

F. SCHMID, JR.

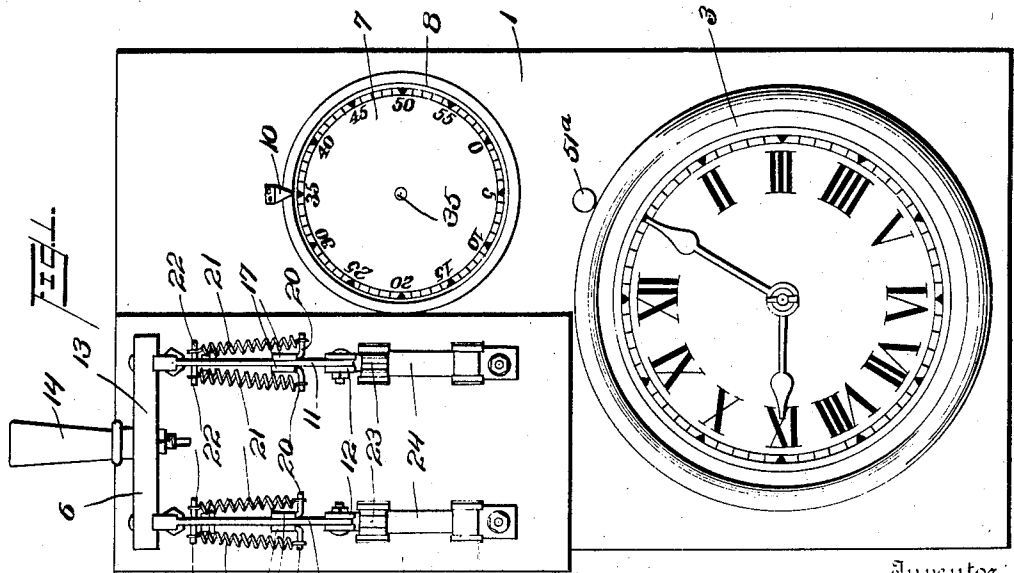
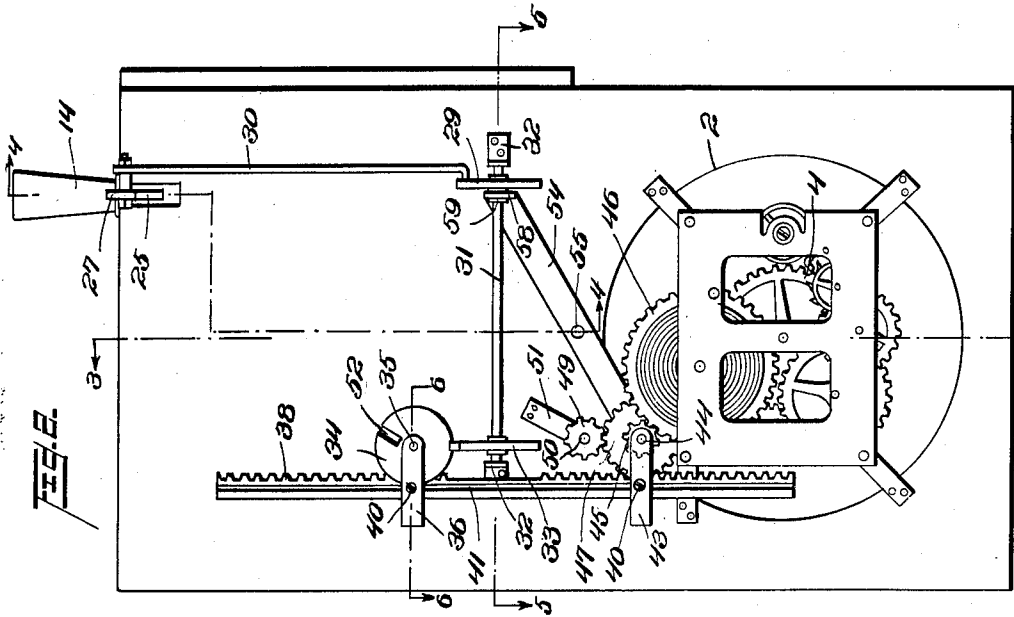
TIME SWITCH.

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1,012,721.

Patented Dec. 26, 1911.

2 SHEETS-SHEET 1.



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2 SHEETS-SHEET 2.

FIG. 3.

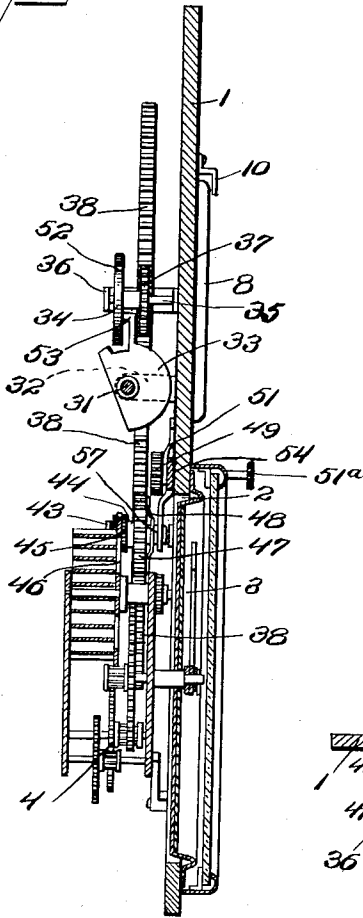


FIG. 4.

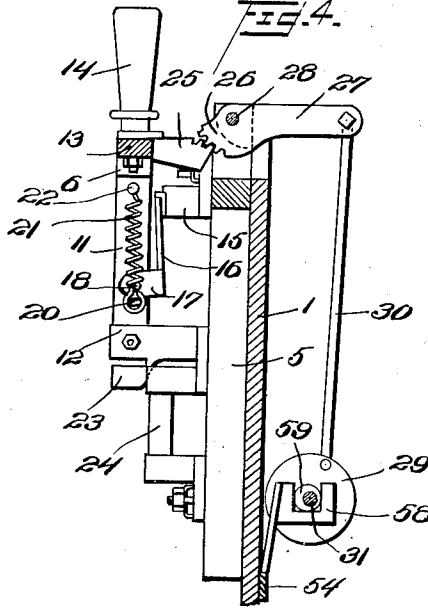


FIG. 5.

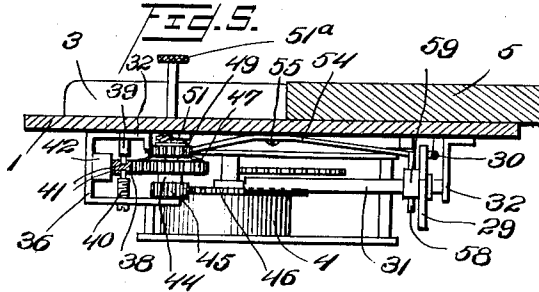


FIG. 6.

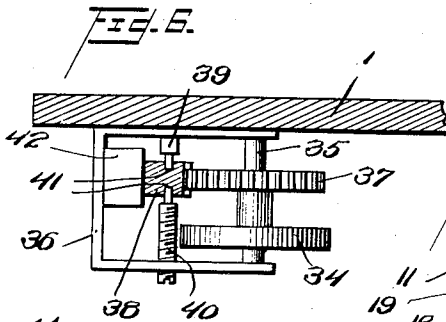


FIG. 7.

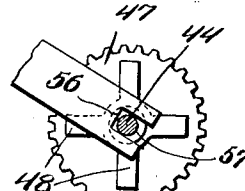
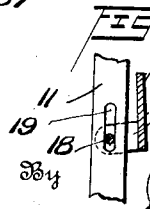


FIG. 8.



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UNITED STATES PATENT OFFICE.

FREDERICK SCHMID, JR., OF PHILADELPHIA, PENNSYLVANIA.

TIME-SWITCH.

1,012,721.

Specification of Letters Patent.

Patented Dec. 26, 1911.

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To all whom it may concern:

Be it known that I, FREDERICK SCHMID, Jr., a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Time-Switches, of which the following is a specification.

My invention relates to improvements in time switches, the object of the invention being to provide improved mechanism operated by clock work to release an electric switch, and permit the latter to be thrown to open position.

A further object is to provide an improved electric switch with clock controlled mechanism for holding the switch in normal closed position, and provide the switch with springs which throw the switch to open position at a pre-determined time.

With these and other objects in view, the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings: Figure 1, is a view in front elevation illustrating my improvements. Fig. 2, is a rear view of Fig. 1. Fig. 3, is a view in vertical section on the line 3—3 of Fig. 2. Fig. 4, is a view in vertical section on the line 4—4 of Fig. 2. Fig. 5, is a view in horizontal section on the line 5—5 of Fig. 2. Fig. 6, is an enlarged view in horizontal section on the line 6—6 of Fig. 2. Fig. 7, is an enlarged detail view showing the connection between the lever 54 and the arbor 44, and Fig. 8, is a fragmentary detail view illustrating the connection between the gears 17 and the switch arm 11.

1, represents a supporting plate having an opening 2 therein, in which a clock 3 is mounted, the face of the clock being exposed on the outer face of plate 1, and the clock works 4 located back of the plate 1. A block 5 of insulating material is fixed to the outer face of plate 1, and supports my improved switch 6 which will be hereinafter described. Beside the block 5, a rotary dial 7 is located, and mounted to turn in a casing 8. This dial is secured upon a shaft 35, which projects through plate 1, and contains a scale on its outer edge registering with a fixed pointer 10, and this scale num-

bered, said numbers indicating minutes as will hereinafter appear.

The switch 6 above referred to, comprises parallel contact arms 11, which are pivotally mounted in brackets 12, and are connected by the ordinary cross bar 13 to which a handle 14 is secured.

15, represent the fixed contacts on block 5, against which contacts 16 engage. These contacts 16 are in the form of flat levers having parallel ears 17 located against the opposite sides of the arms 11, and connected by pins 18 with said arms, said pins projected through slots 19 in the arms, so as to allow the contacts 16 a certain amount of longitudinal movement. These ears 17 are provided with lugs 20 which are connected by coiled springs 21 at both sides of the arms with pins 22 near the upper ends of the arms. These springs tend always to swing the contact 16 on the pins 18, and hence tend to throw the switch to open position. As this switch is positioned vertically when it is thrown out of contact, it will fall by gravity. To cushion this fall, grooved spring extensions 23 are provided on the brackets 12, and these extensions also prevent the arms from engaging the ordinary fuse pieces 24.

On the cross bar 13 of the switch 6, a toothed segment 25 is fixed, and this segment is concentric with the path of said switch, and is adapted to move into contact with a notched segment 26 on the end of an arm 27 projecting through plate 1, and pivoted on a pin 28. The inner end of the arm 27 is pivotally connected by a rod 30 with a crank disk 29. This disk 29 is secured upon a shaft 31 mounted in bearings 32 on the rear face of plate 1. On shaft 31, a segmental disk 33 is fixed, and is adapted to be held by means of a locking disk 34 which is supported upon a short shaft 35 mounted in a bracket 36 on the rear face of plate 1, and located at right angles to the segmental disk 33. On the shaft 35, a gear wheel 37 is secured, and meshes with a vertically movable rack bar 38. This rack bar 38 is guided by fixed pins 39, and set screws 40 located in grooves 41 in the opposite faces of said rack bar, and said bar held in its operative relationship by means of blocks 42 in bracket 36, and a bracket 43, located below the bracket 36. This bracket 43, together with plate 1, serves to support an

arbor 44. On this arbor 44, a relatively small pinion 45 is secured, and meshes with a gear 46 driven by the clock mechanism above described. On this arbor 44, a gear wheel 47 is loosely mounted, but frictionally held to the shaft by means of a spring 48. This spring 48 comprises a plurality of arms as seen most clearly in Fig. 7, which bear against the face of gear 47, and hold the latter against a shoulder on the arbor. In other words, this arbor 44 is made with two diameters as seen most clearly in Fig. 3, so that a shoulder is formed against which the gear 47 is held by the spring 48. This gear 47 meshes with the rack 38, and is adapted to be engaged by a pinion 49 on a shaft 50. This shaft 50 is connected to a spring 51, which normally holds the pinion 49 out of mesh with gear 47, and also serves to tightly close the opening through which said shaft 50 projects to exclude dust and dirt from the works in back of the plate.

It is to be understood that any suitable form of cover (not shown) may be provided to inclose the working parts on the back of the plate 1. Shaft 50 projects beyond the outer face of plate 1, and is provided with a knob 51^a to facilitate the movement of the shaft.

The disk 34 above referred to is provided with a recess 52 of the proper size for the passage of a finger 53 on segmental disk 33, and when the dial 7 is in zero position, this recess 52 will register with the finger 53. When in any other position, the recess will not register with the finger, and the latter will be held against the face of disk 34.

A spring lever 54 is pivotally supported on a pin 55 secured to the rear face of plate 1, and one end of this lever is bifurcated as shown at 56, and projects into an annular groove 57 in arbor 44, so that this lever serves to move the arbor and move gear 45 into and out of mesh with the gear 46. It must be borne in mind that this lever 54 moves at both ends toward and away from plate 1, and while the part 54 is a pivot pin, the lever fulcrums on this pin but moves in a direction parallel to the pin. The other end of lever 54 is provided with a bifurcated extension 58 to receive an eccentric 59 fixed to shaft 31, so that when this shaft 31 is turned, the lever 54 will be moved either to throw the gear 45 into or out of mesh with gear 46.

The operation is as follows: When the dial is at zero, the switch may be closed. When the switch is closed, the segments 25 and 26 will cause the arm 27 to swing upwardly, and through the medium of rod 30, crank disk 29 and shaft 31, will be turned in a direction to move finger 53 to a position back of disk 34. While the switch is held in this closed position, knob 51 is grasped and pushed inwardly until the pinion 49 meshes

with the gear 47. The knob is then turned to turn the dial 7, through the medium of gear 47, rack bar 38, gear 37, and shaft 35, so as to set the dial to any position desired in accordance with the time the switch is to remain closed. This movement of shaft 35 causes the disk 34 to turn to move its recess 52 away from the finger 53, which latter is then held against the back face of said disk 34. The turning of shaft 3, through the medium of lever 54, moves the arbor 44 longitudinally, and moves pinion 45 into mesh with gear 46. This lever 54 contains sufficient inherent elasticity to allow for the pinion engaging the face of the teeth 46. In other words, it is possible that when the arbor 44 is moved, the teeth of pinion 45 will not register with the teeth of gear 46. The spring lever 54 will therefore hold the pinion against the face of disk 46 until the teeth are in register, when the pinion 45 will spring into place. The parts will then be in the position shown in the drawings, and the clock work will be turning gear 46 and pinion 45. As the latter turns, gear 47 will draw rack bar 36 downward, and through the medium of gear 37 and shaft 35, turn disk 34. When the recess 52 moves into register with the finger 53, the springs 21 will be permitted to act, and they will throw the switch to open position and the arm 27 will fall, turning shaft 31 and through the medium of lever 54, draw the pinion 45 out of mesh with the clock work. This is important because the clock is not required to do any work other than its normal work of keeping time, except when the switch is in closed position.

Various slight changes might be made in the general form and arrangement of parts described without departing from my invention and hence I do not limit myself to the precise details set forth, but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of the appended claims.

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

1. In a time switch, the combination with an electric switch, a spring exerting pressure to open the switch, of a shaft, means connected with the shaft for holding the switch in closed position, a rotary disk having a recess therein, clock mechanism controlling the movement of said disk, and a finger on said shaft movable through the recess in the disk, substantially as described.

2. In a time switch, the combination with an electric switch, a spring exerting pressure to open the switch, of a shaft, means connected with the shaft for holding the switch in closed position, a rotary disk having a recess therein, clock mechanism controlling the movement of said disk, a finger

on said shaft movable through the recess in the disk, and means operated by the turning of the shaft when the switch is closed for throwing the clock mechanism into operation, substantially as described.

3. In a time switch, the combination with an electric switch, a spring exerting pressure to open the switch, of a shaft, a pivoted arm, a toothed segment on said arm, a toothed segment on the switch constructed to engage the arm segment and move the arm, a crank on said shaft, a rod connecting the crank and arm, a finger on said shaft, a recessed disk constructed to hold the finger and the shaft against movement, and a clock work controlling the movement of the disk, substantially as described.

4. In a time switch, the combination with an electric switch, a spring exerting pressure to open the switch, of a shaft, a pivoted arm, a toothed segment on said arm, a toothed segment on the switch constructed to engage the arm segment and move the arm, a crank on said shaft, a rod connecting the crank and arm, a finger on said shaft, a recessed disk constructed to hold the finger and the shaft against movement, means for setting the disk so that its movement will be regulated for a pre-determined length of time, and a clock work controlling the movement of the disk, substantially as described.

5. In a time switch, the combination with an electric switch, a spring exerting pressure to open the switch, of a shaft, a pivoted arm, a toothed segment on said arm, a toothed segment on the switch constructed to engage the arm segment and move the arm, a crank on said shaft, a rod connecting the crank and arm, a finger on said shaft, a recessed disk constructed to hold the finger and the shaft against movement, a shaft supporting said disk, a dial on said last-mentioned shaft, a pointer registering with said dial, and a clock work controlling the movement in one direction of said disk and dial, substantially as described.

6. In a time switch, the combination with an electric switch, a spring exerting pressure to open the switch, of a shaft, a pivoted arm, a toothed segment on said arm, a toothed segment on the switch constructed to engage the arm segment and move the arm, a crank on said shaft, a rod connecting the crank and arm, a finger on said shaft, a recessed disk constructed to hold the finger and the shaft against movement, a shaft supporting said disk, a dial on said last-mentioned shaft, a pointer registering with said dial, a gear on said last-mentioned shaft, a clock work, a gear driven by said clock work, and a rack bar meshing with said last-mentioned gears, substantially as described.

7. In a time switch, the combination with

a supporting plate having openings therein, a clock mounted in one of said openings, an electric switch supported on said plate, springs tending to open said switch, and a rotary dial mounted against the outer face of said plate, of a shaft supported against the inner face of the plate, a crank on said shaft, a pivoted arm moved by the switch, a link connecting said arm and crank, a finger on said shaft, a dial shaft to which the dial is secured, said dial shaft projecting through the plate, a recessed disk on the inner end of said dial shaft, a finger on the first-mentioned shaft adapted to move through the recess in said disk, means for moving the dial and recessed disk so that the recess in the disk is out of register with the finger, and means connecting the clock and the dial shaft, whereby the clock serves to move said dial shaft and move the recessed portion of the disk into register with the finger, substantially as described.

8. In a time switch, the combination with a supporting plate having openings therein, a clock mounted in one of said openings, an electric switch supported on said plate, springs tending to open said switch, and a rotary dial mounted against the outer face of said plate, of a shaft supported against the inner face of the plate, a crank on said shaft, a pivoted arm moved by the switch, a link connecting said arm and crank, a finger on said shaft, a dial shaft to which the dial is secured, said dial shaft projecting through the plate, a recessed disk on the inner end of said dial shaft, a finger on the first-mentioned shaft adapted to move through the recess in said disk, a clock driven gear, a gear on the dial shaft, and a rack bar connecting said gears, substantially as described.

9. In a time switch, the combination with a supporting plate having openings therein, a clock mounted in one of said openings, an electric switch supported on said plate, springs tending to open said switch, and a rotary dial mounted against the outer face of said plate, of a shaft supported against the inner face of the plate, a crank on said shaft, a pivoted arm moved by the switch, a link connecting said arm and crank, a finger on said shaft, a dial shaft to which the dial is secured, said dial shaft projecting through the plate, a recessed disk on the inner end of said dial shaft, a finger on the first-mentioned shaft adapted to move through the recess in said disk, a clock driven gear, a gear on the dial shaft, and a rack bar connecting said gears, a spring secured to the inner face of said plate, a short shaft projecting through the plate and mounted in said spring, a pinion on said last-mentioned shaft adapted to be moved into mesh with the clock driven gear, and a knob on the outer end of said

last-mentioned shaft, whereby the same and the dial may be set, substantially as described.

10. In a time switch, the combination
5 with a supporting plate having openings therein, a clock mounted in one of said openings, an electric switch supported on said plate, springs tending to open said switch, and a rotary dial mounted against
10 the outer face of said plate, of a shaft supported against the inner face of the plate, a crank on said shaft, a pivoted arm moved by the switch, a link connecting said arm and crank, a finger on said shaft, a dial
15 shaft to which the dial is secured, said dial shaft projecting through the plate, a recessed disk on the inner end of said dial shaft, a finger on the first-mentioned shaft adapted to move through the recess in said
20 disk, a clock driven gear, a gear on the dial shaft, a rack bar connecting said gears, a spring secured to the inner face of said plate, a short shaft projecting through the plate and mounted in said spring, a pinion
25 on said last-mentioned shaft adapted to be moved into mesh with the clock driven gear, and a knob on the outer end of said last-mentioned shaft, whereby the same and the dial may be set, an arbor on which said
30 clock driven gear has frictional engagement, a small gear fixed to said arbor, and normally out of mesh with the clock work, and means operated by the first mentioned shaft for moving said arbor to position
35 said small gear into mesh with the clock work, substantially as described.

11. In a time switch, the combination with a supporting plate having openings
40 therein, a clock mounted in one of said openings, an electric switch supported on said plate, springs tending to open said switch, and a rotary dial mounted against the outer face of said plate, of a shaft supported against the inner face of the plate,
45 a crank on said shaft, a pivoted arm moved by the switch, a link connecting said arm and crank, a finger on said shaft, a dial shaft to which the dial is secured, said dial shaft projecting through the plate, a
50 recessed disk on the inner end of said dial shaft, a finger on the first-mentioned shaft adapted to move through the recess in said disk, a clock driven gear, a gear on the dial shaft, a rack bar connecting said gears, a
55 spring secured to the inner face of said plate, a short shaft projecting through the plate and mounted in said spring, a pinion on said last-mentioned shaft adapted to be moved into mesh with the clock driven gear,
60 a knob on the outer end of said last-mentioned shaft, whereby the same and the dial may be set, an arbor on which said clock driven gear has frictional engagement, a small gear fixed to said arbor, and normally
65 out of mesh with the clock work, a spring

lever pivotally supported between its ends, said arbor having an annular groove therein, a forked end on one end of said lever mounted in said groove, a cam on said first-mentioned shaft, and a recessed extension on said spring lever in which said cam is located, substantially as described. 70

12. In a time switch, the combination with an electric switch, a spring exerting pressure to open the switch, of a shaft, means connected with the shaft for holding the switch in closed position, and clock mechanism controlling the movement of the switch holding means, and adapted to release the same at a pre-determined time, said switch comprising
80 two pivoted parallel arms having slots therein, fixed contacts, movable contacts having perforated ears at their ends straddling said arms, pins through said ears and slots, and springs connecting said ears with
85 said arms, whereby the tension of said springs tends to pivot the movable contacts and throw the switch to open position, substantially as described.

13. In a time switch, the combination with
90 an electric switch, a spring exerting pressure to open the switch, of a shaft, a pivoted arm, said arm and switch constructed so that the closing of the switch moves the arm, a shaft, means connecting the arm and shaft where-
95 by the movement of the arm turns the shaft, a finger on said shaft, a recessed disk constructed to hold the finger and shaft against movement to maintain the switch in closed position, a clock work controlling the move-
100 ment of the disk, said switch comprising two pivoted parallel arms having slots therein, fixed contacts, movable contacts having perforated ears at their ends straddling said arms, pins through said ears and
105 slots, and springs connecting said ears with said arms whereby the tension of said springs tends to pivot the movable contacts and throw the switch to open position, substantially as described. 110

14. In a time switch, the combination with an electric switch, a spring exerting pressure to open the switch, of a shaft, a pivoted arm, a toothed segment on said arm, a toothed
115 segment on the switch constructed to engage the arm segment and move the arm, a crank on said shaft, a rod connecting the crank and arm, a finger on said shaft, a recessed disk constructed to hold the finger and the shaft against movement, a clock work controlling the movement of the disk, said
120 switch comprising two pivoted parallel arms having slots therein, fixed contacts, movable contacts having perforated ears at their ends straddling said arms, pins through said
125 ears and slots, and springs connecting said ears with said arms, whereby the tension of said springs tends to pivot the movable contacts and throw the switch to open position, substantially as described. 130

15. In a time switch, the combination with
an electric switch, a spring exerting pressure
to open the switch, of a shaft, a pivoted arm,
a toothed segment on said arm, a toothed
5 segment on the switch constructed to engage
the arm segment and move the arm, a crank
on said shaft, a rod connecting the crank
and arm, a finger on said shaft, a recessed
disk constructed to hold the finger and the
10 shaft against movement, a clock work con-
trolling the movement of the disk, said
switch comprising two pivoted parallel arms
having slots therein, fixed contacts, movable
contacts having perforated ears at their ends
15 straddling said arms, pins through said ears

and slots, and springs connecting said ears
with said arms, whereby the tension of said
springs tends to pivot the movable contacts
and throw the switch to open position, and
grooved stops adapted to be engaged by 20
said arms to cushion the opening movement
of the switch, substantially as described.

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

FREDERICK SCHMID, Jr.

Witnesses:

C. R. ZIEGLER,
CHAS. E. POTTS.