H. K. HATHAWAY.

TIMING DEVICE.

APPLICATION FILED OCT. 2, 1909.

995,597. Patented June 20, 1911.

Fig. 1.

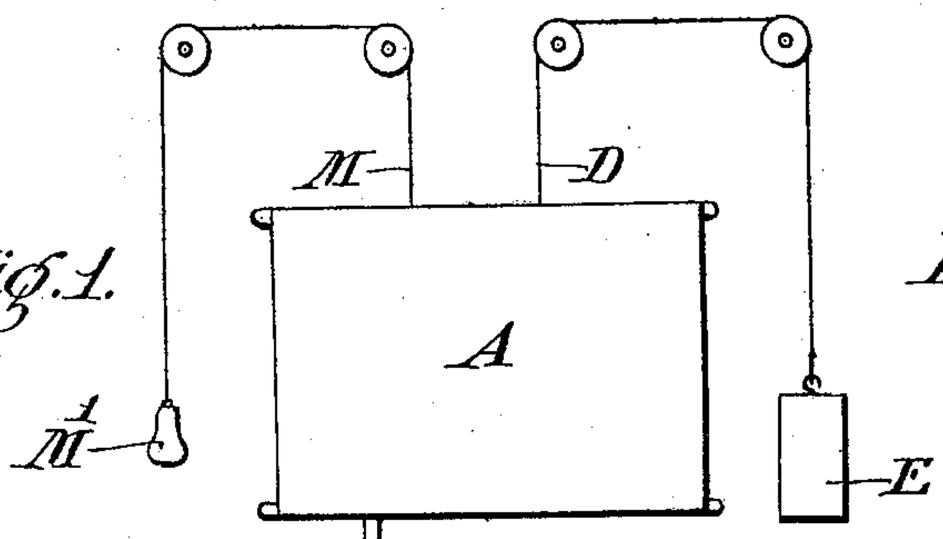


Fig. 3.

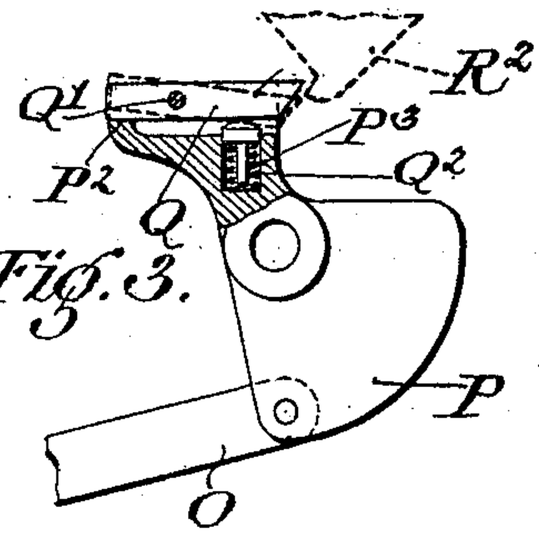


Fig. 4.

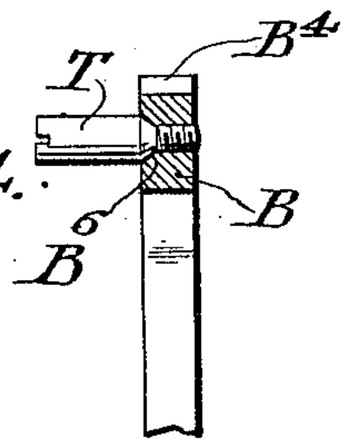
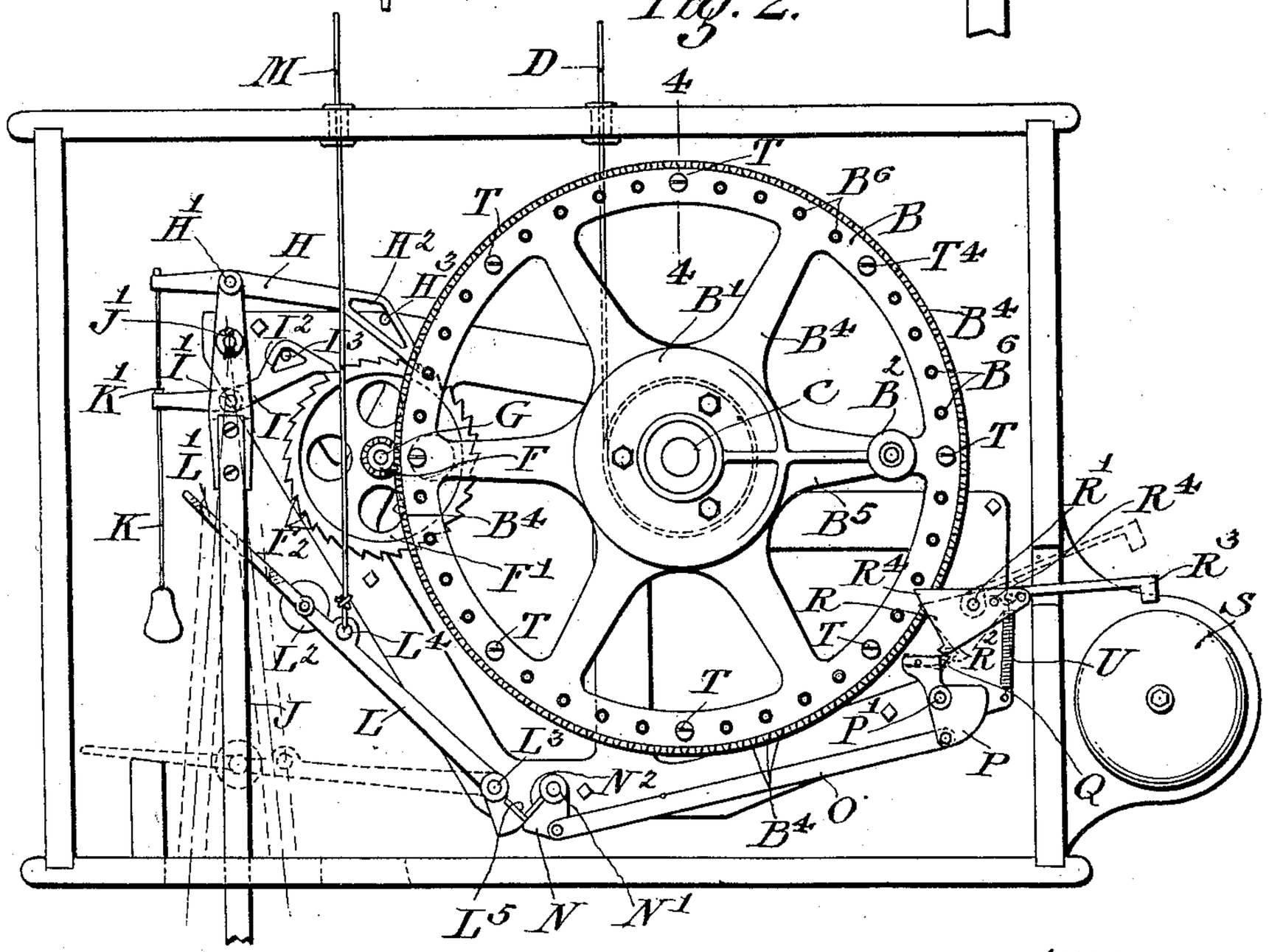


Fig. 2.



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UNITED STATES PATENT OFFICE.

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TIMING DEVICE.

995,597. Specification of Letters Patent. Patented June 20, 1911.

Application filed October 2, 1909. Serial No. 520,652.

To all whom it may concern:

Be it known that I, HORACE K. HATHAWAY, a citizen of the United States of America, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Timing Devices, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My present invention relates to timing mechanisms, and has for its objects the production of a clock having provisions whereby the clock, when stopped, may be started in a simple and positive manner, will thereafter run for a predetermined period of time, and will then simultaneously actuate an alarm, and stop in such condition that it will repeat this cycle of operation when the starting device is again actuated.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, however, and the advantages possessed by it, reference should be had to the accompanying drawings and descriptive matter, in which I have illustrated and described one of the forms in which the invention may be embodied.

Of the drawings, Figure 1 is a front elevation of the complete device. Fig. 2 is a front elevation on a larger scale than Fig. 1, of the clock mechanism proper, with the front wall of the clock case removed. Fig. 3 is an elevation showing a portion of the tripping mechanism, and Fig. 4 is a partial section on the line 4—4 of Fig. 2.

The clock mechanism is mounted within a box like casing A.

B represents the timing wheel, which is journaled on a shaft C, and has secured to it a winding drum B′, on which the cord or chain D, supporting the weight E, may be wound up by turning the wheel B.

B^2 is a knob carried by the arm B^5 projecting from the front end of the winding drum, and is provided for turning the wheel in winding up the weight. The timing wheel B is provided at its periphery with gear teeth B^4 which mesh with the teeth of the spur gear F, journaled on the shaft G, and secured to the escapement disk F′, proper. The escapement disk F′ is provided at its periphery with the usual ratchet teeth F^2, and the movement of the disk F^2 is controlled by the escapement pawls H and I pivotally connected at H′ and I′, respectively, to the pendulum arm J at opposite sides of the stationary shaft J′ on which the pendulum arm is pivotally supported. The pawls H and I are each formed with cam slots H^2 and I^2, respectively, through which pass the studs H^3 and I^3, respectively. The arm J has adjustably secured to its lower end the usual bob or weight J^2.

The mechanism so far described obviously forms a simple but effective timing mechanism in which the timing wheel N will be given a uniform and definitely timed rotation when the pendulum arm J is free to swing back and forth. When it is desired to rotate the timing wheel in the reverse direction to wind up the weight E, the pawls H and I are thrown out of engagement with the escapement disk F′. A convenient means for throwing the pawls H and I out of their operative positions, is formed by the pull cord K secured to the tail of the pawl H and passing through a perforation in the tail of the pawl I and provided with a suitable enlargement or knob K′ adapted to engage the tail of the pawl I and pull it down when a pull is exerted on the cord K, while at other times the pawls H and I are free to have their proper movement.

L is a lever pivoted at L^3 and slotted at its free end as indicated at L′ to receive the pendulum arm J. When the parts are in the position shown in full lines in Fig. 2 the lever L does not engage the pendulum arm J and the latter is free to vibrate under the action of gravity. When the lever L is moved into the dotted line position of Fig. 2, however, the roll L^2, journaled to the lever L in the slot L′ engages the pendulum arm J and holds it against movement from the dotted line position shown toward its neutral position, thus instantly and positively stopping the clock. The lever L may be returned to the full line position by a pull cord M running to the point from which it is desired to start the clock mechanism and provided at that point with a pull or hand grip M′. When the lever L is drawn into the full line position it engages and is held by a latch N until the latter is tripped. The latch N is in the form of a segment or lever pivoted at N′ and provided with a latch

shoulder or plate N^2 adapted to engage the shoulder or plate L^5 on the lever. Preferably the parts N^2 and L^5 are hardened steel plates detachably secured to the members N and L, respectively. The latch member N is connected by a connecting rod O to a lever member P fulcrumed on a stud P′ and provided, in the form shown, with a pawl Q pivoted thereto at Q′ and normally held in the position shown in full lines in Fig. 3, with its tail engaging a shoulder P^2 of the lever P, by a spring Q^2 arranged in a socket P^3 formed in the lever. The pawl Q is movable from the full line position into the dotted line position shown in Fig. 3, however, when pressure is applied to the upper surface of the beveled front end of the pawl. This pressure is applied by the back or lower edge of a tooth R^2 carried by a lever R pivoted at R′ and normally held in the position shown by a spring U and a stud or stop R^4 which limits the movement of the lever R in the direction in which it is urged by the spring U. The lever R has secured to it a resilient striker arm R^3 and is formed with a shoulder R^4 projecting into the path of the studs T removably secured in some or all of the equally spaced apart sockets B^6 formed in the timing wheel B.

The mechanism shown in Fig. 2 is in the condition in which it is free to operate. When the movement of the timing wheel B is continued from the position shown the first pin T being brought into contact with the shoulder R^4 of the lever R depressed this shoulder and swings the lever R into the position shown in dotted lines. During this movement of the lever R the back edge of the tooth R^2 cams the pawl Q down against the action of the spring Q^2 and passes the point of the pawl Q which is thereupon returned by the spring Q^2 into the position in which the tail of the pawl Q bears against the shoulder P^2 of the lever P, and the beveled front end of the pawl Q is in position to be engaged by the lever R on the return movement of the latter. This return movement of the lever R occurs when a small additional movement of the timing wheel permits the shoulder R^4 to pass the pin T which has moved the lever R into the dotted line position. As soon as the lever R is free to do so, it is drawn back into the full line position by the spring U, and as it does so the tooth R engages the beveled end of the pawl Q and turns the lever P sufficiently so that the latter through the connecting rod O swings the latch member N on its pivot N′ a sufficient distance to pull the shoulder N^2 out of engagement with the shoulder L^5, thus permitting the lever L to drop into the dotted line position. The roller L^2 of the lever L thereupon engages the pendulum J and holds it from moving toward the neutral position from the dotted line position shown. As the return movement of the lever R is stopped by its engagement with the stud R^4, the resiliency of the striker arm R^3 causes its free end to impinge against the bell or other alarm device S, sounding the latter. When thereafter the pull device M′ is actuated, the lever L is returned to the full line position. This starts the clock instantly, since the pendulum arm J starts to swing through its neutral position as soon as permitted to do so, and the cycle of operation hereinbefore described may be repeated as often as desired.

As the stop mechanism and alarm sounding mechanism are both brought into operation by the return movement of the lever R under the action of the spring U the alarm is sounded and the clock stopped at the same time. When the pins T are equally spaced apart the intervals between each actuation of the pull N′ and the subsequent sounding of the alarm will be exactly equal and by a suitable arrangement of the sockets B^6 and pins T, the time required for making one turn of the wheel B may be divided into any desired series of equal or unequal periods.

The apparatus disclosed in detail herein was primarily designed for use in connection with the treatment of tools formed of so called "high speed" steel which require to be exposed to a high temperature for a definite predetermined period of time. In treating such tools, a very slight variation in the time of exposure to high temperature from the proper period may destroy the effectiveness of the treatment of the tool. With the timing device shown, after the pins T have been properly set, all that the workman heating the tools needs to do, to obtain the desired accuracy in the time of exposure, is to actuate the pull device M′ at the time the tools or tools being treated are inserted in the furnace, and to withdraw the tools when the alarm is subsequently sounded, repeating this operation as often as there are tools to treat. It will be apparent to those skilled in the art, however, that the mechanism disclosed is in nowise limited in its use in the manner referred to, and that it can be advantageously used wherever it is desired to have one step in an operation follow a preceding step after a predetermined time interval.

While, in accordance with the provisions of the statutes I have herein described and illustrated the best form of my invention now known to me, it will be readily apparent to those skilled in the art that changes may be made in the form of apparatus disclosed without departing from the spirit of my invention, and I do not wish the claims hereinafter made to be limited to the particular embodiment of the invention disclosed more than is made necessary by the state of the art.

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

1. In a clock mechanism, the combination with the pendulum and timing wheel therefor, of a pendulum controlling lever arranged to move, when free to do so, from one position in which it permits motion of the pendulum, into a second position in which it holds the pendulum at one side of its neutral position, a latch adapted to hold said lever in said one position, a lever actuated by the timing wheel on the movement of the latter into a predetermined position, and means actuated by said lever for tripping said latch.

2. In a clock mechanism, the combination with the pendulum and timing wheel thereof, of an alarm mechanism, a pendulum controlling lever arranged to move, when free to do so, from one position in which it permits motion of the pendulum, into a second position in which it holds the pendulum at one side of its neutral position, a latch adapted to hold said lever in said one position, a lever actuated by the timing wheel on the movement of the latter into a predetermined position, and means actuated by said lever for simultaneously tripping said latch and operating said alarm mechanism.

3. In a clock mechanism, the combination with the timing wheel thereof, of an alarm mechanism, a stop mechanism, a lever, a spring tending to hold the latter in one position, said lever and timing wheel having provisions whereby a predetermined movement of the wheel first moves the lever out of said position and then allows it to return to said position under the action of its spring, and connections whereby the return movement of the lever under the action of its spring operates the alarm and stop mechanisms.

4. In a clock mechanism, a timing wheel, one or more projections carried thereby, a stop, a lever, a spring tending to hold said lever against said stop with a portion of the lever projecting into the path of said projection, or projections, whereby a predetermined movement of the timing wheel causes the lever to be first moved away from, and then permitted to return against, said stop, a resilient striker arm connected to said lever, a bell adapted to be struck by said striker arm when the return motion of the lever is arrested by said stop, and mechanism for stopping the clock actuated by said lever on its return movement.

5. In a clock mechanism, a timing wheel, one or more projections carried thereby, a stop, a lever, a spring tending to hold said lever against said stop with a portion of the lever projecting into the path of said projection, or projections, whereby a predetermined movement of the timing wheel causes the lever to be first moved away from, and then permitted to return against, said stop, a resilient striker arm connected to said lever, a bell adapted to be struck by said striker arm when the return motion of the lever is arrested by said stop, and mechanism for stopping the clock actuated by said lever on its return movement, said mechanism comprising a movable member provided with a tooth engaged by the lever on the return movement of the latter.

6. In a clock mechanism, a timing wheel, one or more projections carried thereby, a stop, a lever, a spring tending to hold said lever against said stop with a portion of the lever projecting into the path of said projection, or projections, whereby a predetermined movement of the timing wheel causes the lever to be first moved away from, and then permitted to return against, said stop, a resilient striker arm connected to said lever, a bell adapted to be struck by said striker arm when the return motion of the lever is arrested by said stop, and mechanism for stopping the clock actuated by said lever on its return movement, said mechanism comprising a movable member provided with a yieldable tooth engaged by the lever on the return movement of the latter, but yielding on the initial movement of the lever to prevent said member from being moved thereby.

7. In a clock mechanism, a timing wheel, one or more projections carried thereby, a stop, a lever, a spring tending to hold said lever against said stop with a portion of the lever projecting into the path of said projection, or projections, whereby a predetermined movement of the timing wheel causes the lever to first move away from, and then permits it to return against, said stop, a resilient striker arm connected to said lever, a bell adapted to be struck by said striker arm when the motion of the lever under the action of the spring is arrested by said stop, and mechanism for stopping the clock, comprising a movable member actuated by said lever on the return movement of the latter, the latter and said lever having coöperating parts which engage on the return movement of the lever and thereby cause the actuation of said stop mechanism, and are arranged to clear on the movement of said lever in the other direction.

8. A clock mechanism, comprising in combination, a vibrating pendulum, a rotating timing wheel formed with a plurality of pin receiving sockets, pins removably secured in said sockets, a lever movable into and out of the path of said pins, a spring normally holding said lever in the path of said pins and returning said lever into said path after it has been moved out of the path by one of them, an alarm mechanism actuated by said lever on its return movement into said path,

a pendulum controlling lever tending to move from one position in which it permits the pendulum to move, into a second position in which it holds the pendulum at one side of its neutral position, a latch for holding said controlling lever in said one position, and latch releasing mechanism comprising a movable member provided with a tooth adapted to be engaged by the first mentioned lever on the return movement of the latter.

9. A clock mechanism, comprising in combination, a vibrating pendulum, a rotating timing wheel formed with a plurality of pin receiving sockets, pins removably secured in said sockets, a lever movable into and out of the path of said pins, a spring normally holding said lever in the path of said pins and returning said lever into said path after it has been moved out of the path by one of them, an alarm mechanism actuated by said lever on its return movement into said path, a pendulum controlling lever tending to move from one position in which it permits the pendulum to move, into a second position in which it holds the pendulum at one side of its neutral position, a latch for holding said controlling lever in said one position, and latch releasing mechanism comprising a movable member, and provisions whereby said member is engaged and the latch releasing mechanism operated by the first mentioned lever on the return movement of the latter.

HORACE K. HATHAWAY.

Witnesses:
ARNOLD KATZ,
D. STEWART.