N° 6934 A.D. 1913

(*Under International Convention.*)

Date claimed for Patent under Patents and Designs Act, 1907, being date of first Foreign Application (in Germany), 22nd Mar., 1912

Date of Application (in the United Kingdom), 20th Mar., 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, 21st Aug., 1913

COMPLETE SPECIFICATION.

Improvements in and relating to Electric Clock Control.

We, ALLGEMEINE ELEKTRICITÄTS-GESELLSCHAFT, of Friedrich Karl-Ufer, 2—4, Berlin, N.W., Germany, Electrical Engineers, 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:—

The invention relates to the electrical control of secondary clocks and has for its object to provide means for indicating at the central station periodically the time kept by the secondary clocks so that it can be seen when any of the secondary clocks are wrong and how far any of them are wrong.

It has previously been proposed in connection with electric clock systems to check the operation of the clocks by causing each secondary clock to effect a periodic and transitory change in the normal current in the controlling circuit by shunting or earthing it through a resistance which produces a galvanometer deflection or actuates a relay at the central station the secondary clocks being arranged to give these indications in sequence.

According to the present invention we provide a system of electric clock control in which each secondary clock is furnished with a device adapted to periodically produce a characteristic effect in the controlling circuit which influences a selective indicating device at the central station. The secondary clocks are arranged to produce these effects in sequence and the operation of the clocks is therefore indicated or recorded at the central station both by the sequence and the particular character of the signals.

From the variations in the indications to be given in a certain sequence and at certain intervals of time it may readily be ascertained at the central station how far one or more of the secondary clocks has varied from the normal time provided by the master clock.

In the accompanying drawing,

Fig. 1 shews diagrammatically one method of carrying the invention into effect,

Fig. 2 being a detail diagram of an alternative method of producing the signal from a secondary clock.

The master clock A, which is arranged to provide normal time, continuously

[*Price* 8*d.*]

controls the secondary clocks I, II, III, for example by means of current impulses of varying direction occurring every minute. Each of the secondary clocks I, II, III is provided with a device by means of which automatic interrupters characteristic for each clock are connected in the circuit successively at certain times in the operation of the different secondary clocks. These interrupters produce at the central station a characteristic sign or signal corresponding to each secondary clock. The aforesaid device which brings the interrupter into operation, represented by way of example in the drawing, consists of a rotating disc B provided with an incision on which disc a contact spring C is adapted to bear. When the projection on the spring enters the incision on the rotating disc B, a circuit is closed through the contact spring C, the interrupter D and the main lines, which circuit is supplied by the battery E. The automatic interrupters are adjusted to different numbers of oscillation in the different clocks and when the circuit is closed the current acts temporarily at the central station on the tongues F of a resonance apparatus of known construction, causing oscillations corresponding to the differently adjusted automatic interrupters on the secondary clocks. The oscillations produced in the resonance apparatus make signals or markings on an indicator at the central station which in the example shewn in the drawing is a registering cylinder G rotating in synchronism with the master clock. It will be seen from the drawing that the incision in the disc B is located at a different position of the periphery relative to the projection on the spring C for each of the clocks I, II, III so that the indications returned to the central station do not occur simultaneously but at different times. If the secondary clocks are in synchronism with the master clock, the indications will be given in a certain predetermined sequence and at certain intervals of time, and from the position of the markings on the registering cylinder it can be readily ascertained how far one or more of the secondary clocks has varied compared with the master clock.

In the example shewn in the drawing it is assumed that the outside clocks return indications to the central station every hour, the disc B making a complete rotation once an hour. The device, however, may easily be designed to give an indication at shorter intervals of time, for example every quarter of an hour. To this end it is only necessary to provide a number of incisions, for example four, in the disc B.

The switch H is provided for the purpose of preventing the periodic current impulses from the master clock which control the secondary clocks from interfering with the oscillatory currents caused by the interrupters. In the system illustrated, a current impulse lasting two seconds is sent out from the master clock every minute and in the event of an interrupter operating at the same time when a current impulse from the master clock is due, the current from the master clock opens the switch H to prevent the interrupter from working until the current impulse is finished. The magnet of the switch H always receives current from the battery E but this current is too weak to open the switch.

Instead of the automatic interrupting apparatus shewn in Fig. 1 of the drawing, the frequency of oscillations for the different clocks may be produced mechanically as shewn in Fig. 2. A cam J is provided with which a spring K engages. This spring carries an adjustable weight L and as the cam disc rotates the spring falls at a predetermined time and commences to vibrate. In this case, as in the arrangement above described, a current of a certain interruption factor, which is characteristic for the different secondary clocks, is sent through the contact M over the main conductors to the central station.

In the arrangement according to the invention it will thus be seen at once which clocks indicate disturbances, even when a number of clocks are going wrong at the same time. The interrupting currents with different frequency may be superimposed on the same conductor so that when a number of tongues operate at the central station the disturbance in the corresponding clock is

indicated, and a means of control for the correct working of the remaining clocks is also provided.

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. In a system of electric clock control, the combination of a device in each secondary clock adapted to periodically produce a characteristic effect in the controlling circuit and a selective indicating device at the central station influenced by said effects, substantially as set forth.

2. A system of electric clock control in which an interrupter adapted to operate with a characteristic frequency is provided in each secondary clock, said interrupters being connected in the controlling circuit periodically and in sequence by the secondary clocks so as to influence corresponding indicators on a selective receiver at the central station by means of which the correct operation or variations from synchronism on the part of the secondary clocks can be ascertained, substantially as set forth.

3. A system of electric clock control constructed, arranged and adapted to operate substantially as described and shewn in the accompanying drawings.

Dated this 19th day of March, 1913.

JOHN GRAY,
83, Cannon Street, London, E.C.,
Agent for the Applicants.

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THE COMPLETE SPECIFICATION OF ALLGEMEINE ELEKTRICITÄTS GES. (1 SHEET)

Fig. 1.

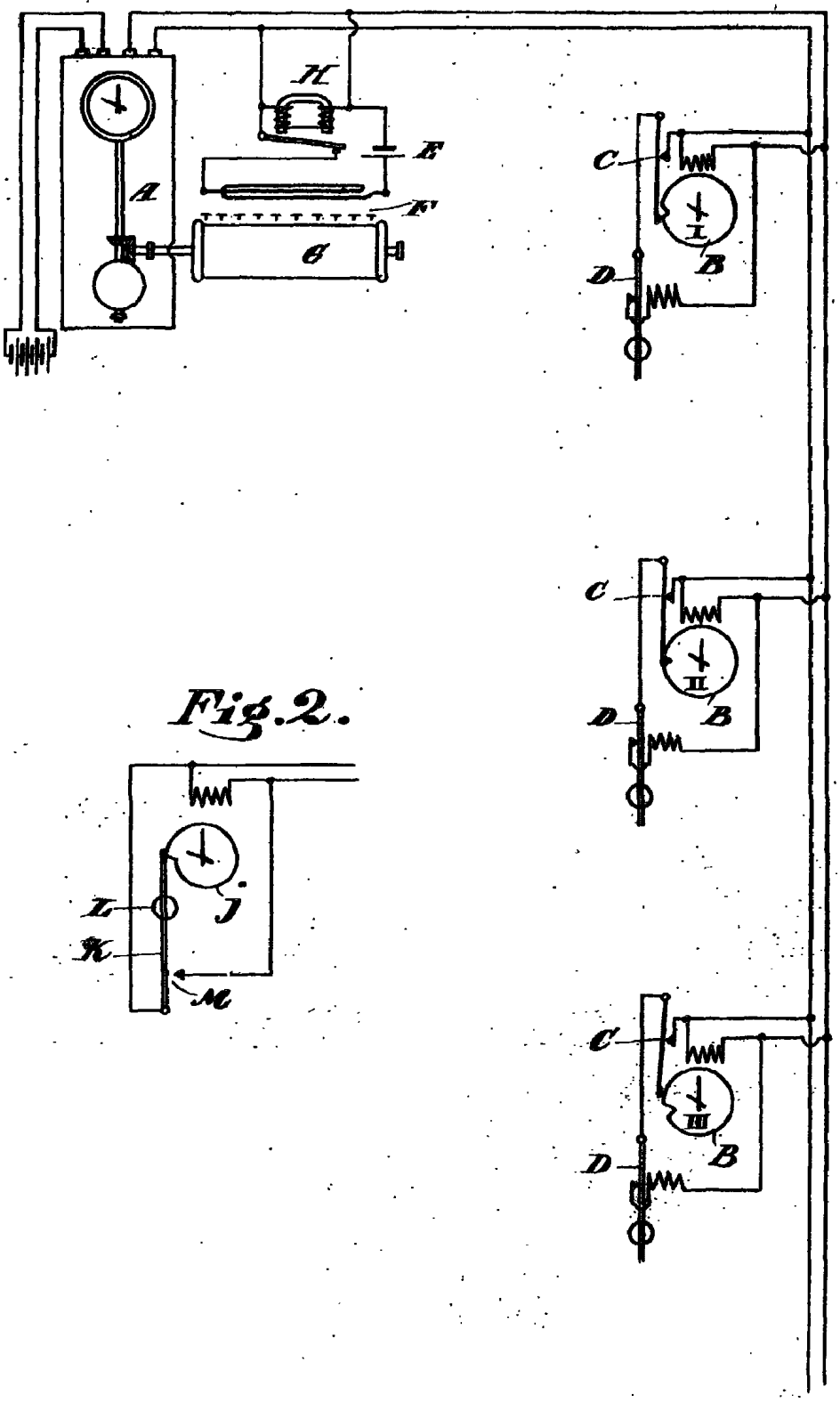

Fig. 2.

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