N° 26,631 A.D. 1913

(*Under International Convention.*)

Date claimed for Patent under Patents and Designs Act, 1907, being date of first Foreign Application (in Germany), 26th Feb., 1913

Date of Application (in the United Kingdom), 19th Nov., 1913

At the expiration of twelve months from the date of the first Foreign Application, the provision of Section 91 (3) (a) of the Patents and Designs Act, 1907, as to inspection of Specification, became operative

Accepted, 8th July, 1915

COMPLETE SPECIFICATION.

Improvements in and relating to Electric Clocks.

We, H. Aron Elektricitätszählerfabrik Gesellschaft mit beschränkter Haftung, of 39, Wilmersdorferstrasse, Charlottenburg, Germany, Manufacturers, 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 secondary clocks or dial indicators employed in connection with polarised electric clock systems and has for its object to provide an improved construction of mechanism of this character, in which a reversal in the direction of rotation of the hands of the clock can be readily effected when desired, as is often necessary in connection for instance with electric clocks on board ship where the time indication is required to be frequently adjusted to allow for variations in local time.

In clock mechanisms for the same purpose as previously constructed, the necessary reverse movement of the hands of the clock is usually effected by providing besides the ordinary forward relay a separate electro-magnetically operated actuating mechanism connected with a gearing moving the hands in the reverse direction. The operating circuits of the forward and reverse actuating mechanisms are arranged to be controlled by an electro-magnetically operated switch device adapted to connect either of these mechanisms to the circuit conductors through which the actuating current impulses are supplied. This arrangement is, however open to the disadvantage that a change of the course of the current is necessary with each reversal of the direction of rotation of the hands of the clock, so that disturbances are likely to arise, due for instance to the mutually opposing magnetic influence of the two actuating mechanisms.

It has also been proposed to provide a single electro-magnetically operated actuating mechanism for effecting the rotation of the hands of the clock in both the forward and reverse direction, but according to the present invention a movable coupling device is provided which can be set by means of a relay mechanism controlled by current impulses supplied from a central station into one or other of two positions so as to transmit the movement of the actuating mechanism to one or other of two escape wheels serving to drive the hands of

[*Price* 6*d.*]

the clock in the forward and reverse direction respectively. The coupling device above referred to may for instance consist of a pivotally mounted pallet which can be moved along its pivot so as to engage with one or other of two escape wheels having teeth inclined in opposite directions.

The invention is illustrated in the accompanying drawings of which Figure 1 is a view in side elevation of a secondary clock mechanism constructed in accordance with the invention, Figures 2 and 3 being views in front elevation and plan respectively of the mechanism shown in Figure 1.

Referring now to the drawings, the actuating electro-magnet of the polarised clock actuating mechanism is indicated at *a*, the armature of the electro-magnet being indicated at *b* as pivotally mounted upon a spindle *c*. The spindle *c* also carries a pallet *d* actuated by the spindle *c* and adapted to be moved along this spindle so that the pallet pins *e* or e^1 carried by the pallet *d* can engage with the escape wheel *f* or f^1 respectively. The two escape wheels *f* and f^1 are rigidly secured to a spindle *g* constituting the minute arbor of the clock mechanism and are provided with teeth inclined in opposite directions as shown in Figure 2. The movement of the pallet *d* along the spindle *c* so as to operate the escape wheel *f* or the escape wheel f^1 is arranged to be effected by means of a relay mechanism comprising an electro-magnet *h* and an armature *i*. The latter is pivotally mounted and is arranged to actuate a pawl *k* operating a ratchet wheel *l* which is secured to a cam disc *m* having a curved cam groove *n* formed therein. A bell-crank lever *o* is provided mounted upon a vertical pivot *q*, one end of the bell-crank lever *o* having a pin *p* engaging the cam groove *n* and the opposite end of the bell-crank lever being coupled to the central portion of the pallet *d*.

The operation of the mechanism is as follows:—

Under normal conditions the pallet *d* occupies the position on its spindle *c* shown in Figures 1 and 3 of the drawings, the reciprocating movement of the pallet due to the current impulses supplied to the electro-magnet *a* serving to effect the intermittent rotation of the escape wheel *f* and thereby the movement of the hands of the clock in the normal or forward direction.

If it is desired to move the hands of the clock backwards the electro-magnet *h* is energised and attracts its armature *i*.

The pawl *k* thereupon moves the cam disc *m* through an arc corresponding to one tooth of the ratchet wheel *l* thereby causing the pin *p* of the bell-crank lever *o* to be moved outwards, due to the form of the cam groove *n*. The bell-crank lever *o* is thus rocked in a clockwise direction Figure 3, and its other arm moves the pallet *d* towards the reverse escape wheel f^1 so that the pallet pins e^1 engage with the teeth of the escape wheel f^1 and the actuating impulses of the magnet *a* consequently effect an intermittent movement of the hands of the clock in the reverse direction. As soon as the hands of the clock have been set back to the desired extent, the electro-magnet *h* is again energised and the pawl *k* moves the cam disc to the extent of another tooth of the ratchet wheel *l*, thereby moving the pin *p* nearer the centre of the cam disc *m* so that the pin *p* occupies its original or normal position. The movement of the pin *p* being transmitted to the bell-crank lever *o* the latter moves the pallet *d* along its shaft so that the pallet *d* is once more in engagement with the forward escape wheel *f* and the hands of the clock resume their normal direction of movement.

The invention is not limited to the precise constructional details above described, which may be modified in various ways to suit particular conditions without exceeding the scope of the invention.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A secondary clock or dial indicator for a polarised electric clock system in which a movable coupling device is provided which can be set by means of a relay mechanism controlled by current impulses supplied from a central station

into one or other of two positions so as to transmit the movement of the actuating mechanism to one or other of two escape wheels serving to drive the hands of the clock in a forward and reverse direction respectively, for the purpose specified.

2. A secondary clock or dial indicator for a polarised electric clock system comprising a pair of escape wheels rigidly secured to a common arbor and provided with teeth inclined in opposite directions, a single pallet being provided adapted to be shifted in an axial direction so that the pallet pins engage with one or other of the escape wheels for the purpose specified.

3. A secondary clock or dial indicator of the kind specified in Claim 2, in which the pallet is arranged to be shifted in an axial direction by means of an electro-magnetically operated mechanism comprising a cam disc or the like, substantially as and for the purpose specified.

4. A secondary clock or dial indicator for electric clock systems, constructed and operating substantially as described with reference to the figures of the accompanying drawings.

Dated this 19th day of November, 1913.

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

Fig. 1

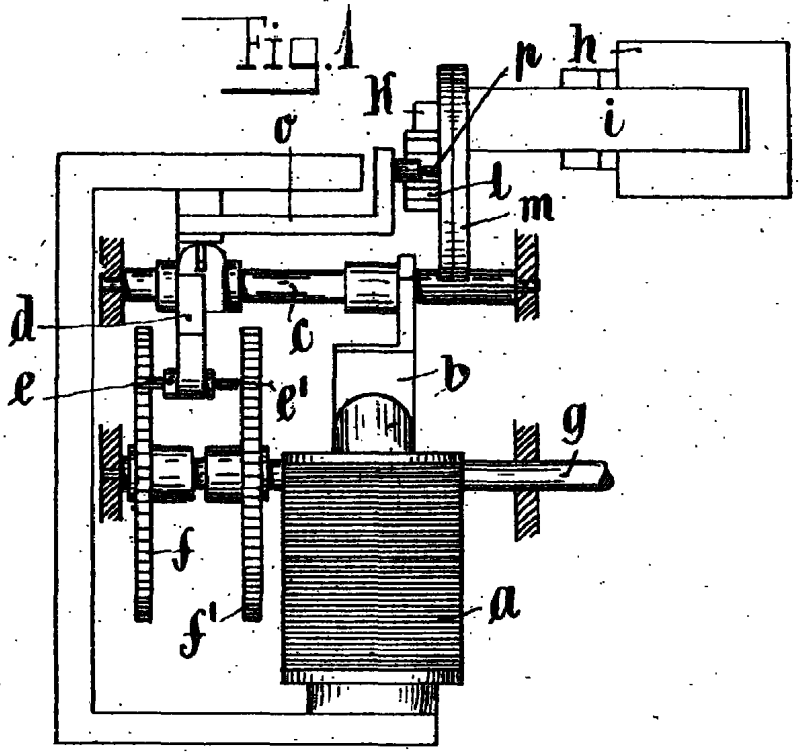


Fig. 2

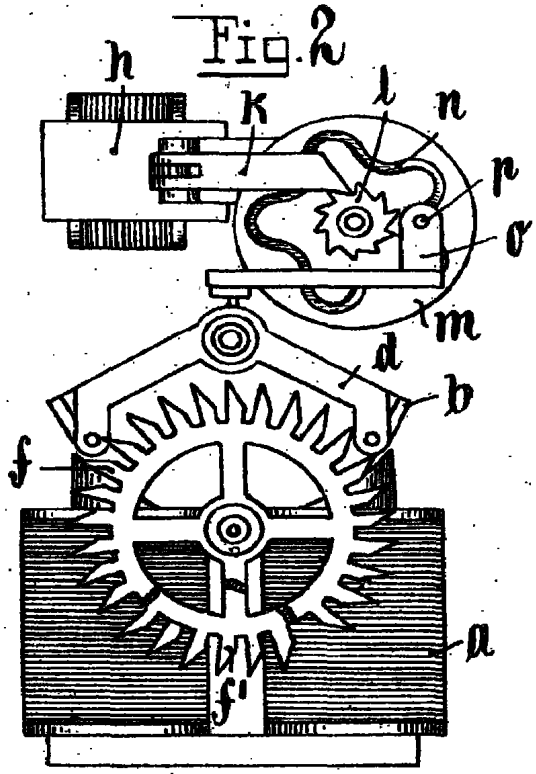
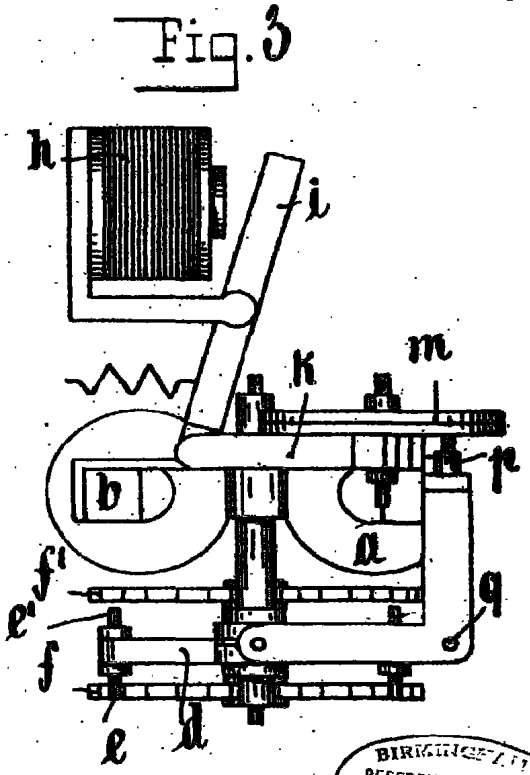


Fig. 3



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