

No. 705,991.

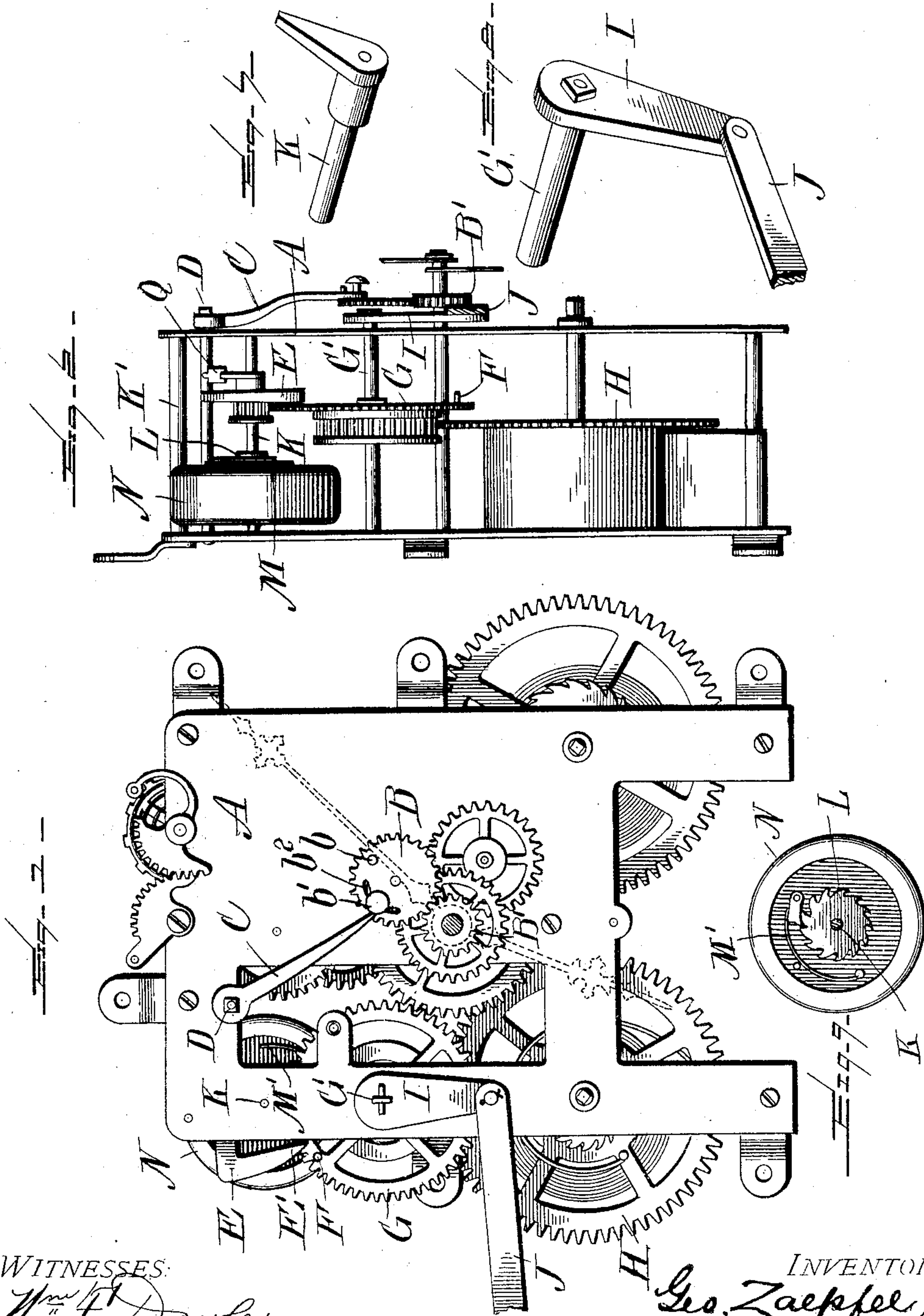
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TIME SWITCH MECHANISM.

(Application filed Oct. 24, 1901.)

(No Model.)

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UNITED STATES PATENT OFFICE.

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TIME-SWITCH MECHANISM.

SPECIFICATION forming part of Letters Patent No. 705,991, dated July 29, 1902.

Application filed October 24, 1901. Serial No. 79,846. (No model.)

To all whom it may concern:

Be it known that I, GEORGE ZAEPFEL, a citizen of the United States, residing at Croghan, in the county of Lewis and State of New York, have invented certain new and useful Improvements in Time-Switch-Operating Mechanism; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in automatic means for throwing switches for turning on and shutting off electric lights, &c.; and it consists in the provision of a crank connected to the switch-lever and actuated by a clockwork mechanism, whereby at any time the lights may be turned on or off.

The invention consists, further, in the various details of construction, combination, and adaptation of parts, as will be hereinafter more fully described and then specifically defined in the appended claims and illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this application, and in which drawings similar letters of reference indicate like parts throughout the several views, in which—

Figure 1 is a side elevation of the clockwork mechanism, showing the switch-lever pivoted to a crank and the trip mechanism for allowing the crank to be turned under the influence of a spring. Fig. 2 is an end elevation of the mechanism illustrated in Fig. 1. Fig. 3 is a sectional view taken on line 3-3 of Fig. 5. Fig. 4 is also a sectional view in the same plane as Fig. 3, but showing different positions of certain operative parts of the mechanism. Fig. 5 is a top plan view of the mechanism. Fig. 6 is a detail in perspective of the trip mechanism for allowing the spring to act to rotate the crank to which the switch-arm is pivoted. Fig. 7 is a detail view in perspective of an arresting-arm which coöperates with a lug on the shaft carrying the trip-arm to prevent the momentum-wheel from

rotating until the trip is free from the pin actuating same. Fig. 8 is a perspective view of the crank and end of switch arm or lever, and Fig. 9 is a detail view of the ratchet-pawl on the momentum-wheel.

Reference being had to the details of the drawings by letter, A designates the frame of an ordinary clockwork mechanism, to which, however, are added wheels that will reduce the revolution from one of twelve hours to one of twenty-four hours, and geared to the wheels of the clock mechanism is a setting-wheel B, having gear connection with a pinion-wheel B', which rotates with the shaft carrying the hour and minute hands of the clockwork. To said wheel B is attached a fixed pin *b* and an adjustable pin *b'*, which latter may be held at different positions within the curved slot *b²* in the wheel B, and each of said pins is designed to make a complete revolution once in twenty-four hours. Interposed in the path of said pins is a trip-arm C, which is mounted on and turns with the shaft D, and fastened to said shaft is a locking-arm E, the free hooked end E' of which is disposed in the path of the pins F, which are secured to the face of the stop-wheel G, there being shown two of these pins diametrically opposite each other and adapted to allow the stop-wheel to make a one-half revolution each time the lock-arm E is raised out of the path of said pins. The wheel G, before referred to as the "stop-wheel," has geared connection with the spring-actuated wheel H of the striking-work of the clock mechanism, which spring-actuated wheel H is wound by a key in the usual manner. On the shaft G', on which the wheel G is mounted, is fastened the crank I, to which is pivotally secured one end of the switch-lever J, which is adapted during a one-half revolution thereof to turn on an electric-light mechanism or actuate other means, while a movement of the crank to complete the revolution will turn off the lights or operate any other kind of switch means.

On a shaft K, which is journaled in the framework, is a pinion K', which is in gear with the teeth on the circumference of wheel G. Also keyed to the shaft K is a ratchet-wheel L, that is engaged by a pawl M, which is pivotally mounted on the face of the mo-

mentum-wheel N, loosely journaled on shaft K. A spring M' serves to hold the free end of said pawl in engagement with the teeth of said ratchet-wheel. It will be observed that
 5 the momentum-wheel N, which is made, preferably, of a heavy metal, as lead, and solid, moves with the shaft K in one direction, but rotates independent of the shaft in the opposite direction, the pawl turning over the
 10 ratchet-wheel. The office of said momentum-wheel, it will be observed, is to allow the wheel G, which through its shaft actuates the lever-throwing arm, to start gradually, it first having to start the momentum-wheel. When
 15 the lever E is disengaged from the teeth of said wheel G to allow the momentum-wheel to slow down to gradually lower the rapid rotary movement after it has done its work and in order not to rack the parts of the mechanism, said momentum-wheel continues to rotate
 20 independently of the shaft on which it is mounted by the pawl turning idly over the teeth of the ratchet-wheel. Said shaft K has an arm P secured at one end thereto, and Q
 25 designates a lug on the shaft D, which lug is disposed in one of its positions in the path of the free end of the arm P to form a stop against which the arm P contacts while the trip-arm C is being actuated by one or the
 30 other of the pins *b* or *b'*. When the arm C has been swung a slight distance by one of said pins, the free end of the lock-arm E will free the pin F on the wheel G and allow the shaft G G, also the shaft K, geared thereto,
 35 to make partial revolutions. When the end of the arm P comes in contact with the end of said lug, the rotary movement of shaft K is arrested, also the movement of the shaft G'. This arresting of the rotary movement of said
 40 shafts K and G' is but for a moment, however, and that during the interval that it requires for the pin on the graduated wheel to pass by the end of the trip-lever. The moment the pin, either *b* or *b'*, passes by the end of the trip-
 45 lever the lug Q swings up out of the path of the arm P, thus allowing the shaft G' and the crank secured thereto to complete a one-half revolution. Were it not for the provision of the lug and arm contacting against same, as
 50 described, the end of the lock-arm would be free from the pins F for a sufficient interval to allow the wheel G to make a number of revolutions while the pin *b* or pin *b'* was passing by the free end of the trip-arm, as this
 55 might require several minutes. The moment the free end of the trip-arm is released by one or the other of the pins on the graduated wheel B the lug Q clears the end of the arm P, allowing the shaft K to make a one-half revolution,
 60 as before described, and a spring may be employed, if desired, to assist in returning the free end of the lock arm or lever in the path of the pins F to form a stop therefor. While the shaft K is being rotated by its gear connection with the wheel G under the influence
 65 of the spring-motor its revolutions become very fast, and as the rotary movement of the

wheel G is stopped, after a one-half revolution thereof, quite abruptly the momentum of the weighter or solid wheel N continues after
 70 wheel G has stopped. Were it not for the provision of this momentum-wheel being allowed to stop gradually the various parts of the mechanism would become damaged, as by a sudden stop of so heavy a wheel rotating
 75 rapidly.

The operation of the device will be readily understood. The setting-wheel B is first set by moving the adjustable pin *b'* to a particular location, so that at a given moment it will
 80 come in contact with the trip-lever to actuate the switch-lever to turn on the electric lights or whatever other mechanism is to be actuated thereby, and the fixed pin is so positioned relative to the position of the adjustable
 85 pin that when the setting-wheel B makes a sufficient revolution to cause the fixed pin to contact with the trip-arm the latter will be swung out of the path of the pin and a complete rotary movement will be imparted
 90 to the crank to which the switch-lever is connected, and the electric-light system may be turned off or any other mechanism stopped by the movement of the switch.

Having thus described my invention, what I claim to be new, and desire to secure by Letters Patent, is—

1. A clock mechanism for actuating electrical switches, &c., comprising a series of spring-actuated gear-wheels, a crank actuated
 100 by said wheels, a switch-lever pivoted to said arm, a setting-wheel in mesh with a clock-work, pins mounted on said setting-wheel, a trip-arm disposed in the path of said pins, a lock-lever normally holding said gear mechanism from rotation, and actuated by the trip-lever, a momentum-wheel, turning with the
 105 spring-actuated wheel in one direction, and designed to turn idly after the switch-lever is operated, as set forth.

2. A clock mechanism for actuating switch-levers, &c., comprising a spring-actuated gear, a crank operated thereby, a lever pivoted to said crank, a setting gear-wheel and clock mechanism for operating same, pins on said
 115 wheel, a trip-arm disposed in the path of said pins, a momentum-wheel actuated as the crank is given a one-half rotation, and allowed to turn idly after the crank has been arrested, and means, actuated by said trip-arm, to allow the gear mechanism to operate,
 120 as set forth.

3. In combination with the spring-actuated gear mechanism, a stop-wheel actuated thereby, a crank actuated by the gear mechanism,
 125 pins on the face of said stop-wheel, a shaft geared to said stop-wheel, a momentum-wheel turning idly in one direction on said shaft after the switch is thrown, a setting-wheel and clockwork geared thereto, a trip-lever
 130 and pins on the setting-wheel for actuating said lever, and means, operated by the trip-lever, for allowing the stop-wheel to rotate and for arresting same, as set forth.

4. In combination with a spring-actuated gear, a stop-wheel in mesh therewith, pins on said wheel, a setting-wheel and clock mechanism for actuating same, pins on said setting-wheel, a trip-lever, and rock-shaft to which it is fastened, said lever being disposed in the path of said pins on the setting-wheel, a lock-lever secured at one end to said rock-shaft, its other end disposed in the path of the pins on said stop-wheel, a shaft geared to the stop-wheel, a ratchet secured thereto, a momentum-wheel, a pawl carried by the latter and having engagement with said ratchet, said momentum-wheel having a free rotary movement in one direction independent of the ratchet, and allowed to stop gradually after being rotated by the pawl and ratchet, and after the stop-wheel has ceased to rotate, as set forth.

5. In combination with the spring-actuated gear, the stop-wheel, the pins thereon, the momentum-wheel and shaft carrying same, the ratchet on said shaft, and pawl carried by said wheel and engaging said ratchet, the setting-wheel, and clockwork mechanism for actuating same, the trip-arm and shaft to which it is secured, a lock-lever fastened to said trip-arm-carrying shaft, and engaging the pins of the stop-wheel, a lug on the shaft to which the lock-lever is fastened, and an

arm on the momentum-wheel shaft adapted to contact with said lug which forms a stop to prevent the rotation of the stop-wheel until the pin on the graduated wheel has passed by the free end of said trip-arm, as set forth. 35

6. In combination with the spring-actuated gear mechanism, the stop-wheel, and shaft on which it is mounted, a crank on said shaft, and switch-lever pivoted to said crank, pins on the face of the stop-wheel, a shaft geared to said stop-wheel, a momentum-wheel on said shaft, a setting-wheel, and clockwork mechanism geared thereto, said setting-wheel having an elongated aperture therein, an adjustable pin held in said aperture, a fixed pin on the face of the setting-wheel, a rock-shaft, a trip-arm secured thereto, and disposed in the path of said adjustable and fixed pins, a lock-lever secured to the rock-shaft and engaging the pins on the stop-wheel, a stop on said rock-shaft, and an arm, on the momentum-wheel shaft, which is designed to contact with said stop, as set forth. 40 45 50

In testimony whereof I hereunto affix my signature in presence of two witnesses.

GEORGE ZAEPFEL.

Witnesses:

EDWARD H. RADIGAN,
LOUISE WENTWORTH.