This invention relates to signal indicating systems and more particularly to signal display systems of the kind where the devices employed are adapted to successively or selectively display a number of predetermined indications obtained by forming different combinations of luminous or otherwise individualized points systematically arranged on the surface of a display board.

The primary object of this invention is to provide a signal display device of a novel and improved design in which the various signs and indications are obtained by various combinations of luminous points, the construction of the device being such that these points may be very numerous and very close together in a relatively small space. This not only permits of displaying an infinite variety of combinations of letters and words but it also permits of applying this system of signal displaying in connection with devices of relatively small proportions, adapted for use in windows, railroad cars, and for other purposes where signal display devices of relatively small size are now employed.

Another object of this invention is to provide a signal display device of the character mentioned, the construction of which is extremely simple, the number of moving parts and of controlling electric circuits having been reduced to a minimum.

Another object is to generally simplify and improve signal display devices of this character and to provide easily adjusted and easily operated devices which may be used for displaying various indications and signals which may be changed at all times without necessarily entailing changes in the electric circuits employed.

With these and other objects in view as will more fully appear as the description proceeds, this invention furthermore comprises certain novel and improved constructions and arrangement of parts as will be hereinafter described and claimed in the appended claims.

The main characteristics of my invention are its compactness and simplicity. The former is made possible by avoiding the complications accompanying the use of numerous electric lamps arranged on a board such as are now employed in large outdoor electric signs, which are based to a certain extent on the same principle.

In the device forming the object of the present invention, the display board is constituted by an opaque front plate provided with a multiplicity of openings which are normally blocked or closed by individual stoppers or shutters; so that by displacing said closing means or by otherwise uncovering certain groups of openings the various combinations of signals or words formed thereby will instantly become visible due to light at the rear of said board showing through said openings. The stoppers or shutters are preferably made capable of axial displacement, so that no side space being required for their movement, they may be arranged very close together in a relatively small space which accordingly acquires a large signal displaying capacity.

In order to make this point clearer, it will be noted that in a sign of this kind each letter space requires a certain minimum quantity of luminous points if any one letter or number has to be displayed in said space; therefore, the minimum size of each letter space is strictly dependent upon the space required by each individual luminous point entering into the various combinations.

Although the shutters may be controlled independently of one another, I prefer to mechanically or electromagnetically control the same in prearranged groups, using a single control means for each group. Such an arrangement affords the possibility of producing a thoroughly reliable device of a sturdy and relatively simple construction, composed of parts which are strong and adapted to be positively operated notwithstanding their small size; furthermore, this arrangement permits the employment of electrical circuits controlled by means which are entirely exposed and accessible at all times, if an electric or electro-magnetic system of control is employed.

My improved device is suitable for a great variety of uses; it is well adapted for display and advertising purposes and it can also be used for the transmission of signals in place of the well known telegraph systems such as used in ships, power houses, etc., for the selective transmission of predetermined orders of a standard character from one point to another.

Another typical application is in connection with station indicators adapted to be mounted in the cars of railroad and subway systems in order to indicate the next stop, at the same time displaying advertising matter if desired.

The device may therefore be connected for automatic operation by means of a controller,
comparable to those used in connection with outdoor electric signs, causing the successive appearance of a series of predetermined signals or indications, or else the device may be connected to a hand operated controller, causing the appearance of signals or indications, such as the operator may choose. In the case of a station indicator, which is represented in the drawings, the system preferably includes a plurality of signal display devices, 1 or 2 for each car, connected in parallel or in series to a controller operated by the conductor of the train. By such an arrangement the system is extremely flexible and the same installation may be used both for local and express stations on the same line.

In addition to possessing the various advantages mentioned, this system also permits of realizing conditions which are a decided improvement upon those encountered in the operation of electric signs of the ordinary type. For instance, the appearance of two successive displays in a sign of the ordinary type, must be separated by a certain period of time in order to avoid confusion due to the afterglow. In the present case, the afterglow does not exist, because the openings are either shut or open and the arrangement therefore produces sharp and sudden appearance and disappearance of the matter displayed.

In the preferred form of device as stated, the shutters are in the form of axially movable bars, terminating in a conical head projecting within the openings of the board from the inside. The appearance of the light beyond each opening is caused by moving its shutter bar towards the rear of the device away from the board; and this permits of obtaining a display of more or less intensity according to the axial displacement of the shutter bar.

It is therefore possible to display signs or signals where certain words stand out more on account of their greater brilliancy, this being obtained by moving the corresponding shutter bars away from their openings, a greater distance than the shutter bars corresponding to the other words or signals. It is also possible to obtain various colors or combinations of colors for different displays or for different parts of the same display, without increasing the total number of luminous points.

In the premises and throughout the specification, I refer to the display board as comprising a plurality of luminous points because this is the most obvious and most practical way of carrying the invention into practice, however, it is also possible to display the same signals merely by varying the visibility of the various points. For instance, if the entire display board including the tapered ends of the shutter bars is painted white by moving a certain combination of shutter bars away from the board, it is also possible to produce a distinguishable display indication or signal, due to the dark or black appearance of the openings which have thus become uncovered standing out against the wide field of the board.

In the majority of cases however, it is preferable to display luminous signals, this merely requiring the addition of a suitable source of light at the rear of the display board. The invention will be better understood by referring to the accompanying drawings, in which Fig. 1 is a front view in elevation partly broken away of a station indicator embodying my invention;

Fig. 2 is a cross sectional view of the same;
Fig. 3 is a side view of the same partly sectioned and broken away;
Fig. 4 is a fragmentary plan sectional view of the rear part of the device showing the manner in which its various parts are assembled and adjusted;
Fig. 5 is a fragmentary front view of a section of display board showing the display of letters with different intensities;
Fig. 6 is a detail sectional side view of the same, also illustrating the construction of the front part of the shutter bars;
Fig. 7 is a fragmentary detail side view in elevation of a possible form of individual shutter bar control which may be applied instead of the group control illustrated in the other drawings.

In its preferred form my improved device substantially comprises a perforated front display board having its perforations arranged in horizontal and vertical rows or in any other suitable systematic arrangement permitting the display of letters, numbers, or other signals. At the rear of said board there is a light chamber which is preferably provided with a reflecting surface opposite the board, and which is lighted in any suitable manner, for instance, by means of electric bulbs of elongated form arranged along its sides, assisted by suitable reflectors directing the light inwardly. The openings in the display board are controlled by axially movable shutter bars co-axial therewith, which project to the rear beyond the light chamber within an operating chamber and through the bottom thereof.

In the operating chamber and over the shutter bars are mounted a plurality of operating boards in close succession to each other, and said boards are so mounted in relation to the shutter bars that a slight displacement to the rear of one or another of said boards will cause a corresponding displacement of one group or another of said shutter bars, each group corresponding to a predetermined signal or indication displayed by the display board.

The movement of the operating boards may
be caused in any suitable manner, for instance by energizing a set of electromagnets for each board so that the device is suitable for association with and controlled by some suitable controlling device placed at some remote point.

The various signals or indications displayed are set in advance by proper arrangement of the connections between the operating boards and the shutter bars, but the signals controlled by any one board may be changed at will at any one time due to the simple manner in which the various combinations may be formed. Referring to the drawings, 10 designates a casing at the front part of which is mounted a perforated display board 11, provided with a plurality of openings 12, in close systematic arrangement permitting the formation of all the necessary combinations needed to display various letters, numbers, or other symbols or designs.

At the rear of said display board is a comparatively narrow light chamber 13, delimited by a bottom 14 parallel to and at a certain distance to the rear of display board 11. Said light chamber is provided at its periphery with electric bulbs 15 or any other suitable means for generating light, and said light is preferably reflected towards the center of the light chamber by means of reflectors 16. Back 14 is provided with openings corresponding to openings 12 of the display board providing guiding means for stems 17 of the shutter bars 18.

Said shutter bars are mounted at the rear of the display board, transversely thereto, one for each opening, and are each provided with a button or head 19 normally abutting against the rear of its corresponding opening due to the action of pressure springs 20 at the rear. Each pressure spring is placed between a collar 21 mounted upon the bar and the back of the casing 22, which is also perforated to allow the rear end of the bars to project there-through as shown at 23; therefore, while the bars can be moved axially to the rear against the action of their corresponding springs, as soon as released the springs will automatically return them to their normal position where their heads obstruct the openings 12 of display board 11.

It is obvious that if certain groups of bars corresponding to certain combinations of letters or other signals are simultaneously displaced to the rear, the corresponding openings will appear lighted so that the desired indication or signal will stand out clearly readable and defined by luminous dots. The brilliancy of the display will be greatly enhanced if the heads 19 of the shutter bars are made of mirrored or cut glass or of polished material or metal of a shape well adapted for reflecting the light issuing from the side bulbs, and if, furthermore they are nickel or silver plated. In this case each shutter bar head acts as an independent reflector, and the effect obtained is even superior to that obtainable by the use of individual bulbs. For instance in Fig. 1, which represents a station indicator adapted for use in railroad cars and subway cars, it is shown how indication of the next station to be reached may be caused to appear and the possibility of using part of the display board for displaying advertising matter is also illustrated.

The same figure also illustrates the possibility of displaying certain letters or words, more brilliantly than others, as it will be observed that the words "Hoyt St." appear composed of dots which are more visible than the dots composing the words "Use Ogoedidusto." This possibility is also illustrated in detail in Figs. 5 and 6, Fig. 6 being a side sectional view in elevation through line 6-6 of Fig. 5. In the same it will be seen that the D is more prominently displayed than the letter U and that this effect is obtained by moving the shutter bars such as 24 corresponding to the letter U a shorter distance to the rear than the shutter bars 25 corresponding to the letter D. Due to the conical shape of the heads 19 shown, a luminous ring of a smaller or greater width will thus be displayed, which is translated into less or more visibility from a distant point.

As previously explained, one of the seriously objectionable features of electric signs, where each dot is represented by a bulb is the necessity of wiring each bulb independently of the others; this necessity being further complicated by the fact that each new combination of letters or signals will again require independent wiring for each bulb composing it. This results in an enormous mass of wires running from the controller to the board and is a potential source of all kinds of breakdowns and other troubles which are difficult to locate and to repair. A similar type of control may be applied if desired in connection with the device forming the object of the present invention, by providing individual means for the operation of the shutter bars; such an arrangement is not seriously objectionable as long as the number of openings in the board is relatively limited, as is the case in connection with carriage call devices where only three letter or number spaces are generally required. One of the ways in which the operation of the device may thus be carried out is illustrated in Fig. 7, where 26 is the rear end of one of the shutter bars passing through plate 27 and provided with a tip 28 which is the armature of an electromagnet 29, coaxial with said shutter bar and mounted upon bottom plate 30. When electromagnet 29 is energized it will attract armature 28, causing axial rearward movement of the shutter bar against the action of spring 31, and as soon as the electromagnet is deenergized the spring will...
force the shutter bar back to its normal position. It is obvious that the circuits of the electromagnets can be controlled in the same manner now employed in controlling the individual circuits of electric bulbs, or else various combinations may also be obtained in a simpler manner by inserting a plate or board perforated to correspond to the desired indication between tips 28 and the electromagnets; then by energizing all the electromagnets, only those shutter bars which are opposite the perforations will be free to move away from the display board while the other shutter bars will be prevented from doing so by the thickness of the board interposed at the rear thereof.

To illustrate this manner of operation of the device, in Fig. 7 I show in dotted lines such a perforated board 32 interposed between the rear ends of the shutter bars and the electromagnets in the manner described. It is obvious that in this case it will not be necessary to have individual electromagnets for each bar, since a single magnet extending over the entire surface of the device will do. This system is to be preferred in such cases where it is desirable to have unlimited capacity in a device of moderate size and where it is possible to change the perforated board by hand or by some mechanical arrangement.

However, I prefer to use the arrangement shown in the drawings on account of its simplicity and reliability and on account of the suddenness with which signals may be changed. The same comprises a plurality of plates 33, provided with perforations 34 corresponding to the shutter bars and inserted over said bars in serial spaced arrangement at the rear of plate 14. Perforations 34 have a larger diameter than bars 18, as shown in detail in Fig. 4, so that it is possible to insert a series of bushings 35 over the bars, still permitting the insertion of plates 33 in position, the outer diameter of said bushings being equal to the diameter of openings 34.

If now it is possible to so arrange the various parts that each plate will control a certain number or group of bars, so that if that plate is displaced to the rear it will cause a corresponding movement of the bars in said group; it will be understood that it will be sufficient to establish a suitable control causing the selective movement of one plate or another, in order to render the device operative.

In the drawings, I show an arrangement which may be employed to cause displacement of the plates to the rear. In the same the plates are shown supported upon and guided by four corner bars 36 maintaining said plates in correct alignment. The bars 36 are a little smaller in diameter than the corresponding openings in the plates, permitting the insertion between the bars and the plates of bushings 37, the outer diameter of which corresponds to the diameter of the openings in the plates. Said bushings are each provided with a rear flange 38 which acts as positioning means for the next plate to the rear, so that when the entire series of bushings is inserted in position together with the corresponding plates, each plate can be displaced rearwardly as far as the flanges of the bushings on which the plate is supported, but cannot be moved forwardly because it abuts against the flanges 38 of the bushings in front of it. Two opposite sides of each plate are engaged by forked members such as 39 which are laterally projecting from stems 40, 41, pivotally mounted at 42, 43, parallel to the sides of the plate engaged thereby. Said stems are also provided with another arm or projection 44, 45, carrying the armatures 46, 47 of electromagnets 48, 49 inwardly projecting from the sides of the casing. Armes 44, 45 project from the stem towards the rear so that energization of the electromagnets will attract the armatures and will cause rearward angular movement of the forked members 39, and these in their turn will force towards the rear the plate engaged thereby.

Two electromagnets, one at each side of each plate are therefore sufficient to operate said plate no matter how many shutter bars the plate controls; said two electromagnets being inserted in parallel on the same circuit. The electromagnets controlling adjoining plates may be placed in staggered position in relation to the others, or else electromagnets controlling one plate may be placed at two different sides from those controlling the next plate as shown; so that electromagnets can be conveniently arranged to provide sufficient angular movement of the forked members without the possibility of mutual interference, while the plates may be set quite close to each other. For instance, it is quite possible, in a device of relatively small dimensions to use plates only one-sixteenth of an inch thick, only three-sixteenths of an inch apart, so that in a device twenty inches deep, allowing for four inches of lost space between the front and rear, it is possible to have upward of sixty plates, corresponding to as many different signals. Accordingly, while such a device may have over two thousand openings and shutter bars, sixty circuits will be all that are needed to control sixty different signals, or less if less signals are used; so that it is obvious that from an electrical stand-point this device is far simpler than any other hitherto known.

I will now describe a simple method for establishing operative connection between each plate and the shutter bars to be controlled thereby. I have mentioned before that series of bushings 35 are inserted over
each shutter bar for the entire length of the bar from front collar members 50 abutting against rear of plate 14 to rear collar members 21 which are secured to the rear end of the portion in any suitable manner, so that by this arrangement the bushings are rendered integral with the bars over which they are inserted, and any axial movement of any one of the bushings is shared by the corresponding bar. The stem of the bushings is of the same diameter as openings 24 in the plates 33, and therefore the plates are free to slide over the bushings except where a bushing is provided with a flange such as 51 at the rear of the plate. Therefore, by providing the shutter bars which are to be controlled by a certain plate, with flanged bushings and the remaining bars with plain bushings, it is obvious that if that plate is displaced towards the rear it will force towards the rear those bars upon which the flanged bushings have been inserted. The same plate will freely slide over the other bars, the position of which will remain unaltered due to the action of their respective springs 20.

Due to this arrangement it will therefore be seen that when any set of two electromagnets is energized causing rearward displacement of the corresponding plate, the plate will cause rearward movement of a certain group or combination of shutter bars which have been provided with flanged bushings in correspondence of the plate, causing light to show through the corresponding openings at the front display board. As soon as the electric circuit is interrupted, the electromagnets become deenergized and the plate will resume its former position to which it will be forced by the action of springs 20 of the bars which have been displaced thereby. The bars, of course, will also resume their normal position and the signal will no longer be visible. In this manner by using unitary bushings such as 33, one for each plate on each bar, it is possible to arrange any desired combination of signals for each plate as the same are inserted in succession in their relative positions. It is also possible to arrange for the effect illustrated in Figs. 5 and 6 where certain bars are displaced to the rear less than others, causing a difference in the relative brilliancy of certain parts of the display. This is obtained by using flanged bushings such as 52, the flange of which 53 does not abut against the rear surface of the corresponding plate but is somewhat to the rear thereof. Assuming for instance, that plate 33' in Fig. 4 is displaced to the rear in the manner indicated it will be understood that the 3rd and 5th bars from the left will be displaced the same distance, the 2nd bar from the left which is provided with a bushing 53, the flange 53 of which is somewhat to the rear of plate 33' will allow a certain lost motion of the plate, before the bar will begin to share in its movement, so that in the end the said bar will be moved a distance which is less than the distance traveled by the 3rd and 5th bars. Therefore, the opening at the display board corresponding to said 2nd bar will be uncovered less than the openings corresponding to the 3rd and 5th bars, and the relative effect will be as described in connection with bars 24 and 25 respectively.

It is obvious that this arrangement lends itself to any suitable system of control. If the various signals have to be successively displayed in a systematic or predetermined arrangement, it is possible to use a mechanically or electrically operated controller causing the energization and deenergization of the various electromagnets in the order set. On the other hand, when it is desirable to have the indications displayed by the device under the control of the operator, the controller may be operated by hand, so that any signal will be displayed at any time according to the position to which the controller is set by the operator.

The latter system is preferable when the device is used to transmit intelligence or orders or signals according to conditions which may vary from time to time, such as the case for instance in connection with marine and power house telegraphs. In the case illustrated, where the device is used as a station indicator it is also desirable to have its operation controlled by the motorman, because some trains may stop at certain stations, while other trains may stop at other stations, or only at a less number of stations.

In the arrangement described, it will be observed that there is no possibility of interference between plate and plate because while a plate is only capable of rearward movement relative to the bars which are not provided with flanged bushings in correspondence of the plate, the bars themselves may be displaced to the rear without causing any movement of the plates, because flanges 51, 53 are at the rear of the plates and not at the front; therefore, the bars which are displaced by any one plate will not cause any movement of the remaining plates. Where the display board is likely to be exposed to external sources of light, as is the case in railroad and subway cars for instance, it is best to equip it with a shield such as 54 surrounding and forwardly projecting from the display board, the effect of said shield being to prevent intense illumination of the board from external sources, otherwise such an intense illumination might interfere with the visibility of the indications displayed.

The device can also be designed for operation by other than electrical power, for instance by pneumatic or by mechanical means by suitably modifying its construction and system of control. I prefer, however, to use electric operation as illustrated on account
of its obvious convenience. In this connection it will be observed that the device has also the advantage of saving considerable power as against that required by an electric sign of the ordinary type. In fact in the present case, only a very small number of bulbs is kept continuously lighted as against the intermittent lighting of a great number of bulbs in the other case. This not only requires more power but also greatly shortens the life of the bulbs themselves.

While the drawings represent the device in its preferred form, the same are intended for illustrative purposes only, because it is obvious that the invention may be varied in a number of details without departing from the inventive idea. For instance, the visibility of the dots of which each letter or number is composed may be obtained by moving the shutter bars outwardly instead of inwardly, through the display board, so that the heads of the bars thus displaced will be exposed and capable of brilliantly reflecting the light generated by some suitable source external to the display board. It is also possible to devise other manners than that shown for establishing operative connection between each plate and the shutter bars; and it is also possible to devise other ways for controlling the operation of the plates. Therefore, I reserve myself the right to carry my invention into practice in all those ways and manners which may best suit various requirements and which may enter fairly into the scope of the appended claims.

I claim:

1. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, and a shutter member for each opening adapted to cover or uncover the same, of a plurality of operating members movably longitudinally of said shutter members, each operating member being adapted to cause the simultaneous operation of a group of said shutter members in a corresponding predetermined combination.

2. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, and a shutter member for each opening adapted to cover or uncover the same, of a plurality of operating members movably longitudinally of said shutter members, each operating member being adapted to cause the simultaneous operation of a group of said shutter members in a corresponding predetermined combination, and means for selectively actuating said operating members.

3. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, and an axially movable shutter member controlling each opening, of means adapted to cause simultaneous axial displacement of groups of said shutter members in predetermined combinations away from said board, said means being adapted to set various shutter members of the same group at different distances from said board.

4. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, and a shutter member for each opening adapted to reflect through said opening, the lateral light rays directed by said light generating means.

5. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, and a shutter member for each opening adapted to cover or uncover the same, of a member movably longitudinally of said shutter members adapted to cause the simultaneous operation of a group of the same in a predetermined combination, and electromagnetic means controlling the operation of said movable member.
the remaining bars permit its free movement, and means for returning said displaced shutter bars and board to their normal position.

10. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of a plurality of axially movable shutter bars controlling said openings, a perforated board inserted on and movable longitudinally of said bars, means causing some of the bars to follow the displacement of said board, while the remaining bars permit its free movement, means for operating said board, and springs returning said displaced shutter bars and board to their normal position.

11. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of a plurality of axially movable shutter bars controlling said openings, a perforated board inserted on and movable longitudinally of said bars, and members mounted on some of said bars in the path of the travel of said board, causing said bars to follow the displacement of said board.

12. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of a plurality of axially movable shutter bars controlling said openings, a perforated board having perforations of a larger diameter than and coaxial with said bars, inserted on and movable longitudinally of said bars, and a series of bushings on each bar constrained to move axially therewith, some of said bushings having flanges of a diameter larger than the openings in said board, in the path of its travel, causing the corresponding bars to follow the displacement of said board.

13. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of a plurality of axially movable shutter bars controlling said openings, a perforated board having perforations of a larger diameter than and coaxial with said bars, inserted on and movable longitudinally of said bars, and a series of bushings on each bar constrained to move axially therewith, some of said bushings having flanges of a diameter larger than the openings in said board in the path of its travel, abutment against said board and some other bushings having a flange of a diameter larger than the openings in said board in the path of its travel, but at a distance therefrom causing the bars corresponding to the first mentioned flanged bushings to follow the displacement of the board in its entirety and the bars corresponding to the second mentioned flanged bushings to follow only a portion of said displacement.

14. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of a plurality of axially movable shutter bars controlling said openings, a plurality of spaced perforated boards inserted on and movable longitudinally of said bars, and means causing a predetermined group of bars for each board to follow the displacement of said board while the remaining bars permit its free movement.

15. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of a plurality of axially movable shutter bars controlling said openings, a plurality of spaced perforated boards inserted on and movable longitudinally of said bars, means causing a predetermined group of bars for each board to follow the displacement of said board while the remaining bars permit its free movement, and means for returning the displaced shutter bars and board to their normal position.

16. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of a plurality of axially movable shutter bars controlling said openings, a plurality of spaced perforated boards inserted on and movable longitudinally of said bars, and members mounted on some of said bars forming parts of individual combinations for each board, in the path of the travel of said board causing said bars to follow the displacement of said board.

17. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of a plurality of axially movable shutter bars controlling said openings, a plurality of spaced perforated boards, having perforations of a larger diameter than and coaxial with said bars, inserted on and movable longitudinally of said bars, and a series of bushings on each bar constrained to move axially therewith, some of said bushings corresponding to individual groups of bars for each board, having flanges of a diameter larger than the openings in said board in the path of its travel, causing the corresponding bars to follow the displacement of said board.

18. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of a plurality of axially movable shutter bars controlling said openings, a plurality of spaced perforated boards, having perforations of a larger diameter than and coaxial with said bars, inserted on and movable longitudinally...
of said bars, a series of bushings on each bar constrained to move axially therewith, some of said bushings corresponding to individual groups of bars for each board, having flanges of a diameter larger than the openings in said board in the path of its travel, and abutting against said board and some other bushings having a flange of a diameter larger than the openings in said board in the path of its travel, but at a distance therefrom causing the bars corresponding to the first mentioned flanged bushings to follow the displacement of the board in its entirety and the bars corresponding to the second mentioned flanged bushings to follow only a portion of said displacement.

19. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of a plurality of axially movable shutter bars controlling said openings, a plurality of spaced perforated boards inserted on and movable longitudinally of said bars, means causing a predetermined group of bars for each board to follow the displacement of said board while the remaining bars permit its free movement and means for selectively causing the operation of said boards.

20. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of a plurality of axially movable shutter bars controlling said openings, a plurality of spaced perforated boards inserted on and movable longitudinally of said bars, means causing a predetermined group of bars for each board to follow the displacement of said board while the remaining bars permit its free movement, means for selectively controlling the operation of said boards, and means for returning the displaced shutter bars and board to their normal position.

21. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of a plurality of axially movable shutter bars controlling said openings, a plurality of spaced perforated boards inserted on and movable longitudinally of said bars, means causing a predetermined group of bars for each board to follow the displacement of said board while the remaining bars permit its free movement, means for selectively causing the operation of said boards, and a spring inserted on each bar causing the return of the displaced bars and board to their normal position.

22. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of a plurality of axially movable shutter bars controlling said openings, a plurality of spaced perforated boards, having perforations of a larger diameter than and coaxial with said bars, inserted on and movable longitudinally of said bars, a series of bushings on each bar constrained to move axially therewith, some of said bushings corresponding to individual groups of bars for each board, having flanges of a diameter larger than the openings in said board in the path of its travel, causing the corresponding bars to follow the displacement of said board, means for selectively causing the operation of said boards, and means for returning the displaced shutter bars and board to their normal position.

23. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of a plurality of axially movable shutter bars controlling said openings, a plurality of spaced perforated boards inserted on and movable longitudinally of said bars, and members mounted on some of said bars forming parts of individual combinations for each board, in the path of the travel of said board causing said bars to follow the displacement of said board, permitting free movement of said bars in relation to the remaining boards.

24. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of light generating means mounted at the rear of said board, and a shutter member for each opening axially movable to and from said opening.

25. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of light generating means at the rear of said board, a plurality of axially movable shutter bars controlling said openings, a plurality of spaced perforated boards inserted on and movable longitudinally of said bars, and means causing a predetermined group of bars for each board to follow the displacement of said board while the remaining bars permit its free movement.

26. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of light generating means at the rear of said board, a plurality of axially movable shutter bars controlling said openings, a plurality of spaced perforated boards inserted on and movable longitudinally of said bars, means causing a predetermined group of bars for each board to follow the displacement of said board while the remaining bars permit its free movement, and means for returning the displaced shutter bars and board to their normal position.

27. In a device of the class described, the combination with a display board provided...
with a plurality of openings suitably arranged to form a variety of signals, of light generating means at the rear of said board, a plurality of axially movable shutter bars controlling said openings, a plurality of spaced perforated boards inserted on and movable longitudinally of said bars, means causing a predetermined group of bars for each board to follow the displacement of said board while the remaining bars permit its free movement, and means for selectively causing the operation of said bars to follow the displacement of said board, electromagnetic means for selectively causing the operation of said boards, and springs for returning the displaced shutter bars and board to their normal position.

31. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, a plurality of individual shutter members one member controlling each opening, and a plurality of operating members therefor independent of one another, of means for operatively associating groups of said shutter members with each operating member, causing simultaneous operation of the shutter members in each group.

32. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, a plurality of axially movable shutter bars controlling said openings, and a plurality of spaced perforated boards inserted on and movable longitudinally of said bars, means mounted on some of said bars in the path of the travel of each board, causing a predetermined group of bars for each board to follow the displacement of said board, in a given direction, said means permitting free movement of said bars through said boards in the same direction.

33. In a device for displaying signals, a display board comprising a plurality of systematically arranged normally covered openings, means for covering said openings, adapted to expose a peripheral clearance space around said openings when withdrawn therefrom, permitting light to show through said peripheral clearance spaces, and means for operating said covering means.

34. In a device for displaying signals, a display board comprising a plurality of systematically arranged normally covered openings, means for exposing a peripheral clearance space around some of said openings in predetermined combinations permitting light to show through said peripheral clearance spaces, and means for regulating the operation of said exposing means, so as to uncover a greater or smaller portion of said openings, according to the intensity of display desired.

35. In a device for displaying signals, a display board comprising a plurality of systematically arranged normally covered openings, means for exposing a peripheral clearance space around some of said openings in predetermined combinations permitting light to show through said peripheral clearance spaces, and means for regulating the operation of said exposing means causing some of the same to expose a portion of the openings controlled thereby, greater than the exposed portion of other openings in order to cause different parts of the same signal to be displayed with different intensities.
36. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, and a source of light at the rear thereof, of a movable shutter member for each opening provided with a light reflecting head, causing light originating from lateral sources to be directly reflected through the openings uncovered thereby.

37. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, and a shutter member for each opening adapted to cover or uncover the same, of a plurality of operating members movable longitudinally of said shutter members, each adapted to cause the simultaneous operation of a group of said shutter members in a corresponding predetermined combination, and electromagnetic means for selectively actuating said operating members.

38. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of light generating means mounted at the rear of said board, a shutter member for each opening axially movable to and from said opening, and means for moving a group of said members in a predetermined combination away from said board, permitting light to show through the corresponding openings.

39. In a device of the class described, the combination with a display board provided with a plurality of openings suitably arranged to form a variety of signals, of light generating means mounted at the rear of said board, a shutter member for each opening axially movable to and from said opening, and means for selectively moving groups of said members in predetermined combinations away from said board, permitting light to show through corresponding openings.

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