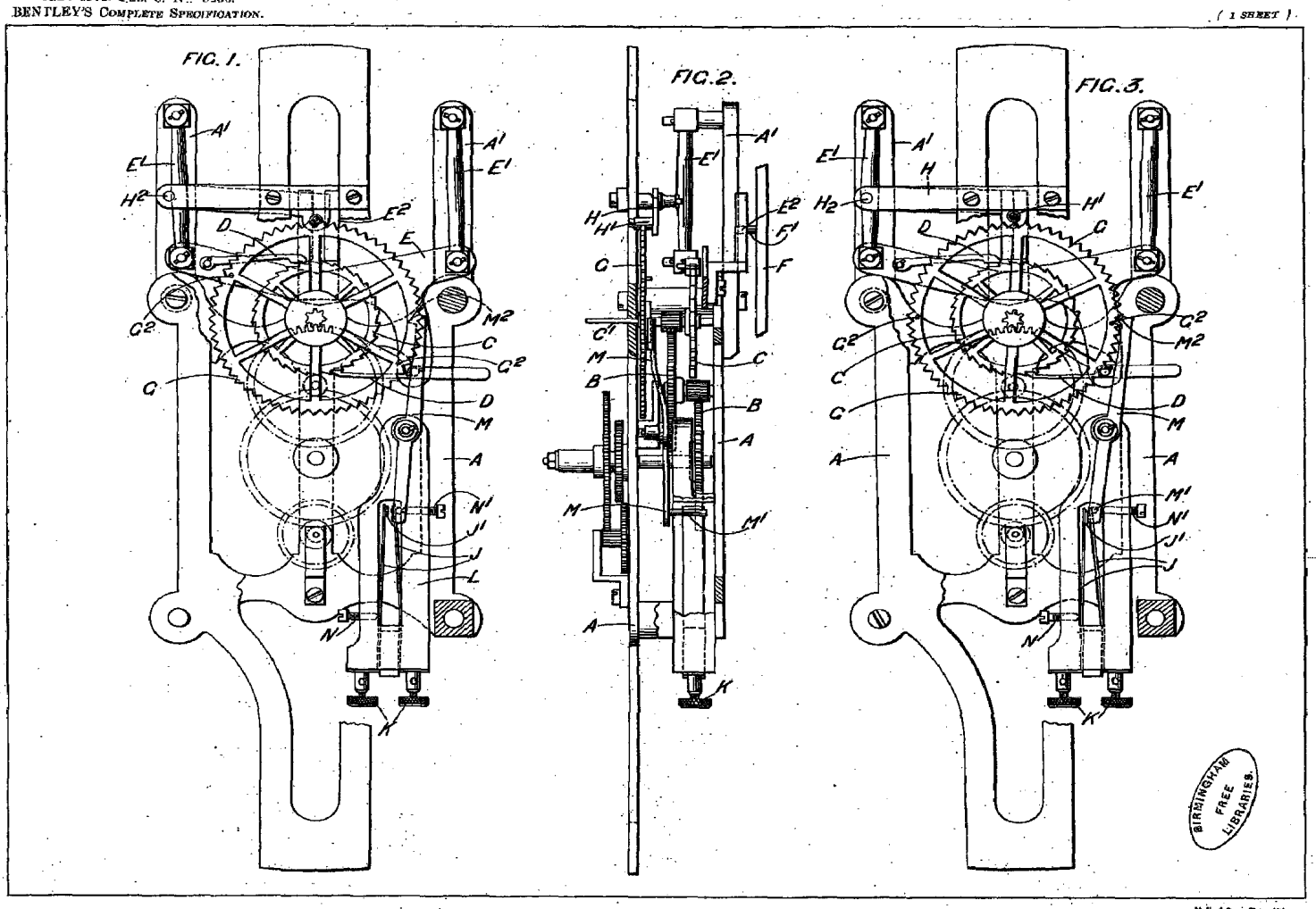

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FIG. 1.

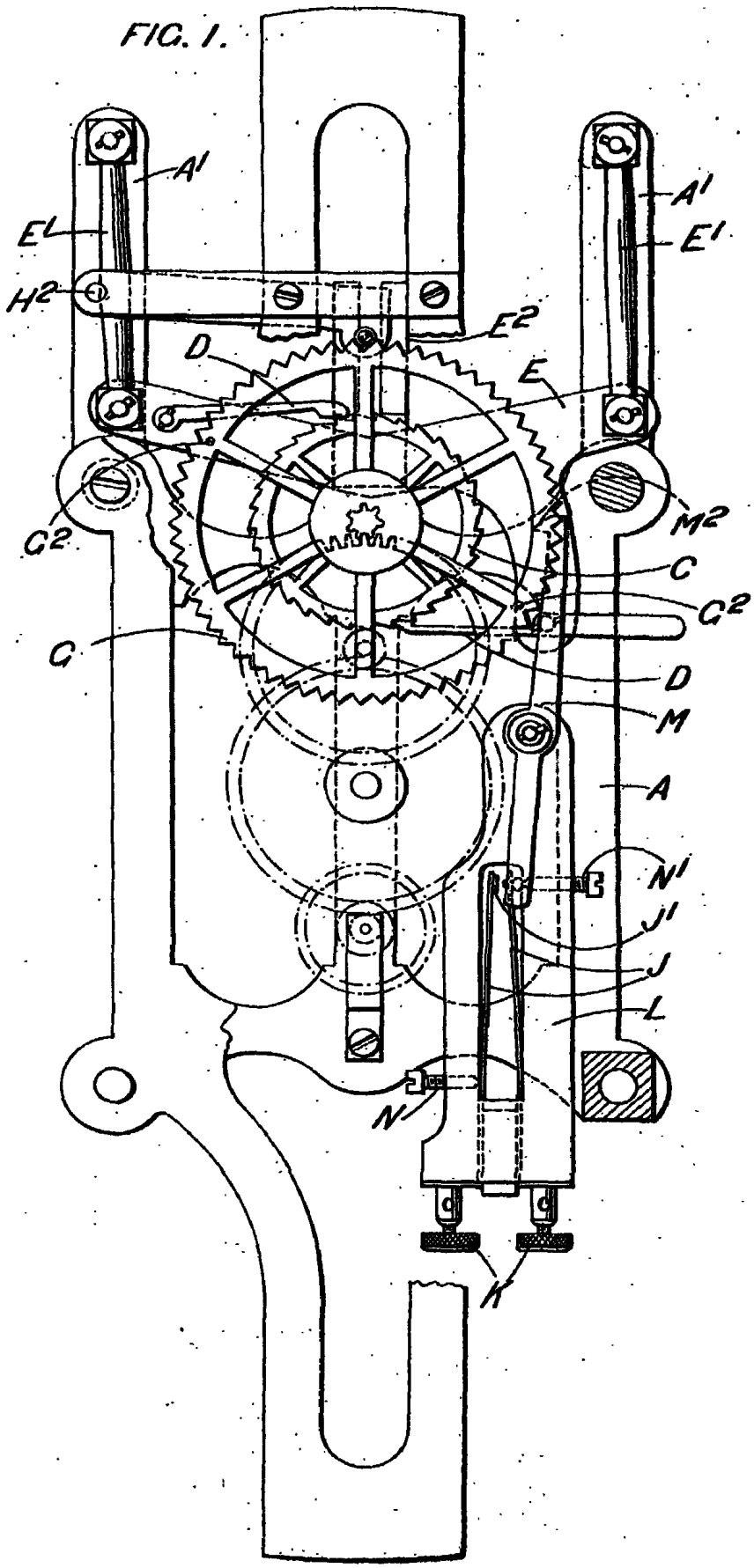
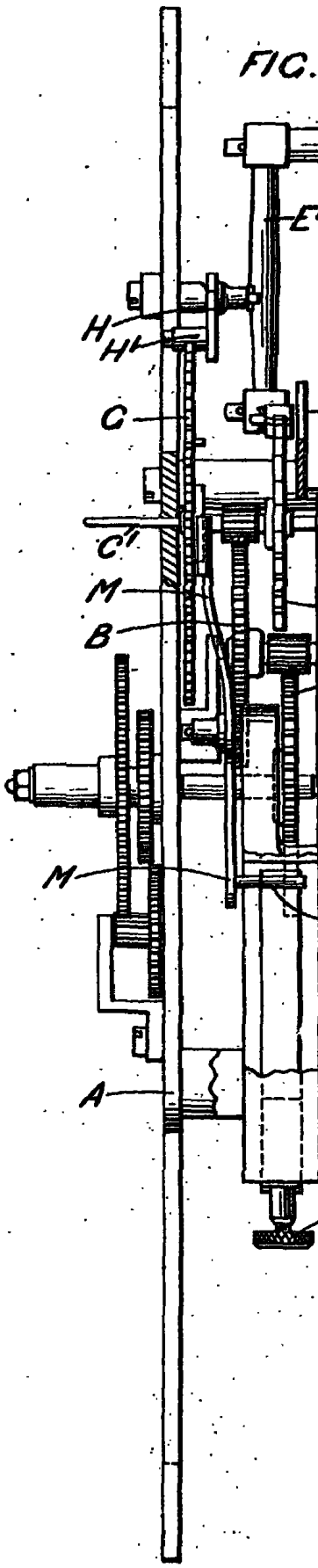
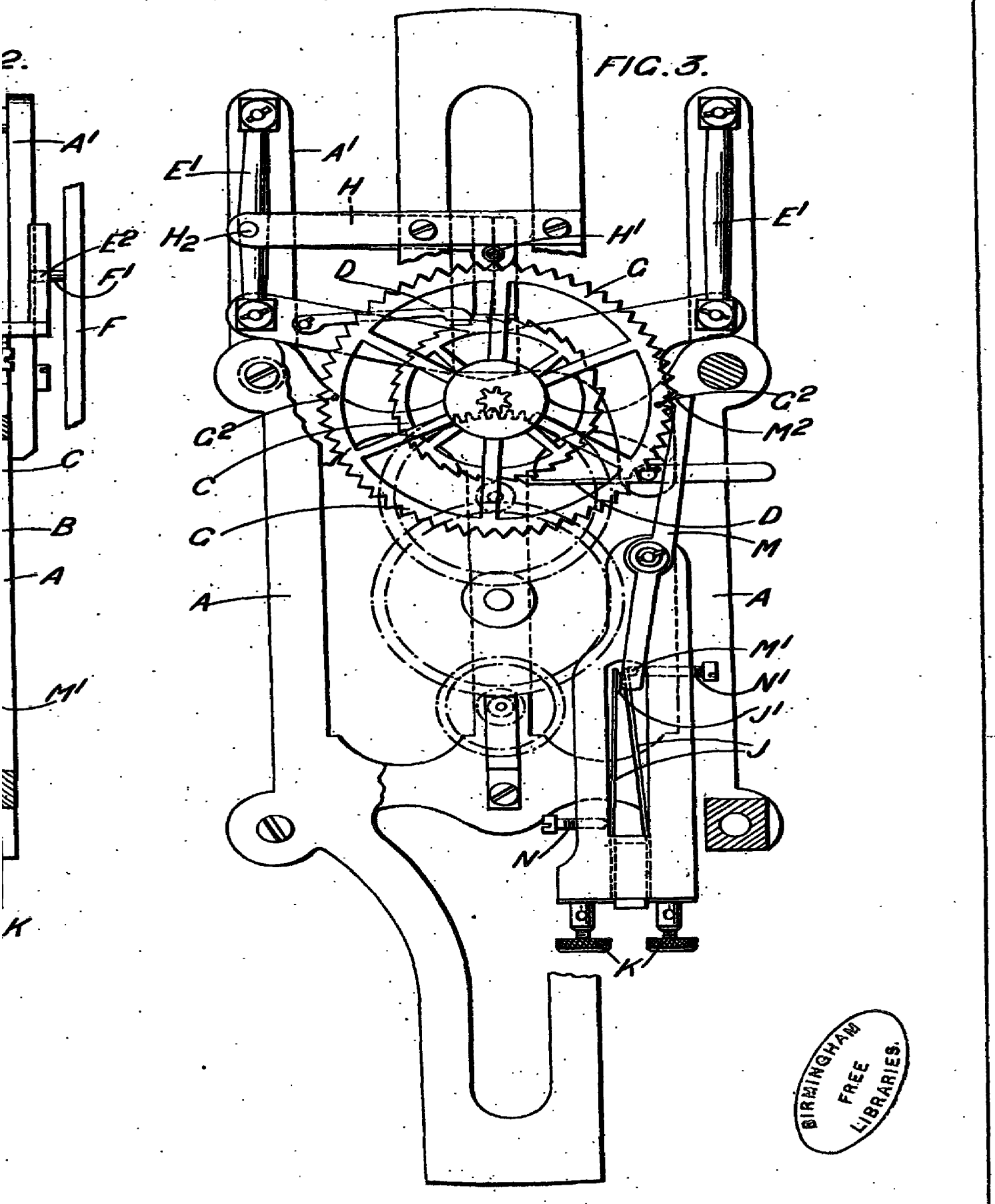


FIG.



2.

FIG. 3.



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