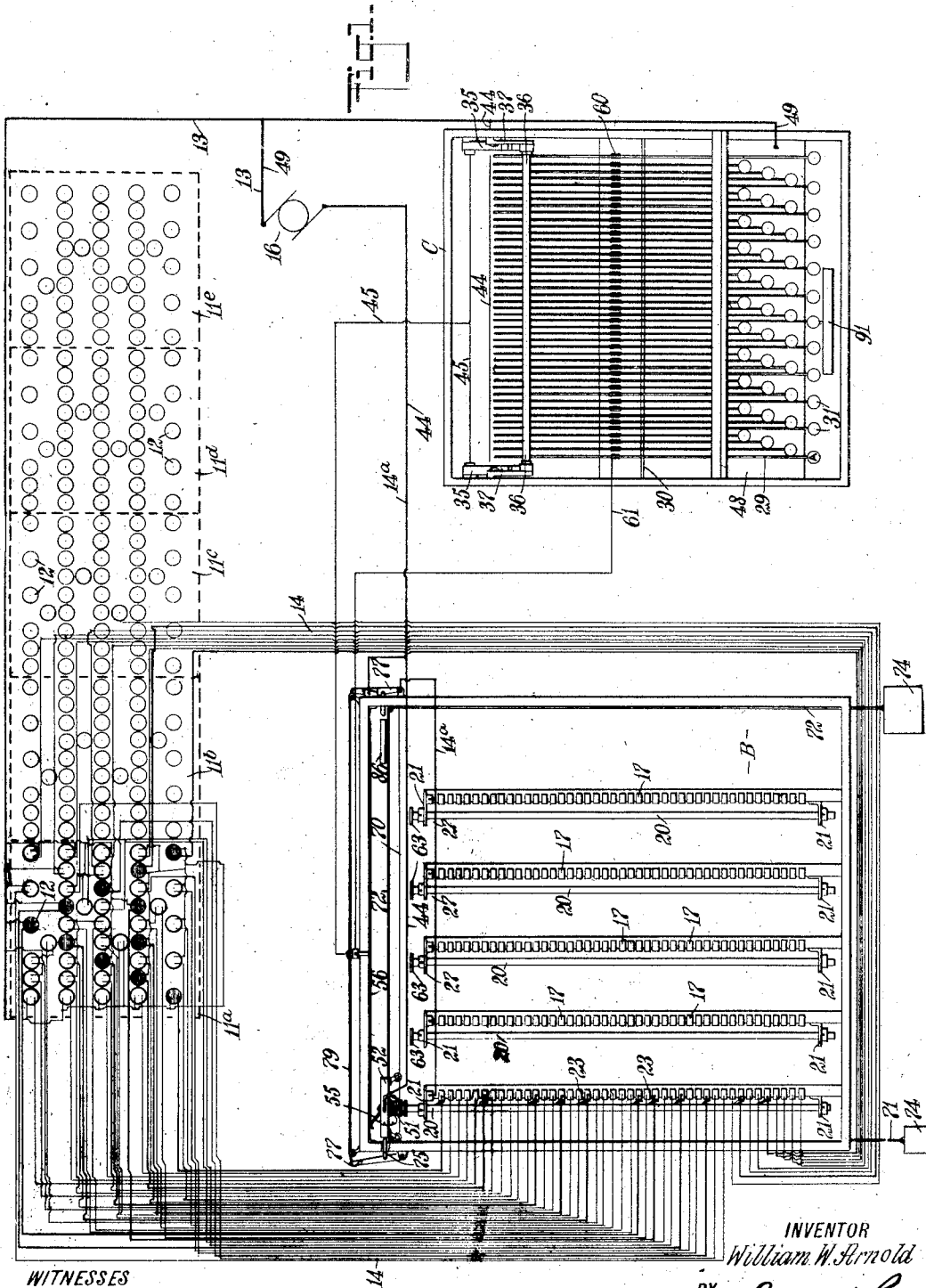


W. W. ARNOLD.
ELECTRICAL ILLUMINATING SIGN.
APPLICATION FILED AUG. 19, 1909.

978,828.

Patented Dec. 20, 1910.

6 SHEETS—SHEET 1.



WITNESSES

Ben. J. J. J.
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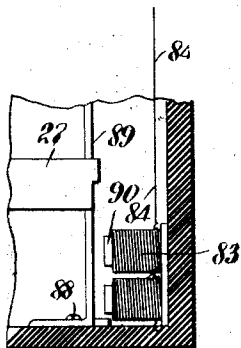
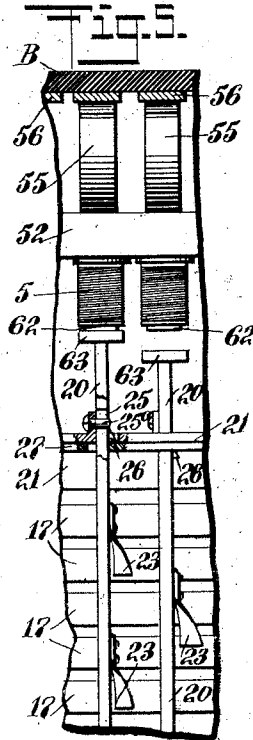
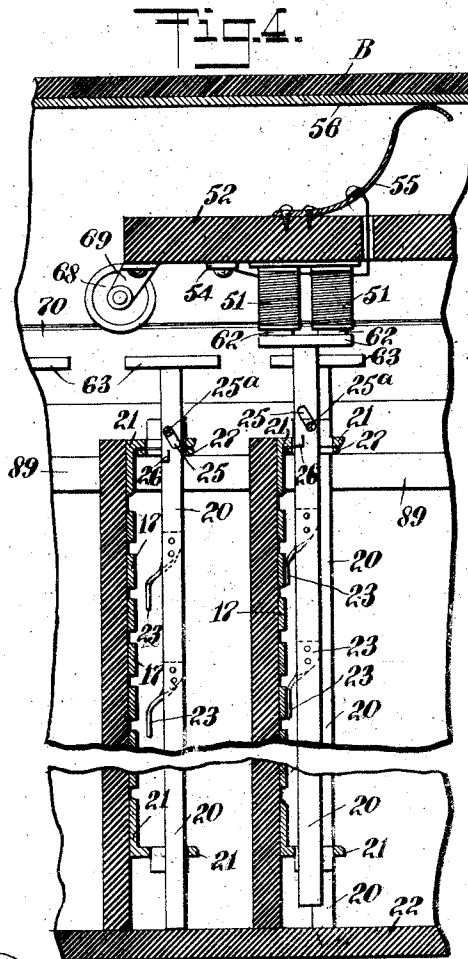
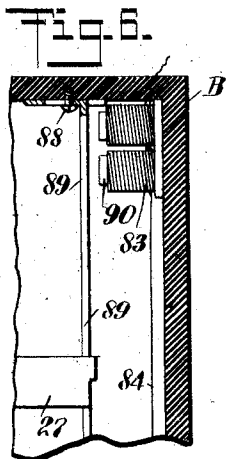
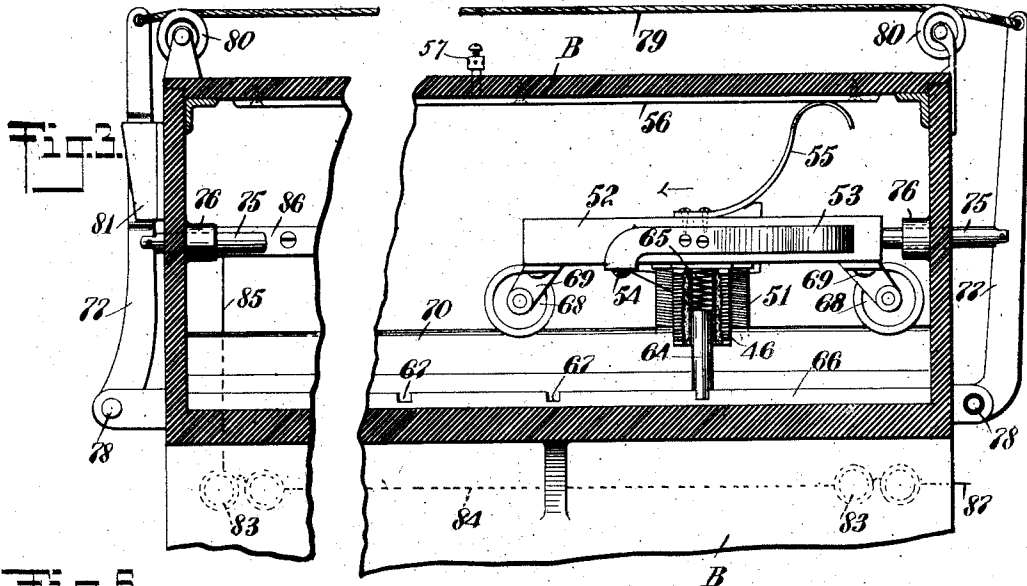
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W. W. ARNOLD.
ELECTRICAL ILLUMINATING SIGN.
APPLICATION FILED AUG. 10, 1909.

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6 SHEETS—SHEET 3.



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APPLICATION FILED AUG. 10, 1909.

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6 SHEETS—SHEET 4.

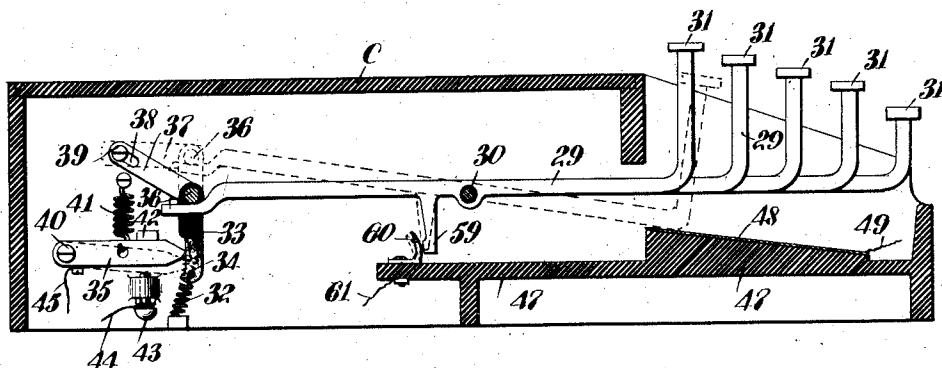


Fig. 7.

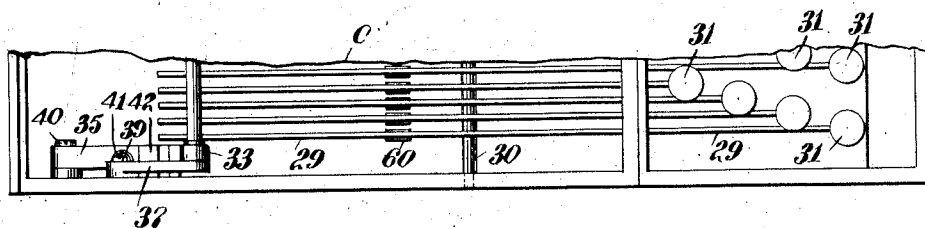
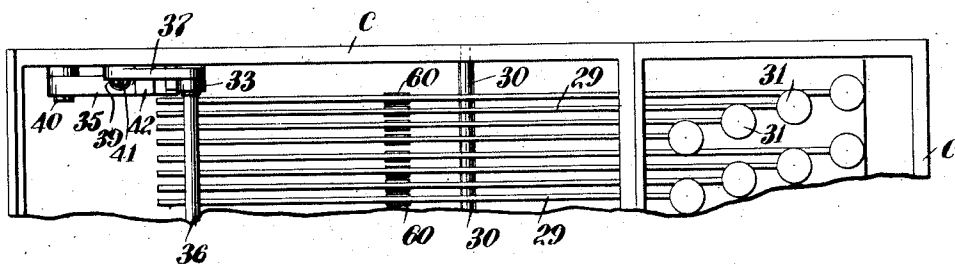


Fig. 8.

WITNESSES

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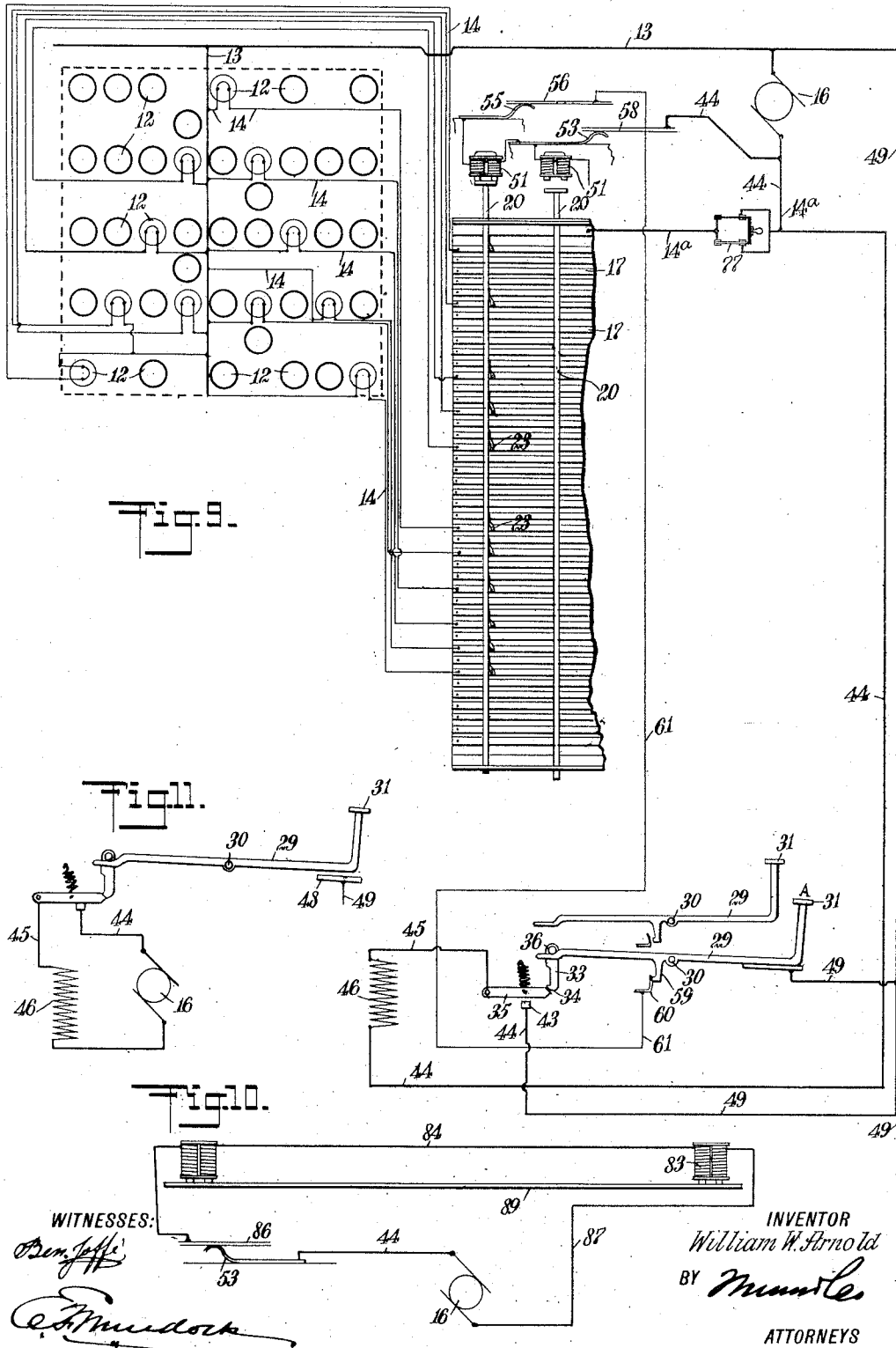
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W. W. ARNOLD,
ELECTRICAL ILLUMINATING SIGN.
APPLICATION FILED AUG. 10, 1909.

978,828.

Patented Dec. 20, 1910.

6 SHEETS—SHEET 5.

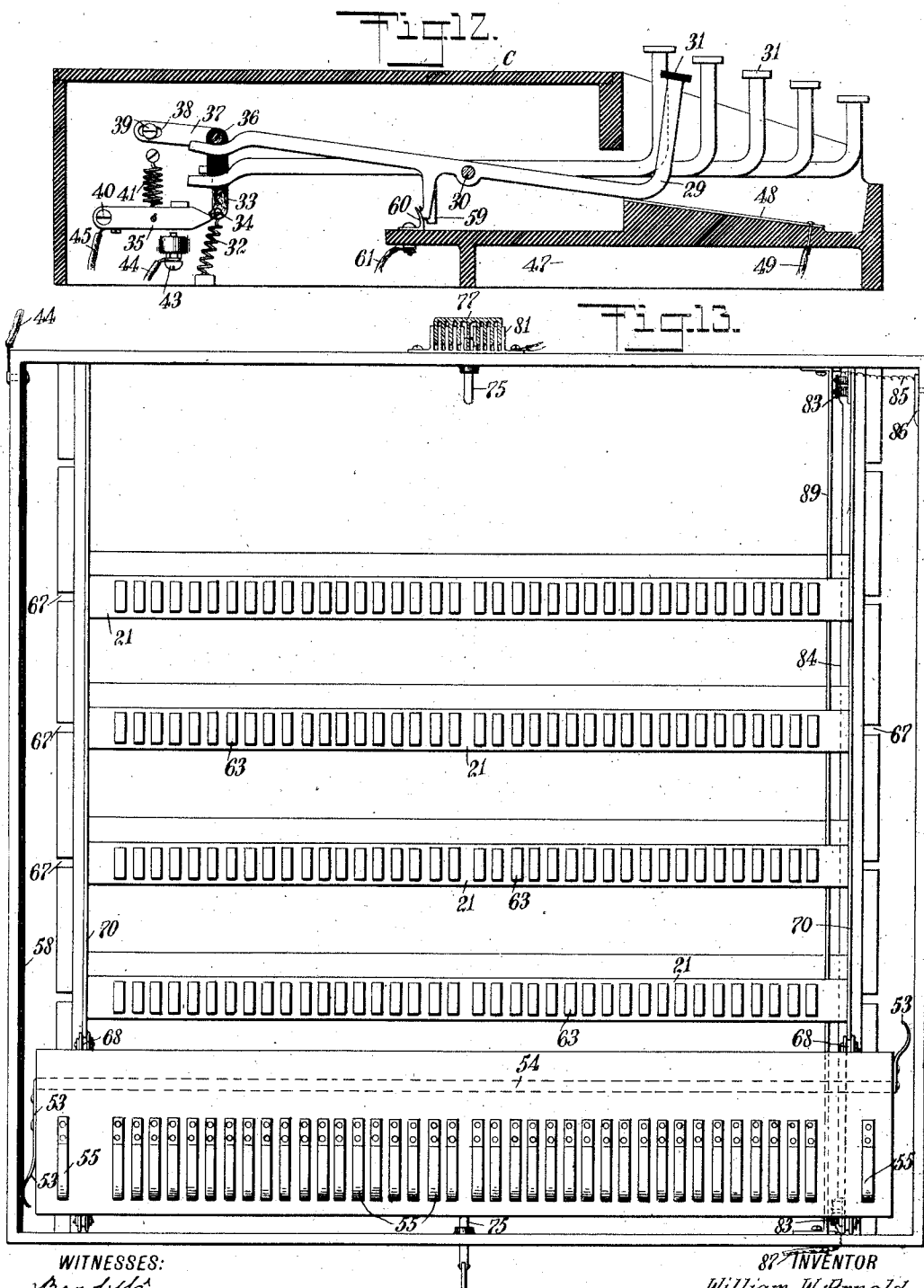


W. W. ARNOLD.
ELECTRICAL ILLUMINATING SIGN.
APPLICATION FILED AUG. 10, 1909.

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6 SHEETS—SHEET 6.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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ELECTRICAL ILLUMINATING-SIGN.

978,828.

Specification of Letters Patent.

Patented Dec. 20, 1910.

Application filed August 10, 1909. Serial No. 512,163.

To all whom it may concern:

Be it known that I, WILLIAM W. ARNOLD, a citizen of the United States, and a resident of Hamilton, in the county of Butler and State of Ohio, have invented a new and Improved Electrical Illuminating-Sign, of which the following is a full, clear, and exact description.

Among the principal objects which the present invention has in view are: to provide an apparatus for producing illuminated display figures successively to form words or other symbols; to provide means whereby the above object is accomplished through a selecting apparatus mechanically operated; to provide a construction whereby the successive words, sentences or combination may be maintained in illuminated form or obliterated at the will of the operator; and to provide a selective mechanism which is certain, efficient and simple in operation.

One embodiment of the present invention is disclosed in the structure illustrated in the accompanying drawings, in which like characters of reference denote corresponding parts in all the views, and in which—

Figure 1 is a view illustrating the layout of a sign wired and equipped, an interposed electric central circuit completing apparatus, and a mechanically operated selective mechanism, all arranged and constructed in accordance with the present invention; Fig. 2 is a front elevation, partly in section, of the central circuit completing apparatus; Fig. 3 is a vertical section, taken on the line 3—3 in Fig. 2, showing the operating carriage and starting and stopping switches in side elevation; Fig. 4 is a vertical section, taken on the line 4—4 in Fig. 2, showing the operating carriage in section; Fig. 5 is an end elevation of the construction shown in Fig. 4 looking at the same from the direction illustrated by the arrow marked 5 in said Fig. 4; Fig. 6 is a sectional view in plan of the releasing mechanism for the contact completing devices, this view being cut in two and contracted; Fig. 7 is a vertical section of the mechanical selecting apparatus; Fig. 8 is a plan view of the construction illustrated in Fig. 7, the top being removed to show the disposition of the operative elements, this figure being broken away in the center; Fig. 9 is a layout view illustrating the mechanical and electrical cooperation of the various elements; and

Fig. 10 is a diagrammatic view in plan of the releasing device for the current completing apparatus; Fig. 11 is a layout view showing the mechanical arrangement and electrical connection for operating the release key of the contact frame; Fig. 12 is a vertical section of the selecting key board constructed in accordance with the present invention, and illustrated as showing one of the keys in operative position; Fig. 13 is a plan view of the switch boards and casing for holding the same.

The signs which this invention has more particularly in contemplation are located on boards having a possibility of one or more extended lines of letters or other characters. These boards are wired to form a number of distinct and separate circuits in which is inserted an illuminating device, such, for instance, as an electric lamp. The illuminating devices are so banked within the allotted space that, as stated, the possibility of the form produced in the space is limited only by the combination of the various circuits employed therein. The capacity of the sign is limited only to the space of the sign board, this being related to the size of what I will style the unit blocks 11, of which there are five shown in the accompanying drawings in Fig. 1. These blocks are constructed of any desired and suitable material, that used by me at present being a wood board or structure of suitable size and marked or spaced off into the blocks 11^a, 11^b, 11^c, 11^d, 11^e. The outer surface is studded with a series of short sections of pipe 12, 12, being of sufficient size to contain a lamp socket and to receive a lamp for the said socket in such manner that the head or nose only of the lamp is exposed. In this manner the radiation of the light laterally is limited, preventing the rendering of the combined form indistinct through diffusion. The various circuits connected with the lamp sockets referred to are on the one side conveyed to a common wire 13, while on the other side they are led from the sign as distinct wires 14, which are congregated to form cables. One such cable is extended from each of the blocks 11, 11 in the completed sign board. Suitably cut in on the common wire 13 is a dynamo 16, or other suitable electrical source. Interposed between the wire 13 and the various cables 15, 15 is a circuit completing apparatus B

wherein the various circuits are completed and maintained as a result of the operation of the selective apparatus C by the operator.

The circuit completing apparatus B is provided with a series of selecting parts composed each of a series of parallel metal strips 17, 17. Each of these strips 17, 17 is suitably insulated from its neighbor and is provided with a binding post 18 extended beyond the casing of the apparatus where-
 10 by the wires composing the cable are secured by the binding screws 19, 19. There are, in vertical arrangement, in each board, as many strips 17 as there are wires 14 or devices 12 in each of the blocks 11. The
 15 strips 17, 17 are mounted stationarily. Disposed across the face of the said strips in vertical positions and movable in guides are a series of rods 20, 20. These rods 20, 20 are guided in cross plates 21, 21 mounted
 20 above and below the metal strips 17, 17. The rods rest by gravity on the bottom 22 of the casing of the apparatus. There are as many rods 20 vertically arranged across the length of the casing of the apparatus as
 25 there are letters or characters in the completed designs to be produced on the sign and upon each of the blocks 11 thereof. As each letter or character requires the employment of a large number of circuits to
 30 illuminate the necessary devices 12, the rods 20, 20 are provided with spring contacts 23, 23 suitably secured thereon to form the needed electrical contacts with the strips 17,
 35 17 comprised in the needed circuits. Each strip 17, is permanently and suitably connected with one device 12. Each operating circuit is composed of one of the said devices 12, the common return wire 13, the
 40 dynamo or other electric source 16, the plates 21, 21 which are connected to the dynamo 16 by means of the binding post 24, and the rods 20, 20 through their contacts 23, 23. Hence, whenever in the operation of the
 45 apparatus the contacts 23, 23 are brought into electrical contact with the strips 17, 17 the circuit of which the selective strip forms a part is electrified and the illuminating devices 12, contained in the branch circuits in-
 50 cluding the various strips 17 engaged by the contacts 23 are illuminated. If the letter A be the character which it is desired to form and the rod 20 corresponding thereto be so disposed that the contacts 23 thereon
 55 be brought into electrical contact with the strips 17, 17 forming parts of the various circuits used in illustrating the letter A, the illumination resulting upon the completion of the various circuits will be formed
 60 on the block. The contacts 23, 23 are brought into contact with the strips 17, 17 when the rods 20, 20 are raised by reason of the said rods being provided at the upper
 65 and lower ends with slots 25, which are inclined to the direction of the movement of

the said rods, as shown particularly at Fig. 4 of drawings, and in such manner as to move the rods 20, 20 laterally as the same are raised in contact with the pins 25^a, 25^a, this movement being sufficient to bring the
 70 contacts 23, 23 against the strips 17, 17. Each rod 20, 20 operates independently of each other rod and is provided with a different assortment and different disposition of the contacts 23, 23, hence, with the rise of
 75 each rod 20 the combined circuits in each cable 15 are changed, resulting in a different arrangement in the illuminated display produced on the blocks 11, 11. With the operation of the rod 20 it is caught and held in
 80 the raised position wherein the contacts 23, 23 bear against the strips 17, 17 and are there held mechanically. This arrangement is produced by the small catches 26, 26
 85 formed on the sides of the rods 20, 20 passing above the sliding lock plates 27. Each of the lock plates 27, 27 is suitably mounted to slide transversely to the path of the rods 20, 20, and is impelled in one direction
 90 by a spiral spring 28 with which each of the lock plates 27 are provided. Due to this construction the action resulting from the upward rise of each of the rods 20, 20 is that
 95 the catches 26 move the lock plates 27 to one side until the said catches pass above the said plates, when the springs 28 immediately move the said plates under the catches 26 of the raised rods 20. In this
 100 position the rods 20 remain until all of the plates 27 are drawn back from under the catches 26, when by reason of their own weight each of the rods 20, 20 will drop to rest upon the bottom 22 of the casing of the
 105 selecting apparatus C. During the time of the said rods being held in the raised position it will be seen that the contacts 23, 23 bear steadily against the strips 17, 17, completing through the said strips the various
 110 circuits necessary to the production of the illuminated design on the block 11 to which the particular board is electrically connected. Coincident with the release of each rod 20 the lifting device is shifted to align
 115 with the next succeeding group of rods and terminals therefor connected with a separate block 11. Thereby it is arranged that only one rod 20 is operated in each group.

The lifting of the various rods 20, 20 is controlled by the selecting apparatus C. The apparatus C resembles in construction
 120 and operation the key board of the usual typewriter. The key bars 29, 29 are pivoted at 30 on pivot rods which extend lengthwise of the casing of the apparatus. The bars are provided with key pads 31, 31
 125 on which is indicated the letter, numeral or other character assigned to the key. The keys are held in raised position at the forward ends carrying the pads 31, 31 by spiral springs 32, 32 secured to a cross bar 36 which
 130

extends over the rear end of each bar 29 by means of links 33, 33 formed from suitable insulating material. The links 33 are provided with heads 34, 34, which, when the links 33 are raised, pass over the end of swinging arms 35, 35. The bars 36 are supported upon links 37, 37 provided at either end of the casing of the apparatus C. The links 37 are provided with elongated slots 38, 38 through which are extended guide screws 39, 39. This mounting of the bar 36 permits the same to assume the position shown in dotted lines in Fig. 7 of drawings when one of the padded ends of the key bars 29 is depressed, as shown in dotted lines in said Fig. 7. The arms 35 are pivotally mounted in the sides of the casing at 40 and are held in a suspended position by means of a spiral spring 41. In the raised position the arms 35 bear against the blocks 42, 42. The arms 35 are depressed above and in line with the binding screw 43 through which the terminal wire 44 of the escapement circuit is secured. This escapement circuit referred to is constituted by the wire 44 and a wire 44 which is secured to the arms 35 and is the other terminal of said circuit. The remaining elements of this circuit are the electric source and the solenoids 46 mounted upon a rolling carriage within the circuit completing apparatus B. This circuit is completed whenever the arms 35 are brought in contact with the binding post 43; and this action is produced as hereafter set forth following each depression of a key 31 to operate to complete the circuit within the circuit completing apparatus B for any one of the characters upon the sign.

Below the forward or pad carrying ends of the bars 29 is a table 47 which extends across the front of the apparatus C. The table 47 is formed from any suitable insulating material, and has secured thereon a series of metal strips 48, 48. The strips 48, 48 coincide in number with the key bars 29 and are so disposed as to receive one of the said bars in contact, and only one. The strips 48 constitute the terminals of the various circuits which this selecting apparatus C is constructed to produce. From each of the strips 48 is extended a circuit wire 49. The wires 49 are gathered and bound into a cable which is carried to the circuit completing apparatus B and there distributed and connected with the various magnets 51, 51 which are suspended from the platform 52 of the carriage employed in the circuit completing apparatus B. Each magnet 51 is provided with the usual wire winding and exposed cores, the winding in the present case being secured on the one side to a common ground bar 54 and on the other side each magnet is metallically secured to a brush spring 55 extended upward from the platform 52. Each spring 55 bears against

a strip 56, 56, which in turn are each provided with a binding post 57, 57 to which the various wires 49 are secured. The bar 54 is extended lengthwise of the platform 52 and forms a metallic contact with the brush springs 53, 53 which are arranged to bear against terminal plates 58, 58. The plates 58, 58 are in metallic contact with the dynamo 16 or other electrical supply. It will be seen from this arrangement that whenever a circuit is completed by the depressing of any particular one of the key bars 29, that circuit incorporates one and only one, of the various magnets 51, 51. The circuit is completed by the depression of the bars 29 by reason of a depended arm 59 mounted on each of the said bars 29, being brought in brushing contact with a brush spring 60 mounted on the inner end of the platform 47. The brush contacts 60 may be many or one. In either event it or they are connected by a terminal 61 to the opposite side of the dynamo 16.

In the operation of the selecting apparatus C as just described, when each key is depressed the bar 29 forms a contact between one of the terminals 60 and the common terminal 48 of the circuit in which is incorporated one of the magnets 51. This magnet 51 is provided with suitable pole pieces 62, 62 which are juxtaposed to plates 63, 63, thus constituting what are substantially the armatures of the said magnets. With the energization of the magnet it draws the plate 63 upward. The plates 63 are integrally formed with the rods 20, 20.

As above explained, the rods 20, 20 when lifted are influenced by the inclined slots 25, 25 to throw forward to cause the contacts 23, 23 to impinge upon the strips 17, 17 for which they are designed. Also, as above explained, when each of the rods 20, 20 are raised the catches 26, 26 extend over and are held by the plates 27, 27 and thus remain until the said plates are removed from their mechanical engagement with the said rods. It has also been explained that coincident with the contact between the contacts 23, 23 and the strips 17, 17 some one particular letter is formed and displayed upon the sign and in the successive block 11 thereof. It has also been stated that there could be, in the proper operation of the apparatus, but one character displayed on each of the blocks. The reason for this is as follows: With the depression of each bar 29 to cause the selective operation above described the links 33, 33 are raised so that the heads 34, 34 thereof extend over the arms 35, 35. In this position the springs 32, 32 are exerting a pull which, when the finger is raised from the key pads 31 causes the inner end of the bar 29 and the links 33 to be depressed into the normal position shown in full lines at Fig. 7 of drawings. On the

return of the link 33 it bears upon the arm 35 causing the same to be depressed until it impinges upon the binding screw 43, thereby completing the electrical circuit in which the solenoids 46, 46 are incorporated. The contact which is formed between the arm 35 and the binding post 43 is momentary, for the reason that the head 34 of the link 33 normally rests below the end of the arm to which it may be depressed, and is impelled to assume such lowered position by the spring 32 passing from over the arm 35 in order so to do. This releases the arm 35 and permits the spring 41 to raise the same to its normal position, which is out of contact with the binding post 43. In this manner there is established a current within the solenoids 46 which energizes the same to free the carriage on which are suspended the magnets 51 and to permit the mechanical means to retract the said carriage from this held position. The breaking of the circuit of the solenoid, however, occurs almost immediately and before the plunger 64 reaches the succeeding indent 67. When such indent is reached the spring 65 seats the plunger 64 within the said indent, and the carriage is locked in position for the succeeding action on the selecting apparatus B and the circuit completing apparatus C. The plunger cores 64, 64 of the solenoids 46, 46 are extended from the center of the solenoids by means of spiral springs 65, 65 which springs press the outer ends of the cores 64 against indented rails 66, 66. The rails 66, 66 are provided with a series of indents 67, 67 there being one of such indents in line with each row of the rods 20, 20 and the plates 63, 63 carried thereby. Or, in other words, there is a position for the carriage supporting the magnets 51 directly over the said rods 20 in each board of the contact completing apparatus B, and this whether the multiplicity of boards be great or small. The carriage supporting the said magnets is mechanically impelled from the forward to the rear end of the casing of the apparatus B, passing transversely over the said boards. The plungers 64, 64 are engaged successively by the indents 67, 67, as stated. It is from such engagement that the plunger cores are raised when the solenoids 46 are energized, as above described. Thus it will be seen that following the energization of each of the magnets 51 and coincident with the release of the key the depression of which causes the said energization of the magnets 51, there is a contact made which energizes the solenoids 46, drawing the plungers 64 upward to within the coil of the solenoid and out of the indent 67. In this position, the carriage being unrestrained, the mechanical means immediately shifts the same.

The carriage above referred to embodies

the platform 52 preferably constructed from any suitable insulating material. This is mounted on suitable carrying wheels 68, 68 which have bearings in brackets 69, 69 fixedly mounted upon the said platform. The wheels 68 track upon rails 70, 70 which are extended at both sides of the casing of the circuit completing apparatus B from the front to the rear thereof. The carriage has secured to each side thereof flexible draft connectors 71 and 72 each of which are led over pulleys and to each of which are attached weights 74, 74. The weight 74 attached to the flexible connector 72 is considerably heavier than that attached to the connector 71. Therefore, the normal tendency of the carriage is to pass to the pulley 73 over which the connector 72 is threaded. When, however, the weight 74 of the connector 72 is raised by the operator the weight mounted on the connector 71 is sufficient to draw the carriage to the forward position. At the forward and rear positions of the carriage are placed the plungers 75, 75. These are suitably mounted in guide bosses 76, 76 and are pivotally secured to levers 77, 77, pivotally mounted at 78, 78 at the front and rear of the casing of the circuit completing apparatus B. The upper ends of the two levers 77 are connected by a flexible connector 79 which is guided over the idler pulleys 80, 80. By means of the connector 79 when either of the levers 77, 77 is thrust from, the other is drawn toward, the casing of the circuit completing apparatus B. The operation of these levers 77, 77 and connected instrumentalities is designed to provide for the completing and breaking of the main circuit and for the disengagement of the various plates 27, 27 from the rods 20, 20 held by them in operative position. At the rear of the casing is a terminal block 81 with which the lever 77 or a suitable member connected therewith forms an electrical contact. The said block 81 and the lever 77 form a switch on the lighting circuit. The switch 82 shown in the diagram illustrated in Fig. 9 is used as the equivalent of these parts. When in the course of this operation the carriage is retracted so that the platform 52 strikes upon the plungers 75, it forces the lever 77 out of electrical contact with the block 81, thereby opening the circuit 82. With the movement of the one lever 77 out of contact with the block 81, the opposite lever 77 through the engagement by the connector 79, is drawn toward the casing, thrusting the plunger 75 carried by it into the said casing. When now the heavier weight 74 is raised, the lighter weight 74 draws the carriage forward in the casing of the circuit completing apparatus B, until the platform of the said carriage impinges upon the plunger 75 in the front of the said casing, thrusting the same away from said

casing and drawing the opposite lever 77 into electrical contact with the block 81. The lighting circuits are arranged so that by the manipulation of any of the said rods 20, 20 the lighting circuit is completed.

In order that the various rods 20, 20 may be successively operated, it is necessary that the plates 27, 27 shall be drawn out of holding engagement therewith at the completion of the rearward travel of the carriage. To accomplish this I have provided magnets 83, 83 which are electrically connected in series by the wire 84. The one of said magnets is connected by means of a wire 85, to a wiping strip 86, fixedly mounted on the side of the said casing and adapted to be impinged upon by one of the springs 53 just prior to or simultaneously with the impingement of the platform upon the plunger 75 connected with the lever 77 which is arranged to break the main lighting circuit. It is to the same circuit that the wires 84, 85 and 87 lead and are connected, whereby when the circuit is broken by the disengagement of the lever 77 and the block 81 the circuit through the wires 84, 85 and 87 and strip 86 and the magnets 83 is also broken. It is during the period of time immediately preceding the throw of the lever 77 from the block 81 that the circuit through the magnets 83, 83 is completed. The magnets 83, 83 as shown in Fig. 3 of the drawings are located at opposite ends of the casing of the circuit completing apparatus B. Mounted upon screws 88, 88 is a plate 89 formed from suitable metal and adapted to be drawn to the cores 90, 90 of the magnets 83, 83. Attached to the plate 89 are the various plates 27, 27 which are thereby moved with the said plate 89 and simultaneously. This movement of the plates 27, 27 is sufficient to withdraw the said plates from engagement with the catches 26, 26 of the rods 20, 20, permitting the said rods to fall for the lack of support by the said plates 27, 27. When the carriage is shifted forward, as above described, the brush 53 is drawn from contact with the strip 86 and the springs 28 are permitted to slide the said plates 27 under the catches 26 of the rods 20 when and as the same are again raised in the continuance of the operation of the sign illuminated.

Having an apparatus constructed and arranged as above described and as shown in the accompanying drawings the operation of the same is as follows: The initial step of the operator would be to lift the heavier of the weights 74 for mechanically operating the carriage of the circuit completing apparatus B. If the apparatus B is provided with a main control switch this is then closed. The operator now, by manipulation of the key bars 29, spells out a word, or if the sign be sufficiently large, a message.

With the depressing of any one of the key pads and the key bar 29 connected therewith, a letter or character corresponding to that for which the particular key pad stands is traced upon one of the blocks 11 of the sign, 70 the tracing being from lamp 12 to lamp 12 within the said block. The key being released causes the solenoids 46 to become energized momentarily to release the carriage and to permit it to fall back for one space 75 and to present the magnets 51 to the next board or bank of plates 63 and rods 20. The second letter of the word being now depressed, there flashes on the second space the second illuminated tracing in simulation of the character for which the said depressed key stands. Again, on the releasing of the second key the solenoids are energized, inaugurating the movement whereby the carriage is again shifted to the next board or bank of rods 20, 20. As each character is illuminated it so remains, due to the rod 20 having been caught and suspended by the plate 27. Thus, if the sign comprises a thousand blocks 11 and the circuit completing apparatus B a corresponding number of groups of plates 17 and rods 20, 20, an illuminated message could gradually be formed upon the sign containing a thousand letters or as many words as those letters would form. At the end of the capacity of the board the carriage would move so that the platform 52 would impinge upon the plunger 75 at the rear end of the casing of the circuit completing apparatus B, to throw the lever 77 out of contact with the switch block 81, thereby breaking the illuminating circuit and placing the whole sign in darkness. Momentarily preceding the breaking of this circuit the brush contact 53 would have swept the terminal strip 86, completing the energizing circuit through the magnets 83 and thereby moving the plate 89 and the plates 27, 27 connected therewith so that the various rods 20, 20 which have held the circuits for the various illuminating devices are permitted to resume their inward and normal position. To continue the operation the steps above described are repeated, thereby permitting such a sign as herein described to be used for conveying a continuous sight message even though the capacity of the sign be limited to only a few words.

While nothing herein has been mentioned with regard to regulating the respective currents, it will be understood that the lighting current may be independent of the current operating the circuit completing apparatus B, whereby the parts of the selecting apparatus C may be formed to a structure more delicate than would otherwise be desirable, and also having the use of variable resistances placed on the various branches of one circuit.

The space bar 91 illustrated in Fig. 1 of

the drawings is provided with a bar 29 similar in all respects to those heretofore described. The plate 48 and the terminal connected therewith are omitted, therefore the action when the spacing bar or key 91 is depressed is that the solenoids 46, 46 are energized by the return of the latches 33, 33 and their depressions of the arms 35, 35 as in the other keys of the selective device. The result of this is to skip a space or unit 11 if such effect be desired. This may be utilized in sign writing as in the ordinary type machine writing when sentences are separated. It may also be utilized in spacing after a punctuation mark.

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

1. An electrical illuminating sign, comprising a sign structure embodying a plurality of monograms; a multiplicity of electric circuits incorporating in each circuit a separate display device mounted on said sign structure; a plurality of board-like members arranged in successive order, said board-like members equaling in number said monograms and arranged to receive the circuit wires of the said monograms of said sign; a series of elongated metal strips mounted on said board like members in parallel arrangement, each of said strips forming the terminal for one of the said circuits incorporating one of the said display devices; movable contactors each adapted to complete a series of said circuits by impinging on a series of said terminals; a series of electromagnets equaling in number the characters to be displayed on the sign and disposed in juxtaposition to the said contactors on one of the said board-like members; a carriage supporting said magnets and movably mounted to convey the said magnets successively over the said board-like members; means for moving the said carriage; electro-responsive means for arresting the movement of said carriage; and circuit closing devices to operate said magnets.

2. An electrical illuminating sign, comprising a sign structure embodying a plurality of monograms; a multiplicity of electric circuits incorporating in each circuit a separate display device mounted on said sign structure; a plurality of board-like members arranged in successive order, said board-like members equaling in number said monograms and arranged to receive the circuit wires of the said monograms of said sign; a series of elongated metal strips mounted on said board-like members in parallel arrangement, each of said strips forming the terminal for one of the said circuits incorporating one of the said display devices; movable contactors each adapted to complete a series of said circuits by impinging on a series of said terminals; a series of

electromagnets adapted to cause said contactors to impinge on said terminals, said electromagnets equaling in number the said contactors and disposed in juxtaposition thereto; a carriage to support said magnets, said carriage being mounted on carrying wheels to operate to successively present the said magnets to the successive board-like member; electro-responsive means for arresting the said carriage at each of the said board-like members, to successively place the said magnets in operative position to the contactors of the successive board-like member; circuit closing devices to operate said magnets; and means for maintaining in contacted position the said contactors.

3. An electrical illuminating sign, comprising a sign structure embodying a plurality of monograms; a multiplicity of electric circuits incorporating in each circuit a separate display device mounted on said sign structure; a plurality of board-like members arranged in successive order, said board-like members equaling in number said monograms and arranged to receive the circuit wires of the said monograms of said sign; a series of elongated metal strips mounted on said board-like members in parallel arrangement, each of said strips forming the terminal for one of the said circuits incorporating one of the said display devices; movable contactors each adapted to complete a series of said circuits by impinging on a series of said terminals; a series of electromagnets equaling in number the characters to be displayed on the sign and disposed in juxtaposition to the said contactors on one of the said board-like members; a carriage supporting said magnets and movably mounted to convey the said magnets successively over the said board-like members; means for moving the said carriage; electro-responsive means for arresting the movement of said carriage; circuit closing devices to operate said magnets; and means for maintaining in contacted position the said contactors.

4. An electrical illuminating sign, embodying a sign structure embodying a plurality of monograms; a multiplicity of electric circuits incorporating in each circuit a separate display device mounted on said sign structure; a plurality of board-like members arranged in successive order, said board-like members equaling in number said monograms and arranged to receive the circuit wires of the said monograms of said sign; a series of elongated metal strips mounted on said board-like members in parallel arrangement, each of said strips forming the terminal for one of the said circuits incorporating one of the said display devices; movable contactors each adapted to complete a series of said circuits by impinging on a series of said terminals; a

a series of electromagnets adapted to cause said contactors to impinge on said terminals, said electromagnets equaling in number the said contactors and disposed in juxtaposition thereto; a carriage to support said magnets, said carriage being mounted on carrying wheels to operate to successively present the said magnets to the successive board-like member; electro-responsive means for arresting the said carriage at each of the said board-like members to successively place the said magnets in operative position to the contactors of the successive board-like member; circuit closing devices to operate said magnets; means for maintaining in contacted position the said contactors; and means for releasing the said contactors after the said carriage has presented the said magnets to the contactors of the last of the said board-like members.

5. An electrical illuminating sign, comprising a sign structure embodying a plurality of monograms; a multiplicity of electric circuits incorporating in each circuit a separate display device mounted on said sign structure; a plurality of board-like members arranged in successive order, said board-like members equaling in number said monograms and arranged to receive the circuit wires of the said monograms of said sign; a series of elongated metal strips mounted on said board-like members in parallel arrangement, each of said strips forming the terminal for one of the said circuits incorporating one of the said display devices; movable contactors each adapted to complete a series of said circuits by impinging on a series of said terminals; a series of electromagnets adapted to cause said contactors to impinge on said terminals, said electromagnets equaling in number the said contactors and disposed in juxtaposition thereto; a carriage to support said magnets, said carriage being mounted on carrying wheels to operate to successively present the said magnets to the successive board-like member; electro-responsive means for arresting the said carriage at each of the said board-like members to successively place the said magnets in operative position to the contactors of the successive board-like member; circuit closing devices to operate said magnets; means for maintaining in contacted position the said contactors; means for releasing the said contactors after the said carriage has presented the said magnets to the contactors of the last of the said board-like members; and a cut-out switch operated by said carriage after the last magnets have been presented to the contactors of the last board-like member.

6. An electrical illuminating sign, comprising a sign structure embodying a plurality of monograms; a multiplicity of electric circuits incorporating in each circuit a separate display device mounted on said

sign structure; a plurality of board-like members arranged in successive order, said board-like members equaling in number said monograms and arranged to receive the circuit wires of the said monograms of said sign; a series of elongated metal strips mounted on said board-like members in parallel arrangement, each of said strips forming the terminal for one of the said circuits incorporating one of the said display devices; movable contactors each adapted to complete a series of said circuits by impinging on a series of said terminals; a series of electromagnets adapted to cause said contactors to impinge on said terminals, said electromagnets equaling in number the said contactors and disposed in juxtaposition thereto; a carriage to support said magnets, said carriage being mounted on carrying wheels to operate to successively present the said magnets to the successive board-like member; electro-responsive means for arresting the said carriage at each of the said board-like members to successively place the said magnets in operative position to the contactors of the successive board-like member; circuit closing devices to operate said magnets; means for maintaining in contacted position the said contactors; means for releasing the said contactors after the said carriage has presented the said magnets to the contactors of the last of the said board-like members; a cut-out switch operated by said carriage after the last magnets have been presented to the contactors of the last board-like member; and means for closing the said cut-out switch by moving the said carriage in line with the contactors of the first of the said board-like members.

7. An electrical illuminating sign, comprising a sign structure embodying a plurality of monograms; a multiplicity of electric circuits incorporating in each circuit a separate display device mounted on said sign structure; a plurality of board-like members arranged in successive order, said board-like members equaling in number said monograms and arranged to receive the circuit wires of the said monograms of said sign; a series of elongated metal strips mounted on said board-like members in parallel arrangement, each of said strips forming the terminal for one of the said circuits incorporating one of the said display devices; movable contactors each adapted to complete a series of said circuits by impinging on a series of said terminals; a series of electromagnets adapted to cause said contactors to impinge on said terminals, said electromagnets equaling in number the said contactors and disposed in juxtaposition thereto; a carriage to support said magnets, said carriage being mounted on carrying wheels to operate to successively present the said magnets to the successive

board-like member; electro-responsive means for arresting the said carriage at each of the said board-like members to successively place the said magnets in operative position to the contactors of the successive board-like member; circuit closing devices to operate said magnets; means for maintaining in contacted position the said contactors; means for releasing the said contactors after the said carriage has presented the said magnets to the contactors of the last of the said board-like members; a switch having a projection in the path of said carriage, adapted to be impinged thereby to open the said switch after the magnets have been presented to the contactors of the last board-like member; a switch at the opposite end of the path of the said carriage, having a projection to extend into the path of the same to be impinged upon by the said carriage as the same approaches the position wherein the magnets are presented to the contactors of the first of the said board-like members; and suitable connections for the said switches, whereby the movement of the one impels the movement of the other.

8. An electrical illuminating sign, comprising a sign board embodying a plurality of monograms; a series of switch boards corresponding in number with the number of monograms in said sign board, said switch boards being disposed in parallel arrangement and in close order; a plurality of contact strips mounted on each of said switch boards, said strips corresponding in number to the number of illuminating devices mounted on the monogram to which each switch board is connected; a key-operated circuit closing mechanism having keys corresponding in number to the various sign characters; a plurality of movable contacts mounted on each of said switch boards and

equaling in number the said sign characters, each of said movable contacts adapted to be moved to place in circuit a separate group of said contact strips; a carriage movably mounted to travel past the edge of said switch boards successively; a series of electromagnets equaling in number the said keys, mounted on said carriage to aline with said contacts successively, said electromagnets being in circuit with the said keys to be energized by the closing of said keys; and means for moving the said carriage past the said switch boards successively.

9. An electrical illuminating sign, comprising a sign board embodying a plurality of monograms; a series of switch boards corresponding in number with the number of monograms in said sign board, said switch boards being disposed in parallel arrangement and in close order; a plurality of contact strips mounted on each of said switch boards, said strips corresponding in number to the number of illuminating devices mounted on the monogram to which each switch board is connected; a plurality of movable contacts mounted on each of said switch boards and equaling in number the various sign characters, each of said movable contacts adapted to be moved to place in circuit a separate group of said contact strips; and means for moving one of said contacts on each switch board against the said strips thereon to place in circuit a certain series of said strips and illuminating devices connected therewith.

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

WILLIAM WARREN ARNOLD.

Witnesses:

FRANK M. HECK,

J. C. SLAYBACK.