F. HOPE-JONES.

ELECTRIC TIME INDICATOR AND ALARM.

APPLICATION FILED AUG. 2, 1910.

1,047,810.

Patented Dec. 17, 1912.

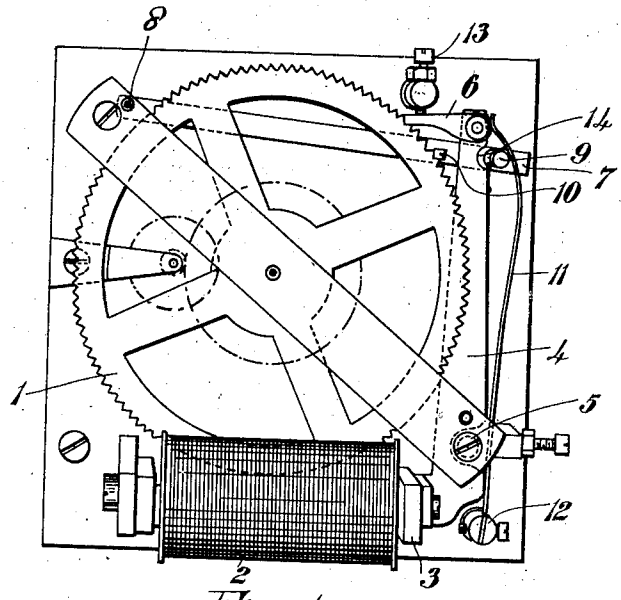

Fig: 1.

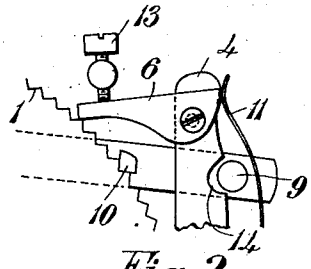

Fig: 2.

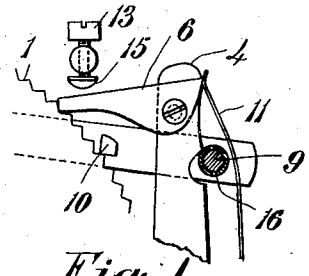

Fig: 4.

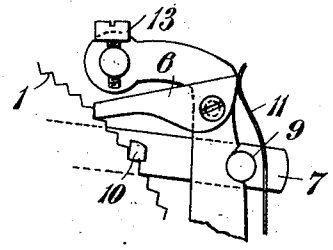

Fig: 3.

Witnesses.
E. W. Moore.
L. E. Barkley.

Inventor
Frank Hope-Jones.
per Frank Ackerman
Attorney.

UNITED STATES PATENT OFFICE.

FRANK HOPE-JONES, OF LONDON, ENGLAND.

ELECTRIC TIME INDICATOR AND ALARM.

1,047,810. Specification of Letters Patent. Patented Dec. 17, 1912.

Application filed August 2, 1910. Serial No. 575,117.

To all whom it may concern:

Be it known that I, FRANK HOPE-JONES, M. I. E. E., a subject of the King of Great Britain, residing at 32 and 34 Clerkenwell road, in the city of London, county of Middlesex, England, have invented new and useful Improvements in Electric Time Indicators and Alarms, of which the following is a specification.

This invention relates to improvements in electric time indicators and particularly to the escapement mechanisms thereof.

It is the object of the invention to provide an escapement mechanism which shall be certain in action while simple in construction.

To this end the invention is designed to provide a mechanism for driving the wheel of a dial movement, which mechanism never leaves the wheel entirely free during its normal action.

More particularly defined the invention consists in a construction of driving click and back stop so interconnected that when the one is released from the driven wheel the other is necessarily engaged therewith.

A further object of the invention is to provide facilities for setting to time the hands, type wheels, barrels or other indicating or recording devices. For this purpose the mechanism referred to is made capable of release by an abnormal movement from the wheel which is driven so as to leave this latter free for setting.

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. Fig. 2 an enlarged detail drawing of the same in the mid-way position of the withdrawal of the driving click; Fig. 3 with the driving click fully withdrawn, the armature being at the end of its stroke; Fig. 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 back stop 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 backward or forward during their motion.

Referring now to Fig. 1 which illustrates the dial movement of the type described in the drawings accompanying the specification of Letters Patent No. 610539, 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 centered 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 center so as to insure 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 toward 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 backward 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 Fig. 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 while the movement is being operated, take first the position shown in Fig. 2 in which the driving click is being withdrawn by the electro-magnet. While the point of the click is traveling 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 traveled 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 Fig. 3 and until after the lever 4 has left the stud on its return journey under the influence of spring 11.

Fig. 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, while 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 Fig. 3 both the limit stops are shown faced with leather or similar material, the stop 13 having a pad 15 and the back-stop 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.

What I claim is:—

1. In an electric time indicator, the combination of a main wheel, an electromagnetically oscillated lever having a recess in its edge and carrying a driving click engaging with said main wheel, a second pivoted lever approximately at right angles to said lever, a back stop upon said second lever adapted to engage the teeth of the main wheel, a pin upon the back stop lever adapted to engage with the recess in the oscillated lever, whereby the back stop is held in engagement with the main wheel when the driving click is withdrawn therefrom.

2. In an electric time indicator, the combination of a main wheel, a driving click, a recessed lever carrying said click, a spring operating same, a second lever, a back stop thereon, a projection thereon normally engaging the recess in the first lever and adapted to be disengaged therefrom and to render said spring inoperative when the second lever is raised.

3. In an electric time indicator, the combination of a main wheel, a lever, electromagnetic means for oscillating said lever, a driving click pivoted upon said lever and adapted to engage with the teeth of the main wheel, a second pivoted lever approximately at right angles to the first, and a back stop upon said lever adapted to raise the driving click out of engagement with the wheel when the back stop lever is raised.

4. In an electric time indicator, the combination of a main toothed wheel, an electromagnetically oscillated lever, a spring normally pressing upon said lever, a driving click pivoted upon said lever and engaging with the main wheel, a second pivoted lever, a back stop thereon adapted to engage with the main wheel, a projection upon said second lever, said back stop and projection being so positioned that when said second lever is raised the back stop raises the driv-

ing click out of engagement with the main wheel and the projection relieves the electromagnetically oscillated lever of the pressure of the spring.

5. In an electric time indicator, the combination of a main wheel, an electromagnetically oscillated lever having a recess in its edge and carrying a driving click, a second lever approximately at right angles to said lever, a back stop upon said second lever adapted to engage the teeth of the main wheel, a pin upon the back stop lever adapted to engage with the recess in the oscillated lever, whereby the back stop is held in engagement with the main wheel when the driving click is withdrawn therefrom, and a sheath upon said pin adapted to deaden noise.

6. In an electric time indicator, the combination with the main toothed wheel of a pivoted driving click, means for reciprocating the same, means for limiting the motion of same about its pivot, a back stop, means for engaging said back stop with the main wheel when the driving click is disengaged therefrom, and pads or sheaths of sound deadening material adapted to lessen the noise of the mechanism.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK HOPE-JONES.

Witnesses:
A. E. O'DELL,
LEONARD E. HAYNES.