

952,123.

Patented Mar. 15, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

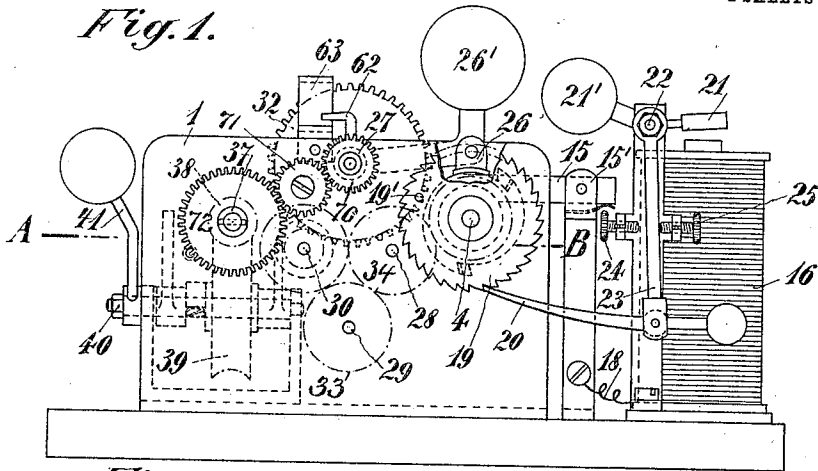


Fig. 2.

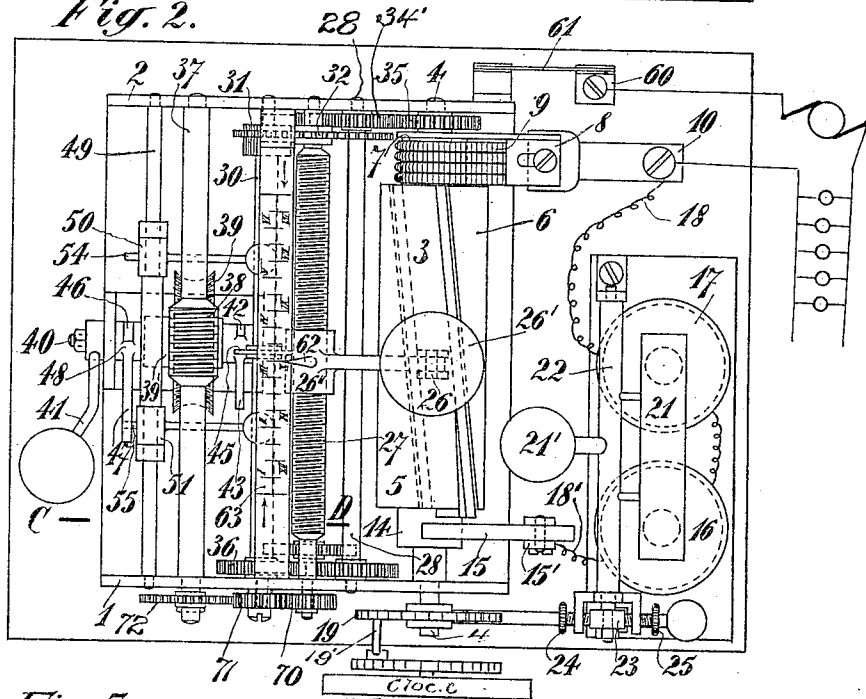


Fig. 7.

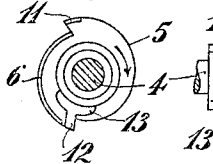


Fig. 6.

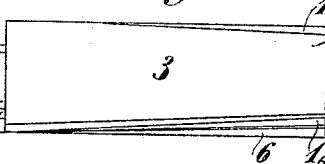
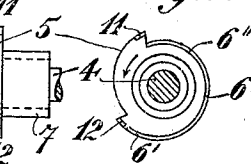


Fig. 8.



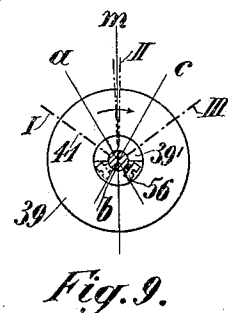
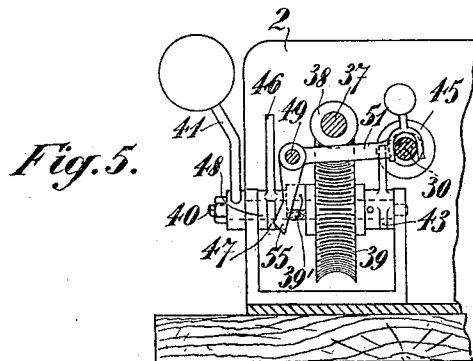
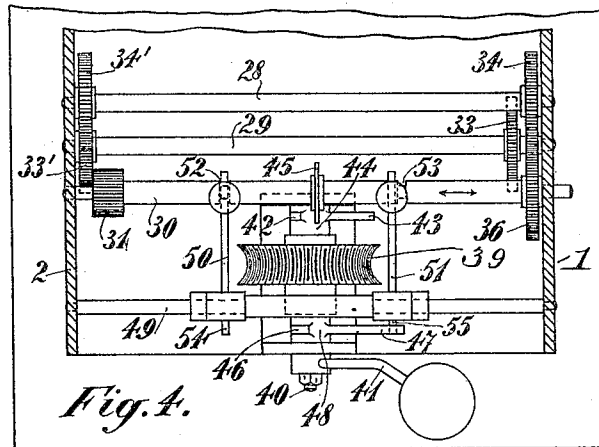
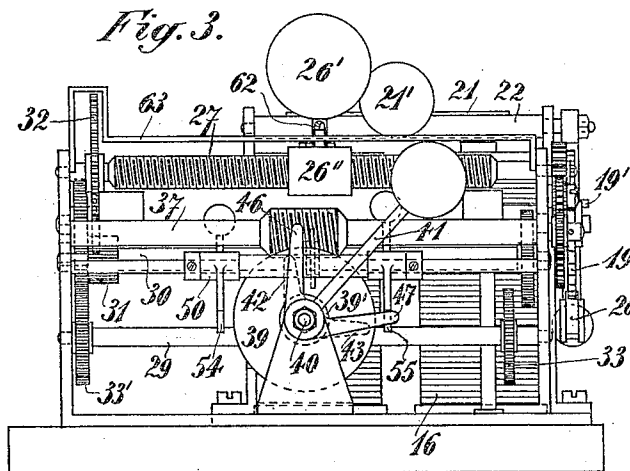
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2 SHEETS—SHEET 2.



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S PATENT OFFICE.

GOTTLIEB LÜTHI, OF SIGNAU, SWITZERLAND.

ELECTRIC TIME-SWITCH.

952,123.

Specification of Letters Patent.

Patented Mar. 15, 1910.

Application filed December 17, 1907. Serial No. 406,960.

To all whom it may concern:

Be it known that I, GOTTLIEB LÜTHI, a subject of the Swiss Confederation, residing at Signau, Canton Berne, in Switzerland, have invented a certain new and useful Self-Acting Electric Time-Switch, of which the following is a specification.

This invention relates to electric time switches.

The object of the invention is to provide a switch which may be adjusted automatically in order to provide for the necessary change in the time schedule at different seasons of the year, and which consists in the novel construction by means of which the position of a contact device is adjusted with reference to a contact roller operated by a clock-work mechanism.

In the accompanying drawings Figure 1 is a side elevation of the device. Fig. 2 is a top plan view. Fig. 3 is an end elevation. Fig. 4 is a horizontal section on the line A—B of Fig. 1. Fig. 5 is a vertical section on the line C'—D of Fig. 2. Fig. 6 is a side elevation of the roller contact. Fig. 7 is an end elevation thereof. Fig. 8 is an elevation of the end opposite to that shown in Fig. 7. Fig. 9 is a detail view of a portion of the structure shown in Fig. 5.

Referring to the drawings in detail, 1 and 2 indicate the sides of the frame-work which support the contact roller 3, and the several shafts carrying the gear wheels mentioned below. The contact roller 3 is provided with a shaft 4, and with a body portion formed partly of insulating material 5, and a metallic portion 6. Metal strips 11 and 12 run lengthwise of the roller and are inclined toward each other, these strips being located on opposite portions of the roller, as clearly shown in Figs. 7 and 8. The strip 11 is insulated, by reason of the adjacent offset portion from the edge 6', of the plate 6, and the strip 12 is insulated from the edge 6' of said plate, the strip last mentioned having connection with the sleeve 14 on the shaft 4, by means of a shoe 13. An offset portion is also provided next to strip 12, as shown in Figs. 6 and 8. Strip 6 (wider at one end than at the other, the edges thereof extending in a direction parallel with the edges of the strips 11 and 12) connects with a sleeve 7 and the latter is engaged by brushes or rubbing rings 9, supported in the holding device 8, which latter is in electrical connection with bind-

ing post 10 and through the wire 18 with the magnets 16 and 17. The contact arm 15 is in contact with sleeve 14, mounted on an upright 15', and wire 18' completes the circuit through the magnets 16 and 17. An armature 21 is pivotally mounted on rock shaft 22, and a weight 21' serves to hold the armature out of contact with the magnets when the latter are free from current. An arm 23 on one end of the shaft 22 carries a catch or pawl 20, set screws 24 and 25 serving to regulate the degree of oscillation of the armature, and a ratchet wheel 19 on the shaft 4 is engaged by said pawl 20. The wheel 19 carries a pin 19', by means of which motion is imparted to the shaft 4 by suitable clock-work mechanism not shown. One full rotation is thereby imparted to shaft 4 in each 24 hours.

The switch is connected in series with the body consuming the current. The current enters at the binding screw 10, flows through the contact springs or brushes 9 to the ring 7, from this ring to the contact piece 6 of the cylinder 3, from the latter through the contact 26 as long as it is in touch with the contact piece 6, through the screw spindle 27 and plate 2, to the binding screw 60, and thence to the motor, lamps, or the like, and through the same back to its source. The direction of the current may be reversed, if desired. The contact piece 6 being broader at one end than at the other, members 6 and 26 will remain in contact for varying periods, according to the position of contact 26 with reference to the ends of member 6, thus providing for an increase or decrease in the length of the lighting period for successive days. The contact 26 moves during one half year from one end of the cylinder 3 to the other, and at the conclusion of this period the reversing device described below causes it to move back again.

The metal strips 11 and 12, insulated from the metallic member 6, are for the purpose of preventing the edges 6' and 6'' of such member from becoming damaged by the current, as the edges pass the rubbing contact 26. The strip 11 is attached to the insulated part 5 of the cylinder 3, and has no conductive connection with the member 6, but serves only the purpose of forming a sharp edge projecting over said member 6 by means of which the contact 26, after leaving this edge, can fall at once on the contact 6 and so form an instantaneous connection,

which obviates any injurious heating of the edge 6'' of member 6. The strip 12 serves the following purpose: Owing to the slow movement of the cylinder 3, there would be
 5 a position in which the contact 26 would for a certain length of time have only slight connection with the edge 6' of the contact 6, (Fig. 8), therefore a great resistance would be caused until the contact 26 falls on the insulated part 5 of the cylinder 3 (Fig. 7),
 10 which would cause injurious heating of the edge 6'. To obviate this, a strip 12 is arranged along the contact piece 6. The same is insulated from the cylinder 3, and also
 15 from the contact 6, but is conductively connected by means of the contact ring 14 and contact 15 with the spools of the magnets 16 and 17 and binding screw 10. When the contact 26 reaches the edge 6' of the member 6 it passes over to strip 12, and as the resistance between the edge 6' and the contact increases, the resistance between the said contact and strip decreases. The intensity of the current on the edge 6' therefore decreases, and increases on strip 12. The result is that the current changes its course and instead of flowing from binding screw 10 through brush 9, contact ring 7, contact 6, to 26, it will flow from binding screw 10
 30 through the coils of the magnets 16 and 17, contact 15, ring 14, strip 12 and contact 26. The magnets 16 and 17 become energized and the armature 21 carrying weight 21' is attracted. This causes the cylinder 3 to receive a momentary forward movement from the large wheel 19 actuated by the pawl 20, and lever 23, and thus helps the contact 26 over the critical place, as the same falls instantaneously upon the insulated part 5 of the cylinder 3, and is then quickly disconnected, and a burning of edge 6' and contact 26 is obviated. The additional partial rotation described places the pin 19' slightly in advance of the corresponding engaging device carried by the clock mechanism.
 45 When a brief space of time has elapsed the said engaging device will again come into mechanical contact with pin 19' and the roller 3 again begins to revolve. It will be observed that this interval occurs while the contact 26 is resting on the insulated part 5 of the roller 3.

The rubbing contact 26, is held by a weight 26' in contact with the roller 3, and may be placed by means not shown in electrical connection with the second binding post 60 of the time switch secured to member 2, by means of a member 61 should this connection be preferred in lieu of the connection through worm shaft 27, blade 2 and member 61. The contact 26 is provided with an arm having an internally threaded member 26'', which operates on a worm shaft 27.
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65 In the members 1 and 2 of the frame

work, shafts 28, 29 and 30 are journaled, the latter having mounted thereon a gear wheel 31, which is constantly in gear with wheel 32, which turns with the worm shaft 27, Fig. 3. Gear wheels 33' and 34', Fig. 4, 70 mounted respectively on shafts 29 and 28 are constantly in gear with each other, and shaft 28 is rotated by gear 35 on shaft 4, Fig. 2, which gear 35 meshes with gear 34'. The shaft 30 is movable longitudinally, and gear 36 thereon meshes either with gear 33 or gear 34 according to the position of the shaft 30. As gears 33 and 34 revolve in opposite directions, the direction of the rotation of gear 36 may be changed by sliding
 80 shaft 30 longitudinally. This change in the direction of the rotation is communicated through pinion 31 on shaft 30 to gear 32 and worm shaft 37 in the following manner: Gear 70 on shaft 27 (Figs. 1 and 2) imparts motion through gear 71 to gear 72, and thus to shaft 37 carrying worm 38. The worm 38 meshes with gear 39 loosely mounted on shaft 40, the latter carrying a weighted arm 41. A member 44 on the opposite end
 90 of shaft 40 is provided with arms 42 and 43, as shown in Fig. 4, and the disk 45 on shaft 30 operates between said arms. The collar 48, also on shaft 40, carries arms 46 and 47, and on shaft 49 arms 50 and 51 are mounted, said arms being adapted to engage annular recesses 52 and 53 in shaft 30, these recesses being so disposed that when recess 52 for instance is engaged by arm 50, recess 53 is out of engagement with arm 51. This relation
 100 is reversed when shaft 30 has been shifted longitudinally. The arms 50 and 51 are weighted, as shown, and cams 54 and 55 project from the opposite ends of the arms into the plane of oscillation of arms 46 and 47. Half of the collar 39' of the wheel 39 is cut out as shown in Figs. 5 and 9, and by rotation of the shaft 40, screw 56 mounted thereon may be moved in the notch thus formed and caused to engage the edge
 110 of this offset portion. The gears between worm shaft 27 and worm shaft 37 are so arranged that by the movement of the member 26 from one end position to the other, the wheel 39 is turned through the angle ABC, Fig. 9. Assume with reference to Fig. 9 that the lever 41 is at the extreme left, at I, and with reference to Fig. 3 that the member 26 is at the left hand end of the shaft 27. If the member 26 is now brought
 120 to the right, the lever 41, on account of the revolution of the wheel 39, will move from the position I into the position II, Fig. 9, and as the lever has already been moved beyond the vertical middle axis, it will then move over automatically until it is brought into position III, by reason of the weight connected therewith. At this moment the screw 56 is in the position shown in dotted lines in Fig. 9. As a result, the shaft 30
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has been shifted longitudinally by the arm 42 on the shaft 40, and placed in contact with the disk 45, so that the collar on the wheel 36 is now close to the member 1—that is, the wheel 36 has been placed out of gear with the wheel 33 and into gear with the wheel 34, in order that the shaft 30 may now be rotated in the opposite direction, causing the wheel 39 to turn in a reverse direction through the angle ABC. In the meantime, the shaft 30, the lever 41 and other parts connected to the shaft 40 are moved back into the starting position. Therefore, the extreme positions of the lever 41 are determined by the measure of the displacement of the shaft 30. Prior to this movement of the shaft 30 one of the arms 46 or 47 strikes cam 54 or cam 55 connected with the arm 50 or 51, and one of said arms 50 or 51 disengages its corresponding annular recess in shaft 30, for releasing the shaft and permitting such longitudinal displacement.

Above the worm shaft 27, is a scale 63, connected with the members 1 and 2 of the framework and above this scale is an index needle, which is affixed to the contact 26, and therefore movable as the shaft 27 rotates. Roman numerals indicate the months of the year, each month being divided into thirds, representing a period of ten days. Means for regulating the device are thus afforded.

I claim—

1. In an electric time switch, a rotatable contact member having a tapering contact surface the edges of which are inclined toward each other, and means for making electrical contact with said member.
2. In an electric time switch, a rotatable contact member having a contact surface, the edges of which are inclined toward each other, a contact device arranged at an angle to the axis of rotation.
3. In an electric time switch, a rotatable time controlled contact member substantially cylindrical in form and provided with contact and insulating surfaces, strips of conducting material arranged at the edges of the insulating surfaces, and insulated from the main contact surface, and a second contact member adapted to be placed in electrical contact with the member first mentioned.
4. In an electric time switch, a rotatable time controlled contact member provided with contact and insulating surfaces, and with off-set portions adjacent to the edges of the insulated surface, a strip of conducting material along the edge of one off-set portion, and the insulated surface, and out of contact with the main contact surface, and a second contact member arranged to be placed in electrical contact with the member first mentioned.

5. In an electric time switch, a movable time controlled contact member, a second contact member arranged to be placed in circuit therewith, a worm shaft, a device on the second member actuated by the worm shaft for driving such member, a rotatable and longitudinally movable shaft for transmitting motion to the worm shaft, a third shaft, a device thereon for shifting the longitudinally movable shaft, and means for rotating said third shaft.

6. In an electric time switch, a movable time controlled contact member, a second contact member arranged to be placed in circuit therewith, a worm shaft, a device on the second member actuated by the worm shaft for driving said member, a rotatable and longitudinally movable shaft for transmitting motion to the worm shaft, a third shaft, a worm wheel carried by the third shaft, a worm shaft for operating said worm wheel, means for driving the worm shaft last mentioned, and mechanism operated by the worm wheel for controlling operation of the longitudinally movable shaft.

7. In an electric time switch, a movable time controlled contact member, a second contact member arranged to be placed in circuit therewith, a worm shaft, a device on the second member actuated by the worm shaft for driving said member, a rotatable and longitudinally movable shaft for transmitting motion to the worm shaft, a third shaft, a worm wheel carried by the third shaft, a worm shaft for operating said worm wheel, means for driving the worm shaft last mentioned, mechanism operated by the worm wheel for controlling the operation of the longitudinally movable shaft, and an arm for locking such longitudinally movable shaft.

8. In an electric time switch, a movable time controlled contact member, a second contact member arranged to be placed in circuit therewith, a worm shaft, a device on the second member actuated by the worm shaft for driving said member, a rotatable and longitudinally movable shaft for transmitting motion to the worm shaft, a third shaft, a weighted arm carried thereby, a worm wheel also carried by the third shaft, a worm shaft for operating such wheel, means for driving the worm shaft last mentioned, and mechanism operated by the worm wheel for controlling the operation of the longitudinally movable shaft.

In witness whereof I have signed this specification in the presence of two witnesses.

GOTTLIEB LÜTHI.

Witnesses:

H. BLUM,

A. LIEBERKNECHT.