B. S. SIBLEY.

CIRCUIT FORMING MECHANISM FOR ELECTRIC SIGNS.

APPLICATION FILED AUG. 26, 1914.

1,200,894.

Patented Oct. 10, 1916.

4 SHEETS—SHEET 1.

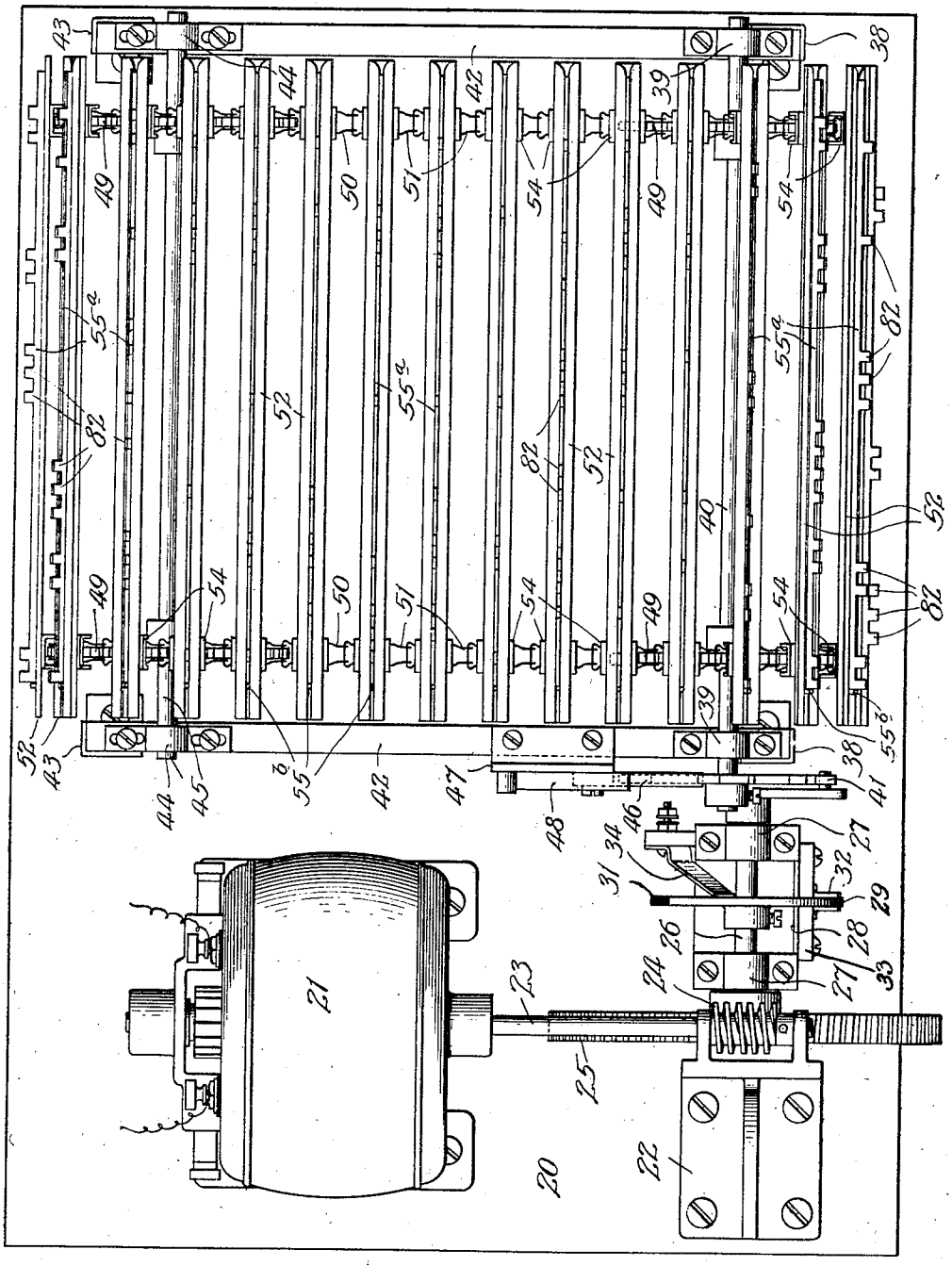


Fig. 1.

Witnesses:
Chas. H. Bull.
Irwin C. Bowman.

Inventor:
Benjamin S. Sibley,
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Attys.

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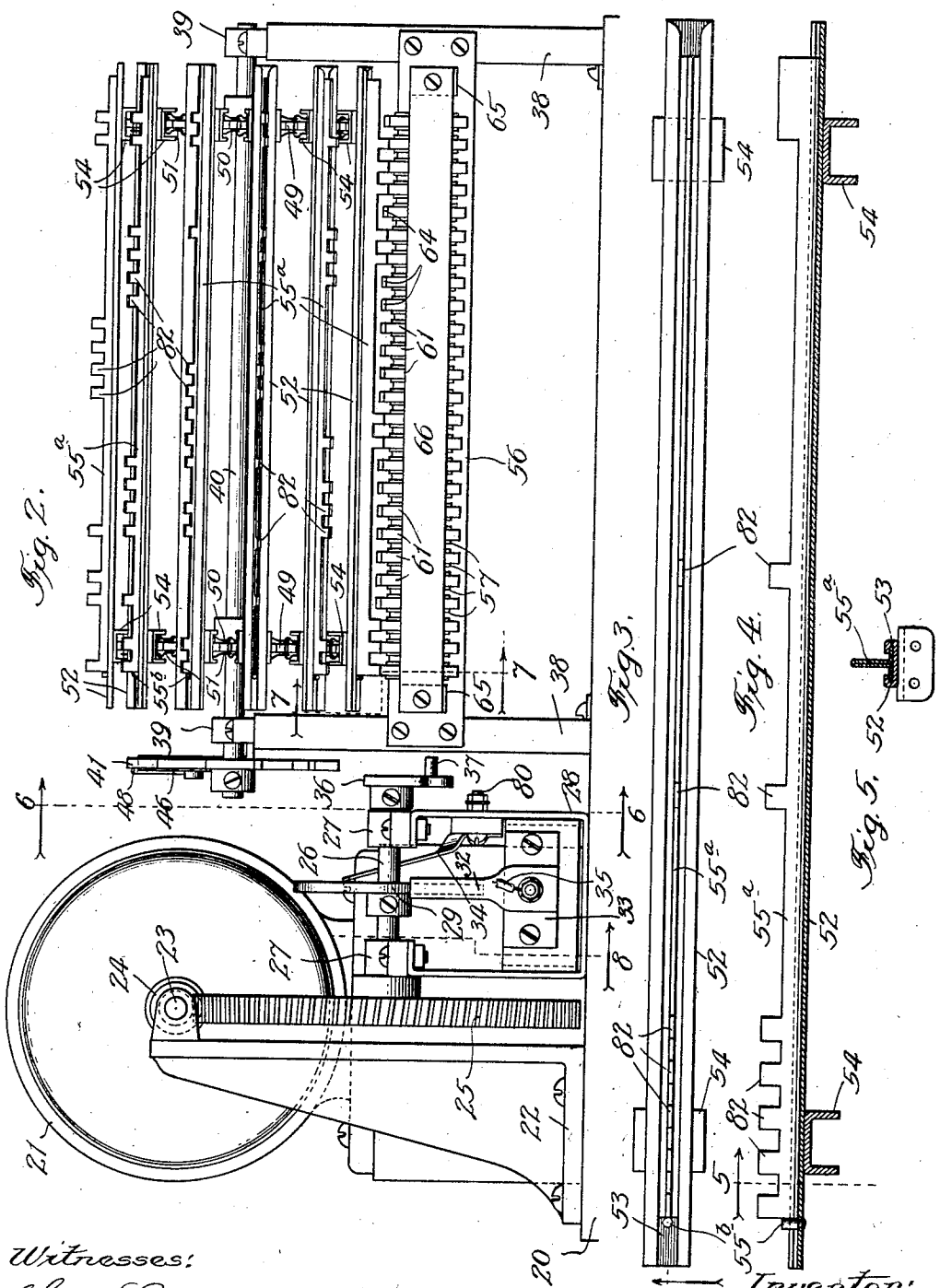
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4 SHEETS—SHEET 2.



Witnesses:
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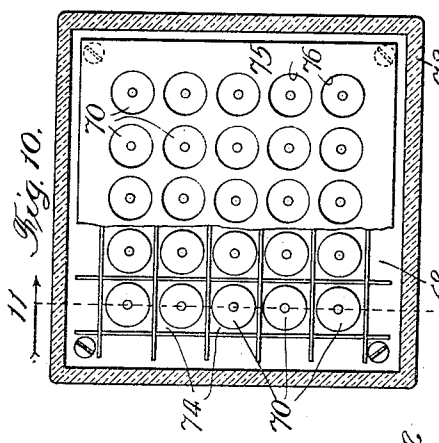


Fig. 10.

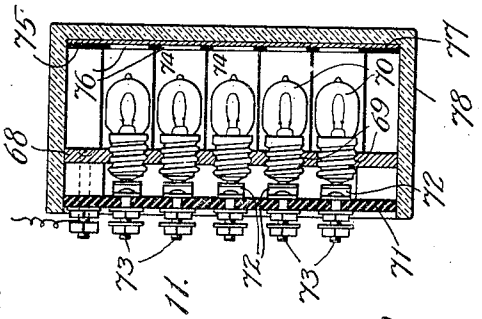


Fig. 11.

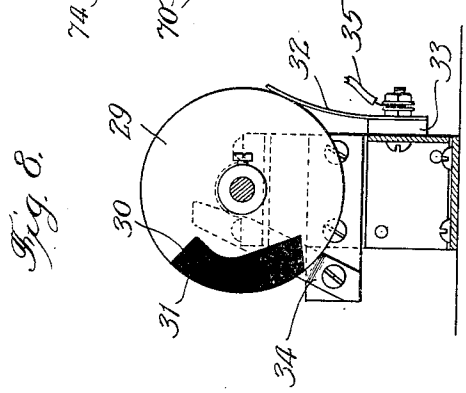


Fig. 8.

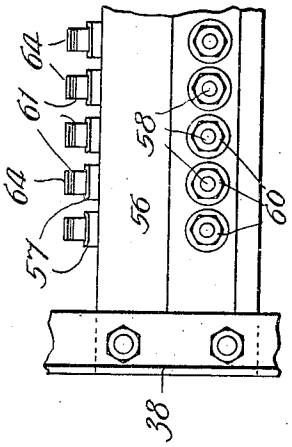


Fig. 9.

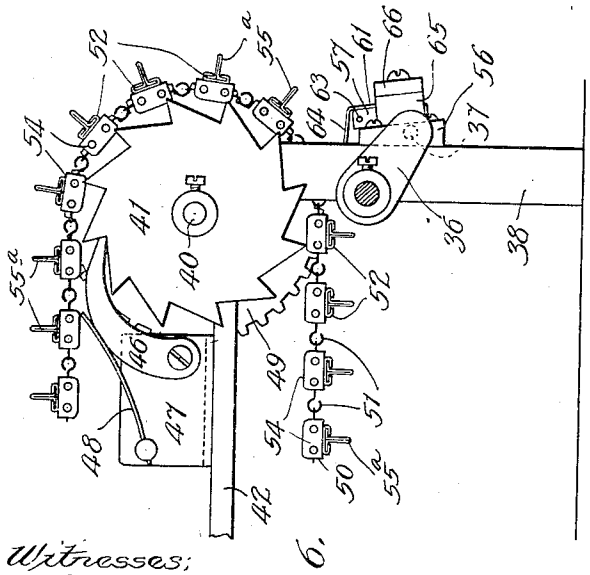


Fig. 6.

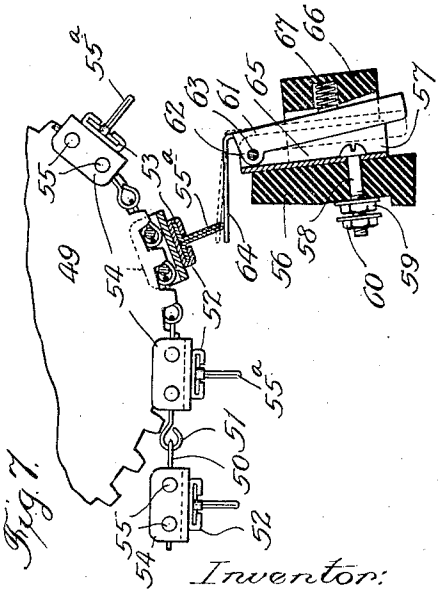


Fig. 7.

Witnesses;
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Louis C. Bowman.

Inventor:
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CIRCUIT FORMING MECHANISM FOR ELECTRIC SIGNS.

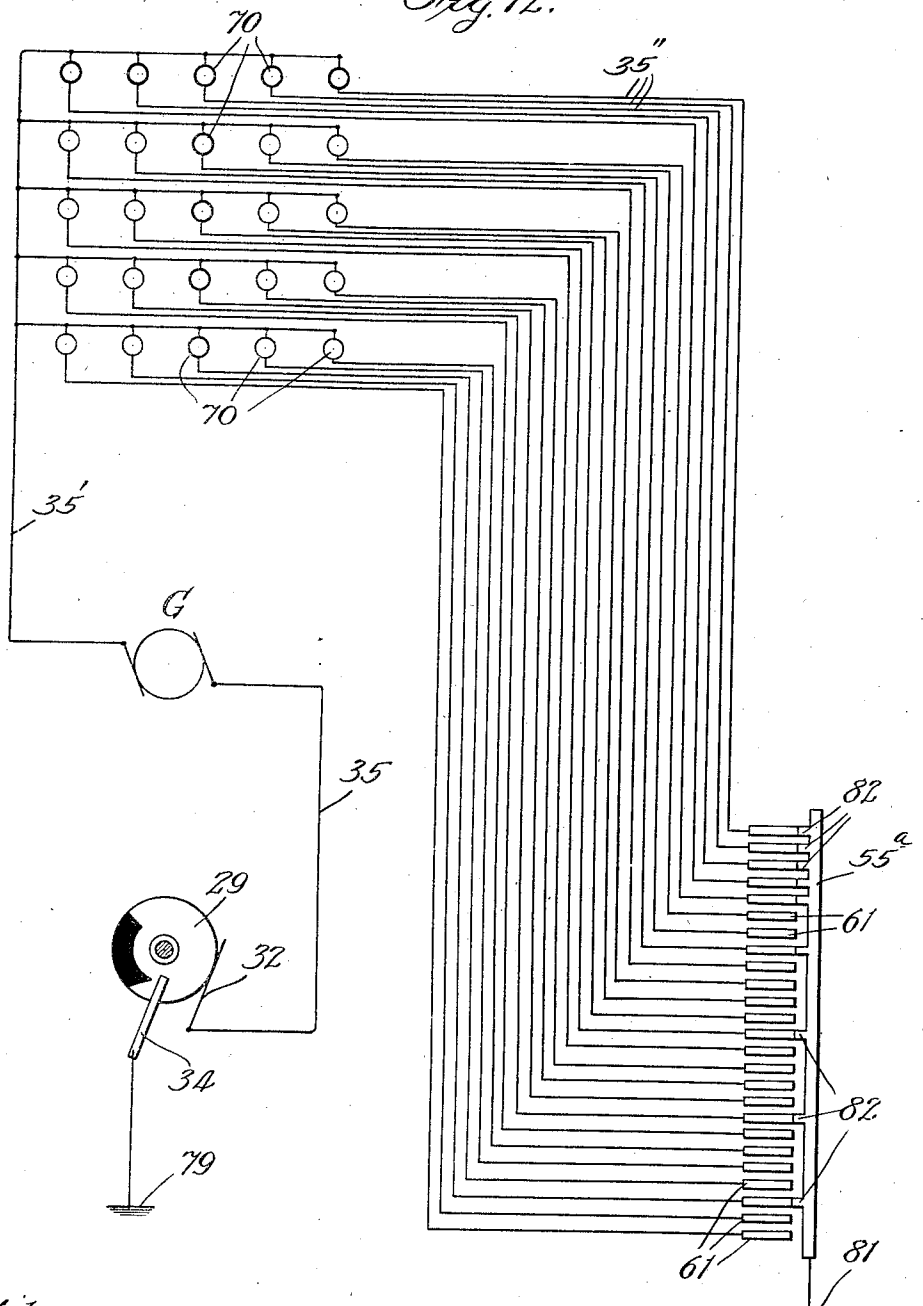
APPLICATION FILED AUG. 26, 1914.

1,200,894.

Patented Oct. 10, 1916.

4 SHEETS—SHEET 4.

Fig. 12.



Witnesses:
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Atty's.

UNITED STATES PATENT OFFICE.

BENJAMIN S. SIBLEY, OF OAK PARK, ILLINOIS, ASSIGNOR TO JOHN HENRY KRAUSE, OF CHICAGO, ILLINOIS.

CIRCUIT-FORMING MECHANISM FOR ELECTRIC SIGNS.

1,200,694. Specification of Letters Patent. Patented Oct. 10, 1916.

Application filed August 26, 1914. Serial No. 858,638.

To all whom it may concern:

Be it known that I, BENJAMIN S. SIBLEY, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Circuit-Forming Mechanism for Electric Signs, of which the following is a specification.

My invention relates to improvements in circuit-forming or contact mechanism for electric signs and more particularly to a form of apparatus useful in connection with electric signs for flashing successively a predetermined series of letters or other characters.

The object of my invention is to provide a circuit former of this type in which the parts will be readily interchangeable to permit of varying the characters or sequence of characters to be displayed by the sign.

A further object of the invention is to generally improve the construction of such circuit-forming mechanism so as to render it less complicated and more efficient and certain in action.

Further objects and advantages will appear from the following detailed description of a form of apparatus embodying my invention, illustrated by the accompanying drawings, in which—

Figure 1 is a plan view of a circuit-former constructed in accordance with my invention; Fig. 2 is an elevation of the same; Fig. 3 is an enlarged plan view of a letter stick holder and a letter stick; Fig. 4 is a longitudinal section taken on the line 4—4 of Fig. 3, the letter stick being shown in elevation; Fig. 5 is a cross-section taken on the line 5—5 of Fig. 4; Fig. 6 is a detail sectional view taken on the line 6—6 of Fig. 2; Fig. 7 is an enlarged detail section taken on the line 7—7 of Fig. 2; Fig. 8 is a detail section taken on the line 8—8 of Fig. 2; Fig. 9 is an enlarged detail elevation of the bar which carries the contact fingers; Fig. 10 is a cross-sectional view of an electric sign adapted for use with my circuit-forming mechanism; Fig. 11 is a cross-section taken on the line 11 of Fig. 10; and Fig. 12 is a diagram showing the electrical connections of the circuit-former and sign.

Referring to the drawings, 20 indicates a suitable base plate on which is mounted an electric motor 21 and a journal bracket 22. A motor-shaft designated 23 extends some distance beyond the motor and is provided on its outer end with a suitable driving-gear, shown as a worm-gear 24, which meshes with a worm-wheel 25, carried on a shaft 26 which rotates in journals 27 supported from the base plate as by a bracket 28. Between the journals of the shaft 26 and secured thereto is a circuit-breaker or interrupter disk 29 (see Fig. 8) formed of metal and having electrical connection with the shaft 26, and through the same with the bracket 28. A portion of the disk 29 is cut away as indicated at 30 and within this cut away portion is fastened an insulating segment 31. The spring-contact finger 32 is secured to an insulating block 33, which in turn is fastened to the bracket 28, and bears upon the periphery of the disk 29. A second contact finger 34 may be mounted upon the bracket to bear against the face of the disk near the center thereof in order to insure perfect electrical connection between the disk and the bracket at all times. A suitable leading-in wire 35 connected with the generator or other source of potential is secured to the finger 32 so as to form electrical connection therewith.

On the outer end of the shaft 26 is mounted a crank 36 having a crank-pin 37, which operates, as will later appear, to intermittently drive the circuit-former. Supported in suitable brackets 38 which rise from the base plate are journals 39 on which is mounted a shaft 40. On the end of this shaft adjacent to the crank 36 is fixed a ratchet wheel 41, the shaft 40 being so placed with relation to the shaft 26 that with each revolution of the latter shaft the crank-pin 37 will engage in a tooth of the ratchet wheel and rotate the latter through the angular distance of one tooth. The upper ends of the brackets 38 carry the horizontal frame members 42 which extend rearwardly, as shown in Fig. 1, and are joined to rear brackets 43 which support journals 44 of a shaft 45. A pawl 46 (see Fig. 6) is pivoted on a plate 47 secured to the left-hand frame member 42, and a leaf-spring 48 bears upon the pawl 46 to keep the same in contact with the ratchet wheel 41. On the shafts 40 and 45 are fixed sprocket wheels 49 and over these sprocket wheels passes a link-belt des-

ignated generally by 50. Referring to Fig. 7, it will be seen that the link-belt is made up of chains 51 which engage the teeth of the sprocket wheel 49 and cross-bars 52 extending between the chains. Each cross-bar is preferably formed of a sheet-metal strip bent over at the edges to provide an internal slide-way 53 (see Fig. 7). The bars are secured to the chains 51 by small bent clips 54 in which are secured pins 55 to which the links of the chains are fastened. Adjacent one end each of the cross-bars has secured therein a rivet as at 55^b, Fig. 4.

Slidable within the internal slide-ways 53 of the cross-bars are letter sticks 55^a, preferably also formed of sheet-metal bent to a T-section, as shown in Fig. 5, the top bar of the T-section moving within the slide-way 53. The letter sticks are of less length than the cross-bars, as shown in Figs. 3 and 4, and when in normal positions, are held at one end by the rivets 55^b. The real function of the rivet, however, is merely to act as a gage so that in sliding the letter stick into position in the cross-bar it will be stopped at the proper point. There are no forces tending to dislodge the letter stick endwise and therefore the frictional grip of the inturned edges of the cross-bars is sufficient to retain the stick in the position in which it is set.

Extending between the front brackets 38 is a finger-bar 56, which is preferably formed of vulcanite fiber, or other insulating material. The finger-bar carries a row of metal finger supports 57 on its front face, the supports being preferably formed as channel sections bent up from sheet-metal and secured to the bar as by bolts 58 passing through drilled openings in the bar. On the rear end of each bolt is threaded a securing nut 59, which holds the finger support in position, and an additional nut 60 to serve as the fastening means for the lamp-wire as will later appear. Pivoted in the upper end of each finger support is a contact finger 61, preferably formed of a sheet-metal strip bent into a U-section, or channel section, at its lower end and having ears 62 through which pivot pins 63 may pass, the pivot pins being riveted or otherwise secured in the finger supports. The upper end of each finger is reduced in width and bent at right-angles to the body of the finger to form a resilient contact arm 64, which is adapted to contact with the outstanding edge of the letter stick, as shown in Fig. 7. Spacing blocks 65 are fastened to the ends of the finger bar on its front face to carry a spring-retaining bar 66. Referring again to Fig. 7, it will be seen that the bar 66 is provided with a recess opposite each of the fingers 61. In the recess is mounted a small compression spring 67 which bears upon the lower arm of the finger to constantly urge the latter inward and thereby to hold the contact arm 64 in elevated position.

Referring to Figs. 10 and 11, there is shown an electric sign adapted for connection with my circuit-former. The sign comprises a lamp plate 68 in which are formed any desired number of threaded openings 69, which receive and act as sockets for the bases of the lamps 70. Mounted in spaced relation to the rear face of the lamp plate is a contact plate 71 carrying spring contacts 72, which are adapted to engage the end contacts of the lamp bases, as shown in Fig. 11. It will be understood that the contact plate is formed of insulating material, and that the contact springs 72 are each in electrical connection with suitable binding posts 73, to which wires may be fastened. Each of the lamps 70 is mounted within the open end of the compartment conveniently formed as a cell of a honey-comb 74. A plate 75 having apertures 76 may be mounted on the face of the honey-comb, and if desired, a colored plate of glass or celluloid may be placed over the plate 75. The whole assembly is held together by the open-ended glass box 78, and is spoken of as a unit. It will be understood that the number and arrangement of the lamps within the unit may be varied to suit the purposes for which the sign is intended. I have shown a conventional unit consisting of twenty-five lamps arranged in lines at right-angles.

Referring to Fig. 12 in which the electrical connections of the apparatus are shown, G represents a suitable source of potential, which may be either a generator or a battery. One terminal of the generator is connected by a wire 35 with the binding post of the contact finger 32 of the circuit-breaker. The other pole of the generator is connected by a wire 35^1 with the metallic lamp plate 68 and thereby forms electrical connection with one terminal of each of the lamps, as indicated in the diagram. The other terminal of each lamp is connected by a wire $35''$, secured to the binding post 73, to one of the binding posts 59, whereby electrical connection is formed between each of the fingers 61 and one of the lamps. The number of fingers therefore will obviously be equal to the number of lamps used in a unit. The circuit-breaking disk 29 is grounded to the frame of the machine which carries the shafts 45, as indicated in the diagram at 79, the ground being effected by the contact finger 34 which bears against the face of the disk and is secured to the bracket 28. A binding post 80 is connected with the finger 34, serving as an attachment for a wire (not shown) which may be fastened at any desired point to the frame above referred to, or if the base plate be of metal or other conducting substance, the ground wire may

be entirely omitted. Each of the letter sticks 55 is also grounded to the frame, as indicated at 81, this ground being effected by means of the mechanical connections between the link-belt and the frame.

Referring now more particularly to the construction of the letter sticks, it will be seen that each of the sticks has its upper edge cut away through the greater portion of the length of the stick to form projections 82, the number and positions of which are dependent upon the letter or character which the stick is designed to produce. Thus, the stick shown in the diagram of Fig. 2 is provided with nine projections 82 so spaced as to engage the fingers which are connected to the top and center row of lamps of the sign. Therefore, if this letter stick be moved into the position shown in Fig. 7, the nine projections referred to will engage nine of the resilient contact arms 64 of the fingers 61, and will thus form electrical connections between the frame of the machine and the nine fingers which are connected with the top and central row of lamps of the sign. Tracing the electrical circuit at this time, it will be seen that the current flows from the generator through the wire 35^1 to the lamp plate 69, thereby forming electrical connection with one terminal of each lamp. The opposite pole of the generator will be connected through the wire 35^1, contact 32, disk 29 and contact 34, with the frame of the machine, as indicated at 79 in the diagram. The wires 35'' which are connected to the opposite terminals of the top and center row of lamps will at the same time be connected with the frame of the machine through the projections 82 which will engage, respectively, the nine contact arms 64 to which are secured the wires 35''. The circuit will therefore be complete from the generator through nine of the lamps and through the frame on one side and from the generator through the circuit-breaker and through the frame on the other side. The nine lamps forming the top and center rows will therefore be lighted up, as indicated in the diagram, and the letter T will consequently appear on the face of the sign. The cellular or honey-comb construction of the sign renders the outlines of the characters formed more sharply defined as the radiance from each lamp is confined by the walls of the compartment in which it is located. It will be understood that by providing the proper number and arrangement of projections 82 upon a letter stick, the stick may be made to form electrical connections so as to light up any desired selection of lamps within the sign.

The action of the apparatus described is to flash upon the sign unit a number of different characters in some predetermined sequence or order, and this is effected in the following manner: The different characters which it is designed to produce upon the sign having been determined upon and their order or sequence fixed, suitable letter sticks will be put in position in the cross-bars 52 any one of the cross-bars being taken as a starting point and the sticks then inserted in the order in which it is desired to have the letters reproduced. For instance, the first letter is placed at the front of the belt, as shown in Fig. 1, and the succeeding letters in proper order moving toward the back of the belt. The circuit of the electric motor 21 is then closed, power being supplied to this motor from the generator G, which provides current for the lamps, or from some other source, and through the worm and wheel gearing 24, 25, the shaft 26 will be caused to revolve carrying with it the circuit-breaker 29 and the crank-pin 37. The angular relation of the crank-pin and circuit-breaker disk is such that when the former approaches the upper limit of its travel, that is, when it is about to engage the tooth on the ratchet wheel 41, the insulating segment 31 of the circuit-breaker disk is moved into contact with the arm 32, thereby breaking connection between wire 35 and the frame of the machine. While this connection remains broken, the crank-pin 37 will engage a tooth of the ratchet wheel to rotate the latter in a clockwise direction through the angular distance of one tooth, and the teeth of the sprocket wheels 49 are of such a pitch that the angular distance between the adjacent letter sticks is exactly equal to the pitch of the ratchet teeth, so that the link-belt has now been moved forward by an amount sufficient to place each letter stick in the position formerly occupied by the adjacent stick. Assuming therefore that one letter stick was in contact with the fingers shown in Fig. 7, the rotation of the ratchet wheel will have moved this letter stick out of engagement with the fingers and moved the adjacent letter stick into engagement. Continued rotation of the shaft 26 will now cause the insulating segment 31 to pass out from under the contact 32 and electrical connection will once more be established between the wire 35 and the frame, whereby a letter or character, as determined by the arrangement of the projections on the letter stick, will be flashed upon the sign. The sign will continue to show this same letter until the circuit-breaking disk 29 has completed approximately one-half of a revolution, at which point the end of the insulating segment 31 will again interrupt the circuit and the lamps will go out. Immediately following this interruption, the crank-pin 37 will engage the next ratchet tooth to advance the belt and bring the succeeding letter stick into registry with the fingers. Because of the slight angularity

between the letter stick and the resilient contact arms 64, as shown in Fig. 7, there may be a slight tendency for the belt to shift backward after the crank-pin 37 has become disengaged from the ratchet tooth; and it is to correct any such tendency of the apparatus that the pawl 46 is employed.

The form of letter stick which I have shown and described is of simple and durable construction and the securing means, *i. e.*, the channel or slide-way 53 within the cross-bars is likewise advantageous, both from the standpoint of manufacture and of use. Each letter stick will preferably be marked or stamped at some point, so that it may be readily identified, and in order to adapt the apparatus to flash letters or characters in any sequence upon the sign, it will only be necessary to insert the proper number and arrangement of letter sticks in the slide-ways of the cross-bars. A user of the apparatus will commonly keep on hand a large supply of letter sticks, and the facility with which the sticks may be interchanged renders it possible for any person of ordinary intelligence to quickly alter the apparatus so as to change the characters and sequence of characters which it is desired to display.

In the specific form of apparatus shown, the link-belt comprises about thirty-four cross-members and will therefore accommodate this number of letter sticks. Accordingly thirty-four characters, determinable at will, may be flashed in any desired sequence upon the sign. It will be understood that by merely lengthening the belt, this number might be increased to any reasonable figure without any other change in the apparatus. It will also be clear that by providing two or three, or more of the finger-bars 56, a corresponding number of sign units might be controlled by the single apparatus. It will only be necessary in this case to exchange the ratchet wheel 41 for a wheel having a pitch equal to the space between two or three or more of the cross-bars so that at each revolution of the shaft 26 the belt will be advanced the proper distance. It will also be understood that any number of link-belts, each controlling a sign unit, may be driven from the shaft 26. Thus, four or five sign units are commonly arranged in line so that the letters flashed on the units will spell out a word. To adapt my device for such service as this, it will only be necessary to extend the shaft 40 and connect therewith similar shafts of link-belt mechanisms which will be duplicates of the mechanism described.

While I have shown and described in considerable detail a form of apparatus embodying my invention, it is to be understood that this is purely illustrative and that my invention is not to be construed as limited to the particular construction of mechanism disclosed herein, except in so far as such limitations are included in the appended claims, or must be construed to be so included in view of the prior art.

What I claim as new and desire to secure by Letters Patent is—

1. In a machine of the class described, a frame, a sprocket-shaft mounted in said frame, a sprocket on said shaft, a link-belt carried on said sprocket, letter-sticks carried by said link-belt transversely of the same, lamp-circuit-controllers mounted in said frame in position to be engaged by said letter-sticks, a driving shaft, connections between said driving shaft and said sprocket-shaft to rotate the latter and bring the letter-sticks successively into contact with said lamp-circuit-controllers, and a circuit-breaker operated by said driving shaft.

2. In a machine of the class described, a frame, a sprocket-shaft mounted in said frame, a sprocket on said shaft, a link-belt carried on said sprocket, cross-bars carried by said link-belt, letter-sticks detachably engaged with said cross-bars, lamp-circuit-controllers mounted in said frame in position to be engaged by said letter-sticks, and means for moving said belt to bring the letter-sticks successively into contact with said lamp-circuit-controllers.

3. In a machine of the class described, a frame, a sprocket-shaft mounted in said frame, a sprocket on said shaft, a link-belt carried on said sprocket, cross-bars secured to said link-belt, letter-sticks detachably secured to said cross-bars, lamp-circuit-controllers mounted in said frame in position to be engaged by said letter-sticks, a driving shaft, connections between the driving shaft and the sprocket-shaft for moving said belt to bring the letter-sticks successively into contact with said lamp-circuit-controllers, and a circuit-breaker connected with said driving shaft for operation thereby.

4. In a machine of the class described, a frame, a sprocket-shaft mounted in said frame, a sprocket on said shaft, a link-belt carried on said sprocket, letter-sticks carried by said link-belt transversely of the same, lamp-circuit-controllers mounted on said frame in position to be engaged by said letter-sticks, means for moving said belt to bring the letter-sticks successively into contact with said lamp-circuit-controllers, and means for interrupting the circuit during such movement of the belt.

5. In a machine of the class described, a frame, a pair of sprocket-shafts mounted in said frame, sprockets on said shafts, a link-belt carried on said sprockets, letter-sticks carried by said link-belt transversely of the same, a finger-bar mounted in said frame

parallel to said letter-sticks, contact-fingers carried by said bar in position to be engaged by said letter-sticks, and means for moving said belt to bring the letter-sticks successively into engagement with said contact-fingers.

6. In a machine of the class described, a frame, a pair of sprocket-shafts mounted in said frame, sprockets on said shafts, a link-belt carried on said sprockets, cross-bars secured to said link-belt, letter-sticks detachably secured in said cross-bars, a finger-bar mounted on said frame parallel to said letter-sticks, contact-fingers carried by said finger-bar, in position to be engaged by said letter-sticks, and means for moving said belt to bring the letter-sticks successively into contact with said contact-fingers.

7. In a machine of the class described, a frame, a pair of sprocket-shafts mounted in said frame, sprockets on said shafts, a link-belt carried on said sprockets, cross-bars secured to said link-belt, letter-sticks detachably secured to said cross-bars, a finger-bar mounted on said frame parallel to said letter-sticks, contact-fingers carried by said finger-bar in position to be engaged by said letter-sticks, means for moving said belt to bring the letter-sticks successively into contact with said lamp-circuit-controllers, and means for interrupting the circuit during such movement of the belt.

8. In a machine of the class described, a frame, a pair of sprocket-shafts mounted in said frame, sprockets on said shafts, a link-belt carried on said sprockets, letter-sticks carried by said link-belt transversely of the same, a finger-bar mounted in said frame parallel to said letter-sticks, contact-fingers carried by said bar in position to be engaged by said letter-sticks, a driving shaft, connections between said driving shaft and one of said sprocket-shafts, said connections operating to move the sprocket-shaft intermittently, and a circuit-breaker operatively connected with said driving shaft and acting to interrupt the circuit during the period of motion of said sprocket-shaft.

9. In a machine of the class described, a frame, a pair of sprocket-shafts mounted in said frame, sprockets mounted on said shafts, parallel chains carried on said sprockets, cross-bars connecting said chains, letter-sticks detachably mounted in said cross-bars, lamp-circuit-controllers mounted in said frame in position to be engaged by said letter-sticks, and means for operating one of said sprocket-shafts to bring the letter-sticks successively into contact with said lamp-circuit-controllers.

10. In a machine of the class described, a frame, a pair of sprocket-shafts mounted in said frame, sprockets on said shafts, parallel chains traveling over said sprockets, cross-bars connecting said chains, said cross-bars being provided with slide-ways, letter-sticks slidable in said cross-bars for detachable engagement therewith, lamp-circuit-controllers mounted in said frame in position to be engaged by said letter-sticks, and means for moving said sprocket-shafts to bring the letter-sticks successively into contact with said lamp-circuit-controllers.

11. In a machine of the class described, a frame, sprocket-shafts mounted in said frame, sprockets on said shafts, a link-belt carried on said sprockets, letter-sticks carried by said link-belt transversely of the same, lamp-circuit-controllers mounted in said frame in position to be engaged by said letter-sticks, a toothed wheel carried by said sprocket-shafts, the pitch of the teeth in said wheel being a multiple of the pitch of the teeth of said sprocket, a driving shaft, and a crank carried by said shaft for intermittent engagement with the teeth of said wheel.

12. In apparatus of the class described, a letter-stick-holder formed of a sheet-metal strip having its edges return-bent to form resilient-walled slide-ways, and a letter-stick having a base portion slidable in said slide-ways and frictionally gripped thereby.

13. A T-section letter-stick formed of a strip of sheet-metal return-bent in the middle to produce a double-thickness contact portion, and having its edges turned outwardly to produce a single-thickness base portion.

In testimony whereof I have hereunto set my hand this 20th day of August, 1914.

BENJAMIN S. SIBLEY.

In presence of two subscribing witnesses:
A. C. FISCHER,
N. B. DEARBORN.