

L. MILLER.
ELECTRIC SIGN.

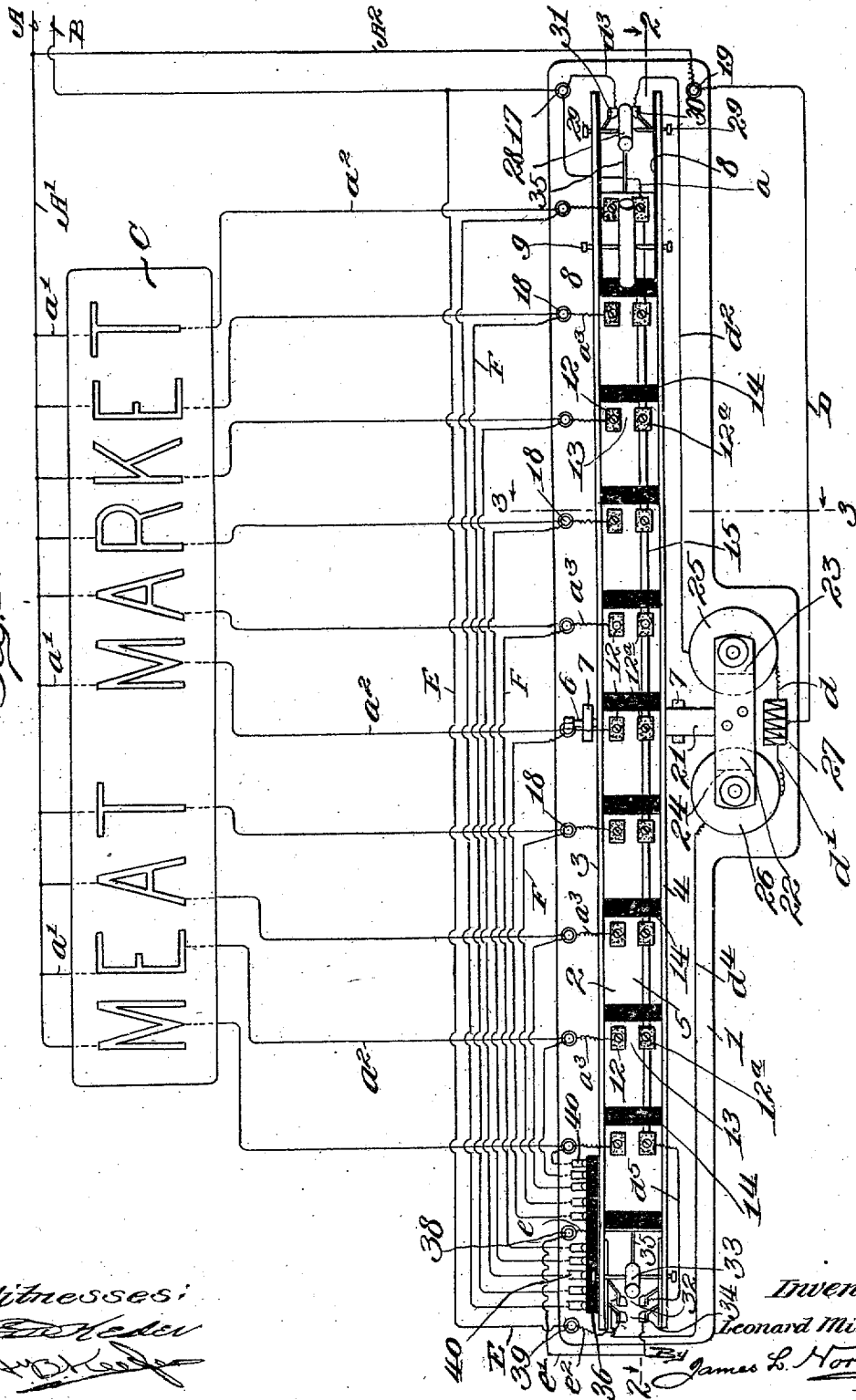
APPLICATION FILED JAN. 18, 1909.

Patented May 24, 1910.

2 SHEETS—SHEET 1.

959,371.

Fig. 1.



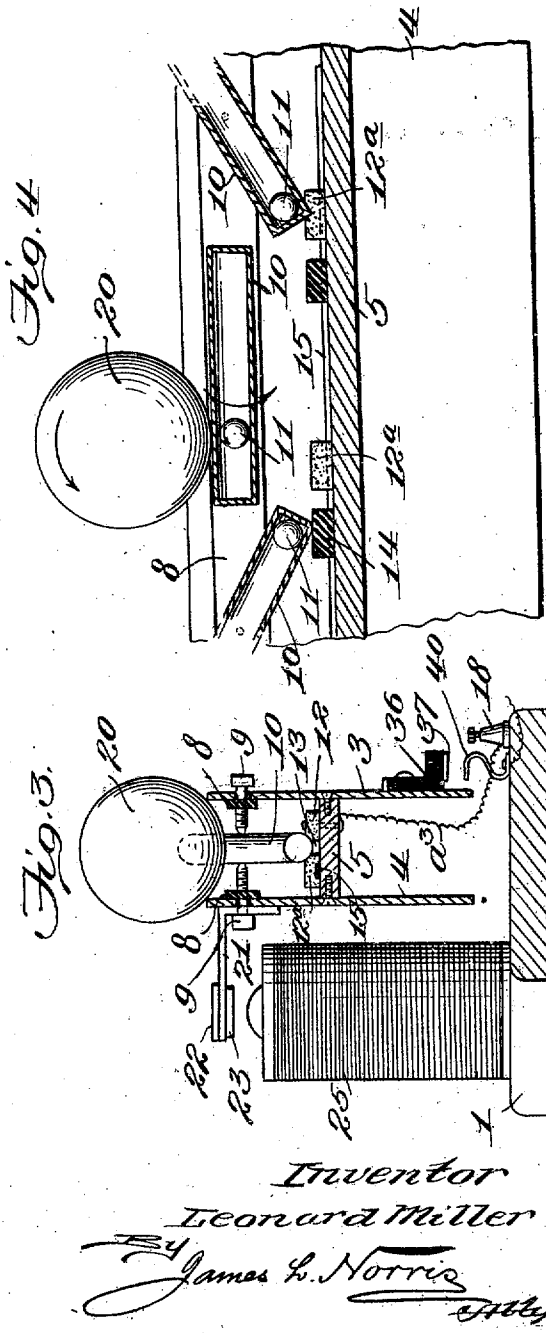
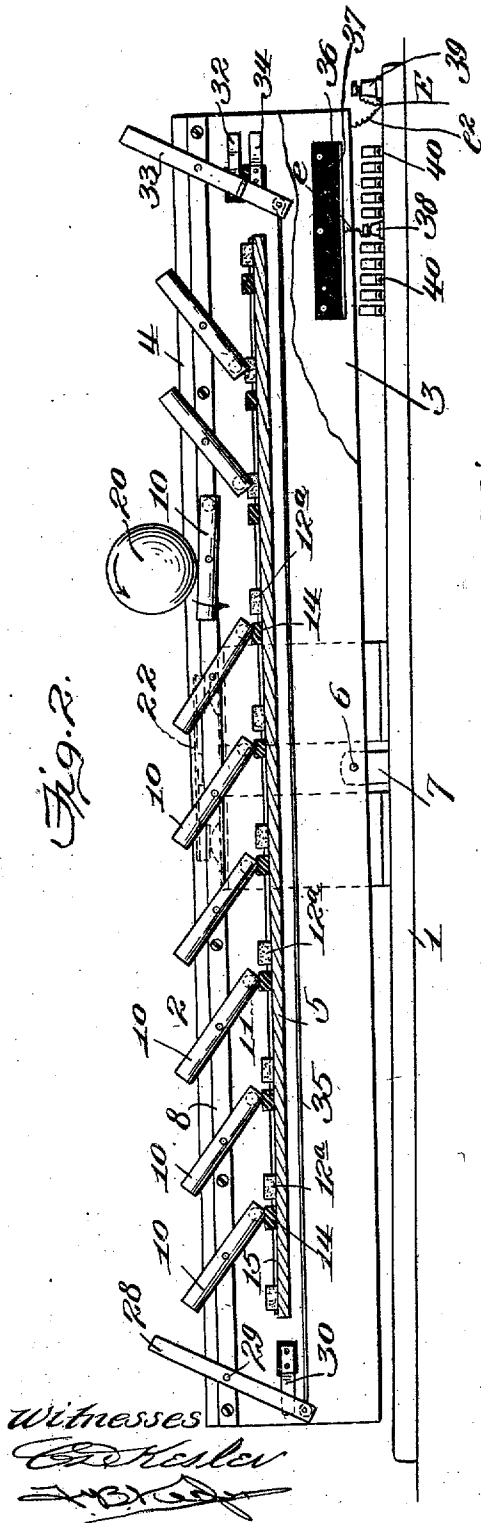
Witnesses:
[Signature]
[Signature]

Inventor
Leonard Miller
James L. Morris

Patented May 24, 1910.

2 SHEETS—SHEET 2.

959,371.



UNITED STATES PATENT OFFICE.

LEONARD MILLER, OF BROWNWOOD, TEXAS, ASSIGNOR OF ONE-HALF TO BOY
STEPHANUS BOYSEN, OF BROWNWOOD, TEXAS.

ELECTRIC SIGN.

959,371.

Specification of Letters Patent.

Patented May 24, 1910.

Application filed January 18, 1909. Serial No. 472,912.

To all whom it may concern:

Be it known that I, LEONARD MILLER, a citizen of the United States, residing at Brownwood, in the county of Brown and State of Texas, have invented new and useful Improvements in Electric Signs, of which the following is a specification.

This invention relates to electric signs; and has for its object to provide a simple and automatic mechanism for illuminating signs composed of electric lights in such manner that each letter, word, line, or character thereof will be illuminated in succession until the whole sign is rendered visible and remains so for a short period of time and then extinguished for a moment before the operation is repeated.

The mechanism employed comprises a vibrating frame carrying circuit breaking devices operated by a gravity moving means adapted to travel back and forth on said frame and throw into circuit the lamps forming the letters, words, lines or characters of the sign. The traveling means also operates suitable switches which energize the motive means for rocking the frame, throwing into circuit certain shunt connections through the lamps to keep the whole sign illuminated for a short time and then cause the lights to be extinguished simultaneously.

With these and other objects in view the invention consists of the novel construction, combination and arrangement of parts hereinafter described and claimed, and illustrated in the accompanying drawings in which:

Figure 1 is a plan view of the device showing in connection therewith in diagrammatic form an electric sign and the circuits connecting the same with the operating mechanism; Fig. 2 a vertical longitudinal sectional view of the same on the line 2—2 looking in the direction of the arrows; Fig. 3 a cross sectional view on the line 3—3 of Figs. 1 and 2 looking in the direction of the arrows, and Fig. 4 an enlarged detail view of a detail of the invention.

Similar reference characters are used for the same parts in all the figures.

In the drawings, 1 indicates a base of the required size and shape, and made of any suitable non-conducting material such as

marble, porcelain or other nonconducting material.

Pivotaly mounted on the base 1 is a vibratory frame 2 comprising two spaced vertically disposed plates 3 and 4 extending from end to end of said base and held apart by a longitudinal separating strip 5 near the center of the plates and preferably made of vulcanized fiber. To the edges of the strip 5 the parallel plates 3 and 4, made preferably of aluminum, are screwed. The frame 2 is supported a short distance above the base on pivot bolts 6, one on each side of the frame, mounted in brackets 7 attached to the base 1. The ends of the bolts 6 are preferably pointed so as to enter depressions in the plates 3 and 4 formed in the longitudinal center of the frame whereby said frame may be rocked on its transverse axis to change the inclination of the same. Fastened against the inner face of each plate 3 and 4 near their upper edges and extending lengthwise from end to end, is a narrow strip of insulating material 8, such as fiber, in which strips are threaded a plurality of equally spaced bolts 9, each bolt on one side being opposite to and in line with a bolt on the other side. The inner ends of said opposing bolts project toward the center of the frame 2 and are shown pointed for the purpose of forming pivots on which a number of tubular swinging circuit closers 10 are adapted to rock in vertical direction, one end projecting normally at an angle above the frame 2. Each circuit closer 10 is closed at its ends and contains a ball 11 movable freely therein throughout its length so as to roll to either end of the circuit closer when such end is swung below the horizontal, and hold the same depressed.

Screwed or otherwise fastened on the upper surface of the fiber separating strip 5 are a plurality of pairs of carbon conducting blocks 12 and 12^a, each pair having a space 13 between them which is bridged by one end of a circuit closer 10 when depressed by the ball 11 therein. A fiber or other insulating block 14 is also fastened to the strip 5 on which the opposite end of the circuit closer rests when its position is reversed to break the circuit through the carbon blocks 12 and 12^a. The block 12^a of each pair of carbon blocks is electrically connected to a common

conductor 15 extending longitudinally of the strip 5, and has a flexible wire a fastened on one end leading to a binding post 17 screwed on the base 1. The other carbon blocks 12 are each connected by a flexible wire a^3 to its individual binding post 18 fastened on the base.

A and B are lead in wires, the former being divided into two branches, one of which 10 A^1 is carried to the sign C and the other A^2 to a binding post 19 on the base 1. The lead wire B is fastened to the binding post 17.

The sign C is of the usual form wherein the letters, words, phrases or other characters thereon are illuminated by or formed of 15 electric lights, said letters, words, phrases or characters being flashed into brightness successively until the whole sign is illuminated, and, after remaining so for a short 20 time, the whole is extinguished only to be illuminated again after a short interval in the same manner. In the present invention the letters of the sign are flashed or illuminated in succession, thus spelling the 25 word or words of the sign, and after remaining visible for a short time all the lamps of the sign are extinguished simultaneously. This effect is accomplished by the mechanism above and that now to be 30 described.

The illuminating lamps of each letter are connected in series and to a separate wire a^1 joined to the wire A^1 . From each binding post 18 a wire a^2 extends to one of the 35 letters of the sign and is there connected to the lamp series forming the letter. The circuit breakers 10 and carbon contacts 12 and 12^a are equal in number to the letters of the sign so that when a circuit breaker is depressed 40 to bridge a pair of contacts 12 and 12^a, the current will pass from lead A along wire A^1 and a wire a^1 to the lamps of one of the letters of the sign, say the letter M in the first word, illuminating the same, thence 45 through the wires a^2 and a^3 to the contact 12 and crossing to the contact 12^a it continues through the common conductor 15 and wire a to the binding post 17 to which the lead wire B is attached. The ball 11 will hold 50 the circuit breaker on the carbon contacts 12 and 12^a until positively raised, thus keeping bright the lamps of the letter. When the next circuit breaker is depressed the second letter is flashed out and so on until all the 55 letters of the sign are illuminated.

For the purpose of operating the circuit breakers to close and open the circuit between the carbon contacts 12 and 12^a a ball 20, made preferably of some heavy material 60 and of a suitable size to roll on the upper edges of the plates 3 and 4 of the frame 2 is employed. The ball 20 as it moves from one end of the frame 2 to the other strikes in succession the upper ends of the inclined 65 circuit breakers 10 and tilting them in op-

posite direction, causes the balls 11 therein to roll to the other ends and depress said ends until they strike the contacts 12 and 12^a (if moving to the right in Fig. 1) or the fiber blocks 14 (if the ball 20 is moving 70 to the left).

The ball 20 is caused to travel alternately from one end of the frame 2 to the other by tilting said frame so that it inclines first in one direction and then in the other. The 75 tilting movement is produced by two electromagnets, one placed on each side of the axis of movement of the frame, and alternately vitalized through a switch at each end of the frame one of which switches is 80 struck by said ball at the completion of each downward movement to break the circuit therethrough and close it at the opposite switch.

Projecting from the top of the frame 2 at 85 one side and above its axis of oscillation is a bracket 21 on which is rigidly secured a spring plate 22 extending across the end of said bracket and lying parallel to the frame 2. Soft steel armature blocks 23 and 24 are 90 fastened to opposite ends of the spring plate 22 and electromagnets 25 and 26 below the respective armature blocks 23 and 24, are fastened to the base 1. A wire D connects the binding post 19 to a resistance 27 from 95 which wires d and d^1 pass to the respective magnets 25 and 26. A switch arm 28 mounted on horizontal pivot screws 29 at the right hand end of the frame 2, Fig. 1, is adapted to be swung at its lower end into a position 100 to bridge or connect the contact points 30 and 31 of a spring switch fastened to the frame, said points 30 and 31 being insulated from the frame, and connected, one 30 by a wire d^2 to the electromagnet 25 and the 105 other 31 by another wire d^3 to the binding post 17. At the opposite end of the frame 2 is a switch 32 having opposed yieldable contacts which are insulated from the frame and adapted to be connected electrically by the 110 lower end of a pivoted switch lever 33, the upper end thereof standing in position to be struck by the ball 20 to break the circuit through the contact points of said switch 32. A second switch 34 is also closed and opened 115 simultaneously with the switch 32 when the switch lever 33 is operated. From the magnet 26 a wire d^4 extends to one of the contact points of the switch 32, while the other contact point of said switch is connected by 120 a wire d^5 to the conductor 15.

Let it be assumed that the end of the frame 2 carrying the two spring switches 32 and 34 is depressed and the ball 20 rolling toward the same end. The ball will 125 strike the switch lever 33 and break the currents passing through said switches demagnetizing the magnet 26, and by means of the rod 35 connecting the lower ends of the switch levers 33 and 28, close the circuit be- 130

tween the contact points 30 and 31, as represented in Figs. 1 and 2. Closing the circuits through the switch points 30 and 31 causes the current to pass from lead A through the wire A^2 to binding post 19, thence by wire D to the resistance 27, wire d to magnet 25 and out through wire d^2 to the point 30, across switch lever 28, point 31, wire d^3 to binding post 17 and lead B. The circuit thus described vitalizes the electromagnet 25 which instantly attracts the armature block 23 and places the spring plate 22 under tension. The spring plate, seeking equilibrium, causes the frame 2 to rock on its pivot bolts 6 thereby elevating the end supporting the ball and lowering its opposite end. The inclination of the frame is slight but sufficient to cause the ball 20 to roll to the opposite end and strike the switch lever 28 which rocks on its axis and breaks the circuit between the points 30 and 31 and by means of the connecting rod 35, rocks the lever 33 and closes a circuit through the switch 32 and the electromagnet 26 which latter in turn causes the frame 2 to oscillate and incline in the opposite direction.

When the ball 20 is at the left end of the frame 2 in Fig. 1 (which corresponds with the right end in Fig. 2), each tubular circuit closer 10 has one end resting on an insulated block 14 and its opposite end projecting above the frame and inclined away from said ball. As soon as that end of the frame 2 supporting the ball is elevated, said ball begins to roll toward the other end, striking the projecting ends of the circuit closers in succession and reversing their position, as clearly represented in Figs. 2 and 4, bringing their opposite ends between the carbon blocks 12 and 12^a and closing the circuits through the lights on the sign as heretofore described. When the ball reaches the opposite end of the frame and begins to return, the circuit closers 10 are reversed and once more break the circuits through the blocks 12 and 12^a. This would cause the lights composing the letters of the sign to be extinguished one at a time and in reverse order, but to prevent this and keep the sign illuminated until the ball 20 strikes the switch arm 28, a shunt circuit is provided.

Near one end of the frame 2 and on the outside of the plate 3 is secured a bracket 36 which is of non-conducting material with a metal plate 37 fastened against its under side. A flexible wire e extends from said plate 27 to a binding post 38, and a wire e^1 connects said binding post to one of the contact points on the spring switch 34. From the other contact point on the same switch a flexible wire e^2 extends to a binding post 39 which is connected by a wire E to the outgoing lead B. Fastened on the base 1 below the insulating bracket 36 are a series of independent spring fingers

40 adapted to contact with the plate 37 on the bracket 36 when the end of the frame 2 carrying said bracket is drawn down by the electromagnet 26.

There are as many spring fingers 40 as letters in the sign C and circuit closers 10 in the frame 2. From each binding post 18 a wire F is carried to one of the spring fingers 40 to form a shunt circuit through the letter lamps while the ball 20 is rolling toward the switch lever 33. This shunt circuit begins at the binding posts 18 thence through the wires F to the spring fingers 40, to the plate 37, by wire e^1 to the spring switch 34 thence through wire e^2 to binding post 39 and finally through wire E to the lead B. These several circuits will keep the sign illuminated until the ball 20 strikes the switch lever 33, thus shunting the current from wire A^2 to the electromagnet 25 and deenergizes magnet 26. The position of the frame 2 is then changed and breaking the contacts between the fingers 40 and the plate 37, the lights are extinguished and remain so until the ball 20 once more reverses the position of the circuit breakers 10 and successively illuminates the letters of the sign.

The operation of the device is set forth in the above description but to briefly review the same it will be seen that with the frame 2 inclined as shown, the circuit breakers 10 resting on the fiber blocks and the electromagnet energized by closing the circuit therethrough at the contact points 30 and 31; the ball 20 if placed on the upper end of the frame will roll by gravity toward the other end successively reversing the circuit closers as it moves and illuminating the letters of the sign one at a time until the word or words thereof are all "spelled." The ball then strikes the switch lever 28, reversing it and the switch lever 33 thereby interrupting the current through the magnet 25 and energizing the magnet 26 which causes the frame to rock and change its inclination so that the ball can roll to the end from which it started. The change of inclination of the frame closes the shunt circuits through the fingers 40, plate 37 and switch 34, to keep the sign illuminated during the return movement of the ball which movement breaks the circuit through the carbon blocks formed by the circuit breakers and would extinguish the lamps but for the shunt circuits already described. The circuit breakers are returned to their first position as the ball runs down the frame ready to be reversed on the return of the ball and again illuminate the letters of the sign. The ball having reached the end of its travel strikes the switch lever 33 breaking once more the circuits through the magnet 26 and the lamps and closing the circuit through the magnet

25. This automatic operation will continue indefinitely as long as the current passes along the leads A and B.

Having thus described the invention,
5 what is claimed is:—

1. A flashing device for an electric sign comprising a tilting frame, electric means for rocking the same, circuit closers carried by said frame, means movably supported on
10 said frame for successively operating the circuit closers, and switches shifted by said movable means for shunting the current through the electric means and rock the frame.

15 2. A flashing device for an electric sign comprising a tilting frame, independent electromagnets for rocking the same, circuit closers on said frame each adapted to close a circuit through the lamps of a separate element of an electric sign; means
20 movably supported on said frame for successively operating said circuit closers, and switches shiftable by said movable means for shunting the current from one electromagnet to the other.

25 3. A flashing device for an electric sign comprising a tilting frame, independent electromagnets for rocking the same, circuit closers pivotally mounted on said frame each adapted to close a circuit through the
30 lamps of a separate element of an electric sign, a switch at each end of said tilting frame, and movable means supported on said frame for successively operating said circuit closers and shifting said switches
35 to shunt the current from one electromagnet through the other.

4. A flashing device for an electric sign comprising a tilting frame, independent
40 electromagnets for rocking said frame to change its inclination, circuit closers pivotally mounted on said frame each adapted to close a circuit through the lamps of a separate element of an electric sign, a switch at
45 each end of said frame connected together, and gravity operated means mounted for automatic travel from end to end of the tilting frame for successively operating the circuit closers and shifting said connected
50 switches to shunt the current from one electromagnet to the other.

5. In combination, an electric sign, an automatic flashing device comprising a tilting
55 frame, independent electromagnets for rocking the same to change its inclination, circuit closers each provided with a shifting weight and pivotally mounted on said frame each circuit closer adapted to close a circuit
60 through the lamps of a separate element of said electric sign, a switch lever at each end of said frame, means connecting said switch levers, a gravity operated means adapted to travel automatically from end to end of the
65 tilting frame for successively operating the circuit closers and simultaneously shifting

the switch levers, a switch alternately closed to shunt the current from one electromagnet to the other, a second switch on one end of the frame and a shunt circuit from all the lamps of the sign closed when said second
70 switch is closed and the end of the frame carrying the same is lowered.

6. In combination, an electric sign, an automatic flashing device comprising a rocking
75 frame, independent electro-magnetic means for tilting the same in opposite directions to change its inclination, gravity operated means adapted to travel alternately from end to end of said frame, switches on
80 the frame arranged to be closed by said gravity operated means to shunt an electric current from one magnet to the other and change the inclination of the frame, circuit
85 closers each provided with a shifting weight and pivotally mounted on said frame, each circuit closer adapted to successively close a circuit through the lamps of a separate element of said electric sign when said gravity
90 operated element moves in one direction and open said circuit when it moves in the opposite direction, and a shunt circuit to keep the lamps glowing while said circuits are being broken.

7. In combination, an electric sign provided with separate illuminating elements,
95 a lighting device comprising a rocking frame, independent electrically operating means for tilting the same in opposite directions, a gravity moving means adapted to travel alternately from end to end of said
100 frame and shunt the circuit from one of said electrically operating means to the other, independent circuits passing through the lamps of each sign element, a series of circuit closers in the path of said gravity moving
105 means for closing and opening in succession said lamp circuits, and a shunt circuit passing around said circuit closers for holding all the lamps of the sign illuminated while the direct lamp circuits are being
110 broken by the gravity moving means.

8. In combination an electric sign provided with separate illuminating elements, a
lighting device comprising a rocking frame, independent electrically operated means for
115 tilting the same in opposite directions, a gravity moving means supported on said frame and adapted to travel alternately from end to end thereof and shunt the circuit from one electrically operating means
120 to the other at the end of each movement, independent circuits passing through the lamps of each sign element, a series of pivoted circuit closers in the path of said gravity moving means to be successively rocked
125 by said means when moving in one direction for closing said lamp circuits and reversed to open said circuits when said means is traveling in the opposite direction.

9. A flashing device for electric signs pro- 130

vided with separate illuminating elements comprising a rocking frame, electrically operated means for tilting the same, a series of pairs of conducting blocks mounted on said frame each pair of said blocks forming a part of the circuit through the lamps of one of the sign elements, a pivoted hollow circuit closer to bridge each pair of conducting blocks, a movable weight in each circuit closer, and a rolling element mounted on said frame and adapted to travel from end to end thereof for rocking said circuit closers and cause their contained weights to move to their lower ends and make or break the lamp circuits.

10. A flashing device for electrical signs comprising a rocking frame, electrically operated means for inclining the same in opposite directions from the horizontal, a series of pairs of conducting blocks mounted on said frame each pair forming the terminals of an electric light circuit, a pivoted hollow circuit closer containing a movable weight and arranged to bridge each pair of said conductor blocks, a switch at each end of said frame, and a rolling weight on said frame to reverse the positions of said circuit closers to close and open said lamp circuits as it travels over said inclined frame and to operate the switches at the ends of the frame for causing the latter to change its inclination.

11. A flashing device for electric signs comprising a rocking frame, electro-magnetic means for inclining the frame in opposite directions with respect to the horizontal, a ball adapted to roll from end to end of said frame, movable circuit closers having individual circuits connected therewith and adapted to be moved into circuit closing positions by said ball, said circuit closers being capable of maintaining their respective circuits in closed condition, and means controllable by said ball for energizing the said electro-magnetic means to reverse the inclination of the frame.

12. A flashing device for electrical signs comprising a pair of parallel plates, connected together by an insulating strip, a series of pairs of conducting blocks fastened to said strip and forming the terminals of electric lamp circuits, hollow circuit closers mounted on insulated pivots, each adapted to bridge a pair of said conducting blocks, and a movable weight in each circuit closer adapted to travel from end to end and hold said end in a downward position.

13. A flashing device for electrical signs, comprising a rocking frame, means for automatically rocking the same, a series of pairs of conducting plates mounted on said rocking frame and forming the terminals of electric lamp circuits, circuit closers adapted to bridge said pairs of conducting plates and close said lamp circuits, a plate secured to

one end of said frame and insulated therefrom, stationary fingers to contact with said plate, each finger being in a shunt circuit from one of said lamp circuits, a switch on said frame, and a rolling weight automatically movable from end to end of said frame to engage and close said switch and bring into contact said plate and fingers when the frame is inclined in the proper direction.

14. A flashing device for electrical signs comprising a rocking frame capable of being tilted on a horizontal axis, an electro-magnet on each side of said pivot, a spring plate having an armature at each end above said magnets and intermediately secured to the longitudinal center of said frame, a switch in the circuit of each magnet at each end of said frame, a switch lever for closing the circuit through each magnet, a connecting rod between the lower end of said switch levers to cause them to move in unison, and a rolling weight carried by said frame to strike said switch levers and shunt the current from one of said magnets to the other for changing the inclination of said frame.

15. In combination, an electrical sign provided with separate illuminating elements for each letter, an automatic lighting device for flashing the lamps of each letter singly and in consecutive order comprising a vertically tilting frame, independent electromagnets for changing the inclination of said frame, a series of pairs of conducting blocks mounted on said frame and each pair forming the terminals of the lamp circuits of one letter of said sign, circuit closers pivoted in said frame and adapted to be rocked to bridge said pairs of lamp terminals, a rolling weight carried by said frame and moved by gravity alternately from one end thereof to the other, a switch at each end of said frame having their levers coupled together to move in unison when struck by said rolling weight to shunt the circuit from one magnet to the other for changing the inclination of said frame, said rolling weight in its movement rocking said circuit closers successively to open or close said lamp circuit, and a shunt circuit through said lamps to keep them glowing while the main circuits therethrough are being broken by said rolling weight.

16. A circuit controller comprising a support, a series of movable circuit closing devices arranged thereon and connected to a plurality of electric circuits, said circuit closing devices being provided with means for maintaining their respective circuits in closed condition, a movable body capable of successively operating said circuit closing devices to close the circuits connected thereto, means operative by said movable body for simultaneously breaking all of said circuits, electro-magnetic means for causing recipro-

cating movement of said body alternately in reverse directions, and a pair of operating circuits for said electro-magnetic means, said circuits being arranged to be closed alternately at each reciprocation of said body.

17. A circuit controller for electric signs comprising a support provided with a runway, a series of movable circuit closing devices spaced longitudinally thereof and provided with individual circuits, a body capable of traversing said runway longitudinally and operative to move the circuit closing devices into circuit closing position, means independent of the circuit closing devices for automatically and simultaneously breaking said individual circuits, electro-magnetic means for causing said body to travel alternately in reverse directions longitudinally of said runway, a pair of operating circuits for said electro-magnet means, and switches controlling said circuits and arranged to be operated alternately by said body.

18. A circuit controller for electric signs comprising a support, a series of contact devices arranged in spaced relation thereon, individual sign elements having circuits connected to the respective contact devices, said contact devices having means for maintaining their respective circuits in closed condition, a body movable on said support and coöperative with said contact devices to successively close the circuits connected thereto when said body moves in one direction, means operative by said movable body for simultaneously breaking said circuits to extinguish the sign when said body reaches a predetermined position, and means for restoring said body to a position preparatory to the next illumination of the sign.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

LEONARD MILLER.

Witnesses:

V. M. BYRNES,

A. H. RICHARDSON.