N° 18,405 A.D. 1909

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Complete Specification Left, 10th Feb., 1910—Accepted, 10th Aug., 1910

PROVISIONAL SPECIFICATION.

Improvements in Electric Time Indicators.

I, Frank Hope-Jones, M.I.E.E., of 32 and 34, Clerkenwell Road, in the County of London, Electrical Engineer, do hereby declare the nature of this invention to be as follows:—

This invention consists of improvements in electric time indicators. It enables half-minute or minute impulses transmitted by a master clock to propel the hands of dials, employees' time recorders and the like, and provides facilities hitherto unattainable for setting to time the hands, type wheels, barrels or other indicating or recording devices.

In this invention the dial movement is provided with a main wheel of 120 or 60 teeth according to whether the desired periodicity is half-minute or a minute, and this wheel is driven by a click pivoted upon a rocking armature or armature lever, and engaging the wheel at an angle of about 135° to the radial line, a momentum stop being fixed to the base plate over the front end of the click. The backstop is carried by a pivoted lever just below the driving click, which lever carries a post or projection upon its extreme end which limits the backward motion of the armature lever carrying the driving click. The driving click is shaped on its under side in such a manner that when the backstop lever is lifted, a projection thereon such as the backstop itself, engages with the driving click and causes it to recede from the wheel which is then immediately free to revolve for the purpose of setting the dial to time either by a zeroiser or by hand. At the point where the armature lever comes into mechanical contact with the post or projection at or near the end of the backstop lever, it is so shaped that it holds the backstop securely into engagement with the wheel, and by shaping the surfaces at approximately an angle of 45° to the direction of the motion of both these parts respectively at the point of contact, the lock may be continued practically throughout the cycle of the movement, so that the wheel is never unlocked and cannot possibly pass more than one tooth for one to and fro movement of the armature even though the hands of the clock are exposed to weather and external influences tend to push them backwards or forwards during their motion.

Dated this 10th day of August, 1909.

FRANK HOPE-JONES.

COMPLETE SPECIFICATION.

Improvements in Electric Time Indicators.

I, Frank Hope-Jones, M.I.E.E., of 32 and 34, Clerkenwell Road, London, E.C., in the County of Middlesex, Electrical Engineer, 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 consists of improvements in electric time indicators. It enables half-minute or minute impulses transmitted by a master clock to propel the hands of dials, employees' time recorders, and the like, and provides facilities hitherto unattainable for setting to time the hands, type wheels, barrels or other indicating or recording devices.

[*Price 8d.*]

In order more clearly to set forth my invention I have illustrated the same in the accompanying drawing in which

Figure 1 shows an electrical impulse dial movement in its normal position or position of rest;

Figure 2 an enlarged detail drawing of the same in the midway position of the withdrawal of the driving click;

Figure 3 with the driving click fully withdrawn, the armature being at the end of its stroke;

Figure 4 half-way forward in the propulsion of the movement.

In this invention, the dial movement is provided with a main wheel of one hundred and twenty teeth or sixty teeth according to whether the desired periodicity is half a minute or a minute, and this wheel is driven by a click pivoted upon a rocking armature or armature lever and engaging the wheel at an angle of about 135° to the radial line, a momentum stop being fixed to the base plate over the front end of the click. The backstop is carried by a pivoted lever just below the driving click, and this lever carries a post or projection upon its extreme end which limits the backward motion of the armature lever carrying the driving click. The driving click is shaped on its under side in such a manner that when the backstop lever is lifted, a projection thereon such as the backstop itself, engages with the driving click and causes it to recede from the wheel which is then immediately free to revolve for the purpose of setting the dial to time either by a zeroiser or by hand. At the point where the armature lever comes into mechanical contact with the post or projection at or near the end of the backstop lever, it is so shaped that it holds the backstop securely into engagement with the wheel, and by shaping the surfaces at approximately an angle of 45° to the direction of the motion of both these parts respectively at the point of contact, the lock may be continued practically throughout the cycle of the movement, so that the wheel is never unlocked and cannot possibly pass more than one tooth for one to-and-fro movement of the armature even though the hands of the clock are exposed to weather and external influences tend to push them backwards or forwards during their motion.

Referring now to Figure 1 which illustrates the dial movement of the type described in Figure 2 of the drawings accompanying the Specification of Letters Patent No. 7868 of 1897, 1 is a wheel which carries the minute hand of a dial on its arbor and is provided with any convenient number of teeth, which are preferably rectangular in shape as shown, but may be of ratchet shape. 2 is an electro-magnet adapted to attract armature 3 when impulses are received by it from any source such as an electric time transmitter or master clock. The armature 3 is attached to the short end of the armature lever 4 centred at 5, and the latter carries a driving click 6 pivoted on the end of its long arm. A backstop lever 7 is pivoted at 8 and carries a steel backstop 10 and a steel stud 9 which limits the stroke of the armature lever 4 in its motion to the right. A flat steel spring 11 clamped to the pillar 12 bears upon the long end of the armature lever 4 or preferably upon the heel of the driving click 6 above its centre so as to ensure its falling on to the next tooth. An adjustable screw stop 13 is provided above the point of the driving click 6 which limits the forward motion of the latter to the left. It is not essential in this invention that the teeth of wheel 1 shall be rectangular in shape. They may be of ratchet shape or of any convenient form provided only that the tooth surface opposite stop 13 is parallel with click 6. A small semi-circular recess 14 is formed in the armature lever 4 opposite the stud 9 so that when the magnet has drawn the armature towards it, the backstop lever 7 is locked thus preventing the wheel 1 moving in either direction. The complete locking of the wheel at every point in the cycle of operations can now be readily understood.

It is obvious that under no circumstances can the wheel 1 move backwards because it is always held by the backstop 10.

Assuming a force tending to propel the wheel 1 forward when in the position

of rest as shown in Figure 1, it is securely locked in that direction by the click 6 which lies between the tooth on which it rests and the stop 13.

Assuming a force tending to propel the wheel forward whilst the movement is being operated, take first the position shown in Figure 2 in which the driving click is being withdrawn by the electro-magnet. Whilst the point of the click is travelling to the right the wheel cannot progress so long as and because the click is still between the stop 13 and the tooth opposite it, and when the click has travelled far enough to enable it to drop on to the surface of the next tooth, the backstop 10 is held down by the semi-circular recess in the armature lever 4 engaging with the steel stud 9. The locking of the wheel by the stud 9 remains effective while the armature is at rest as shown in Figure 3 and until after the lever 4 has left the stud on its return journey under the influence of spring 11.

Figure 4 shows the driving click mid-way on its return journey in the act of propelling the wheel. Before the armature lever 4 has advanced far enough to let the backstop 10 rise sufficiently to allow the next tooth of the wheel 1 to pass it, some part of the driving click 6 is between the wheel and the momentum stop 13 and effectually prevents the wheel from advancing more than the one tooth picked up by the click 6 on each vibration of the armature lever 4.

When it is desired to set the hands of the clock or for other reasons to disengage the escapement mechanism, the backstop lever 7 is lifted beyond the recess 14 in the armature lever. In this motion the backstop 10, or another projection specially provided, engages the driving click 6 and moves it out of the path of the wheel, which is thus free to be rotated.

It will be observed that the motion of the stud 9 is approximately vertical, whilst the motion of the semi-circular slot in the armature lever is approximately horizontal, the theoretically correct shape of the passing and locking surfaces should therefore be planes with their contact surfaces at an angle of 45°, and that form of construction is suitable for providing broad flat banking surfaces one or both of which may be leathered to secure silence, but the circular construction will usually be found more convenient. In Figure 4 both the limit stops are shown faced with leather or similar material, the stop 13 having a pad 15 and the backstop 9 a sleeve 16.

It is obviously immaterial in this invention whether the relative positions of the spring and magnet are reversed, in which case the spring will normally hold the armature lever back away from the wheel, the latter being locked by the backstop 10 and stud 9, and the wheel will be propelled by the magnet 2.

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 electric time indicator escapement having a driving click pivoted upon an electromagnetically oscillated lever and a second lever carrying a back stop resting against the toothed wheel driven by the click, the provision of a pin upon the back stop lever co-operating with a recess in the driving click lever so that the back stop is held in engagement with the wheel when the driving click is withdrawn therefrom.

2. In an electric time indicator according to Claim 1, the arrangement of the back stop lever so that it can be lifted to disengage the back stop and the driving click from the wheel.

3. An escapement mechanism for electric time indicators, substantially as described with reference to Figures 1 and 4.

Dated this 10th day of February, 1910.

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Liverpool and Bradford,
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HOPE—JONES' COMPLETE SPECIFICATION. (1 SHEET)

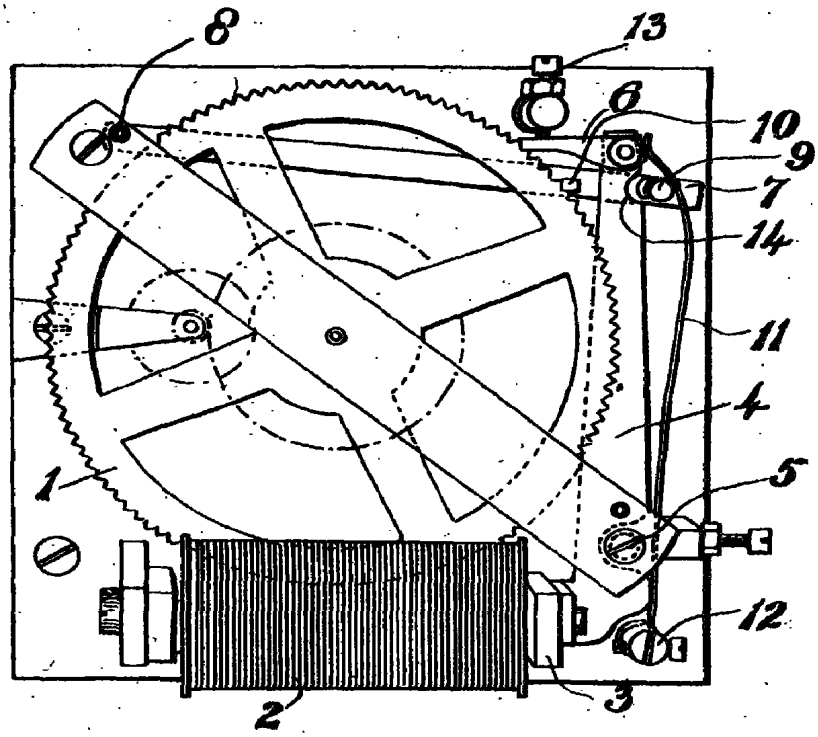

Fig: 1.

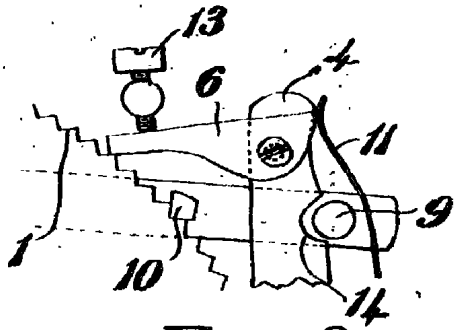

Fig: 2.

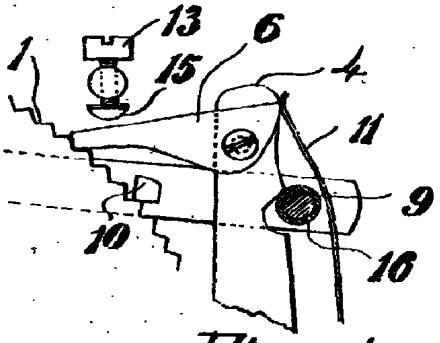

Fig: 4.

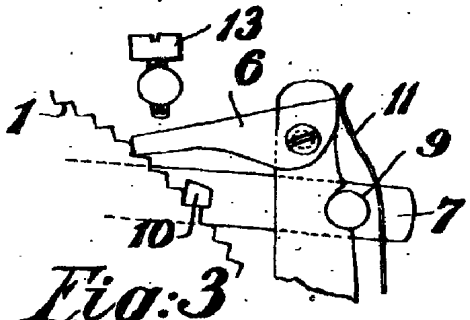

Fig: 3

Malby&Sons, Photo-Litho.