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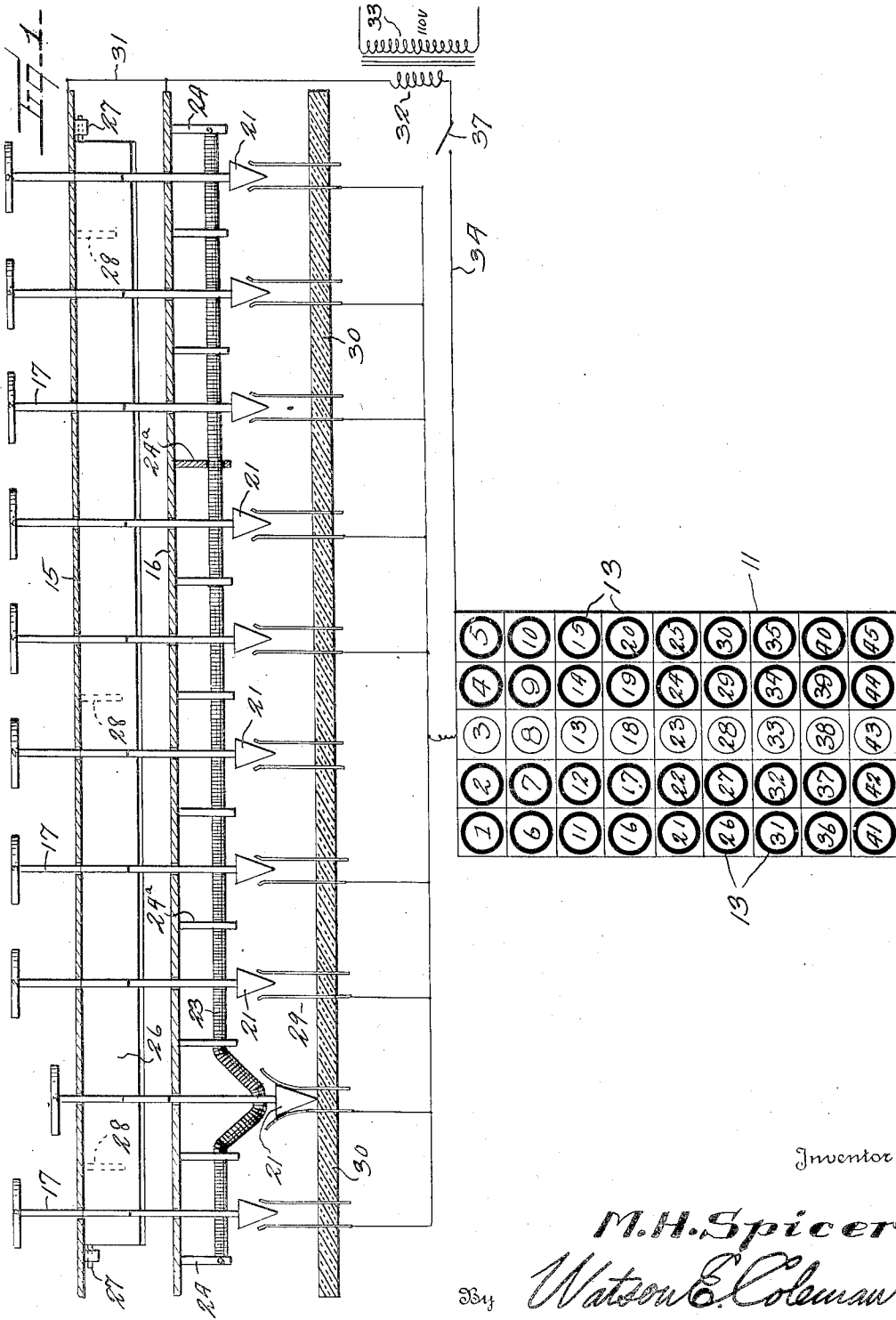
M. H. SPICER

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CONTROL FOR ELECTRIC SCOREBOARDS

Filed June 5, 1934

2 Sheets-Sheet 1



Inventor.

M.H.Spicer  
Watson & Coleman

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Attorneys

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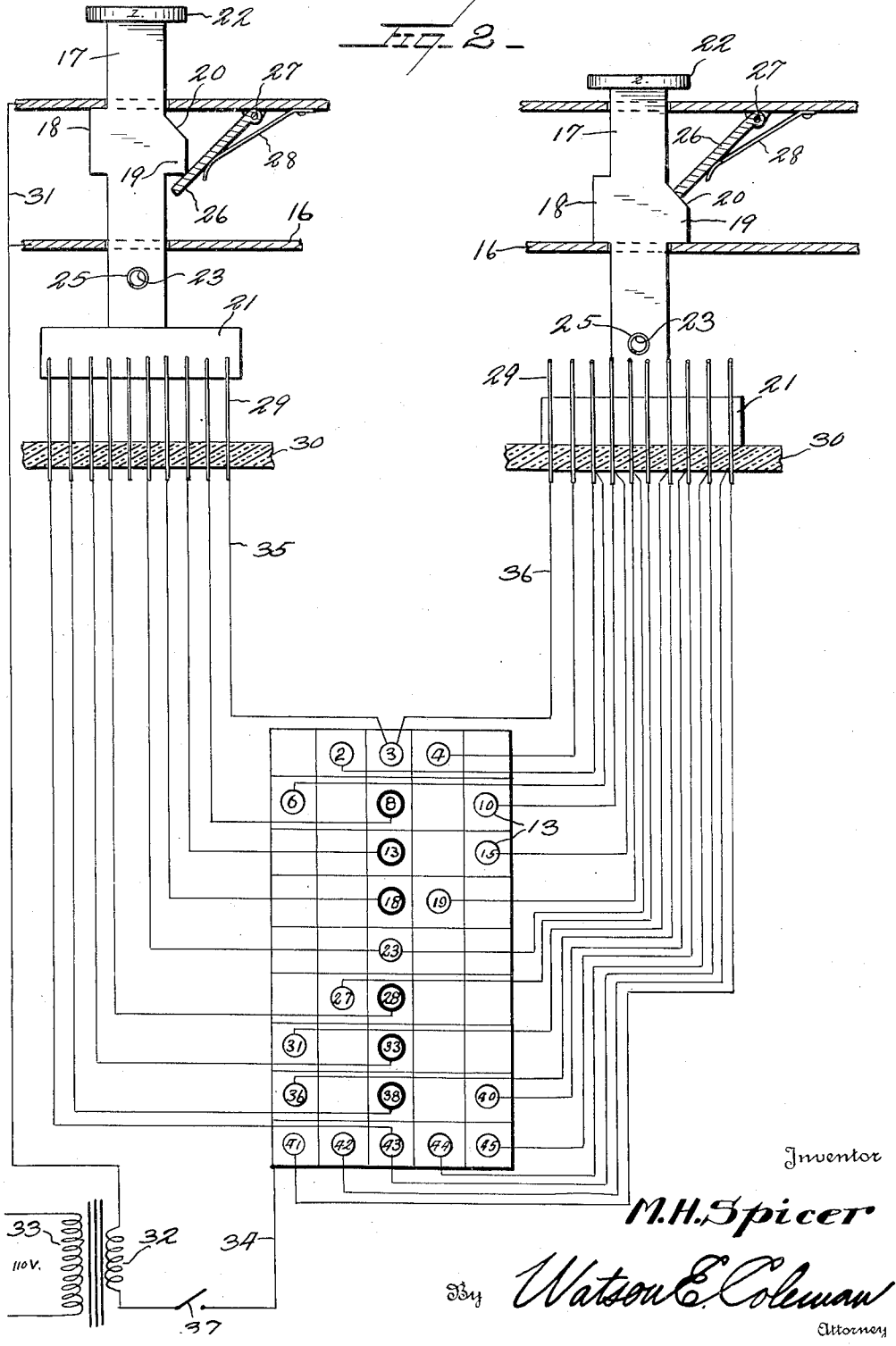
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CONTROL FOR ELECTRIC SCOREBOARDS

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2 Sheets-Sheet 2



Inventor

**M.H. Spicer**

By *Watson E. Coleman*  
Attorney

# UNITED STATES PATENT OFFICE

2,060,431

## CONTROL FOR ELECTRIC SCOREBOARDS

Myrle H. Spicer, Wisconsin Dells, Wis.

Application June 5, 1934, Serial No. 729,163

2 Claims. (Cl. 200—16)

This invention relates to means for controlling the illumination of electric lamps used on score boards, in advertising matter or message transmitting devices where the message is spelled out by means of illuminated letters or numerals, and the general object of the invention is the provision of improved and relatively simple mechanism adapted to be operated by means of manually depressible keys whereby numbers or letters may be formed from incandescent electric lamps on a supporting frame or board.

A further object of the invention is to provide a new and improved control mechanism or box, in which the parts are so constructed and arranged that when any particular key is depressed to form a row or number, the key will be held down until released and whereby the successive depression of any other key will automatically release the previously depressed key.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a vertical sectional view through a control box embodying my invention showing the keys in elevation, the number one key being depressed, the view also showing in elevation a bank or frame with lamps illuminated to form the numeral one;

Figure 2 is a section through the control box taken at right angles to Figure 1 and showing two adjacent keys of a line of keys, one of these keys being depressed and the other elevated, the view showing diagrammatically the manner in which the depression of the second key illuminates the lamps forming the numeral two, all of the other lamps of the bank except those connected to these keys being omitted for clearness.

In order that my improved control mechanism or box may be clearly understood, I have illustrated with it in Fig. 1 of the drawings a frame 11 supporting a plurality of incandescent bulbs 13 used for forming numerals, there being forty-five bulbs arranged in five vertical rows. These electric light bulbs 13 may be disposed each in a separate compartment, that is, in a compartment which is separated from the next adjacent compartment or the bulbs may project out from the face of the board or frame and not be separated from each other by intervening partitions. With the forty-five bulbs arranged as shown in Figure 1, any of the numerals from naught to nine may be formed by illuminating certain predetermined lamps. For convenience, these lamps are numbered from one to forty-five in the drawings and

it will be seen that in order to form the numeral one, all the lamps of the middle vertical row must be illuminated, that for forming the number two, the lamps which are indicated in Figure 2 as being illuminated, must be energized, etc. Any of the numerals from naught to nine may be formed by a proper illumination of the lamps.

As illustrated in Figure 1, the control box includes two metallic plates 15 and 16 which are slotted for the reception of metallic plungers 17. These plungers are shaped from flat and relatively thin material and have the form shown in Figure 2. Each plunger has a key at one end and the shank of each plunger on one side edge is formed with a shoulder 18 and directly opposite this shoulder 18 with an outwardly projecting shoulder 19, the upper face of which is beveled at 20. The lower end of each plunger below the plate 16 carries upon it a head 21 formed in cross section in the shape of a wedge. The keys of the several plungers are designated 22. The plungers are urged upward by any suitable means and I have shown for this purpose a long coiled spring 23 attached to brackets 24 projecting downward from the plate 16, the shank of each plunger adjacent its lower end being formed with an aperture 25 through which the coiled spring extends. It will be seen that when any one plunger is depressed, the spring 23 will be tensioned and will tend to urge the plunger upward as soon as released.

It will be noted that the provision of a single coil spring for all of the plungers or keys considerably cheapens the cost of the structure and, furthermore, permits flat keys to be used which may be made by stamping the keys out. If individual coil springs were used, there would have to be one for each key and, under ordinary circumstances, the keys would have to have round shanks around which the coil springs would be disposed. This is entirely avoided by the use of the single spring 23. It will also be noted that the spring 23 is electrically connected through the brackets 24 with the plate 16, which receives current, as will be later described, so that the spring 23 acts as a distributor of electrical current for the plungers or keys, thus securing a much better application of current to the keys than if the plates 15 and 16 were solely relied on for this purpose. By the provision of the brackets 24 and 24<sup>a</sup>, the depression of one key will pull the spring down directly between the brackets and will not exert a downward pull on any other of the keys or plungers, as would be the case were there no brackets 24<sup>a</sup>.

For the purpose of holding each plunger downward after it is depressed, I provide for the whole row of plungers an elongated pawl 26 pivoted at 27, the pawl being urged toward its set of plungers by means of the spring 28. It will be seen from Figure 2 that when one set of plungers is raised, the common pawl 26 will extend beneath all of the shoulders 19 and the spring 23 will hold all of these pawls raised with the shoulder 18 of each pawl bearing against the upper plate 15 and acting as a stop but that when any one plunger is depressed, it will force out the corresponding pawl 26 and when the plunger has passed the pawl, the pawl 26 will spring back and engage the beveled shoulder of the depressed plunger, thus holding that particular plunger downward. It will likewise be seen that this plunger will be held depressed by the pawl until another plunger of the same set is depressed. This depression of the second plunger will force the pawl 26 outward from above the previously depressed plunger and the previously depressed plunger will promptly rise. Thus when any one plunger of a set has been depressed, it will stay depressed until another plunger is depressed, whereupon the first plunger is released.

Coacting with the V-shaped contact heads 21, which are of metal and conductive, are a series of jacks 29, consisting of two resilient fingers held spaced from each other but when a plunger is depressed, the head 21 of this plunger engages between the fingers and forms an electrical connection between the plungers and the fingers of the jack. These jacks are supported upon an insulating base or board designated generally 30 and forming part of the control box. Because of the wedge-shaped heads 21, these resilient fingers tend, as soon as the pawl 26 has been released, to urge the key quickly upward, thus giving to the plunger or key a greater acceleration than would be the case if only the main spring 23 were used, this being desirable, inasmuch as it results in the more rapid break of the contacts and greatly minimizes arcing.

The plates 15 and 16 are connected by a wire 31 to one side of the secondary coil 32 of a 110 V.-transformer designated generally 33. The wire 34 leads from the coil 32 to the sockets of the several lamps 13. The base of each socket is connected by wires 35 and 36 leading to certain of the spring fingers 29. As seen in Figure 2, a plurality of spring fingers 29 are associated with each plunger and these selected spring fingers or jacks are electrically connected to all of the lamps that go to make up any particular numeral. Thus, for instance, the second plunger of the series which is marked "1" and which, when depressed, is designed to energize those lamps which will form the numeral "1", on the score board, has nine fingers all connected to the bases of the sockets for the lamps 3, 8, 13, 18, 23, 28, 33, 38 and 43 in Figure 1 so that when this plunger is depressed, the aforesaid lamps will all be illuminated and the numeral "1" will be displayed. The spring fingers for the key No. 2, which, when depressed, will cause the numeral "2" to be formed upon the score board, are seventeen in number and are connected up to the lamps which in Figure 2 are indicated as being energized.

It is not believed necessary to state the various lamps which will be lighted in order to form the numerals naught, three, five, six, etc., three illustrations of numerals having been given which are believed to be sufficient.

It will be seen, of course, that each lamp is connected to the source of current and to the spring fingers or jacks 29 of selected plungers.

A switch 37 is disposed in the line so as to cut off the current entirely whenever desired. With the construction illustrated, it is evident that the lights of a frame or section may be readily energized and deenergized to form any numeral desired or any combination of two numerals by depressing the appropriate plungers and it is equally obvious that if it is desired to set up combinations of three figures, three sets of keys and three sections of lamps would be used for the purpose.

It will be, of course, understood that in Figure 1, the wiring for the lamps 8, 13, 18, 23, 28, 33, 38 and 43 are omitted for clearness and that only the wiring to the lamp 3 is shown, the plunger 21 of number 1 key, of course, having wires connecting it with the lamps 8, 13, 18, 23, 28, 33, 38 and 43 so that when this key is depressed, the lamps forming the numeral 1 will be energized.

While I have shown a bank of lamps arranged in transverse groups of 5, some of the lamps are never lighted, as, for instance, 7, 17, 29, 34, 32 and 39. Such lamps need not be placed in a bank at all but are illustrated merely to show the regularity of the numbering of the lamps in groups of five and to fill out the bank.

It will be, of course, understood that the spring 23 extends loosely through the intermediate brackets 24<sup>a</sup> as shown in Figure 1 and, therefore, the spring will receive some tension throughout its entire length when the plunger is depressed. However, since the spring is closely wound, nearly all of the tension will be exerted between the brackets, the friction involved by the contact of the spring with the brackets acting as a retardation to those portions of the spring on each side beyond the key which is depressed. In actual practice, the plunger need not be depressed more than a quarter of an inch so that this tension is not very extensive.

It will also be obvious that instead of the numerals, the letters of the alphabet may be displayed by lamps and the lamps designed to form a particular letter readily controlled by a particular key in the same manner as heretofore described for numbers.

The plungers may be arranged on the plan of the standard key board of a typewriter, either the number key board or the letter key board, and with the proper electrical connections on the principle of those described herein, it will be possible for a typist to flash a letter at a time, thus spelling out words or transmitting a given signal as far as the letters are visible. Such a bank of lights could be used for advertising in store windows while the operator would be unseen and such a bank of lights could be arranged in connection with any score board and thus information be given concerning the game which was being scored no matter how much noise was being made.

While I do not wish to be limited to the use of a long spring 23 for the purpose of urging the plungers upward except as may be defined in the claims, yet by providing this long spring, no tension is present in the assembly of the unit and also in case of repairs due to breakage of the spring, the repairs may be greatly facilitated.

While I have illustrated certain details of construction as regards the control, it is obvious that minor changes might be made therein without departing from the spirit of the invention except as defined in the appended claims.

Further it will be understood that the arrange-

ments of the lamps in a section or frame can be changed so that letters or other devices might be displayed without departing from the spirit of the invention as defined in the appended claims.

5 I claim:—

1. A mechanism of the character described including a longitudinal series of depressible flat key switches, each having a wedge-shaped head at its lower end, a plurality of pairs of spaced resilient fingers constituting jacks with which the heads are adapted to engage when the keys are depressed to thus close a selected circuit and a single longitudinally extending coil spring anchored at its ends and extending through all of the keys and acting to yieldingly hold the keys in a raised position, a plate having slots through which the keys pass, and brackets extending from said plate disposed between each pair of keys and through which the spring loosely passes.

2. In a mechanism of the character described, a longitudinal series of depressible flat keys, a pair of spaced plates having slots through which the keys pass, each key having a wedge-shaped circuit closing head at its inner end, pairs of spaced resilient fingers constituting jacks between which the triangular heads of the corresponding keys may be inserted when the key is depressed, means carried by the outermost plate and coacting with the keys to hold any one key depressed but releasing the depressed key upon the depression of any other key, resilient means acting to hold the keys in a projected position and resist the depression of the keys, the spring fingers acting upon the wedge-shaped heads to urge the heads upward quickly and assist the action of the coil spring when a key is released.

MYRLE H. SPICER.