

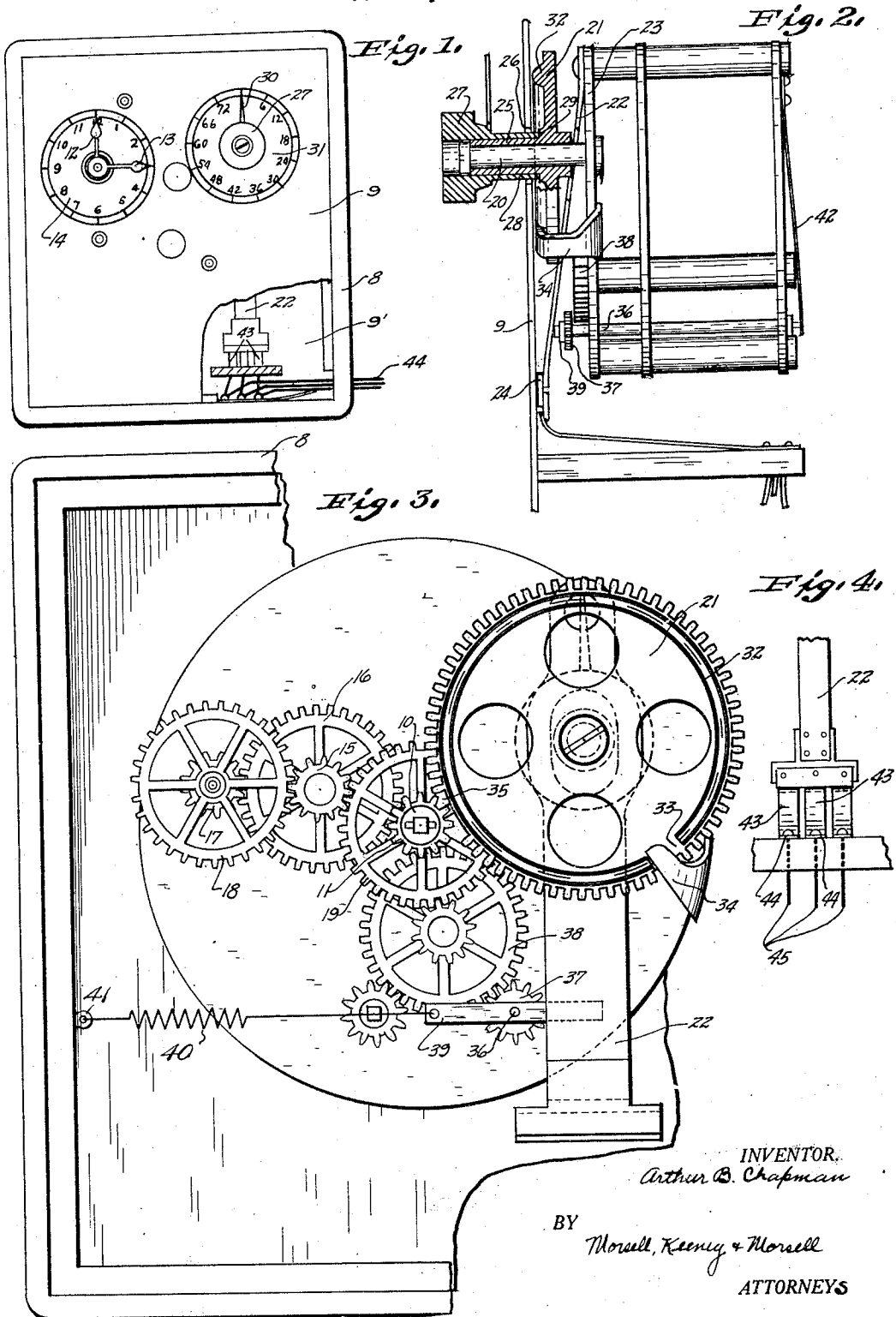
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A. B. CHAPMAN

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CLOCK FOR ALARM SYSTEMS

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ARTHUR B. CHAPMAN, OF OSHKOSH, WISCONSIN, ASSIGNOR TO THE DOUBLE-A ALARM COMPANY, OF OSHKOSH, WISCONSIN, A CORPORATION OF WISCONSIN

CLOCK FOR ALARM SYSTEMS

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This invention relates to improvements in clocks for alarm systems.

In stores, banks and like establishments, where it is necessary to protect valuables, the safe is usually protected against unauthorized opening and tampering with by means of an alarm system. In brief, one desirable form of alarm system is a closed circuit including a signal and a normally energized relay. The circuit is so arranged that during the day, it is completed through a clock, and during the night or other time when the establishment is closed, it is completed through the door of the safe. Thus, during working hours the safe door may be opened without sounding the signal, but during closing hours, if the door is tampered with, the alarm will be sounded.

It is, therefore, the principal object of the present invention to provide a clock particularly adapted for use in time alarm circuits or with time locks.

A further object of the invention is to provide a clock of the class described, which, after being initially set for the period of closing, allows a predetermined period to elapse before transferring the circuit through the door, thereby allowing sufficient time for the closing and locking of the door after the clock has been set.

A further object of the invention is to provide a clock of the class described which may be set to transfer the alarm circuit for any desired number of hours, within certain limits.

A further object of the invention is to provide a clock for alarm systems which is of simple construction, is strong and durable, is efficient and accurate in operation and is well adapted for the purposes described.

With the above and other objects in view, the invention consists of the improved clock and its parts and combinations as set forth in the claims, and all equivalents thereof.

In the accompanying drawings in which the same reference characters indicate the same parts in all of the views:

Fig. 1 is a front view of the improved clock, part being broken away to show details of construction;

Fig. 2 is a side view of the clock removed from its casing and on a larger scale, parts being shown in section;

Fig. 3 is an enlarged front view of the clock mechanism with the front plate removed; and

Fig. 4 is an enlarged detail view showing the contact members.

Referring now more particularly to the drawing, it will appear that the clock mechanism is mounted in a case 8 enclosed by a front plate 9 and a back 9'. All of the clock mechanism common to the ordinary form of clock is not shown in detail, but it will be seen that power for the moving parts is taken from the main clock shaft 10 on the outer end of which is mounted a pinion 11 formed with twelve teeth.

The movement of the time hands 12 and 13 over a clock dial 14 is effected by means of a series of gears and idlers 15, 16, 17 and 18, one of which, as 15, meshes with an hour wheel or gear 19 mounted on the main shaft 10 rearwardly of the pinion 11.

Mounted on a shaft 20, at one side of the main shaft 10, is a large gear 21, formed with seventy-four or more teeth. As shown in Fig. 2, said gear 21 is yieldingly mounted on the shaft 20 against the tension of a flat spring 22 secured at its upper end to the frame 23 and sometimes engaging at its lower end a block of insulation 24 attached to the inner surface of the front plate 9. The gear 21 is formed with a sleeve portion 25 extending forwardly through an opening 26 in the plate 9. Keyed to the outer end of the sleeve portion 25 is a knob 27 also having a sleeve portion 28 which seats against an annular shoulder 29 formed on the gear 21. Thus, the gear 21 may be pushed inwardly, against the tension of the spring 22 and out of engagement with the pinion 11, and turned.

Fixed to the outer portion of the knob 27 is a hand 30 adapted to register with any of the members appearing on a graduated dial 31. The number of graduations on said dial are, of course, dependent on the number of teeth in said gear 21.

Formed on the front surface of the large gear 21 is an annular ring bearing 32 which

is broken at a point 33 to engage a fixed or stationary lug 34 extending forwardly from the frame 23. The flat spring 22 holds the ring bearing 32 in an intermediate position, pressed against the stationary lug 34, and in this position the large gear 21 is in engagement with the pinion 11 so as to be turned thereby. At a point on the periphery of the gear 21, correctly spaced from the break 33 of the ring 32, a number of teeth are omitted, as at 35, so that when the gear 21 is in its forward position and the lug 34 is seated in the break 33, the pinion 11 is free to rotate without engaging the teeth of the gear 21. The large gear 21 may thus be in any of the three positions; in the rear position where it is out of engagement with the pinion 11 to permit setting of the mechanism; in an intermediate position where it is in engagement with the pinion 11 to be rotated until it reaches the break 33; or in the forward position where it is again out of engagement with the pinion, the spring 22 effecting closure of the circuit contact members 44.

Extending through the frame of the clock is a shaft 36 on the forward end of which is mounted a small gear 37 adapted to mesh, in one position to be explained, with a larger gear 38. Also fixed to the forward end of the shaft 36 is a dog 39 which moves against the pull of a spring 40 secured thereto and to the casing, as at 41. The gear 37 is of such a diameter that when it is in mesh with the gear 38, it will turn a quarter of a revolution to throw the dog 39 out of contact with the spring. The gear 38 is an idler and engages with the regular clock wheels.

It should be observed that the shaft 36 is slidably mounted in the clock frame and its rear end portion is engaged by a flat spring 42 of less strength than the spring 22. When the spring 22 is held in the position shown in Fig. 2 by the dog 39 with the gear 21 in, sufficient force is exerted by the spring 22 to hold the shaft 36 in its rear position and the gear 37 meshes with the idler 38. In this position, also, the spring 22 which carries a plurality of bridged brushes 43 at its lower end, is arranged so that the brushes contact with a plurality of contact members 44 to complete electrical circuits through wires 45. However, when the dog 39 is pivoted out of engagement with the spring 22, the shaft 36 is free to be pushed forward by the spring 42, and the gear 37 is out of mesh with the idler 38. In this position, the spring 22 moves inwardly and the brushes carried thereby disengage the contact members 44, breaking the circuits.

The improved clock is designed for use in connection with electrically operated time locks or time alarm systems. In systems of this character, the safe or building door is wired with a signal energized by a relay. The arrangement is such that during work-

ing hours the circuit is completed through the clock, permitting the door to be opened. However, during hours when the establishment is closed, the circuit is shunted through the door so that if it is opened, the circuit will be broken and the alarm sounded. The clock includes mechanism for an ordinary clock, preferably of the eight day type, and in addition, the mechanism herein described is associated therewith. When the door is to be locked at night, the hand 30 is set for the number of hours the place is to be closed, as for instance twelve. To set the clock, the knob 27 is pushed inwardly and the pointer turned to "12". This movement pushes the large gear 21 in against the spring 22 and permits the disengagement of the lug 34 from the break 33, to ride on the ring bearing 32. In this initially set position, the dog 39 is in the position shown in Fig. 2 holding the lower end of the spring 22 and brushes in contact with the contacts 44 whereby the circuits are still completed through the clock. As the minute hand turns, motion is transmitted through the gears to the small gear 37 until the gear 37 and the dog 39 are turned a quarter of a revolution, at which time it will have pivoted out of engagement with the spring 22, allowing it to move inwardly, breaking the contacts 44 and thereby shunting the circuits through the door. The parts are so geared that the time required for this movement of the dog is approximately fifteen minutes, thereby permitting ample time for the door to be set and locked before the circuit is transferred to the door. Immediately upon the disengaging movement of the dog, the spring 42 forces the shaft 36 forwardly so that the gear 37 no longer meshes with the idler 38. In this position, there is no further movement of the dog 39, which is now held pressed by the spring 40 against the left side of the depressed leaf spring 22. Now, as the twelve hours elapse, movement is transmitted through the clock gears to the large gear 21, the same being gradually turned. Upon the expiration of the twelve hours, the break 33 will have moved to such a position that the lug 34 will drop thereinto and the gear 21 will then be forced to its forward position by the spring 22. In this position the gear 21 will no longer turn, as the portion having the teeth cut out is adjacent the pinion 11. The spring in this position again engages the contacts whereby the circuits are completed through the clock so that the door may be opened without sounding the alarm. The forward movement of the main leaf spring leaves the dog 39 with the associated, now disengaged, small gear wheel 37, free to be rotated by the tension spring 40 to the horizontal position. The dog is thus brought underneath the main leaf spring 22, ready to be pushed in to bring small gear wheel 37 in engagement with the

large gear wheel 38 when the clock is being set for the next operation.

From the foregoing description it will be seen that the improved clock for alarm systems is of simple and novel construction, and is well adapted for the purposes described.

What I claim as my invention is:

1. The combination with a clock mechanism having a driving gear, of a driven gear adjustable to mesh with said driving gear, switch means actuated by said driven gear, means for moving said switch means to one position upon a predetermined movement of said gear from one position of adjustment and means for moving said switch means to another position upon the movement of said gear from the position of adjustment to a normal position.

2. The combination with a clock mechanism having a driving gear, of a driven gear longitudinally adjustable to mesh with said driving gear, and a circuit maker and breaker operated by longitudinal movements of said driven gear.

3. The combination with a clock mechanism, of an adjustable gear movable into and out of engagement therewith, said gear being rotatable and longitudinally movable, and a circuit maker and breaker controlled by longitudinal movements of said gear.

4. The combination with a clock mechanism, of an adjustable gear associated therewith, said gear being rotatable and longitudinally movable, a circuit maker and breaker controlled by the longitudinal movements of said gear, and an additional means for controlling said circuit maker and breaker operated by a predetermined revolvable movement of said gear.

5. The combination with a clock mechanism, of an adjustable gear movable into and out of engagement therewith, means for manually forcing said gear inwardly and turning it to a desired "set" position, means for automatically forcing said gear outwardly to normal position, and a circuit maker and breaker controlled by the in and out movements of said gear.

6. The combination with a clock mechanism, of a gear movable into and out of engagement therewith, means for manually forcing said gear inwardly and turning it to a desired "set" position, means for automatically forcing said gear outwardly to normal position after the clock mechanism has revolved said gear a predetermined distance, and a circuit maker and breaker controlled by the in and out movements of said gear.

7. The combination with a clock mechanism, of a gear associated therewith, means for manually forcing said gear inwardly and turning it to a desired "set" position, means for automatically forcing said gear outwardly to normal position, means for coupling and uncoupling said gear to said clock

mechanism in response to said gear movement and a circuit maker and breaker controlled by the in and out movements of said gear.

8. The combination with a clock mechanism, of a shaft, a gear movable into and out of operating engagement with said mechanism and revolubly and longitudinally movably mounted on said shaft, manual means for moving said gear inwardly on the shaft, spring means for moving it outwardly on the shaft, and a circuit maker and breaker controlled by said spring.

9. The combination with a clock mechanism, of a shaft, a gear revolubly and longitudinally movably mounted on said shaft said gear being movable into and out of operating engagement, a flat spring bearing against the gear, the end of the spring being free and carrying a circuit maker and breaker, manual means for moving said gear inwardly on the shaft and flexing said spring, and means for releasing the gear from its "in" position and allowing the spring to return it to normal position.

10. The combination with a clock mechanism, of a shaft, a gear revolubly and longitudinally movably mounted on said shaft said gear being movable into and out of operating engagement, a flat spring bearing against the gear, the end of the spring being free and carrying a circuit maker and breaker, manual means for moving said gear inwardly on the shaft and flexing said spring, and means controlled by a predetermined revolvable movement of the gear for releasing the gear from its "in" position and allowing the spring to return it to normal position.

11. The combination with a clock mechanism, of a driving gear rotated by said clock mechanism, a driven gear freely mounted on a shaft and axially slidable thereon between a first position in which it is freely rotatable with respect to said driving gear, a second position in which it is in engagement with and rotated by said driving gear, and a third position in which it is disengaged from said driving gear and locked against rotation, and a switch mechanism controlled by said driven gear and means for moving said gear between said positions.

12. The combination with a clock mechanism, of a driving gear rotated by said clock mechanism, a driven gear movable between a position of engagement with said driving gear in which it is rotated thereby and a position of disengagement, means tending to move said driven gear to the position of disengagement with said driving gear, means counteracting said last mentioned means for holding said two gears in engagement during an adjustably controlled period of time, and a switch controlled by said driven gear.

13. The combination with a clock mechanism, of a gear movable between a position in

which it is in engagement with said clock mechanism and rotated thereby and a position of disengagement from said clock mechanism, a switch controlled by longitudinal movement of said gear, and means for adjustably controlling the time period during which said gear is in engagement with said clock mechanism.

14. The combination with a clock mechanism, of a switch, a control member for said switch, means for coupling said control member to said clock mechanism for movement therewith during an adjustably predetermined period of time, and a second control member arranged to be coupled and uncoupled to said clock mechanism for additionally controlling said switch.

15. The combination with a clock mechanism, of a control member, means for adjustably coupling said control member to said clock mechanism for movement therewith through a predetermined period of time, a switching member actuated by the movement of said control member to perform a predetermined switching operation during coupling thereof with said clock mechanism, a second control member, and means for holding said second control member coupled to said clock mechanism during a predetermined period of time, said switching member, being prevented by said second control member from carrying out the switching operation initiated by the coupling of the first control member with the clock mechanism during the coupling of the second control member with the clock mechanism.

16. The combination with a clock mechanism, of a switch associated therewith, a control means for said switch, and means for coupling said control means to said clock mechanism for movement therewith during an adjustably predetermined period of time, said control means being arranged to cause said switch to perform a first control operation at a time fixed in relation to the beginning of its movement, and a second control operation at a time fixed in relation to the completion of its movement.

17. The combination with a clock mechanism, of a gear, means for intermittently coupling said gear to said clock mechanism for movement therewith during an adjustably predetermined period of time, a switch having a switching member arranged to be actuated by said gear to one switching position during its coupling with said clock mechanism and to be in another switching position during the period in which said gear is uncoupled from said clock mechanism, and a second gear arranged to be intermittently coupled with said clock mechanism for movement therewith during a predetermined period of time, said second gear being arranged to control the movement of said switching member to a position to which it is actuated

by the coupling of the first gear with said clock mechanism.

18. The combination with a clock mechanism having a driving gear, of a driven gear axially movable between a first position in which it is freely rotatable with respect to said driving gear, a second position in which it is in engagement with and rotated by said driving gear, and a third position in which it is disengaged from said driving gear, a spring axially pressing said driven gear in a direction from the first to the third position, a second driven gear, a switching member operated by the movement of said spring member to be brought to one switching position while said gear is brought toward the first position and to another switching position while said gear is in third position, and means for intermittently coupling said second driven gear to said clock mechanism for rotation therewith during a predetermined period of time, said second driven gear opposing the movement of said switching member to the position to which it is actuated by the movement of said first driven gear toward its third or second position.

19. The combination with a clock mechanism having a driving gear, a driven gear axially movable adjacent said driving gear between a first position in which it is freely rotatable, a second position in which it is in engagement with said driving gear, and a third position in which it is disengaged from said driving gear, a spring axially pressing said driven gear in the direction from the first to the third position, said driven gear having a break in its circumference at which there is no engagement therebetween and said driving gear in any of its positions, a catch for holding said driven gear in said second position against the action of said springs, said catch being arranged to release said driven gear to its third position at the moment when its circumference is at the point at which it becomes disengaged from said driving wheel, and a switch controlled by the movement of said driven gear.

20. The combination with a clock mechanism having a driving gear, of a driven gear adjustably engageable by longitudinal movement with said driving gear, said driven gear being arranged to automatically disengage by longitudinal movement from said driving gear after a time set by the adjustment, and a switch actuated by longitudinal movement of said driven gear.

21. The combination with a clock mechanism having a driving gear, of a driven gear adjustably engageable with said driving gear, a spring acting on said driven gear to cause its disengagement from said driving gear after a time set by the adjustment, and switch means actuated by the movement of said spring.

22. The combination with a clock mechanism having a driving gear, of a driven gear adjustably engageable with said driving gear, a spring acting on said driven gear to cause its disengagement from said driving gear after a time set by the adjustment, switch means actuated by the movement of said spring, and an additional time control element acting on said spring to control its actuation by said driven gear.

In testimony whereof, I affix my signature.

ARTHUR B. CHAPMAN.