

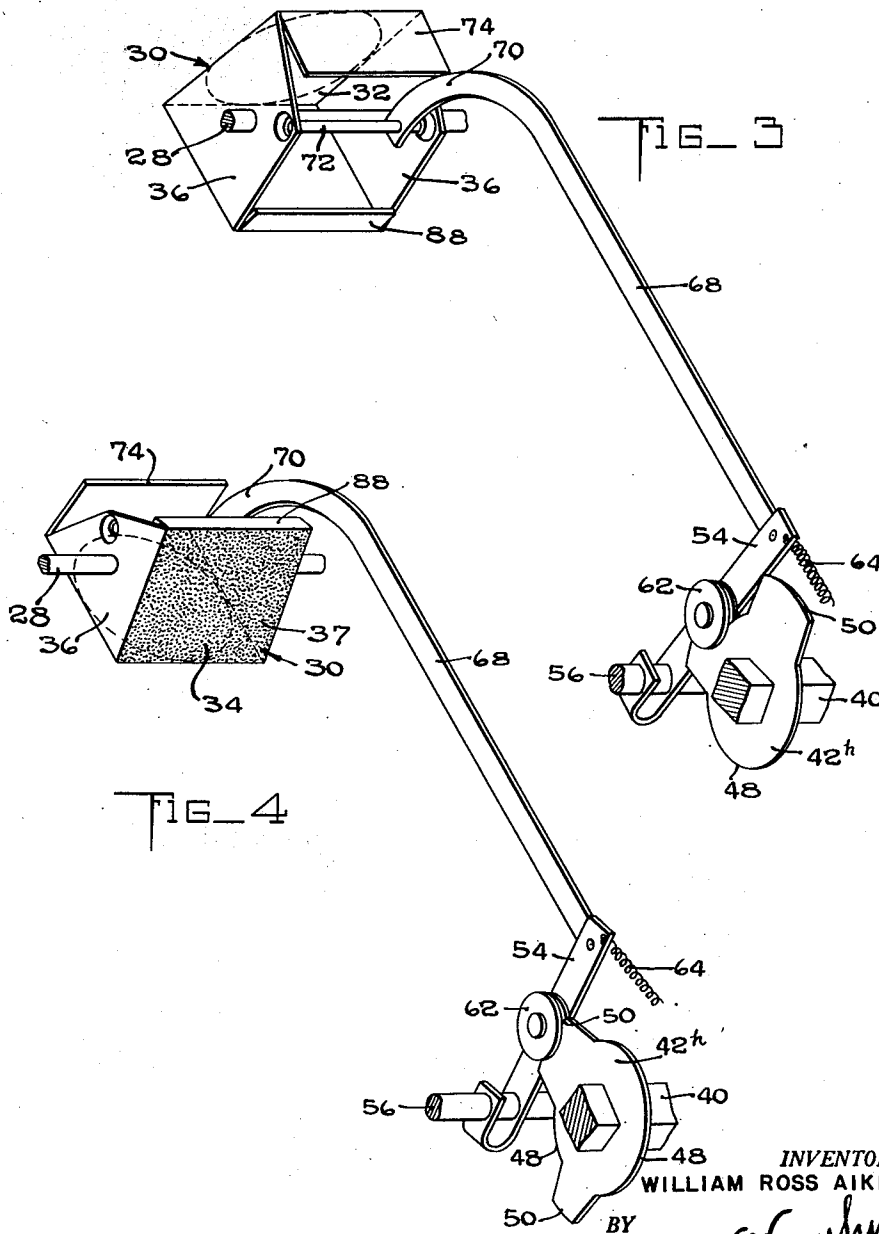
Dec. 3, 1957

W. R. AIKEN
DISPLAY DEVICE

2,814,893

Filed July 27, 1954

5 Sheets-Sheet 2



INVENTOR.
WILLIAM ROSS AIKEN

BY

W. R. Aiken

PATENT AGENT

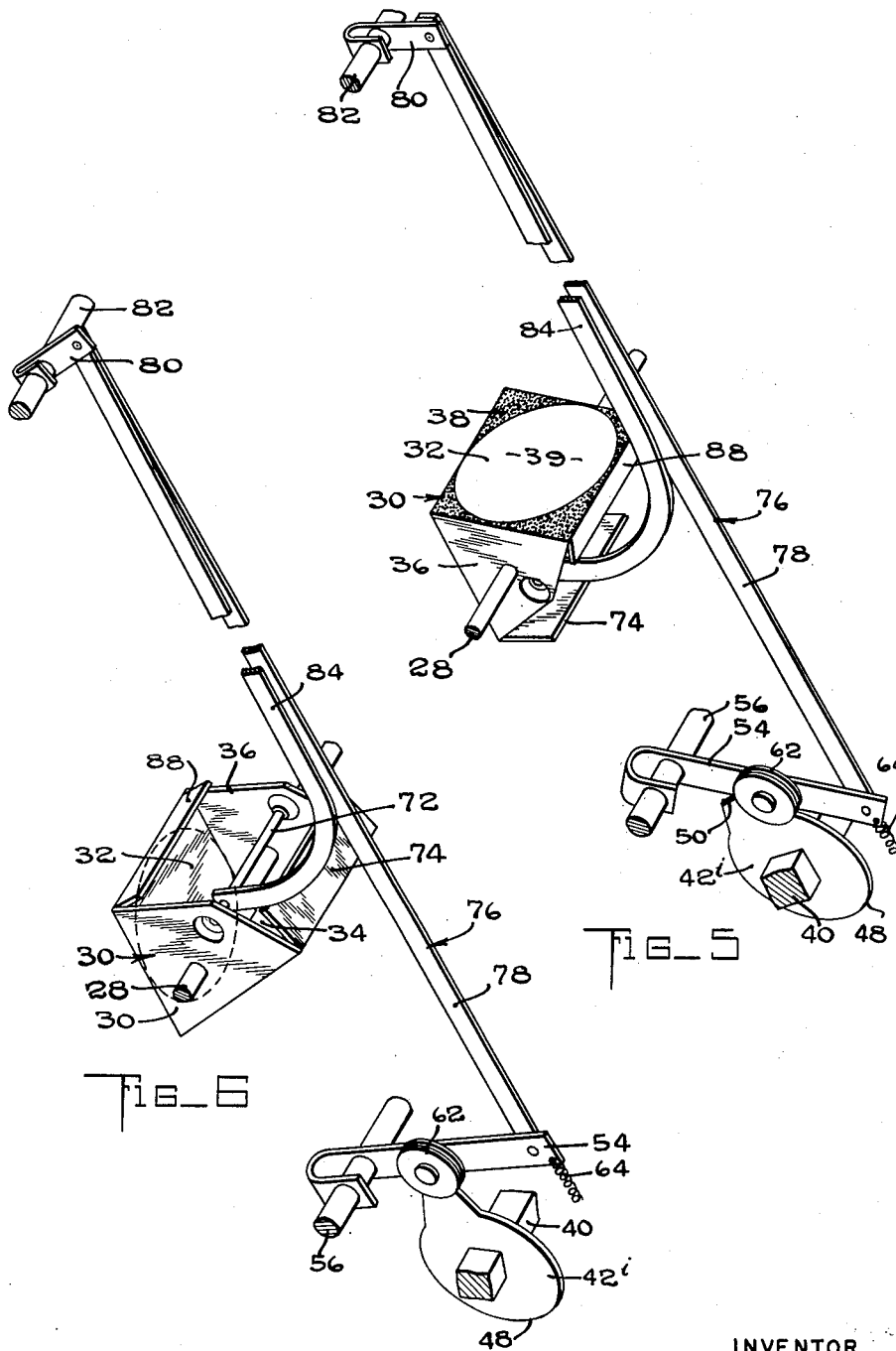
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DISPLAY DEVICE

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5 Sheets-Sheet 3



INVENTOR
WILLIAM ROSS AIKEN

BY

W. F. Kauffman
PATENT AGENT

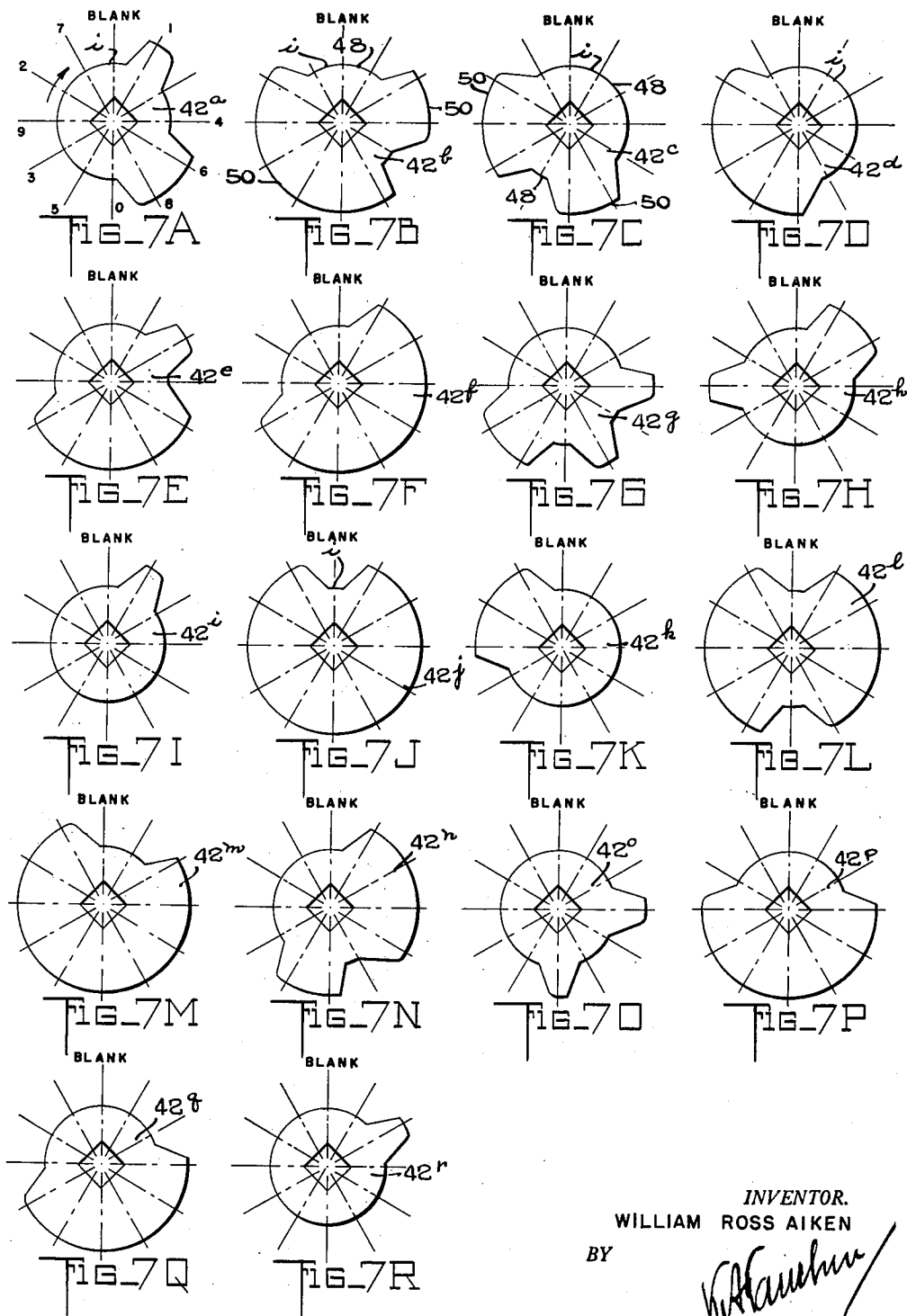
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5 Sheets-Sheet 4



INVENTOR.
WILLIAM ROSS AIKEN
BY

W. R. Aiken
PATENT AGENT

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5 Sheets-Sheet 5

FIG. 8

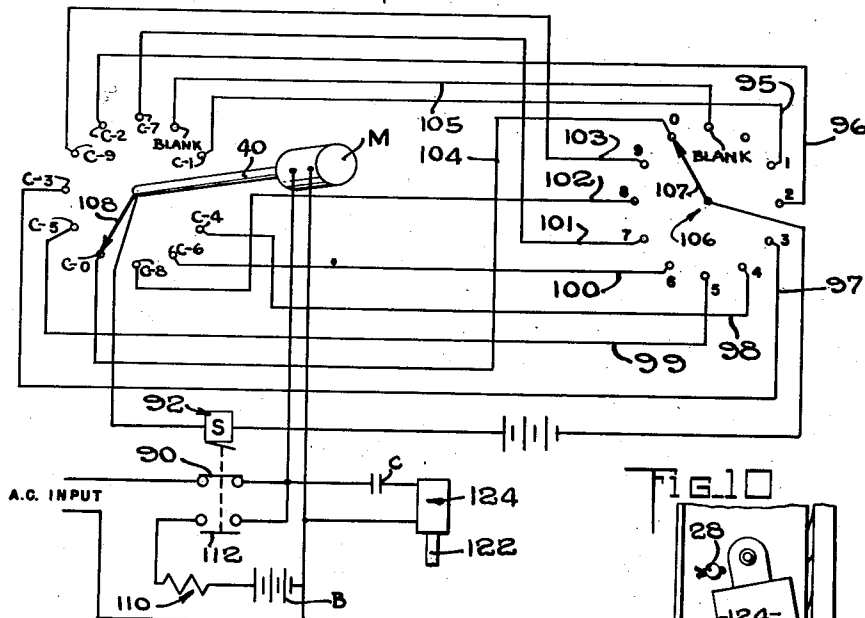
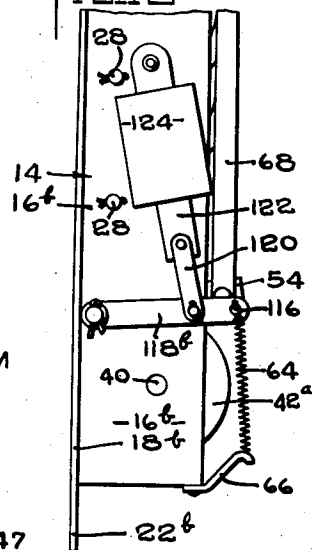


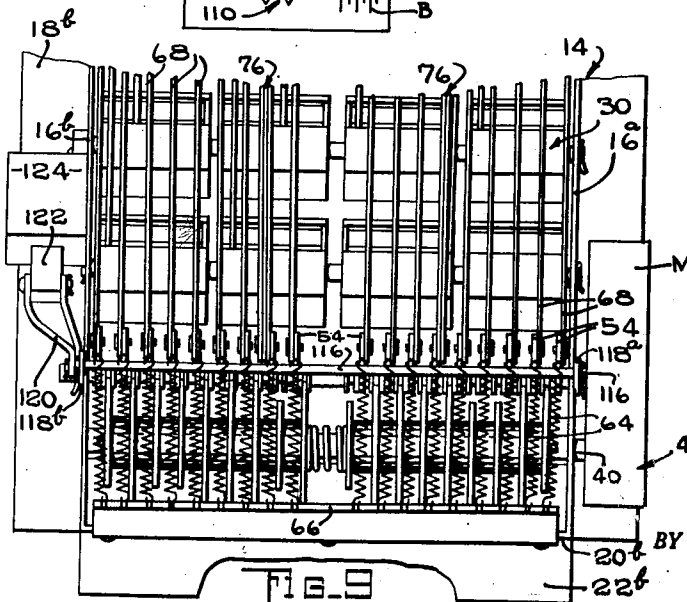
FIG. 9



INVENTOR.
WILLIAM ROSS AIKEN

K. A. Fauchon
PATENT AGENT

FIG. 10



2,814,893

DISPLAY DEVICE

William Ross Aiken, Berkeley, Calif., assignor to Ross Radio Corporation, Berkeley, Calif., a corporation of California

Application July 27, 1954, Serial No. 446,016

13 Claims. (Cl. 40—52)

The present invention relates to transmutable display devices such as may be manipulated to display different letters, figures, and like symbols. Devices of this type are generally in use on race courses and playgrounds, in stock exchanges, and the like.

It is an object of this invention to provide a transmutable display device, of the type referred to, that is of simple and compact construction and yet dependable in operation.

Another object of the invention is to provide a display device of the type referred to, whose symbols are clearly recognizable both at daytime and at night.

Still another object of the invention is to provide simple and dependably operating symbol forming members for a display device of the type referred to.

An additional object of the invention is to provide a simple and effective actuating mechanism for the symbol forming members of display devices of the type referred to.

Furthermore, it is an object of the invention to provide a simple and effective symbol selector mechanism for control devices of the type referred to.

These and other objects of the present invention will be apparent from the following description of the accompanying drawings which illustrate a preferred embodiment thereof and wherein:

Fig. 1 is a front elevation of a transmutable display device which embodies my invention and whose sign indicating board is composed of twenty-four changeable figure forming members.

Fig. 2 is a vertical cross section of the display device illustrated in Fig. 1 taken along line 2—2 thereof and viewed in the direction of the arrows associated with said line.

Fig. 3 is a fragmentary perspective illustrating a lever train employed to operate some of the figure forming members of the display device shown in Fig. 1.

Fig. 4 is a fragmentary perspective of the same lever train in a different operational position.

Figs. 5 and 6 are fragmentary perspectives, similar to Figs. 3 and 4, illustrating two different operational positions of another type of lever train employed to operate the changeable figure forming members of the display device shown in Fig. 1.

Figs. 7A to 7R are side elevational views of the cams employed in the display device shown in Fig. 1, to control the position of the figure forming members thereof.

Fig. 8 is a circuit diagram illustrating the manner in which the operation of the cams shown in Figs. 7A to 7R is controlled.

Fig. 9 is a fragmentary rear elevation of a modified embodiment of a display device constructed in accordance with the invention.

Fig. 10 is a fragmentary side elevation of said device.

Fig. 1 illustrates a single unit, of a figure display device embodying my invention, which is adapted upon appropriate operation to display any one of the figures 0 to 9. In practical use, several such units will usually be

employed in juxtaposition so as to be able to display multi-digit figures.

The device illustrated in Figs. 1 and 2 comprises a rectangular frame 14 whose side bars 16a and 16b form laterally turned flanges 18a and 18b and whose top and bottom bars 20a and 20b form upwardly and downwardly directed flanges 22a and 22b, respectively. Within the side bars 16a and 16b of said frame are rotatably mounted six vertically superposed horizontal shafts 28. Supported upon each of said shafts are four juxtaposed figure forming members 30 which form the actual sign indicating area of the device. Each of said figure forming members comprises two flat walls 32 and 34, respectively, which are of square shape and which are disposed relative to each other in the manner of a V. Said walls are joined along their side edges by webs 36 that may be of trapezoid shape, as shown in any one of Figs. 2, 3, 4, 5 and 6, and through said webs extend the hereinbefore mentioned shafts 28.

In the figure forming members illustrated in the accompanying drawings, the outer surface of rectangular wall 34 presents a neutral field 37 that may be painted in plain black, while the outer surface of the other wall 32 presents a figure forming field 38 that may be painted in white, or may at least display a white circle as shown at 39 in Figs. 1 and 5. When the display device of the invention is in idle position, all its members 30 are in a rotary position wherein their walls 34 are disposed in a vertical plane and present their black fields 37 to the observer. When it is desired to display a figure, selected ones of the members 30 are actuated to move their walls 32 into a vertical plane to present the white fields 38 thereof to the observer according to a pattern that will form the desired figure in white against the black background formed by the members that remain in idle position. Thus, if it is desired to form the character 2 on the indicating board of the display device, the two center members in the top row are moved into active position, also the two outer members in the second row from the top, the right center member in the third row from the top, the left center member in the third row from the bottom, the left outer member in the second row from the bottom, and all the members of the bottom row. Thus, the activated members display the figure "2" against the black background formed by the idle members, as illustrated in Fig. 1, and said figure may clearly be recognized whether it is daylight or whether the indicating board lies in the glaring cone of a searchlight. In an analogical manner any one of the figures from 0 to 9 may be formed by actuation of the appropriate figure forming members of the device.

To move the proper figure forming members of the unit into active position, depending upon which figure it is desired to establish, a shaft 40 is rotatably mounted within the side bars 16a and 16b of the rectangular frame 14 below the lowermost row of the figure forming members. Said shaft may be of square cross section, as shown in Fig. 2, and carries a plurality of control cams 42 that will hereafter be individually identified by the suffix letters a to r, wherever necessary. Said cams may be maintained in appropriately spaced relation from each other by means of suitable spacer bushings 44, and they may be yieldably held in their proper position by a strong spring 46 that is coiled around the center portion of shaft 40 and bears with its opposite ends against the two center cams 42i and 42j on said shaft. The shaft 40 may be driven from an A. C. motor M (Fig. 8) through suitable reduction gearing collectively identified by the reference numeral 47. The cams 42 are arranged to actuate the figure forming members through suitable cam follower linkages in such a manner that said members will successively form any one of the figures from

0 to 9 during each 360° revolution of the shaft 40. For this purpose each of the cams has one or several "idle" sectors 48 of reduced radius and one or several "active" sectors 50 of increased radius.

To actuate the figure forming members cam follower levers 54 are employed which turn upon a common transverse spindle 56. The spindle 56 is mounted in the repeatedly mentioned side bars 16a and 16b of the rectangular frame 14 below the lowermost row of figure forming members 30 but above the cam shaft 40, as shown in Fig. 2. To avoid wobbling of the cam follower levers 54, the pivoting end of each lever may be bent at an angle of 180°, as best shown in Figs. 3 and 4, and both legs of the resulting hairpin structure may be rotatably engaged over the spindle 56.

At a mid-point each cam follower lever 54 carries a roller 62 that is held in engagement with the edge of its respective cam 42 by means of a suitable spring 64 which is tensioned between the free or actuated end of the cam follower lever and a common transverse lip 66 that rises from the rear edge of the bottom flange 22b of rectangular frame 14. To the actuated ends of the cam follower levers 54, of all the figure forming members 30 except those in the two lowermost rows, are pivoted links 68 which are formed in the manner of an inverted J and which reach with their arcuate ends 70 into the hollow space defined by the walls and webs of their respective figure forming members 30. Within said members they are pivotally engaged over a transverse spindle 72 that extends parallel to the shaft 28 upon which the particular member 30 is supported and which is mounted in the side webs 36 of said member at points spaced from said shaft 28 in a direction radially opposite to the trace formed by the converging fields 37 and 38.

When a cam 42 presents a sector 48 of reduced radius to its roller 62, the spring 64 holds the respective figure forming member in its neutral or idle position, wherein it presents its black field 37 to the outside, as shown in Fig. 3. To avoid overthrow of the figure forming members under the urgency of springs 64, which might cause their neutral areas to depart from the common vertical display plane in case of irregularities in the radii of the reduced cam sectors 48, an intumed lip 74 may be provided along the free edge of the figure forming walls 32 of said members and may be arranged to bear against the convex edge of their actuating links 68, whenever their neutral wall has reached a rotary position fully aligned with the common vertical display plane of the device. Thus, whenever a figure forming member is in its neutral position of adjustment, its black field 37 will always be accurately in vertical alignment with the surfaces of all the other figure forming members irrespective of slight variations in the dimensions of their cams.

Whenever a cam 42 presents a sector 50 of increased radius to its roller 62, the resultant lift of the link 68 swings its respective figure forming member 30 in counterclockwise direction, as viewed in Fig. 3, into the position illustrated in Fig. 4, wherein it presents its figure forming surface 38 to the outside.

If links of the type described were employed to convey the movement of the cam follower levers 54 to the figure forming members in the two lowermost rows of the unit, the force exerted upon the spindles 72 of said members by the lifting of a link 68 would be directed almost radially against the shaft 28, with only a very small component thereof acting in a direction tangentially of said shaft. For this reason the figure forming members in these two lowermost rows are provided with linkage trains 76 that are constructed in such a manner that they pull rather than push said members from their neutral position into their active position. Having reference to Figs. 5 and 6, the cam follower levers 54 of the cams 42e, 42f, 42i, 42j, 42m, 42q, and 42r that operate the figure forming members in the two bottom rows of the device are pivotally connected to straight elongated links 78 that

reach to the top of the rectangular frame 14 where they are pivoted to the free end of short arms 80 which are rotatably supported upon a transverse shaft 82. Shaft 82 is mounted in the hereinbefore mentioned side bars 16a and 16b of the frame 14 near the upper end thereof. Likewise pivoted to said short arms 80 are J-shaped links 84 whose curved lower ends are pivotally engaged over the cross spindles 72 of the figure forming members in the two lowermost rows. Thus, when the actuating cam of one of said last mentioned figure forming members raises its cam follower lever 54, the elongated link 78 rocks its arm 80 in counterclockwise direction, as viewed in Fig. 5, into the position illustrated in Fig. 6, and the J-shaped link 84 pivoted to said arm pulls the figure indicating member, to whose spindle 72 it is attached, with ease from the position shown in Fig. 5 to the position shown in Fig. 6 without having to negotiate any dead-point positions. Figure forming members actuated by linkage trains of the type illustrated in Figs. 5 and 6 may be provided with a narrow lip 88 formed along the free edge of their figure forming field 38, which is arranged to bear against the concave edge of their actuating link 84 to prevent overthrow of the members under the urgency of springs 64 into a position wherein their neutral field 37 is no longer accurately aligned with the vertical indicating plane of the signboard.

As previously pointed out, all the cams 42 are mounted upon a common shaft 40 for rotation in unison, and the consecutive sectors of said cams are adapted to actuate in succession those of the members 30 that form the figures 0 to 9. In the embodiment of the invention illustrated in the accompanying drawing wherein the figure indicating area is subdivided into twenty-four figure forming fields, the left center field of the second row from the top is never required for forming any one of the figures 0 to 9, and the respective member 30 may therefore be rigidly supported in its idle position, such as by means of a brace arm (not visible) that is attached to and depends from the top bar 22a of the rectangular frame 14. Other figure indicating members may always operate in unison, i. e., whenever one is required in active position others may also be required. If such members happen to lie in the same row, they may be mounted firmly upon their common supporting shaft 28 for rotation in unison, and only one need be operated by a cam 42 and a link 68 or linkage train 76, respectively. Thus, the two outer members in the topmost row of the illustrated device will always have to be in idle or in active position at the same time. Hence, only one of said members, for instance, the left one, needs to have an actuating cam 42, i. e. cam 42a, upon the shaft 40 and a link 68, provided both are firmly mounted upon their common supporting shaft 28. To avoid simultaneous actuation of the two center members of the topmost row and to allow for independent operation of said center members, these members should be arranged to turn loosely on the shaft 28.

If figure forming members required to operate in unison happen to lie in vertical alignment in superposed rows, one and the same cam 42 may readily serve to actuate all of them in the required manner. Thus, in the second, fourth and fifth row from the top the second members from the right (as viewed in Fig. 1) will always have to change position in unison. Accordingly the cam follower lever 54 of control cam 42k may be employed to actuate the member in the second row from the top through a link 68 that is pivoted to the actuated end of the cam follower lever 54, and the member in the fourth row through another link 68 of somewhat shorter length that is likewise pivoted to the free end of said cam follower lever. In addition a linkage train 76 pivoted to the actuated end of said same cam follower lever 54 may serve to actuate the member in the fifth row. In practice a single pivot stud may be employed to connect both the links 68 and the linkage train 76 to the cam follower lever 54.

Figs. 7A to 7R show the contours of eighteen exemplary cams which are capable to set the members 30 during a 360° revolution into ten consecutive positions according to patterns that cause all the characters from 0 to 9 to appear on the indicating area of the device. All the cams illustrated in said Figs. 7A to 7R have an initial sector of reduced radius that is identified by the letter *i* and which corresponds to the full cycle position of the mechanism wherein all of the figure forming members are in their neutral or idle position and present their black fields to the outside. To move the figure forming members from idle to active position, it is necessary that the rotating cams present sectors of increased radius to their respective cam follower rollers 62 so as to lift the links 68 or linkage trains 76 respectively by increments sufficient to turn the figure forming members in the appropriate manner, as has previously been explained. To maintain the load placed upon the motor M (Fig. 8) during operation of the device at a minimum, the sequence of the characters established by rotation of the cam shaft 40 should preferably be such that the change from one to the next character requires the smallest possible number of links 68 or linkages 76 to be raised from ineffective to active position. Thus, the cams illustrated in Figs. 7A to 7R are not designed to establish the characters 0 to 9 in their proper sequence, but will consecutively establish the characters 1, 4, 6, 8, 0, 5, 3, 9, 2 and 7 in the order named.

In the embodiment of the invention illustrated in the accompanying drawings the cams 42a to 42r are actually designed to have twelve consecutive equi-spaced figure establishing positions or stations, the first of which is the previously mentioned full cycle position that has been identified by the letter *i*. The next station is spaced from station *i* by an angular interval of 30° and is marked by the reference numeral 1 in Figs. 7A to 7R because it is designed to establish the character 1 on the signboard of the described display device. To form the character 1 on said signboard, it is necessary that all figure forming members in the second vertical row from the right be turned into active position. Hence, when the control cams 42 advance in unison from their full cycle station *i* to station 1, the cams 42j, 42k, 42l, and 42m move raised sectors under their respective cam follower rollers 62, and the resultant upward movement of the cam follower levers 54 to which said rollers are pivoted, actuate the links 68 for the four upper members and the linkage trains 76 for the two lower members, with the result that the character "1" appears in white on the display board.

To change the adjustment of the display board to the position wherein it displays the character "4," it is necessary that five additional links 68 and linkage trains 76, respectively, be raised to move the rightmost, the left center, and the leftmost members of the fourth row and also the leftmost members of the second and third row from idle to active position. Since it may place an excessive load upon a small motor to raise all these links and linkage trains simultaneously, it may be of advantage to effect the changeover from character "1" to character "4" in two consecutive stages, i. e., the control shaft 40 will turn through an angle of twice 30°, i. e., 60°, to establish the character "4" on the signboard. While turning through the first angle of 30°, the cams 42b, 42c and 42d move raised sectors underneath their follower rollers and lift the links 68 that move the leftmost members of the second, third and fourth rows from idle to active position, and during rotation through the second angle of 30° the cams 42h and 42p move raised sectors underneath their follower rollers and lift the links 68 that move the left center and the right outer members of the fourth row from idle to active position, while the raised sectors of cams 42j, 42k, 42l and 42m are of sufficient angular width to maintain the previously actuated figure forming members in active position. Thus the character "4" is

formed in white on the signboard without placing an excessive load upon the motor M.

To establish the character "6" on the signboard, it is necessary that the right center members of the second, fourth and fifth rows and the left center member of the fourth row be returned from active to neutral position, and the left center members of the first, third and sixth rows and the two outer members of the fifth row be changed from neutral to active position, while the left outer members of the second, third and fourth row and the right center members of the first, third and sixth row remain in active position. Consequently, cams 42e, 42f, 42g and 42q present raised sectors to their follower rollers while the cams 42k and 42h move reduced sectors underneath their follower rollers, and cams 42b, 42c, 42d, 42j, 42l, 42m and 42q retain their follower rollers in raised position.

The subsequent contours of the cams 42a to 42r are appropriately raised or reduced respectively, as illustrated in Figs. 7A to 7R, to establish in further succession the characters 8, 0, 5, 3, 9, 2 and 7, as previously pointed out, and the manner in which the remaining characters are formed on the signboard during rotation of the control shaft will be evident from a study of said Figs. 7A to 7R.

To make it possible for the figure forming members 30 to be placed very closely above each other, they should be of such shape that their areas 37 and 38 define an angle of about 60°, with their supporting shaft 28 arranged to extend through the geometrical center of the hypothetical equilateral triangle defined by said areas. As a safeguard against jamming of directly superposed figure forming members whenever they should happen to be turned simultaneously, i. e., during the same rotary increment of cam shaft 40, it may be of advantage to place the rotation effecting rises or drops, respectively, in the edges of the cams that are to effect simultaneous rotation of two or more superposed figure forming members, at slightly different angular positions. Consequently, superposed figure forming members, when actuated by the same rotary increment of cam shaft 40, will actually commence and/or complete their rotation at a slight phase difference. Thus, their edges will never move simultaneously through the points of closest approach of their circular orbits.

It remains to explain how rotation of the cam shaft 40 may be controlled to cause its arrest at the very moment when the cams mounted thereon have established a pre-selected character on the signboard. For this purpose the power circuit of motor M (Fig. 8) may include a normally closed switch 90 that may be opened by energization of a relay 92. The relay 92 has as many potential power circuits as there are stations at which rotation of shaft 40 should be halted to establish a desired figure on the signboard, or to set the board to neutral position. In the embodiment of the invention illustrated in the accompanying drawings the signboard has one idle position and ten figure forming positions of adjustment; consequently the relay 92 has eleven potential power circuits that are individually identified in Fig. 8 by the reference numerals 95 to 105, respectively. The relay 92 may individually be connected into every one of said power circuits by means of a selector switch 106 which comprises an arm 107 and eleven selector contacts, one for each of the circuits 95 to 105, that are consecutively marked 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, and blank, corresponding to the positions to which the signboard may be set. The eleven potential power circuits for the relay 92 are each interrupted near one end of the cam shaft 40 and form contacts C that are located about the axis of said shaft at points corresponding to the angular positions at which the shaft must come to a halt to establish the characters represented by said power circuits, and which are accordingly identified in-

dividually by corresponding suffix numerals. Secured to, and moving in unison with, shaft 40 is a radially extending switch arm 108 that is arranged, during rotation of the shaft, to engage consecutively the eleven contact points to complete whatever power circuit has been conditioned for energization of the relay 92 by the setting of arm 107 of selector switch 106. Thus, whenever the shaft 40 reaches a rotary position at which the cams operate to form upon the display board, the character represented by the engaged contact of the selector switch 106, the arm 108 closes a circuit through the relay 92 which energizes said relay and causes it to open switch 90 in the power circuit of the motor M. As a result thereof the motor comes to a halt and whatever character is set up on the signboard at the moment is retained on the board. For instance, let it be assumed that the selector switch is set to contact 0. In such a case the power circuit of the relay 92 remains interrupted, and the motor M remains in operation and turns the cam shaft 40 until it reaches an angular position, at which its arm 108 moves into engagement with the contact point C-0 of power circuit 104. When this occurs, a power circuit is closed through the relay 92 and the relay operates to open switch 90 in the power circuit of the motor M. As a result the motor M is deenergized, causing the cam shaft 40 to come to a halt in a rotary position, wherein the cams 42 cause the character "0" to appear on the signboard.

To prevent overthrow of the motor M when it comes to a halt, the relay 92 may be also arranged to close, upon energization, a D. C. circuit 110 through the motor M by closure of a normally open switch 112, which connects the motor across a D. C. battery B, as indicated in Fig. 8. As is well known, D. C. flowing through an A. C. motor acts as a brake upon the rotor of the motor.

It will be understood that by moving the arm 107 of selector switch 106 to any other position, the previously established power circuit through relay 92 is interrupted, allowing motor control switch 90 to close and motor brake switch 112 to open. As a result thereof the motor commences operation and will turn until the arm 108 on shaft 40 closes the relay power circuit representative of the figure to be set up on the signboard. Then rotation of shaft 40 is again arrested at a rotary position at which the cams 42 establish the character that is represented by the engaged contact of the selector switch.

When the display device of the invention is set from one to another character, it may happen that the control shaft has to make almost a complete revolution to establish the new character, such as is the case when after displaying the character "6," the device is set to display the character "4." In such an event all the intermediate characters will appear in rapid succession on the display board before the device comes to rest. The continuous shifting of the individual figure forming members as they display in rapid succession all the intermediate characters, may be tiresome and confusing. Means may therefore be provided in the actuating mechanism of the figure forming members that suspends contact between the cam follower rollers 62 and the cams 42 during rotation of the control shaft 40, and which reestablishes operative contact between said rollers and said cams as soon as the control shaft has come to rest at the selected position.

Having reference to Fig. 9 a cross rod 116 may be pivotally supported directly below the outer ends of the cam follower levers 54 by means of arms 118a and 118b that are pivoted to the side bars 16a and 16b respectively of the frame 14. Arm 118a of said cross bar is pivotally connected to a link 120 which in turn is pivoted to the normally projected armature 122 of an A. C. solenoid 124 (Fig. 10). Said solenoid is suitably secured to the side bar 16a of the rectangular frame 14 and lies in the power circuit of the motor M (Fig. 8). It is

therefore energized and retracts its armature 122 whenever the motor M is set into operation, and it returns to idle position wherein its armature is projected, whenever the A. C. power supply to the motor is cut off. A blocking condenser C prevents its energization by the D. C. battery B. Thus, whenever the motor is set in operation by manipulation of selector switch 106 and turns the control shaft 40, the solenoid 124 raises the cross rod 116 which is effective to lift all the cam follower levers 54 disengaging the follower rollers 62 from the edges of their cams 42 against the urgency of springs 64. The described movement of the cam follower levers is effective to shift all the members 30 of the display board into active position so that they present an unchanging area of white circles to the observer until the motor M comes to a halt with the control shaft 40 at the position corresponding to the character selected by manipulation of the selector switch. Whenever the power supply to motor M is interrupted, the solenoid 124 is automatically deenergized, as previously pointed out, and the springs 64 lower all the cam follower levers 54 until their rollers 62 contact their respective cams, which is effective to establish the selected character on the display board.

While I have explained my invention with the aid of an exemplary embodiment thereof, it will be understood that I do not wish to be limited to the specific constructional details shown and described, which may be departed from without departing from the scope and spirit of the invention.

Wherever the term "geometrical center" of a triangle is employed in the following claims, the term is understood to mean the point of intersection of the perpendicular bisectors of the sides of the triangle referred to in said claims.

I claim:

1. As part of a display device of the type referred to, a symbol forming member having relatively inclined neutral and symbol forming areas of rectangular shape, means for mounting said member for rotation between a first position wherein it exhibits said neutral area and a second position, wherein it exhibits said symbol forming area about an axis parallel to the trace of said areas and extending through the geometric center of the hypothetical triangle determined by said areas, an actuating link for said member in the form of a J with its curved end pivotally connected to said member at a point spaced from its axis of rotation in a direction opposite to the trace formed by said areas, cyclically operable camming means for shifting said link between a position wherein it holds said member in said first position and a position wherein it holds said member in said second position, and a stop lip along the free edge of the symbol forming area of said member arranged to bear against the convex edge of the curved end of said link when said member is in said first position.

2. As part of a display device of the type described, a member having relatively inclined neutral and symbol forming areas, means mounting said member for rotation about an axis parallel to the trace formed by said areas, and cyclically operable means for turning said member between a first position exhibiting said neutral area and a second position exhibiting said symbol forming area, said cyclically operable means including a cam disposed in close proximity to said member, a cam follower lever having a roller in engagement with the edge of said cam, a straight link pivoted to the actuated end of said lever and extending adjacent said member a substantial distance beyond said member, and a counter link pivoted to said first link at a point substantially beyond said member and having a curved end pivotally connected to said member at a point radially spaced from the axis of rotation of said member.

3. As part of a display device of the type described, a symbol forming member having relatively inclined square-

shaped neutral and symbol forming areas, means mounting said member for rotation about an axis parallel to the trace formed by said areas and extending through the geometric center of the hypothetical triangle formed by said areas, and cyclically operable means for turning said member between a first position exhibiting said neutral area and a second position exhibiting said symbol forming area, said cyclically operable means including a cam disposed in close proximity to said member, a cam follower lever having a roller in engagement with the edge of said cam, a straight link pivoted to the actuated end of said lever and extending adjacent said member a substantial distance beyond said member, a counter link pivoted to said first link at a point substantially beyond said member and having a curved end extending into the space between the relatively inclined areas of said member, said end being pivotally connected to said member at a point radially spaced from the axis of rotation of said member in a direction opposite to the trace formed by the areas of said member.

4. An arrangement according to claim 3 wherein said member has a stop flange along the free edge of its symbol forming area arranged to engage the concave edge of said counter link whenever said member reaches a position exhibiting its neutral area.

5. A display device comprising a symbol forming member having relatively inclined neutral and symbol forming areas, means mounting said member for rotation between a first position displaying its neutral area and a second position displaying its symbol forming area, and cyclically operable means for setting said member alternately to said different positions including a cam, a normally effective cam follower linkage interposed between said cam and said member, means operable to turn said cam, and means operative coincident with said cam turning means for disabling said cam follower linkage.

6. A display device comprising a plurality of symbol forming members each having relatively inclined neutral and symbol forming areas, means mounting said members for rotation between a first position displaying their neutral areas and a second position displaying their symbol forming areas, and cyclically operable means for selectively setting said members to a sequence of different relative positions comprising a plurality of cams, means operable to turn said cams, normally effective cam follower linkages between said cams and said members, and means operative coincident with said cam turning means for disabling said cam follower linkages.

7. In a display device having symbol forming members movable between idle and effective positions, a rotary shaft, means operable to turn said shaft, a plurality of aligned cams mounted upon said shaft for rotation in unison with the consecutive sectors of said cams adapted to actuate said symbol forming members in various patterns effective to set up a sequence of desired symbols; a control mechanism for selecting a desired symbol comprising a normally deenergized relay adapted upon energization to disable said shaft turning means, a number of normally interrupted power circuits for said relay corresponding to the symbol forming rotary positions of said shaft, a selector switch operable to connect said relay into any one of said power circuits, and means turning in unison with said shaft and adapted during each single revolution of said shaft to close the interruptions of said power circuits at the corresponding symbol forming positions of said rotary shaft.

8. In a display device having symbol forming members movable between neutral and active positions, an actuating mechanism for the members comprising a rotary control shaft, means operable to turn said shaft, a plurality of aligned cams mounted upon said shaft for rotation in unison, the consecutive sectors of said cams being adapted to actuate said symbol forming members in various patterns effective to set up a sequence of desired symbols,

and means for suspending operation of said shaft turning means at preselected rotary positions of said shaft to retain preselected symbols in the display device including a normally deenergized relay adapted upon energization to disable said shaft turning means, a number of normally interrupted power circuits for said relay corresponding to the various symbol forming rotary positions of said shaft, a selector switch operable to connect said relay into any one of said power circuits, and an arm arranged to turn in unison with said shaft and adapted to close consecutively the interruptions of every one of said power circuits during each single revolution of said shaft.

9. In a display device of the type described having symbol forming members movable between neutral and active positions, an actuating mechanism for the members comprising a rotary control shaft, a motor operable to turn said shaft, a power circuit for said motor, a plurality of aligned cams mounted upon said shaft for rotation in unison, the consecutive sectors of said cams being adapted to actuate said symbol forming members in various patterns effective to set up a sequence of desired symbols, and means for suspending operation of said motor at preselected rotary positions of said shaft to retain preselected symbols in the display device including a normally deenergized relay adapted upon energization to interrupt the power circuit of said motor, a number of normally interrupted power circuits for said relay corresponding to the various symbol forming rotary positions of said shaft, a selector switch operable to connect said relay into any one of said power circuits, every one of said power circuits having a normally open switch adjacent said shaft in positions corresponding to the symbol forming rotary positions of said shaft, and an arm arranged to turn in unison with said shaft and adapted to close consecutively every one of said switches during each single revolution of said shaft.

10. An arrangement according to claim 9 including a normally interrupted D. C. circuit for the motor and means effective in response to energization of said relay to close said D. C. circuit to brake said motor.

11. A display device comprising symbol forming display members movable between neutral and active positions, an actuating mechanism for the display members comprising a rotary control shaft, means operable to turn said shaft, a plurality of aligned cams mounted upon said shaft for rotation in unison, the consecutive sectors of said cams being adapted to actuate said symbol forming members in various patterns effective to set up a sequence of desired symbols, and settable means for suspending operation of said shaft turning means at preselected rotary positions of said shaft to retain preselected symbols in the device.

12. A display device comprising a plurality of superposed symbol forming members each having relatively inclined neutral and symbol forming areas, a plurality of superposed horizontal shafts supporting said members for rotation between a first position displaying their neutral areas and a second position displaying their symbol forming areas, a cyclically operable control shaft extending parallel to said member-supporting shafts, a cam mounted upon said control shaft for rotation in unison therewith, and a plurality of actuating linkages operatively interposed between said cam and said superposed members for selectively setting said members to a sequence of different positions during each revolution of said control shaft.

13. A display device comprising a plurality of juxtaposed symbol forming members each having relatively inclined neutral and symbol forming areas, a rotatably mounted horizontal supporting shaft extending through the geometric center points of the hypothetical triangles defined by the relatively inclined areas of said members, some of said members being firmly mounted upon said shaft for rotation in unison therewith and others being

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loosely mounted upon said shaft for rotation independently of said shaft, a cyclically operable control shaft extending parallel to said supporting shaft, a plurality of cams mounted upon said control shaft for rotation in unison therewith, an actuating linkage operatively interposed between one of said cams and one of the members that are firmly mounted upon said supporting shaft, and individual actuating linkages operatively interposed between others of said cams and the members that are loosely mounted upon said supporting shaft.

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