No. 758,589. PATENTED APR. 26, 1904.

H. FALTERMAYER.

LIGHT CONTROLLING SYSTEM.

APPLICATION FILED OCT. 2, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

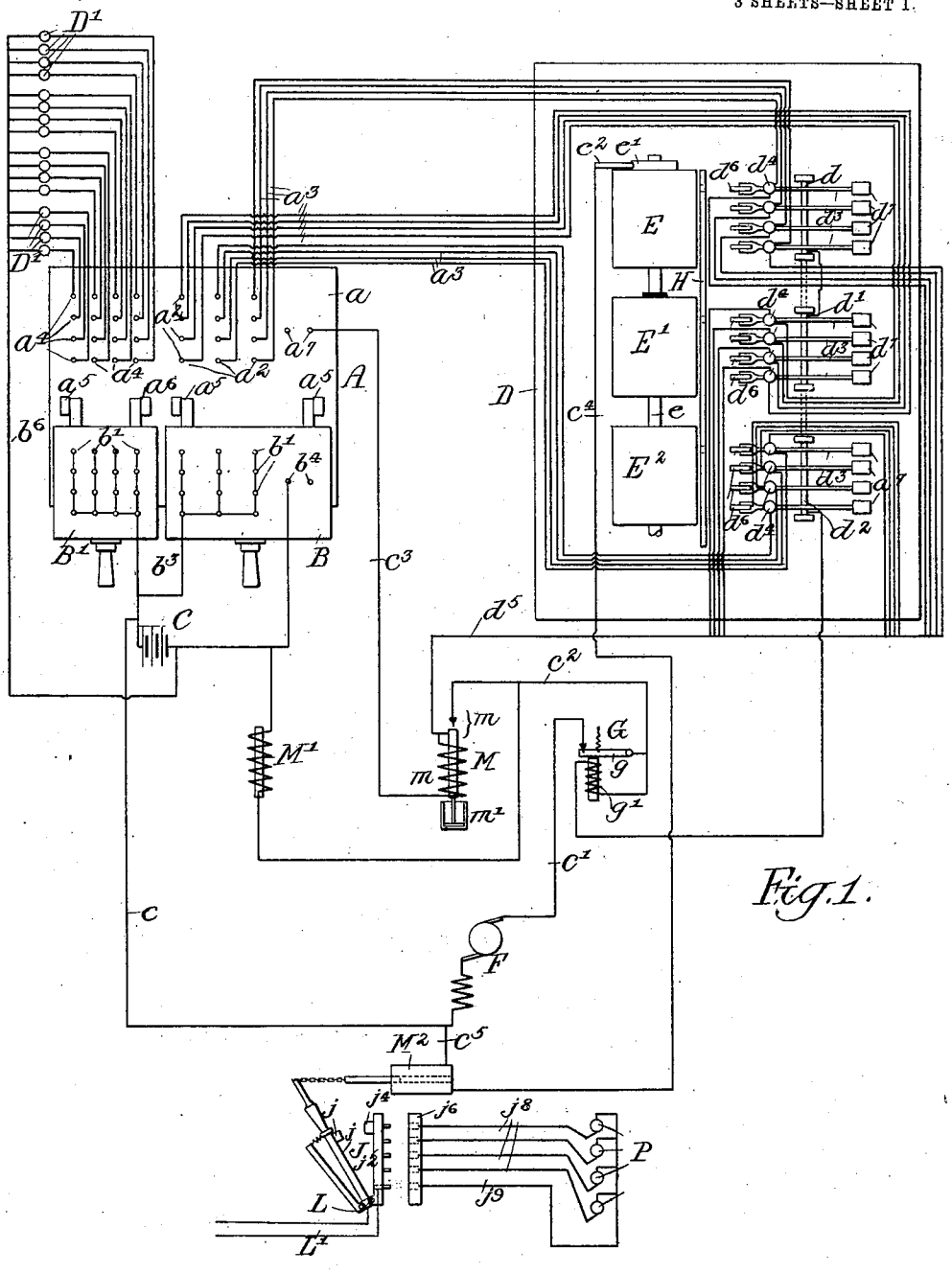


Fig. 1.

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by his Attorneys,
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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.

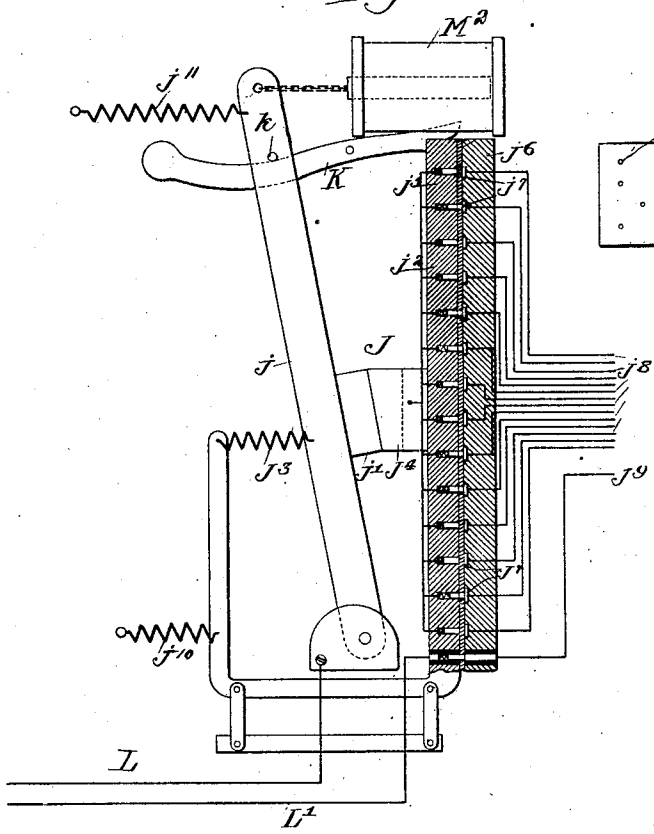


Fig. 4.

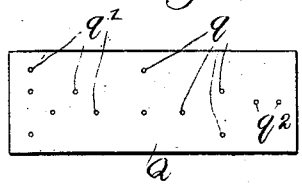


Fig. 3.

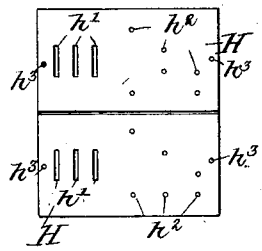


Fig. 5.

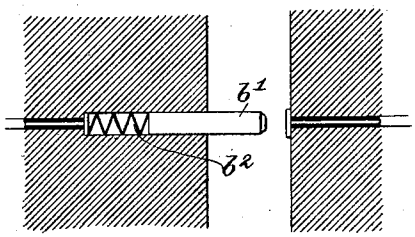
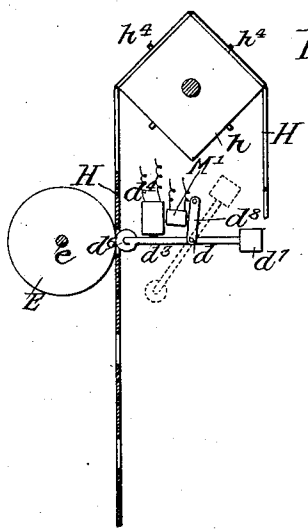


Fig. 6.



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No. 758,589. PATENTED APR. 26, 1904.

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LIGHT CONTROLLING SYSTEM.

APPLICATION FILED OCT. 2, 1903.

NO MODEL. 3 SHEETS—SHEET 3.

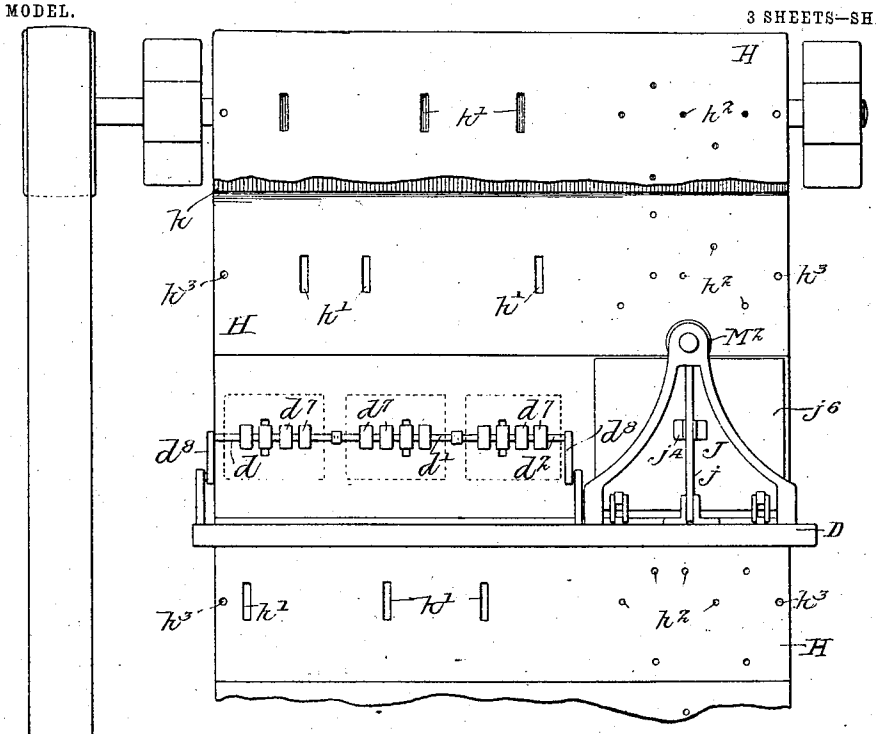
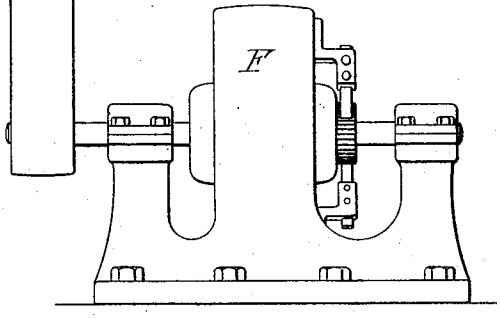


Fig. 7.



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No. 758,589. Patented April 26, 1904.

UNITED STATES PATENT OFFICE.

HARRY FALTERMAYER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO WILLIAM J. CASKEY, OF PHILADELPHIA, PENNSYLVANIA.

LIGHT-CONTROLLING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 758,589, dated April 26, 1904.

Application filed October 2, 1903. Serial No. 175,492. (No model.)

To all whom it may concern:

Be it known that I, HARRY FALTERMAYER, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Light-Controlling Systems, of which the following is a specification.

My invention relates to certain improvements in systems for governing the lighting and extinguishing of series of incandescent lamps; and it consists more particularly in a system designed to govern the action of lamps used to illuminate signs or letters forming words or to control lamps which are themselves arranged so as to form or indicate words, letters, or symbols.

The object of the invention is to provide a system of the general character above noted by which it shall be possible for an operator to set in action certain electromechanical devices, which shall in turn cause to be lighted certain definite combinations of lamps or certain groups of lamps. It is further desired that such lighting shall be done automatically after a plate or card having in it certain openings or the equivalent thereof is once inserted in the proper apparatus by an operator; and the invention contemplates the duplicating at a number of points of any desired combination of lamps or signals set in action by said apparatus.

Another object of the invention is to provide a device for carrying out the above-indicated idea which shall be comparatively simple as regards the number and arrangement of its parts and which is of such a nature as not to become easily deranged in its operation.

These objects I attain as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a diagrammatic view of my improved system, showing the connections and arrangements of the various apparatus employed. Fig. 2 is an enlarged detail elevation, to some extent diagrammatic, of the automatic light-switch. Fig. 3 is an elevation of the preferred form of the cards or plates employed for controlling the lighting of a definite combination of lights, these being designed for use in the controller and automatic light-switch. Fig. 4 is an elevation of one of the cards used by the operator when he desires to set the system in operation to cause certain lamps or combinations thereof to be lighted. Fig. 5 is a sectional elevation showing the detail construction of a portion of one of the switches. Fig. 6 is a side elevation, to a great extent diagrammatic, of the light-switch controller; and Fig. 7 is an elevation, to some extent diagrammatic, illustrating the means for securing movement of the cards and also certain of the detail arrangement of the various parts of my invention.

In railroad-work it is desired to indicate, particularly in large stations, the time of departure of each train, as well as its destination, the stations stopped at, and the track from which it is to leave, and it is wished in the present invention to provide a system by which a train-despatcher shall by merely placing a punched card or plate in position in a switch and closing said switch be enabled to set in operation apparatus which will illuminate a sign at one of the train-gates, so as to give the desired information, and will supply current to a number of lamps arranged to spell or otherwise indicate the same at one or more points.

While in the case illustrated and described I shall explain my invention as applied to a station for the purpose set forth above, it is to be understood that it may be with advantage applied for any similar purpose—as, for example, the announcement of the numbers of a musical program for advertising purposes, exhibiting designs of various characters, &c.

In the above drawings, A indicates a switch placed in the despatcher's office, and this preferably consists of a supporting board or base a, of insulating material, as marble or slate, on which are a number of contacts a^2, to which are connected wires a^3, as hereinafter explained. The number of contacts in a horizontal row depends on the number of letters or symbols which it is desired to have in a combination, while the number of contacts in each vertical row depends on the number of letters, &c., which it is desired to have for use in any

one position in the said combination. In the case illustrated I have shown one set of contacts a^2 arranged in three rows and four contacts to a row and a second set of contacts (designated at a^4) having four rows and four contacts to a row.

Suitably hinged to the base a at a^5 and a^6 are two plates B and B′, each having a handle b, and though I have shown these as independent of one another it will be understood that I may connect them or, if desired, make them as a unit, having but a single handle. Said plates carry a number of spring-supported contact-pins b', placed in sets arranged similarly to the contacts a^2 and a^4, so that when the plates are properly manipulated by means of their handles the contact-pins may engage with said contacts. It is to be noted that these pins have under them springs b^2, so designed that when pressure is brought to bear upon them they are free to yield to an extent sufficient to bring their ends flush with the surface of the supporting-plates. All of the pins, with an exception hereinafter referred to, are electrically connected to each other, and a common connection b^3 leads from them to one pole of an electrical generator C, whose other terminal is in electrical connection with one or more pins b^4, also supported on the base-plate a, it being understood that said latter pins are insulated from those before mentioned.

If desired, pins of a construction similar to that illustrated may be carried on the plate or base a, and a single metallic plate may be employed on the movable plates B and B′, said metallic plate being connected to one terminal of the generator C, as above indicated.

From each of the contacts a^2 wires a^3 lead to the magnets of an automatic light-switch controller, those of each horizontal row being all connected to separate groups of said magnets, there being as many groups as there are vertical rows of holes. In the diagram said controller is shown as supported on a base D and including means for supporting three independent spindles d, d', and d^2, since there are three vertical rows of contacts in the portion of the device under consideration. Each of said spindles carries upon it as many levers d^3 as there are contacts in a vertical row, (in the present case four,) and the position of these levers is determined by the magnets d^4, each of the latter having one terminal connected, as above indicated, to the contacts a^2. The second terminals of the magnets are all connected to a common return d^5, and after passing through a magnet M this leads to one of the contacts a^7 on the board a, and when the switch-plate B is in its closed position the circuit is completed through one of the pins b^4 to the generator-terminal.

The levers d^3 are carried by their spindles, so as to be free to swing, each having at one end a revoluble contact-roller d^6 and at the other a counterweight d^7. Though for a reason set forth hereinafter the spindles d and d' are electrically insulated from each other and the spindles d' and d^2 are in electrical connection, all three of them are supported so as to be free to swing bodily upon a pair of pivoted arms d^8, whose position is governed by the magnet M′, having a core placed to act upon an armature fixed to said arms.

When the magnet M′ is energized, the arms d^8, and consequently the rollers d^6 on the levers, are moved into a position which will bring that one of said rollers whose lever is displaced from its normal position by one of the magnets d^4 into a position in which it is free to make electrical contact with the surface of a metallic roller E, carried on a shaft e, if a card or plate having a suitable opening is presented, as hereinafter explained. There are three of these rollers E, E′, and E^2 on said shaft, the first being insulated from the second and third, which are in electrical connection with each other through the shaft e. While, as noted above, I have shown the spindles d, d', and d^2 free to swing toward and from the rollers E, E′, and E^2, it will be understood that said latter rollers may be supported so as to swing toward and from the lever-spindles, which may be stationary, without departing from my invention.

Connected to one terminal of the generator C is a wire c, also connected to the motor F, whose second terminal is led through a wire c' to a switch G, having a movable element g under the influence of a magnet g'. From said switch connection is made by a wire c^2 through a second switch m, whose movable element is in turn controlled by a magnet M, said latter switch being in electrical connection with the circuit passing through said magnet and by this means being in connection with the second terminal of the generator through a wire c^3, contacts a^7 and b^4. A dash-pot m' or other suitable retarding device is attached to the movable element of the switch m, so that said switch is not closed immediately after the magnet M is energized.

By means of a contact-ring e' electrical connection is made from a brush e^2 to the shaft e, and consequently with the metallic roller E, said brush having a wire c^4 connecting it with a switch-magnet M^2, from whence a connection c^5 is made to the wire c. As above stated, all of the levers d^3 of any one set are in electrical connection with their respective supporting-spindles, so that current is free to flow from the levers d^3 on the spindle d to the levers d^3 on the spindle d'. If now one of these latter levers makes connection with the roller E′, current would be free to flow to the roller E^2, through a lever bearing on the surface of the latter to the spindle d^2, and out through the wire c^2.

A side elevation of the light-switch controller is shown in Fig. 6, and it is to be noted at this point that said device is intended to be

acted upon by a series of punched cards H, of insulating material, as fiber or cardboard, connected together and passed tangent to the rollers E, E′, and E² by means of a pulley *h*, operated by the motor F. Said cards are preferably similar to those shown in Fig. 3 and are provided with two sets of holes *h′* and *h²*, arranged in any desired pattern, as is common in jacquard-cards. The holes *h′*, which are preferably in the form of elongated slots, may each be in any one of four positions and are placed to receive a roller *d⁶* of each set of four, so that when a card is presented by the proper operation of the motor F there is one of the holes *h′* opposite each of the rollers E, E′, and E², and one of the four rollers *d⁶* of each set may therefore contact with its adjacent roller E, E′, or E² through the above-mentioned holes or openings.

In addition to the above there are holes *h²* in each of the cards H, and these are, as in the well-known jacquard mechanism, arranged in any desired pattern, though for a purpose radically different from that customarily noted, as explained hereinafter. Guide-holes *h³* are made at the ends of the cards, and guide-pins *h⁴* are placed on the pulley *h*, so as to properly direct the line of cards.

In placing the various apparatus for working conditions there is an automatic switch J, supported adjacent to the controller mechanism on the base D in any convenient manner, and said switch, as indicated in Fig. 2, consists of a lever or blade *j*, pivoted to a supporting-base and electrically connected to a main L of a lamp-supplying circuit, preferably independent of the other electrical circuits heretofore referred to. There is upon said lever a contact-clip *j′*.

A plate *j²* is pivoted or otherwise movably carried on the supporting-base and has an extension which is connected to the lever *j* by means of a spring *j³*, there being a clip *j⁴* on the back of said plate for the reception of the clip *j′* on the blade. The magnet M² has its armature attached to said lever *j*, and the various parts are so arranged that when said magnet is first energized the lever *j*, through the spring *j³*, moves forward the plate *j²*, with the result that certain of the contact-pins *j⁵*, which are supported in a manner similar to those of the switch A, engage metallic contact-plates *j⁷*. After this has taken place the clip *j′* on the blade *j* contacts with the clip *j⁴* of the plate *j⁶*, so that electrical connection is established between the feed-wire L and the contact-plate *j⁷* on the plate *j²*, which is in connection with the clip *j⁴*. The pins *j⁵* are spring-supported similarly to those of the switch A, so that when a portion of one of the cards H is placed between the two plates *j²* and *j⁶* said pins will pass through those holes which come opposite to them and will thus form electrical contact with certain of the contact-plates *j⁷*. Separate wires *j⁸* lead from said plates each to a single lamp or series of lamps P, and there is a single common return-wire *j⁹*, having its contact and pin upon the switch-plates *j²* and *j⁴*, said parts being insulated from the other contacts and connected to the wire L′, or it may, if desired, be returned to the current-generator independently of the switch.

The lever *j* is normally held in a position with its clip out of engagement with that of the plate *j²* by means of a spring *j¹⁰*, and there is a pivoted bar K, having one end notched, so as to engage and hold the plate *j²* when this latter is in a position for the pins *j⁵* to strike the contact-plates *j⁷*. The opposite end of the bar K passes under a projection *k* on the lever *j*, which latter is so fixed as to turn said bar on its pivot and disengage its notched end from the plate *j²* when said lever is in or moves toward its normal position. A spring *j¹¹* normally holds the said switch-lever in a position such that the switch is open. It will be understood that the lights P, controlled by the switch J, may be arranged each to illuminate a certain numeral or letter, and the particular ones of these to be lighted up or displayed are determined by the design on the card H, as shown by the holes *h²*. Each hole of the twelve possible on the particular cards illustrated therefore controls the action of one lamp, since only those of the contact-pins *j⁵* as are uncovered by the openings or holes in the card H can engage with the contact-plates *j⁷*, and so be supplied with current.

In operation the action of the switch A (which for convenience I shall designate the "despatcher's" switch) is determined by a punched card Q, of insulating material, of the form shown in Fig. 4, and this latter has holes *q* in it corresponding to any predetermined display of lamps. Upon inserting one of these cards Q in the switch A and bringing the switch-plate B to its closed position certain of its spring contact-pins *b′* will pass through the holes in the card and striking certain of the contacts *a²* will permit current to flow from the generator C to one magnet *d⁴* of each of the sets of four carried by the spindles *d*, *d′*, and *d²*. This in addition to energizing the three magnets of the switch-controller also energies the magnet M and starts to move the armature thereof, which, as above noted, serves as the movable member of the switch *m*. The energization of the magnets *d⁴* swings one each of the three sets of levers *d³* so that it is in position to make contact with the metallic rollers E, E′, and E² as soon as a card is presented between the levers and said rollers which has its opening *h′* so spaced as to permit the passage through them of the rollers *d⁶* on said levers. By the time the levers under the action of their magnets have swung into position the movable member of the switch *m* has been sufficiently moved by the magnet to close the circuit between the

wires c^3 and c^2, with the result that current flows to the motor F through the wires c c' c^2 c^3 and the switch-contacts a^7 and b^4. This starts the motor, and its operation continues until such time as one lever of each of the three sets of the levers d^3 simultaneously contact with their respective rollers E, E', and E^2, when current will be permitted to flow through wire c, magnet M^2, wire c^4, brush e^2, contact-ring e', the roller E, one of the levers d^3 to the first section d of the spindle, from the first to the second section d' of said spindle, to one of the second set of levers d^3, roller E', shaft e, roller E^2, a third one of the levers d^3, to spindle d^2, wire c^6, magnet g', wires c^2 and c^3 to the other terminal of the generator C. Such flow of current energizes the magnet g' and causes a movement of the armature thereof, so that the circuit supplying the motor F is instantly broken, thus leaving in the controller D a card whose openings h' are so placed as to permit the three rollers d^6 on the three levers d^3 which have been actuated to be in contact with the metallic rollers E. As has been described, this card has in it other holes, h^2, which are so placed with regard to the automatic switch J that the portion of said card containing them is opposite the portion of said switch on which are the contact-plates j^7 and the contact-pins j^5. The current which actuates the magnet g' also energizes the magnet M^2, which in turn moves the switch-lever j, tending to close the switch J. As before explained, the first result of this motion is to bring the pins j^5 of the plate j^6 into contact with the card H, and certain of these pins pass through the holes therein and make contact with the contact-plates j^7, after which the clip j' engages the clip j^4, so as to close the circuit and allow current to flow from the current-supply main L to the wires leading to certain of the lamps P, as predetermined by arrangement of the holes q on the card Q originally placed in the despatcher's switch A. It will be noted that when by the movement of the lever j the plate j^2 is brought to its closed position the bar K locks it therein, and it cannot be released until such time as the magnet M^2 is deënergized when the backward motion of the lever j brings the projection k thereof into contact with the rear end of said lever, thus turning the latter on its pivot and releasing the plate j^2, which is then free to move away from the plate j^6. It will therefore be seen that as in closing so in opening the clips j and j^4 make and break contact, in the first case after and in the second case before contact is made or broken between the pins j^5 and the contact-plates j^7. These latter parts are thus effectually protected from arcing and the consequent burning or roughening. In order that the switch-controller D may be in readiness to be operated to bring another card into use, I provide a device by which the levers d^3 are held or retained out of contact with the rollers E, &c., except while the switch is closed. This device, as indicated above, serves whenever the magnet M is energized to turn on its pivot the arm or arms d^8, thus bringing and holding the levers d^3 sufficiently near the rollers E, &c., to permit of their making contact with the same when swung on their spindles by the action of any of the magnets d^4. As noted, these lever-spindles may be supported in stationary position and the rollers E, E', and E^2 made bodily movable. If desired, any other form of controller may be substituted for the device D—as, for example, the structure described and claimed in my Patent No. 685,590, of October 29, 1901, or, in fact, any form of automatically-acting device having means actuated by an electrical current or currents by which a motor is operated to bring a punched card or cards into position in an automatic switch which is also actuated by said controller when said card has been properly placed.

It will be understood that, if desired, the cards Q may be continuously fed through the switch A by any of the well-known devices, so as to make the machine altogether automatic after being once started.

Referring to Fig. 4, it will be noted that there are in the card Q a second set of holes q', and these are so varied in position on different cards as to cause definite ones of the pins on the plate B' of the despatcher's switch to engage with the contacts a^4. Said pins, like those on the plate B, are all connected together and to one terminal of the generator C, while the contacts a^4 are each connected to a lamp or group of lamps D', arranged, if desired, in the main waiting-room of a railroad-station to announce the arrival or departure of trains or to give any other desired information in connection therewith. These lamps have a common return b^6, which may be connected to the generator C independently of the switch A.

Should it be desired to duplicate a display of lamps at one or more points, duplicate controllers D and duplicate switches J are placed at such points and the wires leading from the contacts a^2 are "multipled," as is common in telephone-work, connection being made thus to the additional instruments. The number and particular ones of these duplicate machines in action is determined by the holes q^2 in the card Q, since, as before, wherever there is a hole omitted from the card the corresponding pin is prevented from completing an electrical circuit.

While throughout the specification and claims I have referred to the use of plates or cards having holes or openings, it is to be understood that my invention would be equally well operated by means of a plate of insulating material in which were set metallic pieces. Said pieces could be arranged in any desired pattern on said plate and an electrical circuit

would be completed whenever one of said pieces bearing upon a fixed contact-plate would come into engagement with a spring-supported pin.

I claim as my invention—

1. The combination of a switch including a plurality of contacts, a plurality of current-receiving devices connected to the switch, a plurality of pieces for said switch constructed to coact with the contacts thereof to permit only predetermined ones of said receiving devices to be supplied with current, and means for selecting certain of said pieces and presenting the same to the switch, substantially as described.

2. The combination of a switch including a plurality of contacts, a plurality of current-receiving devices connected to the switch, a series of plates of insulating material having openings placed to coact with predetermined ones of said switch-contacts to permit certain of the receiving devices in connection therewith to receive current, and means for causing others than successive ones of said plates to be presented to the switch, substantially as described.

3. The combination of a switch including a plurality of contacts, a plurality of current-receiving devices connected to said switch, a plurality of plates for the switch having openings placed to coact with certain predetermined ones of said contacts to permit the receiving devices in connection therewith to receive current, and selecting mechanism operative upon the plates to cause any predetermined succession of the same to be presented to the switch, substantially as described.

4. The combination of a switch including a plurality of contacts, a series of current-receiving devices connected to the switch, a series of perforated plates coacting with said contacts, mechanism including means for moving the perforated plates and mechanism for stopping said plate-moving means at irregular intervals, substantially as described.

5. The combination of a switch including a plurality of contacts, a series of current-receiving devices connected to the switch, a series of perforated plates coacting with said contacts for determining the ones of said devices to be supplied with current, a master-switch and means governed by said master-switch for automatically presenting any one of said plates to the said first switch, substantially as described.

6. The combination of a switch including a plurality of contacts, a series of current-receiving devices connected to said switch, a series of perforated plates coacting with said contacts for determining the ones of said devices to be supplied with current, a master-switch and means governed by said master-switch for automatically presenting any one of said plates to the said first switch, with means for automatically operating said first switch, substantially as described.

7. The combination of a switch having connected to it a plurality of current-receiving devices, perforated plates for said switch, means on the switch coacting with the perforations of said plates, means for presenting said plates to the switch in irregular order, and means for determining the order of such presentation of the plates, substantially as described.

8. The combination of a switch having connected to it a plurality of current-receiving devices, perforated plates coacting with said switch for permitting current to flow to certain ones only of said devices, means for presenting different ones of said plates to the switch, with other means for controlling the action of said switch, said latter means also having a plurality of conductors and being adapted to receive perforated plates, substantially as described.

9. The combination of a switch having connected to it a plurality of current-receiving devices, perforated plates coacting with said switch for permitting current to flow only to certain ones of said devices, means for presenting different ones of said plates to the switch, with other means for controlling the action of said switch, said controlling means including a master-switch having a plurality of contacts adapted to receive perforated plates, substantially as described.

10. The combination of a switch having a plurality of contacts, a controller having magnets connected to said contacts, movable contacts controlled by said magnets, a circuit including a motor controlled by the movable contacts, perforated plates movable by the motor and an automatic switch for the reception of said plates, with means for actuating said latter switch, substantially as described.

11. A master-switch, a motor having means whereby its starting is caused to be controlled by said switch, a series of controlling-plates movable by the motor, a switch constructed to receive said plates, with means for stopping the motor when a predetermined one of said plates is presented to the said switch, substantially as described.

12. A master-switch, a motor having means whereby its starting is caused to be controlled by said switch, a series of controlling-plates movable by the motor, a switch constructed to receive said plates, with means for stopping the motor when a predetermined one of said plates is presented to the second switch and means for automatically operating said latter switch while the motor is out of operation, substantially as described.

13. A switch having a plurality of contacts, a series of current-receiving devices connected to the switch, and a plate or plates having openings for the passage of predetermined ones

of said switch-contacts, with mechanism including a plate-selecting device and electrical operating means therefor, for presenting any one of said plates to said switch, substantially as described.

14. A switch including a plurality of contacts, a series of current-receiving devices connected to said switch and a plate or plates having openings for the passage of predetermined ones of said switch-contacts, with means for automatically presenting said plates to the switch, a mechanism coacting with the plates for controlling said presenting means and a device for causing operation of said mechanism, substantially as described.

15. A switch including a plurality of projecting contacts, a series of current-receiving devices connected with the switch, a plate or plates having openings for the passage of certain of the switch-contacts, with a motor for moving said plates through the switch, a controller for said motor and a master-switch for governing said controller, substantially as described.

16. A switch including a plurality of projecting contacts, a series of current-receiving devices connected to the said switch and a plate or plates having openings for the passage of predetermined ones of said switch-contacts, with a motor for presenting any one of said plates to the switch, mechanism for controlling said motor, said mechanism including a master-switch and a controller operated therefrom having means for breaking the motor-circuit when a predetermined one of the plates is presented to the first switch, substantially as described.

17. The combination of a switch, a plurality of current-receiving devices connected thereto, a controller connected to said switch, a motor, a master-switch having connections to the controller, and a series of controlling-plates, each having portions common to the controller and to the said first switch, substantially as described.

18. The combination of a master-switch, a controller, a second switch having a plurality of current-receiving devices connected to it, a series of controlling-plates for said second switch for determining the one of said devices to receive current, a series of movable contacts on the controller operated by the master-switch and placed to coact with the controlling-plates and means in connection with said movable contacts for stopping the motor when a predetermined one of the controlling-plates is presented to the second switch, substantially as described.

19. In a system for controlling the operation of current-receiving devices, the combination of a master-switch, a second switch, a series of controlling-plates for the second switch, a motor for moving said plates through the switch and a controller having a plurality of series of movable contacts governed by the master-switch, a plurality of contact-pieces each common to one series of the movable contacts, with means operated by the movable contacts and the contact-pieces for stopping the motor when a predetermined one of the controlling-plates is presented to the second switch, substantially as described.

20. The combination of a switch, having connected to it a plurality of independent current-receiving devices, a series of controlling-plates for the switch for determining the ones of said devices to receive current, a motor, a controller therefor also constructed to receive said controlling-plates, with means for causing operation of the controller and of the motor and a device for stopping the motor when a predetermined plate is in the switch, substantially as described.

21. The combination of a switch having connected to it a plurality of independent current-receiving devices, a series of controlling-plates for the switch for determining which of said devices is to receive current, a motor, a controller therefor also constructed to receive said controlling-plates, means for causing operation of the controller and of the motor and an automatic switch operated by the controller for stopping the motor when a predetermined plate is presented to the switch, substantially as described.

22. In a controlling system the combination of a switch including a plurality of contacts and having connected to it a plurality of current-receiving devices, a series of controlling-plates, means for automatically presenting said plates to the contacts of the switch, a master-switch and mechanism controlled thereby for stopping said presenting means with a predetermined plate in the switch, with a device on said switch having means for completing the circuit between said contacts and the current-receiving devices before the current for said devices is permitted to flow, substantially as described.

23. The combination of a switch including on one of its elements a plurality of pins and on the other element a metallic plate, a plurality of current-receiving devices connected to the switch, a series of controlling-plates for the switch having openings for the passage of the pins and means for moving said plates, with a device for stopping the plates and mechanism for causing said device to operate at predetermined irregular times, substantially as described.

24. The combination of a switch including a plurality of pins and a contact or contacts therefor, a plurality of current-receiving devices connected to the switch, a series of controlling-plates for the switch having openings for the passage of the pins, means for moving the series of plates through the switch, a master-switch, movable contacts in circuit

therewith, a device connected thereto for stopping such movement and means for closing the switch, substantially as described.

25. The combination in a light-controlling system, of a master-switch having connected to it a controller, controlling-plates coacting with said switch for actuating said controller, a second series of the controller-plates connected together, an automatic switch having parts coacting with the plates of said connected series, and means operated by the said controller for presenting a predetermined one of said latter plates to the automatic switch, substantially as described.

26. The combination of a master-switch, an automatic switch, controlling-plates for said two switches, means for presenting a predetermined controlling-plate to the automatic switch, said means including a controller having a contact-piece and movable arms coacting with the controlling-plates and placed to engage the contact-piece to cause operation of the automatic switch, substantially as described.

27. The combination of a master-switch, controlling-plates therefor, an automatic switch, a series of current-receiving devices connected thereto, a series of controlling-plates for the automatic switch, and a controller actuated by the master-switch having means for closing the automatic switch after there has been presented to said automatic switch a predetermined one of said series of controlling-plates, substantially as described.

28. The combination with a master-switch, of an automatic switch and controlling-plates for the switches, of a controller constructed to receive said controlling-plates, said controller having a contact-piece and a plurality of movable contacts placed to coact therewith each having a magnet connected to the master-switch, a motor, with means for starting and stopping the said motor and means for operating the automatic switch, substantially as described.

29. The combination with a master-switch, an automatic switch, a motor and controlling-plates for the switches, of a controller constructed to receive the controlling-plates, said controller having a contact-roller and a plurality of movable contacts placed to permit the passage of the controlling-plates between them and said contact-roller, a magnet operative on each of the movable contacts to cause it to move toward the roller, with means for starting and stopping the motor and means for operating the automatic switch, substantially as described.

30. The combination of a master-switch, an automatic switch, controlling-plates for the automatic switch, means for moving the said plates through the said automatic switch, with a controller having means for starting and stopping the motor, said controller including a circuit provided with means for operating the automatic switch when a predetermined one of the contact-plates is presented to it, substantially as described.

31. The combination of a master-switch, an automatic switch having a plurality of contacts, a controller energized from said master-switch, and controlling-plates having two sets of perforations, one set being adapted to coact with the controller and the other set being placed to coact with the automatic switch, substantially as described.

32. The combination of a master-switch, an automatic switch having a plurality of contacts, a controller having movable contacts provided with magnets energized from said master-switch, a relatively fixed contact on the controller, and controlling-plates having two sets of perforations, one set being adapted to coact with the movable contacts of the controller and the other set being placed to receive the contacts of the automatic switch, substantially as described.

33. The combination of a master-switch, an automatic switch, controlling-plates for said two switches, means for presenting a predetermined controlling-plate to the automatic switch, said means including a controller having a contact-piece and movable arms coacting with the controlling-plates and placed to engage the contact-piece to cause operation of the automatic switch, one of the two members comprised by the contact-piece and the movable arms having means whereby it may be moved toward the other, substantially as described.

34. The combination of a master-switch, an automatic switch, controlling-plates for said two switches, means for presenting a predetermined controlling-plate to the automatic switch, said means including a controller having a contact-piece and movable arms coacting with the controlling-plates and placed to engage the contact-piece to cause operation of the automatic switch, one of the two members comprised by the contact-piece and the movable arms being free to move bodily toward the other and having a magnet operated from said controller for so moving it, substantially as described.

35. The combination of a master-switch, an automatic switch, controlling-plates for said two switches, means including a motor for presenting a predetermined plate to the automatic switch, a controller having a contact-piece and a series of movable arms placed to engage the same through openings in said controlling-plates, means for moving certain of said arms and means for bodily moving one of the two members comprised by the contact-piece and the series of arms, toward one another, substantially as described.

36. The combination of a number of current-receiving devices, a series of governing devices whereby the flow of current to said receiving devices is determined, electrical means for operating said governing devices and a

current-controller for said electrical means, having as elements a series of contacts independently adjustable to operate said controller, substantially as described.

37. A series of movable contacts, a multiple-contact switch in circuit therewith, a motor, a series of contact-plates movable thereby, means in circuit with the movable contacts for stopping the motor, and a second multiple-contact switch constructed to coact with the contact-plates, substantially as described.

38. A series of movable contacts, a multiple-contact switch in circuit therewith, a motor, a series of contact-plates movable thereby, means in circuit with the movable contacts for stopping the motor, a second multiple-contact switch constructed to coact with the contact-plates and means for automatically actuating said second switch after the motor is stopped, substantially as described.

39. A series of movable contacts, a multiple-contact switch in circuit therewith, a motor, a series of contact-plates movable thereby, means in circuit with the movable contacts for stopping the motor, a second multiple-contact switch constructed to coact with the contact-plates and means also in circuit with the movable contacts for actuating said second switch, substantially as described.

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

HARRY FALTERMAYER.

Witnesses:

WILLIAM E. BRADLEY,

JOS. H. KLEIN.