PATENT SPECIFICATION

Convention Date (Belgium): Sept. 26, 1919.

157,438

Application Date (in United Kingdom): Jan. 10, 1921. No. 1365/21.

Complete Accepted: Nov. 10, 1921.

COMPLETE SPECIFICATION.

Improvements in or relating to Relays and to Synchronised Clocks or other Apparatus Actuated thereby.

We, SOCIÉTÉ ANONYME DES ATELIERS BRILLIÉ FRÈRES, a French company, of 28, Boulevard de Villiers, Levallois-Perret, Seine, France, 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 setting of clocks in order to synchronise them. It is known to set the hands of clocks by hand by means of a hand pushing device acting on a finger which in its turn acts on a heart shaped cam carrying the hand to be corrected.

It is also known to effect the setting of clock hands by means of an electric current transmitted by wires. The present invention relates to means for synchronising or setting clocks by means of time signals transmitted by hertzian waves.

Hertzian waves for other purposes than synchronising clocks are constantly sent out, also strays or "statics" occur. These influences must not affect the hand setting device in order to prevent untimely setting of the hands of the clocks. The said disturbing influences are intermittent and have not a prolonged duration.

According to this invention relatively very long time signals, of the duration of 5 seconds for instance are used in connection with a retarded relay constructed to attract an armature or to produce an analogous movement, in a very slow manner, the actual setting of the hands of the clock occurring only after the ceasing of the time signal and being effected by the return of the armature or analogous part to its neutral position.

The invention will be fully understood with the assistance of the following description as well as from the accompanying drawing, in which

Fig. 1 shows diagrammatically a method of setting the hands of a clock according to the invention.

Fig. 2 shows an example of a retarded relay suitable for use in carrying out the invention, (the idea of damped or retarded relays being known) which may be used with the method shown in Fig. 1.

With each clock to be regulated by means of wireless waves, a receiver A is combined, which acts either after amplifying or directly on a sensitive common relay B which in its turn acts on a retarded relay C adapted to produce a rapid movement only when the duration of the wireless signal received is of a comparatively great length. The retarded relay B may act directly on a clock regulating device, such as a clock-setting device consisting of a mechanism of any known description. Fig. 1 shows a hand setting device D comprising a heart shaped cam 1^1 carrying the hand to be corrected the cam being mounted on the axle 1 of a clock wheel. The cam and the hand integral therewith ordinarily partake the movement of the clock, but the cam is so mounted on the axle 1 that when a certain force is applied to the cam 1^1, the latter can be turned on the axle 1. Mounted adjacent the cam is a finger 2 which moves in a vertical plane above the centre of the cam. The point of the heart shaped cam which is nearest

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to the centre of the same should be, if the clock is right, just opposite the finger 2 when the latter is operated, *i.e.* pushed towards the centre of the cam and released immediately afterwards. Supposing the clock is slow or fast, the finger 2 will strike one or the other of the inclined parts of the cam 1^1, and sliding on said inclined parts will forcibly turn the cam so as to obtain the correct position of the cam and the hand on the clockwheel axle 1. The finger 2 may be mounted in a radial slide or at the end of a comparatively long lever as shown in Fig. 1. The retarded relay C may act directly on the hand setting device D during the descent of the armature, or, and as shown in Fig. 1, the excitation of the coil *b* of the said retarded relay C may slowly raise its armature *a*, so that at the end of the specified time signal (of a duration of 5 seconds for example) a contact *d* of a local battery 4 will be closed and in energising a coil 3 of a hand setting relay will produce the operation of the finger 2.

The manner in which the damped relay C is retarded is not specifically described with reference to Fig. 1, as it may be of any known description *i.e.* retarded simply by a long stroke by a dash pot, by springs, brakes and so on.

The Fig. 2 shows to a larger scale an example of a special retarded relay C which can be used in connection with the invention. It acts on the descent of the core *a*. This action is obtained by means of a lever *c* pivoted around an axis perpendicular to that of the core *a*. This lever *c* is under the action of a spring system c^0 which give the same a horizontal neutral position tending to bring about this neutral position whenever the free end of the lever *c* is moved up or down.

That end of the lever *c* which is turned towards the core *a* of the relay is positioned in the path of a projection a^1 of the core *a*, in such a way that the said projection will carry with it the free end of the lever during a fraction of the latter part of its upward stroke, but will release the same when it arrives at almost the highest point of said upward stroke. An actuating part *d* for causing the functioning of a hand setting device is in such connection with the said pivoted lever *c*, that it will act when the free end of the lever moves downwards. In Fig. 2 the part *d* is to be considered as the contact of the local battery D^1 for the relay 3 of the hand setting device D shown in Fig. 1. This contact is placed on the resilient end of a spring, said end occupying such a position that there is no contact in the neutral position of the pivoted lever *c*.

The function of this special retarded relay is as follows:

Supposing that usual wireless signals or the usual short stray effects take place, the core *a* of the relay will rise a little then fall down again and so on without rising to the level of the bevelled of the free end of the pivoted lever *c*. Supposing now that the time signal of 5 seconds arrives, its duration is so long that the core *a* will rise in say 4 seconds to its highest point having during the latter part of its upward stroke raised and again released the free end of the lever *c*, which returns to its neutral position without having produced any contact on *d*. The five seconds having elapsed, the core *a* falls freely down sets the free end of the lever *c* in motion downwards and releases it again thus producing a short contact on *d* which short contact causes the hand setting mechanism D (Fig. 1) to correct the position of the cam and its hand.

The use of the described retarded relay is in no way essential for the function of the combination according to Fig. 1. Any conveniently retarded relay will do to produce the effect of responding to a very long time signal only. The rapid active back stroke of the retarded relay which has to occur after the slow inactive attracted stroke can be accomplished or helped by any force other than the gravity which has been supposed as utilised in the case of Fig. 2. A unilateral dashpot-effect can be utilized, braking the upward stroke and leaving free the downward stroke.

The retarded relay in question may be constructed as a little electric motor instead of having a reciprocating armature.

As regards supplementary mechanism, for the apparatus for setting of clocks as shown in Fig. 1, means may be added which cut in circuit the electrical sources (batteries, receivers, magnifiers and so on) only a short time, for instance a minute before and after the awaited time signal, so that useless wear on the instruments is eliminated, the means for cutting in and out of the circuit being under the control of the clock to be regulated.

Signaling methods may be utilised which indicate that no correction of the clock has taken place, either, by way of the time signal itself not having

occurred or as consequence of a fault in the mechanism.

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. Means for setting the hands of clocks comprising in combination, a wireless receiver A with associated apparatus acting on a retarded relay actuating a clock regulating device D only in the case when a relatively very long wireless signal, which is used as time signal, arrives, said clock regulating device D being actuated by said retarded relay C substantially as described.

2. Means for setting the hands of clocks as claimed in Claim 1, wherein the receiver A acts on a sensitive relay B itself actuating a retarded relay C which on the falling down of its core actuates the clock regulating mechanism, for instance a hand setting mechanism C substantially as described.

3. Means for setting the hands of clocks as claimed in Claim 1, wherein the retarded relay C acts through a common relay (B) on the clock regulating mechanism D.

4. Means for setting the hands of clocks as claimed in either of the Claims 1, 2 or 3, wherein the retarded relay C is constructed as described with reference to the Fig. 2.

5. Means for setting the hands of clocks, substantially as herein described with reference to the accompanying drawings.

Dated this 10th day of January, 1921.

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Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1921.

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

Fig. 1.

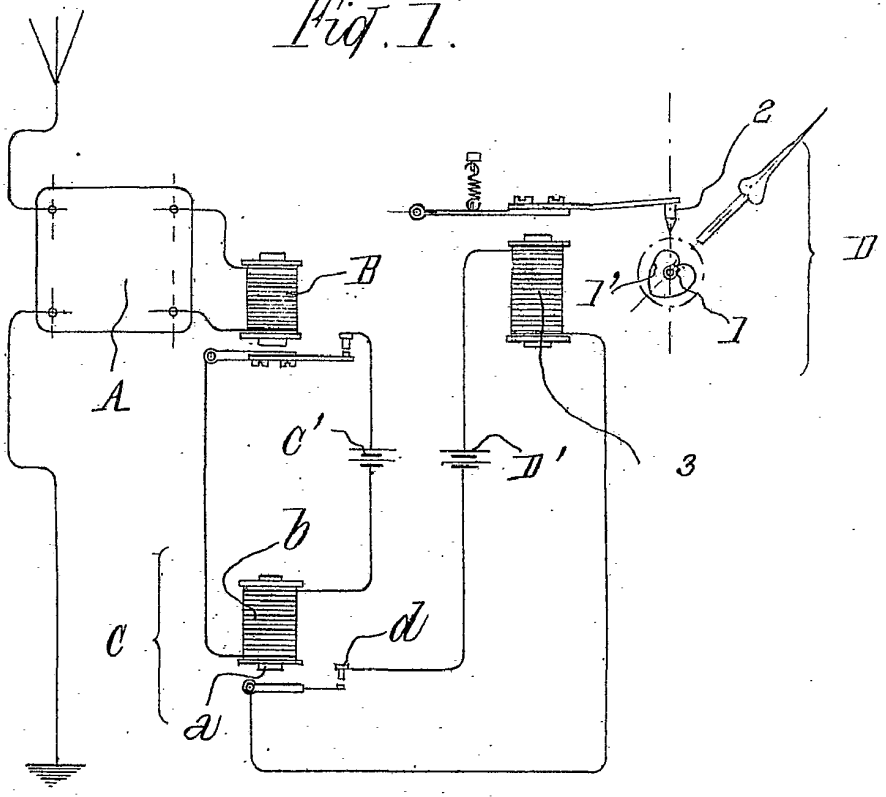
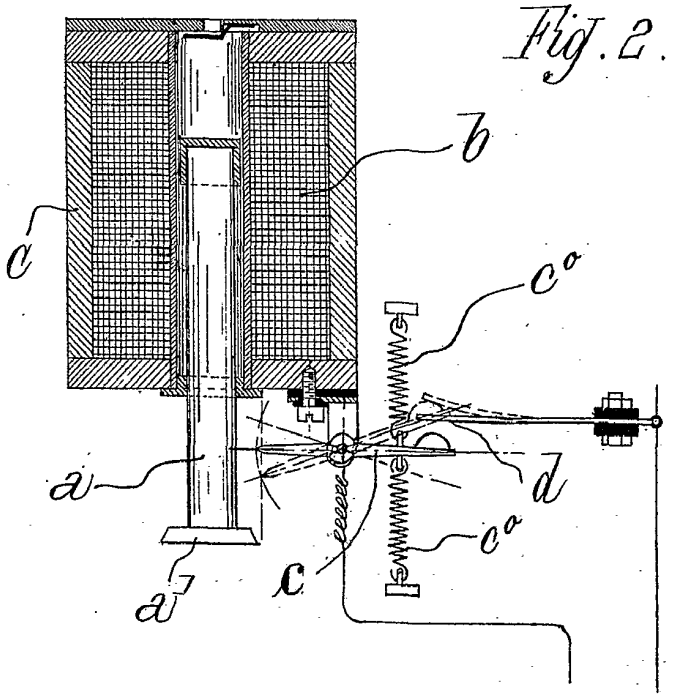


Fig. 2.



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