June 10, 1947. E. H. UNKLES ET AL 2,422,149

SIGN CONTROL AND SYSTEM

Filed Nov. 16, 1943 4 Sheets-Sheet 1

Fig. 1

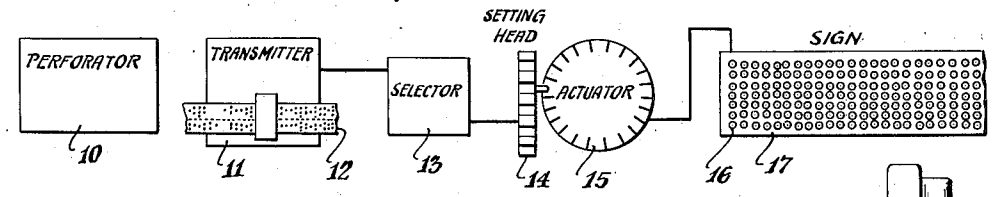


Fig. 2

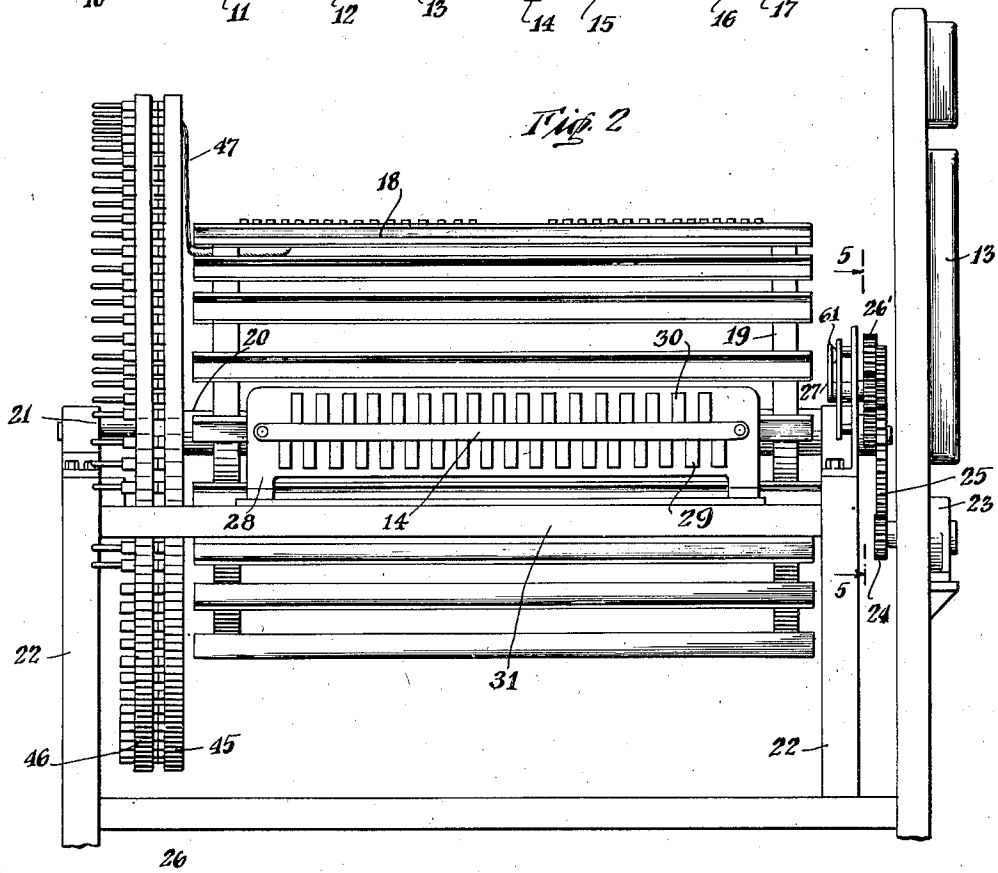
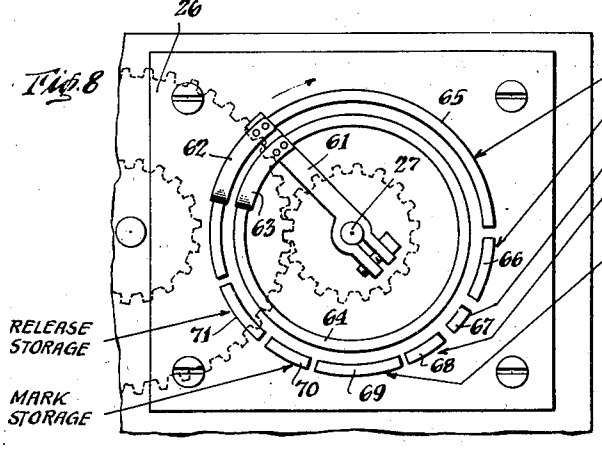


Fig. 8



SETTING HEAD

RELEASE LETTER AND CHARACTER

TAPE STEP

NEUTRAL

OPERATE STORAGE RELAYS

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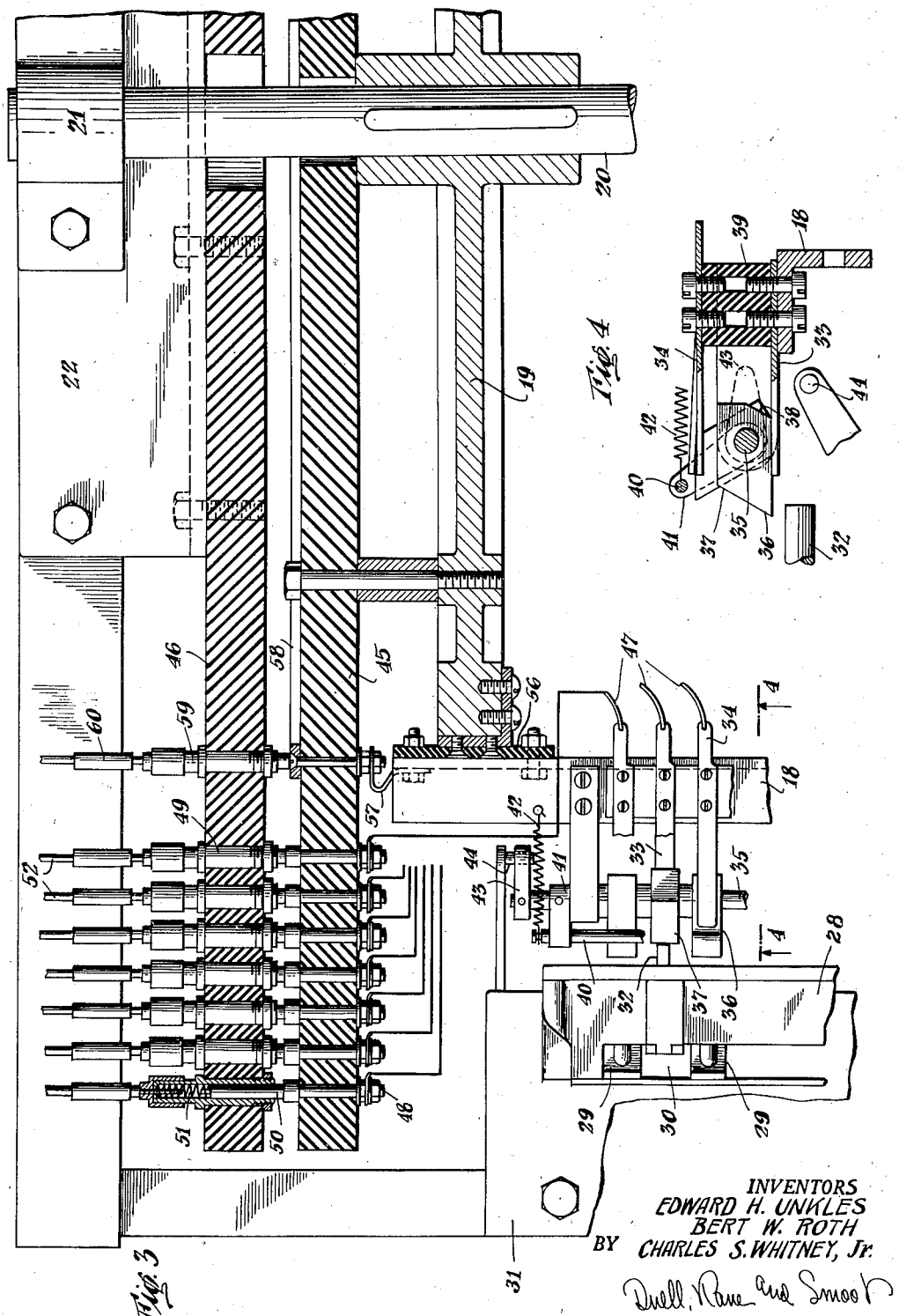


Fig. 3

Fig. 4

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SIGN CONTROL AND SYSTEM

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Fig. 6

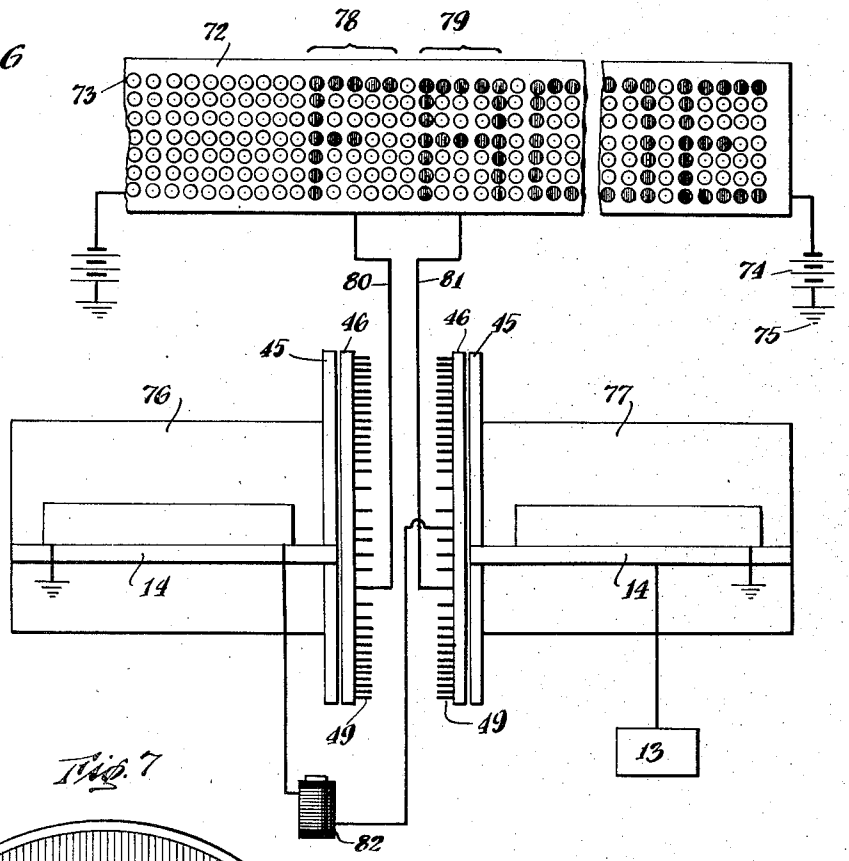


Fig. 7

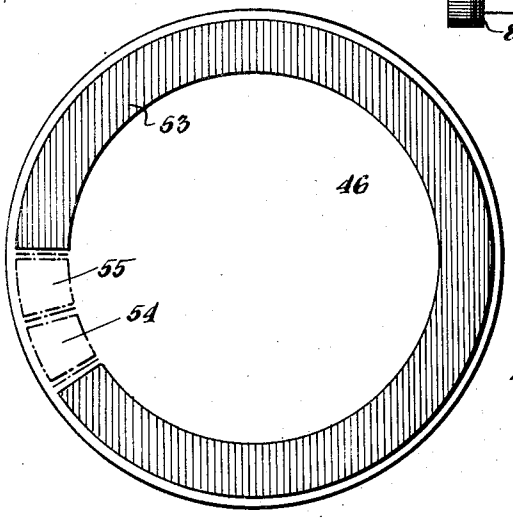
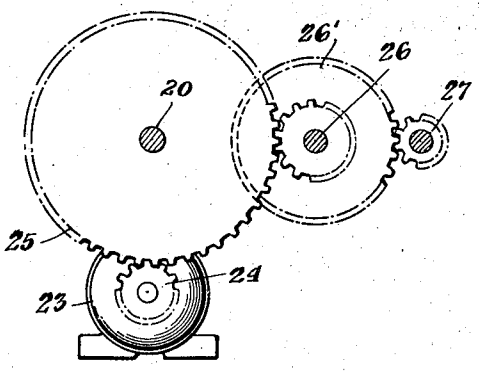


Fig. 5



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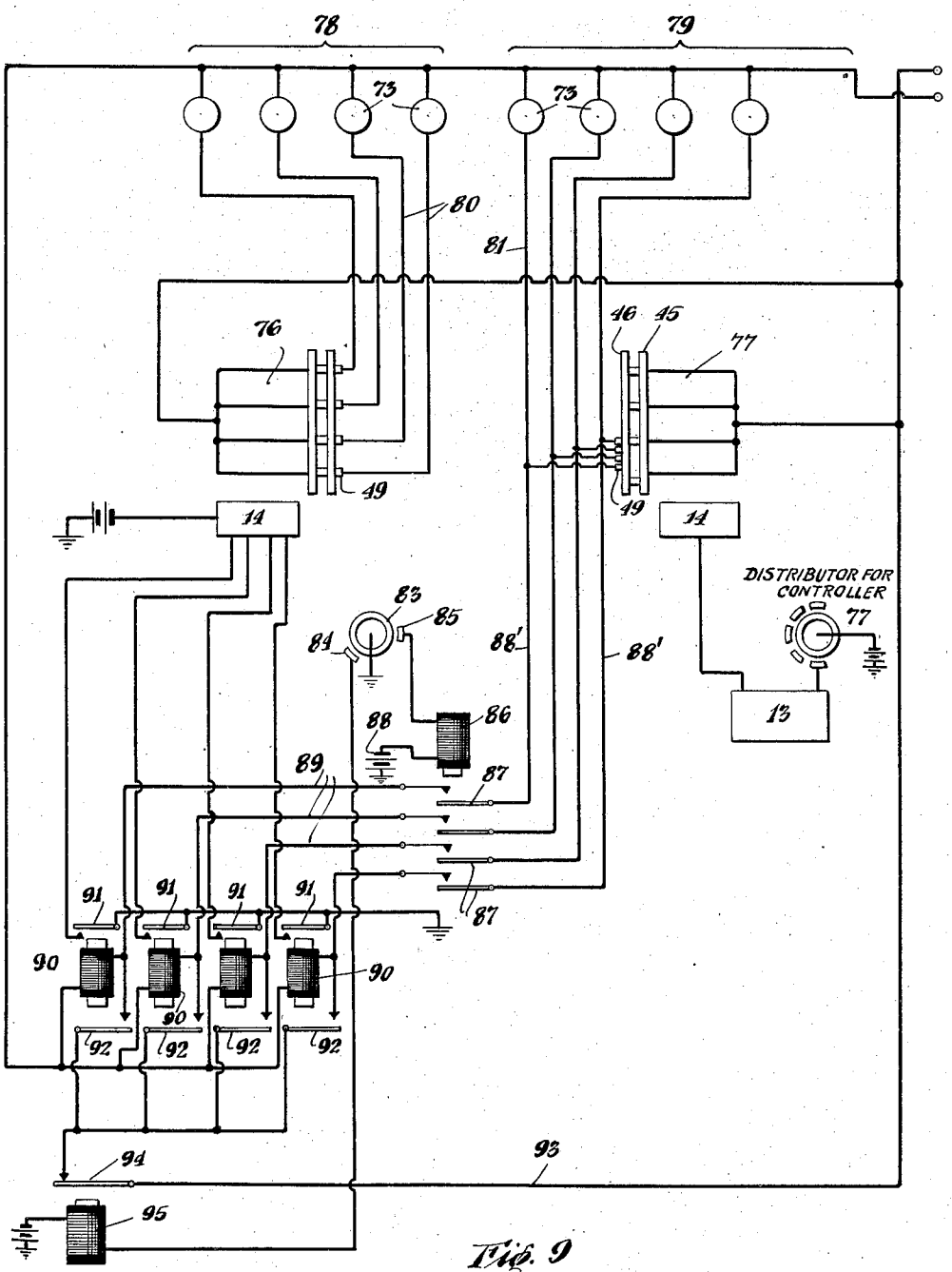


Fig. 9

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UNITED STATES PATENT OFFICE

2,422,149

SIGN CONTROL AND SYSTEM

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Application November 16, 1943, Serial No. 510,470

16 Claims. (Cl. 177—346)

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This invention relates to a structurally and functionally improved sign control and system; the present application being a continuation in part of our application for Sign control and system which is now identified under United States Patent 2,343,594, dated March 7, 1944.

It is an object of the invention to provide a structure and system of this type, and by means of which a sign may be actuated or energized to display a successive series of indicia including, for example, letters, symbols and numerals and which indicia will be presented in a non-confusing or interfering relationship. Accordingly, the observer will see, for example, a series of indicia elements which present the illusion of traveling or shifting along the sign to present a coherent and readily readable message.

Preferably, according to the teachings of the present invention, the sign will embrace a field composed of a series of energizable elements capable of being operated according to any desired and predetermined permutation to furnish clearly legible indicia; the present control system and apparatus serving to assure an operation of the controller associated with the panel in a manner such that the indicia will appear to be traveling across the face of the sign.

It is a further object of the invention to provide a layout of apparatus such that an operator may readily control the entire assembly; it being, for example, feasible for the operator to govern the functions of the controller in a manner such that current information, data or messages prepared by the operator may be displayed upon and traverse the sign panel or equivalent structure.

Another object is that of furnishing a control system and by means of which—without any undue complication—a sign panel of virtually any desired or required length may be caused to operate with the same efficiency as a panel of materially shorter length.

Other objects of the invention will become hereinafter apparent. Reference is had to the attached sheets of drawings illustrating one practical embodiment of the invention, and in which:

Fig. 1 is a diagrammatic view of a layout of apparatus such as may be embodied in a control system and sign;

Fig. 2 is a face view of one form of controller which may be embodied in this system;

Fig. 3 is a fragmentary and somewhat enlarged sectional view of a portion of the controller;

Fig. 4 is a transverse sectional view taken along the lines 4—4 and in the direction of the arrows as indicated in Fig. 3;

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Fig. 5 is a transverse sectional view taken along the lines 5—5 and in the direction of the arrows as indicated in Fig. 2;

Fig. 6 is a somewhat diagrammatic view showing the association of a pair of controllers with each other and with a sign common to the same;

Fig. 7 is again a somewhat schematic view showing a portion of the controller apparatus;

Fig. 8 is a face view of the synchronizer or governing mechanism which acts as a distributor and which is coupled to the controller; and

Fig. 9 is a schematic view of a wiring diagram showing the circuit which may be incorporated in the layout of the apparatus.

Attention is primarily directed to Fig. 1, in which there has been diagrammatically shown a grouping of mechanism in accordance with the teachings of the present invention. In this view, the reference numeral 10 indicates a perforator for a tape, 11 a transmitter which cooperates with the perforated tape 12, and 13 a selector mechanism. This mechanism controls the operation of the setting head indicated by the reference numeral 14, which in turn causes current to flow through selected paths or portions of the actuator 15. The latter is connected to the energizable elements 16 of a sign panel 17.

As will readily be understood by those skilled in the art, various forms of perforating, transmitting and selecting mechanisms have heretofore been devised and are currently on the market. Except insofar as they form a part of the present inventive combination, they are not to be considered as novel per se in the present application. Thus, the perforator ordinarily takes the form of a keyboard mechanism through which a tape is passed to be perforated. This tape, as indicated by the reference numeral 12, conveniently presents aggregations of openings or perforations formed in accordance with the operation of the perforator 10. Also, the tape is conveniently formed with a series of feed perforations or any other desired or necessary structure, such that it may be fed by the mechanism of the transmitter.

The latter ordinarily has a series of pins or equivalent elements which are projected and retracted in accordance with the perforations or equivalent indicia formed in the tape 12. Such operation of pins is accomplished by a feeding mechanism associated with the transmitter and cooperating with feed perforations of the tape to cause a traversal of the same with respect to the transmitter pins or their equivalents. This operation of the parts results in a series of

electrical impulses being transmitted to the selector 13.

The latter may include a number of desired structures but it is preferred that the same be constructed in accordance with the teachings of United States Letters Patent 2,343,294 to Haselton et al. on "Traveling message sign," issued March 7, 1944. A selector of this or equivalent type serves to cause a functioning of the mechanism of the setting head in a manner corresponding to the impulses received by the selector. The functioning of the setting head in turn causes operation of the switch elements or equivalents associated with the controller.

Of course, in certain instances, the selector 13 might be manually controlled by a suitable form of mechanism. Such an operation is, however, not preferred in that it has proven to be more desirable to embody the message to be displayed on the sign in the form of a record such as the tape 12. When thus embodied, it may be edited, if desired, and continuously fed through the transmitter or else modified to, for example, provide an endless record which repeatedly passes through the transmitter. Regardless of the manner in which the selector mechanism is operated, however, the setting head will be actuated to set up or provide current paths through the elements of the actuator 15. These paths including the energizable elements 16 or their equivalent, it follows that certain of the latter will be illuminated to thus cause an actuation of the sign or, in other words, a display of indicia upon the field or base 17 thereof.

Again a fuller understanding of the manner in which the foregoing set-up of apparatus accomplishes the desired results as well as the manner in which mechanism hereinafter described functions, reference is next had to Fig. 2 which shows the controller in elevation. The subject matter of the controller is primarily claimed in the parent patent of which the present case forms a continuation in part. In any event, it will be seen that, as illustrated, this unit may comprise an annular series of bars or supports 18 secured to mounting members 19, in turn supported upon a rotatable shaft 20. The ends of this shaft may extend into bearings 21 associated with a base 22. A rotation of shaft 20 and the elements associated therewith is conveniently effected by an electric motor 23 driving a gear 24, the teeth of which mesh with a gear 25 affixed to that shaft. The details of this drive have been shown in Fig. 5 which also shows that a shaft 26 may be driven in a predetermined manner with respect to shaft 20 by providing a gear train 26' conveniently driven by gear 25 and which train serves to rotate shaft 27.

The setting head 14 as shown especially in Fig. 2, may include a support 28 mounting a seriees of switch-actuating elements. In order to minimize the spaee necessary for these elements, they are conveniently divided into two rows as indicated by the numerals 29 and 30; the actuators of the different rows being arranged in staggered relationship. In other words, adjacent actuators are disposed in different rows. The entire setting head may be mounted upon a support 31 which is coupled against movement with respect to the base 22.

As shown especially in Figs. 3 and 4, the operative part of the actuators may be in the form of plungers 32 serving to actuate switch elements. As shown in the parent application, these elements may take numerous different forms. According to one type of construction, it is preferred to employ the form illustrated in the last two figures and which conveniently includes a pair of arms 33 and 34 both of which may incorporate substantial resiliency. A shaft 35 extends between these arms and may be common to all the switch elements. Individual to each element and mounted by this shaft is a multi-sided member or block 36 formed of conducting material. This block may embrace substantially parallel side edges and an end edge 37 extending tangentially with respect to the side edges. The opposite end edge should be formed with an angularly extending surface 38 which is conveniently parallel to the edge 37. As will be seen particularly with reference to Fig. 4, arm 33 of each switch element is preferably grounded to or in direct contact with the support 18. Also, this arm projects immediately adjacent the block 36. Arm 34, on the other hand, is insulated from the support 18 by, for example, di-electric material 39. Also, it extends normally in spaced relationship with respect to block 36. This block which is rotatably mounted with respect to shaft 35 may, however, be swung to a position such as is shown in this figure and in which its edge portion 38 will be in electrical contact with arm 33 while its edge 37 may electrically engage arm 34. Under such circumstances and due to the resiliency incorporated in the arm, it is obvious that an accidental dislodgement of the block 36 from between the same is prevented. Under these circumstances, current will, of course, be free to flow from arm 34 to arm 33.

To effect such shifting of the block 36, it will be observed that the actuating plungers 32 of the setting head may be projected to a position such that they intersect the path of normal travel of the projecting end portion of the block. Consequently, as the series of supports move as the result of the rotation of shaft 20, those switch elements which are in line with plungers 32—extending into projected position—will be engaged by them. This will have the result of rotating the corresponding block as the supports 18 continue to move to positions at which they engage arms 33 and 34, thus closing the circuit between the latter.

For reasons which will hereinafter become apparent, it will be necessary to open the switch elements. To secure this result, a bar 40 may be swingingly supported to overlie the ends of blocks 36. This bar may be mounted upon arms 41 rockingly supported by the shaft 35 and the bar is preferably common to an entire row of switch elements. A spring 42 may normally maintain the bar out of contact with the blocks 36 and in the position shown in Fig. 4. A crank 43 may be secured to the shaft 35 so as to rock the latter as well as arms 41 and the bar 40 carried thereby. When so rocked, the bar will move to a position at which it will engage the edge 37 of any block which is in circuit-closing position. Thereupon, it will shift the block to a position at which its side edges extend substantally parallel to the arms 33 and 34. Thus, the circuits through all switch elements of any given row or series will be simultaneously opened when the crank 43 is rocked. To secure such rocking, the support 31 may mount in advance of the setting head a pin 44. As a given support 18 moves towards the setting head, the crank 43 associated with the former will engage pin 44 to thus rock shaft 35 against the resistance offered by spring 42. In so

rocking this shaft, the switch elements will be opened.

The supports 18 and mounting members 19 are secured against movement with respect to an end plate 45 conveniently formed of di-electric material. This plate is disposed adjacent a similar plate or wall member 46 carried by and fixed with respect to the base 22. Leads 47 extend from the arms 34 and are connected to terminal members 48 supported by the plate 45. These terminal members cooperate with contacts 49 which, as shown in Fig. 3, may each include plungers 50, spring pressed as at 51 to assure an electrical contact between the individual terminals and contacts. Leads 52 are coupled to contacts 49 and extend through to the individual elements 16 of the sign panel.

If these energizable elements are arranged to provide a bank seven rows high, then conveniently five rows extending lengthwise of the field of the sign may be allotted to each individual indicia element to be displayed. This would provide a group of thirty-five energizable elements for each indicia element. If such an expedient is resorted to, then thirty-five switch elements should be provided for each row or series supported by the individual bars 18. According to the number of the latter, terminals 48 are provided, and each of the switch elements is coupled to one of these terminals.

Also, according to the number of energizable elements 16 in the sign panel, a number of contact members 49 are provided; one being connected to each by means of the leads 52. While the aggregate of the terminal bodies may provide an uninterrupted and continuous series of members extending around the entire surface of wall or plate 45, the series of terminals 49 on the plate 46 may be interrupted as indicated in Fig. 7.

As shown in this figure, the contacts series or group is preferably uninterrupted throughout almost the entire circumference of plate 46. This has been indicated by the reference numeral 53. The contact group is, however, interrupted throughout, for example, two indicia groups as has been indicated by the reference numerals 54 and 55. Of course, such interruption does not necessarily have to be of a physical nature. Rather, contacts may continue throughout these faces but such contacts are not connected to energizable elements in the sign.

While on the subject of contacts and terminals, attention is again invited to Fig. 3. In this figure, it will finally be observed that the mounting members 19 may conveniently be insulated from the supports or bars 18 as indicated at 56. As previously brought out, the arms 33 are electrically connected to or grounded against the supports 18. In order to continue this "ground" connection, each of the bars or supports 18 may be electrically connected as at 57 to a ring 58 mounted upon the exterior face of plate 45. This ring may be common to all of the supports 18. Any desired number of terminal members 59 may engage this ring and be provided with suitably grounded leads 60.

A suitable source of current supply (not shown) is conveniently interposed between the second leads of the energizable elements 16 and the "ground." In any event, it will be appreciated that with the construction shown and described, the current flow will be through an energizable element, the lead 52 connected thereto, the corresponding contact 49 and terminal 48, and the lead 47 connected to the latter. Thus, the current will flow through the arm 34 connected to the lead 47, the block 36 and the arm 33 to the support 18. The circuit will be completed by the current flowing through connection 57, the ring 58 or its equivalent and the terminal 49 and so to the ground through lead 60. In line with zones or spaces 54 and 55, however, no current will flow regardless of whether the individual switch elements are closed or not. These positions or stations are in line with the switch-opening station provided by the bar 40 as well as the switch-setting station provided by the plungers 32 of the setting head.

As shown in Fig. 8, the shaft 27 mounts an arm 61. This arm supports brushes 62 and 63. The latter may conveniently traverse a continuous or ring-shaped contact strip 64. The brush 62 or its equivalent also moves over a circular path but in so moving successively engages strips 65 to 71 inclusive arranged in the form of an arcuate series. The contact ring 64 and series of arcuate parallel segments 65 to 71 are electrically connected to the selector mechanism 13 or its equivalent by leads which have not been shown. It is obvious, however, that as shaft 27 rotates, the brushes 62 and 63 will close the circuit through ring 64 and the parallel segments to transmit electrical impulses.

These impulses serve not alone to control the energization of the elements 29 and 30, but also the movement and feeding of the tape 12. As will be understood, the switch elements must be actuated by the setting head according to a predetermined pattern. Immediately after selected switches have been closed by the setting head, the latter must be reset so as to operate the next series of switch elements which will traverse the setting head station as the next succeeding bar or support 18 moves past the same. It is preferred to employ a selector mechanism which comprises a series of relays and by means of which the desired impulses are transmitted to the setting head. As afore brought out, the selector operates in response to impulses emanating from the transmitter 11. This in turn functions as a consequence of a record—such as a tape—being associated with it. Obviously, therefore, the operation of the record and transmitter must be timed in a manner such that as the different series of switches move past the setting head, the latter in each instance will be operative to set up a different character, numeral or symbol on the sign.

In the embodiment illustrated twenty-two series of switches are present. As will be apparent the synchronizing or controlling mechanism should operate through one complete cycle for each switch series. Accordingly, the drive indicated in Fig. 8 and illustrated in Figs. 2 and 5 assures that for each revolution of shaft 20, shaft 27 will rotate twenty-two times. As viewed in Fig. 5, the rotation of shaft 20 will be in a counterclockwise direction and, in this figure, as well as in Fig. 8, the rotation of shaft 27 is in a clockwise direction. There being, in the illustrated embodiment, twenty-two series of switch elements associated with and directly operated as a consequence of rotation of the shaft 20, it follows that shaft 27 will complete one revolution as each of the different series of switch elements traverses any given station.

As the brush 62 traverses contact segment 67, an impulse is transmitted through the selector mechanism 13 back to the transmitter 11. This causes the mechanisms of the latter to advance the tape 12 or other record one step. Segment

68 is preferably furnished to provide a continuation of the contact path. Therefore, while the brush 62 is traversing this segment, no change in the functioning of the mechanism occurs. Rather, sufficient time is permitted to elapse during this interval of traversal so that the record or tape may be shifted forward one step in accordance with the impulse created by closing the circuit through segment 67. In other words, this step might be termed a neutral or inoperative one. A traversal by the brush of segment 69 results in a closing of the circuit between the relays of the selector mechanism in response to the particular code impulse transmitted as a consequence of the then operative portion of the record or tape cooperating with the transmitter. Consequently, segment 69 is for the purpose of operating the storage relays within the selector 13.

A traversal by the brush 62 of segment 70 results in current being transmitted through the contacts of the relays within the selector (and which contacts have been closed or have remained open incident to the brush traversing segment 69). The brush thereupon traverses segment 71 which serves to interrupt the energization of the storage relays within the selector and so that such relays will be ready to receive a succeeding impulse from the transmitter. As the brush traverses the segment 65, the circuits are closed through the electro-magnet or other units operating the plungers 32; such closing being in accordance with the pattern as determined by the impulse emanating from the transmitter 11. Consequently, those switches which are passing the setting head station at that particular moment will be operated. The plungers or equivalent switch closing units will continue in operative position while the brush is traversing all of segment 65. In this manner, there will be ample time to adequately assure the closing of the switches. Thereupon, the brush will traverse segment 66 which serves to release the circuit-closing elements of the relays. Therefore, it is to be noted that while these contacts have been closed ever since the brush traversed segment 70 this contact is now interrupted.

The brush will now again traverse segment 67, resulting in the record or tape being advanced a further step and the entire operation will be repeated. Synchronizing or controlling mechanisms of this general type are, of course, well known to those skilled in the art. However, it is to be observed that, contrary to accepted practice, the distributing mechanism herein employed actually controls the movement of the record or tape by sending through an impulse to the transmitter such that the latter advances the tape one step. In this manner, perfect synchronization and timing is assured.

Therefore, a structure is furnished in which the switch elements of any given group are closed according to a selected pattern. Due to continued movement of the supports 18, these switch elements will serve to close circuits through contact within the area 53. Due to the relative movements between the contact and terminal, the illusion of the moving characters will appear upon the sign field. As these indicia characters reach the end of this field, the corresponding terminals will reach a position adjacent station 54.

Thus, it will be appreciated that both through the circuit opening as well as circuit closing stations current flow is interrupted. Consequently,

no sparking or arcing will occur at either of these stations.

As has been seen in the preceding description, the particular actuator or controller which has been illustrated carries twenty-two series of switch elements. In view of the fact that two groups of these switches, as they traverse the re-setting and setting head stations, are de-energized—i. e., have no current flowing through them—it is apparent that only twenty switch series may be operative at any given instant. Allowing for a sign field which will have a height such that seven rows of energizable elements may be included, we have heretofore seen that five lengthwise rows of elements should be allotted to the formation of a single indicia symbol. Thus, the thirty-five energizable elements are in such an instance to be considered as being monopolized to provide the indicia symbol. It is for this reason that, in the embodiment illustrated, thirty-five switch elements are provided in association with each bar or support 18. Allowing an extra vertical row of energizable elements as a spacing zone, it will be seen that, under the circumstances, forty-two of these elements are monopolized as a group in connection with one indicia symbol. Thus, a sign, to accommodate simultaneously twenty of these symbols would include seven rows of elements, each one hundred and twenty elements long. It will be apparent that certain signs may embrace a field, the length of which will call for a far greater number of energizable elements and indicia spaces. Obviously, by simply enlarging the controller and associating a larger number of switch series with the same, such enlarged sign might be properly operated. However, in certain instances, it might not be desirable to thus enlarge the controller or, in fact it might be impracticable to do so.

One method of overcoming any difficulties in this connection has, in accordance with the present invention, been illustrated in Fig. 6, in which the sign panel indicated at 17 in Fig. 1 has been shown in greater detail. Thus, this sign includes a body 72 supporting energizable elements 73. One side of a current source 74 may have leads extending through to the terminals of these elements. The other side of this source may be grounded as indicated at 75. Controllers 76 and 77, which are substantial duplicates of the controller illustrated in Figs. 2 and 8, are provided.

As shown in this view and in Fig. 9 the energizable elements 73 in preceding group 79 are caused to function by means of current flowing through the contacts of controller 77 and by virtue of the leads one of which has been indicated at 81. The group of terminals immediately preceding the element opening station 55 indicated in Fig. 7 are connected to the setting head of controller 76. Thus, as these terminals move to positions within the station 55, corresponding and energized terminals of the controller 76 will be moving away from the setting head station 54 of the latter. It follows that energizable elements embraced within field or zone 78 and in succeeding portions of the sign will operate incident to current flow through leads, one of which has been indicated at 80 and this operation will be with complete continuity. Accordingly, the observer will not be aware in the slightest that the same controller is not continuing to cause illumination of the succeeding energizable elements in the second por-

tion of the sign field. This system of coupling controllers might, of course, be continued throughout any desirable number thereof and thus a sign of any usable length might be properly energized and operated.

As will be seen in the schematic illustration of Fig. 6, the coupling between the controllers is effected by means of relays 82 of any desired and proper type. In actual practice, it has been ascertained that a more involved form of coupling is, under ordinary circumstances, desirable. Thus, the preferred manner of connecting and actuating the several units of the layout has been somewhat schematically illustrated in Fig. 9. In that view, earlier reference numerals indicate parts heretofore identified.

The distributor indicated by the reference numeral 83 is preferably coupled to and driven by the controller 76. This controller and controller 77 are preferably coupled to move in synchronism by, for example, having a common drive (not shown). The distributor 83 for each series of switch elements associated with controller 76 operates throughout a complete cycle. In such cycle, it closes circuits through contacts 84 and 85 and a ground. Contact 85 is connected to a relay 86 which controls the operation of switches 87. These are interposed in the leads 88' connected to the leads 81 (or otherwise identified as 52).

As previously brought out, thirty-five energizable elements 73 provide for one indicia unit. Therefore, the switches 87 controlled by relay 86 are thirty-five in number. The contacts 49 to which they are coupled are the group immediately preceding station 55. The distributor 83 is so timed that, when the indicia element appearing in the last position or zone 79 of the sign is properly centered with respect to the final left-hand group of energizable elements, the circuit through contact 85 will be closed. Thus for an instant, current will flow through switches 87 and until contact 85 is no longer energized. The source of energizing current for relay 86 has been indicated at 88.

The leads 88' and 89 extending beyond switches 87 are connected to relays 90. These relays will—in the embodiment under consideration—be thirty-five in number. Switches 91 are controlled one by each of relays 90. These switches are connected individually to the elements of the setting head of controller 76. It follows that with current flowing through certain of the leads 88' and 89 when the switches 87 are closed, relays 90 will be energized to close switches 91. This will result in current's flowing to the units of the setting head. Such flow would normally, however, be only momentary and of insufficient duration to cause a proper operation of the units of the setting head.

With this in mind, a "hold-in" structure is preferably incorporated in the relay assemblies. The holding structure may conveniently be electrical and include switch units 92, one for each of the relays 90 and which will close as the latter are energized. These switches close the relay circuits through a return lead 93. Accordingly, it is immaterial that switches 87 will open almost instantly because—relays 90 having once been energized—switches 92 are closed. This will result in a continuing flow of current through their windings and therefore a locking-in of both switches 91 and 92.

Thus, current flows through switches 91 for an ample period of time to cause operation of the elements of the setting head of the second controller.

To interrupt such operation after a sufficient period of time has elapsed, a switch 94 is employed. This switch is interposed in lead 93. It forms a part of relay 95 which may be connected to the source of current supply indicated at 88. Relay 95 is connected to contact 84 of the distributor 83. As the latter closes the circuit through this contact, current will flow through the coil of relay 95. This will result in an opening of the switch 94. Consequently, further flow of current through relays 90 is prevented. Therefore, both switches 91 and 92 open and this apparatus will now be ready to again operate through another cycle.

Now considering the operation of the control system and mechanism, it wil be understood that an operator will provide a tape by means of the perforator 10 or otherwise may—through a suitable mechanism—directly operate the selector 13. If a tape is furnished, the latter is associated with the transmitter 11. Current is now applied to the system and the motor 23 will begin to function to turn the shaft 20. The tape, selector and setting head units will function in precisely a predetermined and desired manner due to the fact that the control mechanism generally indicated at Fig. 8 is synchronized with the operation of the shaft 20. Therefore, each time a row or series of switches providing one indicia area or group moves in operative relationship with respect to the setting head, the latter will have been potentialized and caused to function to project precisely the permutation of plungers or equivalent units to effect a proper closing of the corresponding switches of a given series.

It is to be borne in mind that this operation occurs preferably with no current flowing through the switch elements and regardless of whether they are closed or not; this being due to the provision of the zone 54 or equivalent station as illustrated in Fig. 7. Due to continued rotation of the shaft 20, the switch elements which have now been closed according to the desired predetermined pattern are moved bodily as a group together with the corresponding terminals connected thereto.

It will be observed that, in effect, the controller simply provides two relatively movable members with cooperating and correspondingly moving contacts or terminals. One set of the latter is connected to the energizable elements of the sign while the other series of the same are connected to any convenient and proper type of switch element. For this reason the first set are preferably stationary, in that such a construction will avoid unnecessary complications. The second set, together with the switch elements, are preferaby the moving assembly.

Thus, as the terminals move into the zone 53 of the contacts, energizable elements 16 will begin to function. These elements will be located at the right hand side of the sign panel as viewed in Fig. 1. The indicia element will have the illusion of moving to the left over the body of the sign. Therefore, on the continued movement of the shaft 20, the successive portions of the indicia unit will appear on the right hand edge of the sign as defined by the first vertical row of energizable elements. These indicia units will continue to travel to the left across the sign and to provide a successive series furnishing individual words, sentences, etc. This display of the

indicia will continue throughout one rotation of the shaft 20 to a point at which the particular group of terminals fully enters station 55 as illustrated in Fig. 7. When thus disposed, the resetting mechanism shifts all switch elements to open positions. Obviously, as the terminals enter zone or station 55, the energizable elements positioned adjacent the right hand edge of the sign are being operated. These elements are the ones connected to the contacts immediately in advance of that station.

Thus, the indicia units are successively extinguished or disappear as they reach points adjacent the left hand end of the sign. This, of course, need not necessarily be true if a layout of apparatus such as that generally illustrated in Figs. 6 and 9 is resorted to. As afore brought out, it is apparent that the length of the sign may be continued almost indefinitely by simply providing successive controllers and operatively coupling these one to the other.

From the foregoing, it will be appreciated that, among others, the several objects of the invention as specifically afore noted are achieved. Obviously, numerous changes in construction and rearrangements of the parts might be resorted to without departing from the spirit of the invention as defined by the claims.

We claim:

1. In combination, a controller including contacts, terminals, switches connected thereto, said terminals being disposed adjacent said contacts, means for causing relative movement between said terminals and contacts, and means for causing a selective closing of said switches whereby energizable elements forming a part of a sign and coupled to said contacts will be selectively and successively energized to create the effect of indicia traversing said sign, a transmitter connected to said controller and to receive a record effective to operate said transmitter in a manner such as to cause a functioning of said switch-closing means in accordance with a pattern as determined by said record, and means connected to said controller and operating subsequent to the functioning of said switch-closing means, to cause an operation of the transmitter to advance the record associated therewith.

2. A control including in combination, a plurality of series of switches to be connected to elements to be energized, a setting head comprising units cooperative with said switches for operating the latter, means for effecting relative movement between said switches and said head, a transmitter, a mechanism connected to said transmitter and to be energized thereby, means for connecting said setting head to said mechanism whereby the units of the former will respond to operation of the latter, and a synchronizing mechanism connected to have movement responsive to the movement of the setting head, relative to said switches, said synchronizer functioning to potentialize said mechanism to cause an operation of said head-units, said mechanism thereupon closing circuits to cause said units to operate, and said mechanism subsequently closing circuits to release said units.

3. In combination, a plurality of controllers, each comprising a setting head, switch-operating units forming a part of said head, a plurality of series of switches to be connected to energizable elements, means for causing relative movement between said switches and setting head, a mechanism controlling the operation of the units of one of said heads, whereby to cause a predetermined operation of one of said series of switches, and means functioning after a predetermined interval to connect such series of switches with the setting head of an adjacent controller to cause a similar functioning of the units of the latter.

4. A sign control system including in combination a controller, switches carried thereby, a setting head forming a part and operating the switches of said controller, a selector for said setting head, a transmitter to receive a movable record, said transmitter being connected to said selector to operate the latter in accordance with the pattern of said record, and a synchronizer connected to operate with said controller and governing the movements of said record with respect to said transmmitter.

5. A sign control system including in combination a controller, switches carried thereby, a setting head forming a part and operating the switches of said controller, a selector for said setting head, a transmitter to receive a movable record, said transmitter being connected to said selector to operate the latter in accordance with the pattern of said record, and a synchronizer connected to operate with said controller and governing the movements of said record with respect to said transmitter and also governing the functionings of said selector.

6. A control system for connection to the energizable elements of a sign panel, said system including in combination a controller, switches carried thereby, a setting head forming a part of and operating the switches of said controller, a selector for governing the operation of said setting head, a synchronizer connected to operate with said controller and governing the functioning of said selector, said controller being connected to cause an operation of an initial group of energizable elements of the sign panel, and a second controller and setting head connected to govern other energizable elements of the sign; the setting head of said second controller being connected to be operated by parts of said first named controller.

7. In a control system for connection to the energizable elements of a sign panel, said system, including a plurality of controllers, each controller including groups of cooperable, relatively movable contacts, switches connected to one of said groups of contacts the other groups of contacts of each controller being connected to succeeding groups of energizable elements of the sign, electrically operated means for selectively closing certain of the switches of one controller to establish through the contacts thereof a flow of current through one group of energizable elements of the sign panel, means for subsequently opening all switches thus closed, and means forming part of said system for automatically setting the switch-closing means of a second controller to correspond to the switch-closing of the one controller and prior to the operation of the switch-opening means of that one controller.

8. A control system including in combination a transmitter with which there is to be associated and through which there is to be fed a tape having predetermined permutations of perforations, a selector mechanism connected to said transmitter to be operated thereby, a controller including relatively movable parts, cooperable groups of contacts associated with such parts, one of said groups being connectable to energizable elements, means for energizing the second group of contacts in accordance with the operation of said selector, synchronizing means connected to be operated responsive to the relative movements of the parts

of said controller, and means connecting said synchronizing means to govern the feeding of the tape through the transmitter and also the operation of said selector.

9. A control system including in combination a transmitter with which there is to be associated and through which there is to be fed a tape having predetermined permutations of perforations, a selector mechanism connected to said transmitter to be operated thereby, a controller including relatively movable parts, cooperable groups of contacts associated with such parts, one of said groups being connectable to energizable elements, means for energizing the second group of contacts in accordance with the operation of said selector, synchronizing means connected to be operated responsive to the relative movements of the parts of said controller, means connecting said synchronizing means to govern the feeding of the tape through the transmitter, the operation of said selector, and also the means energizing the second group of contacts.

10. A control system including in combination a transmitter with which there is to be associated and through which there is to be fed a tape having predetermined permutations of perforations, a selector mechanism connected to said transmitter to be operated thereby, a controller including relatively movable parts, cooperable groups of contacts associated with such parts, one of said groups being connectable to energizable elements, a setting head forming a part of said controller and comprising a plurality of elements actuated responsive to the operation of said selector for selectively energizing contacts of the second group, synchronizing means connected to be operated responsive to the relative movements of the parts of said controller, and means connecting said synchronizing means to govern the feeding of the tape through the transmitter and also the intervals of time during which the elements of said setting head are operated.

11. A control system including in combination a transmitter with which there is to be associated and through which there is to be fed a tape having predetermined permutations of perforations, a selector mechanism connected to said transmitter to be operated thereby, a controller including relatively movable parts, cooperable groups of contacts associated with such parts, one of said groups being connectable to energizable elements, means for energizing the second group of contacts in accordance with the operation of said selector, synchronizing means connected to operate in timed relation with the relative movements of the parts of said controller, said synchronizing means including a series of contacts and a contact member movable with respect thereto, one of said contact series being electrically connected to the transmitter to govern the feeding of the tape therethrough, and another of said contacts being electrically connected to said selector to govern the operation of the latter.

12. In combination a pair of synchronized controllers, each including relatively movable parts, contacts mounted by one of said parts, leads extending from said contacts, the leads from the contacts of the two controllers being connectable to succeeding groups of energizable elements, switches mounted by the other of said controller parts and connected to energize and de-energize said contacts, means for operating said switches, a selector for governing the functioning of the switch-operating means of one controller of said pair, and relay means connected to said one controller and the switch-operating means of the second controller to cause the switches of the latter to function in a manner corresponding to the functioning of the switches of said one controller.

13. In combination a pair of synchronized controllers, each including relatively movable parts, contacts mounted by one of said parts, leads extending from said contacts, the leads from the contacts of the two controllers being connectable to succeeding groups of energizable elements, switches mounted by the other of said controller parts and connected to energize and de-energize said contacts, means for operating said switches, a selector for governing the functioning of the switch-operating means of one controller of said pair, relay means connected to said one controller and the switch-operating means of the second controller to cause the switches of the latter to function in a manner corresponding to the functioning of the switches of said one controller, and a distributor operated in synchronism with said controllers and governing the operation of said relay means.

14. In combination a pair of synchronized controllers, each including relatively movable parts, contacts mounted by one of said parts, leads extending from said contacts, the leads from the contacts of the two controllers being connectable to succeeding groups of energizable elements, switches mounted by the other of said controller parts and connected to energize and de-energize said contacts, means for operating said switches, a selector for governing the functioning of the switch-operating means of one controller of said pair, relay means connected to said one controller and the switch-operating means of the second controller and whereby electrical impulses are transmitted to said latter switch-operating means to potentialize them to function in a manner corresponding to the functioning of the switches of said one controller, time-delay means operating in response to said impulses to assure the maintenance of circuits for sufficient intervals of time such that the switch-operating means of the second controller will function in accordance with the impulses, and distributor means connected to said controllers and governing the operation of said time-delay means.

15. A sign control system including in combination a controller, switches carried thereby, a setting head movable with respect to said switches, means forming a part of said head for operating said switches as the latter are moved with respect thereto, a selector causing a functioning of the switch-operating means of said setting head, a synchronizer governing the functioning of said selector, and means connecting said synchronizer with said controller whereby the former will operate as the switches of the controller move with respect to the setting head thereof.

16. A sign control system including in combination a controller, switches carried thereby, a setting head movable with respect to said switches, means forming a part of said head for operating said switches as the latter are moved with respect thereto, a selector causing a functioning of the switch-operating means of said setting head, a transmitter governing the functioning of said selector, a synchronizer govern-

ing the functioning of said selector and transmitter, and means connecting said synchronizer with said controller whereby the former will operate as the switches of the controller move with respect to the setting head thereof.

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