

Oct. 31, 1939.

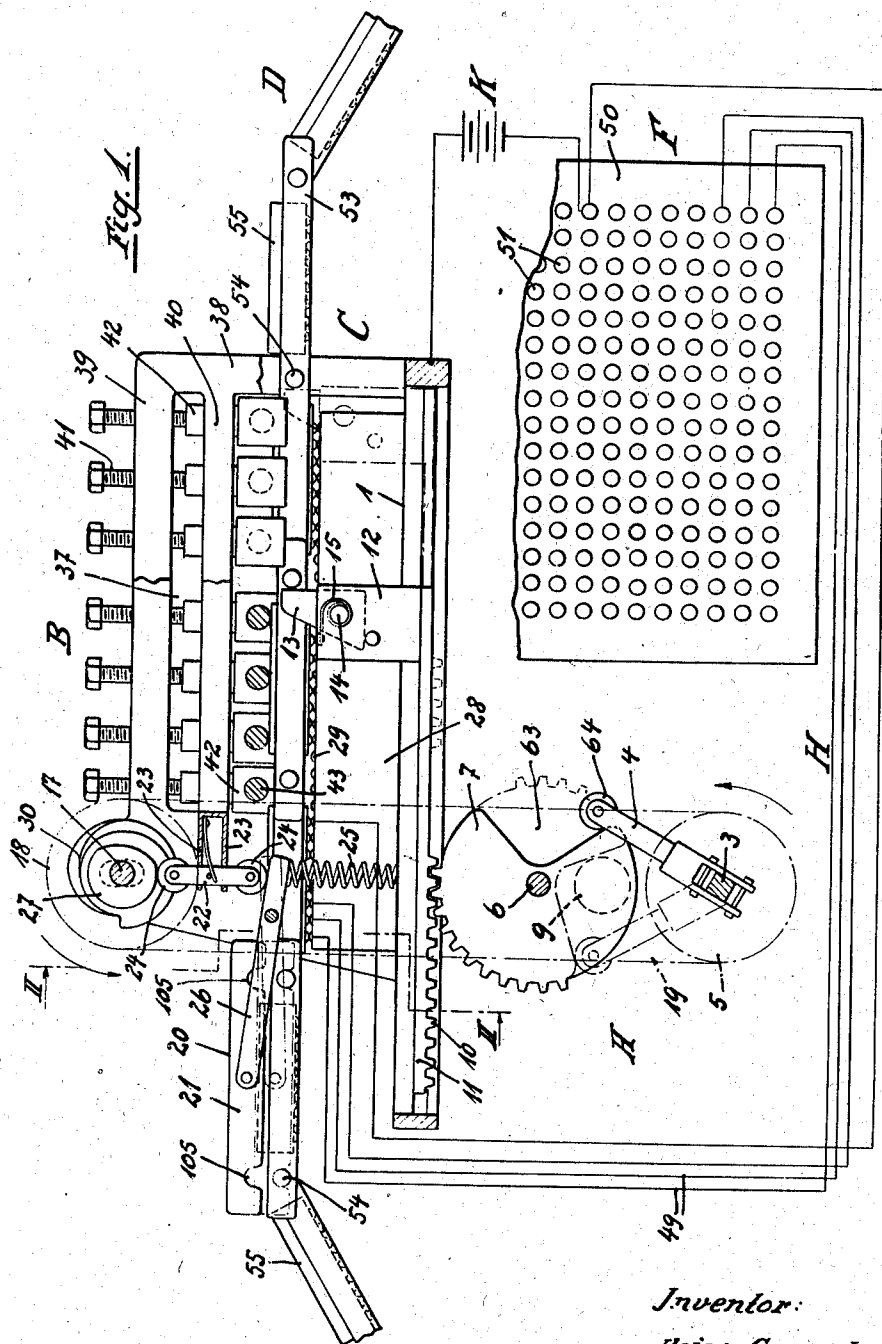
H. GRAUERT

2,177,771

LUMINOUS SIGN

Filed Aug. 28, 1936

3 Sheets-Sheet 1



Inventor:
Heinz Grauert
by *Karl Michaelis*
att.

Oct. 31, 1939.

H. GRAUERT

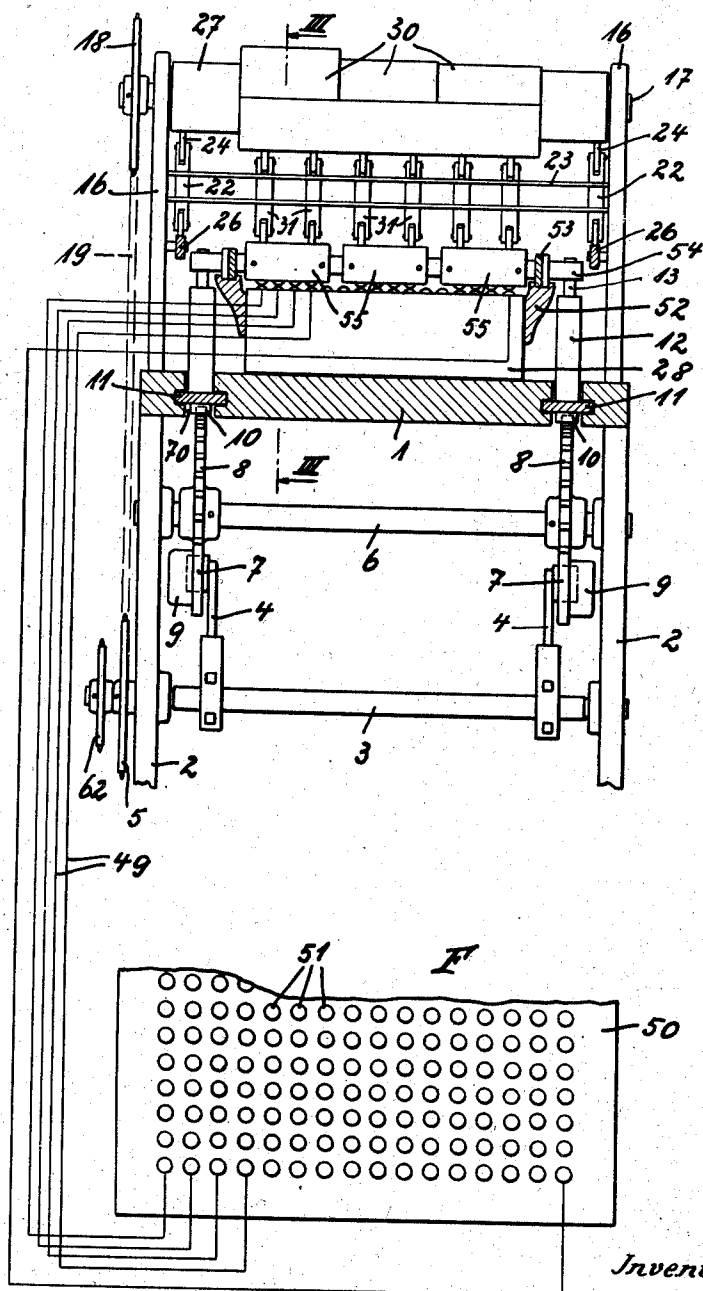
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3 Sheets-Sheet 2

Fig. 2.



Inventor:
Heinz Grauert
by *Karl Kischner*
Atty.

Oct. 31, 1939.

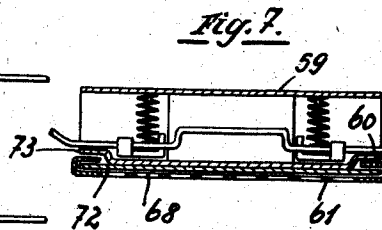
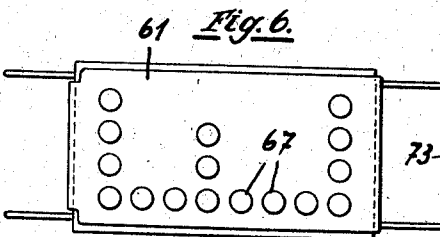
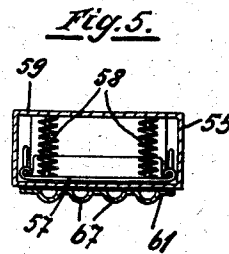
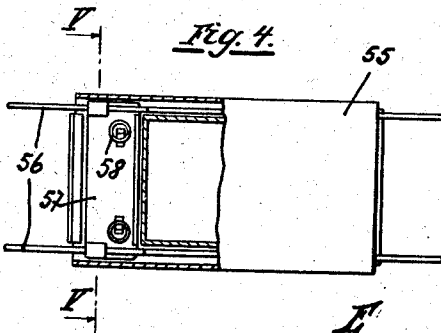
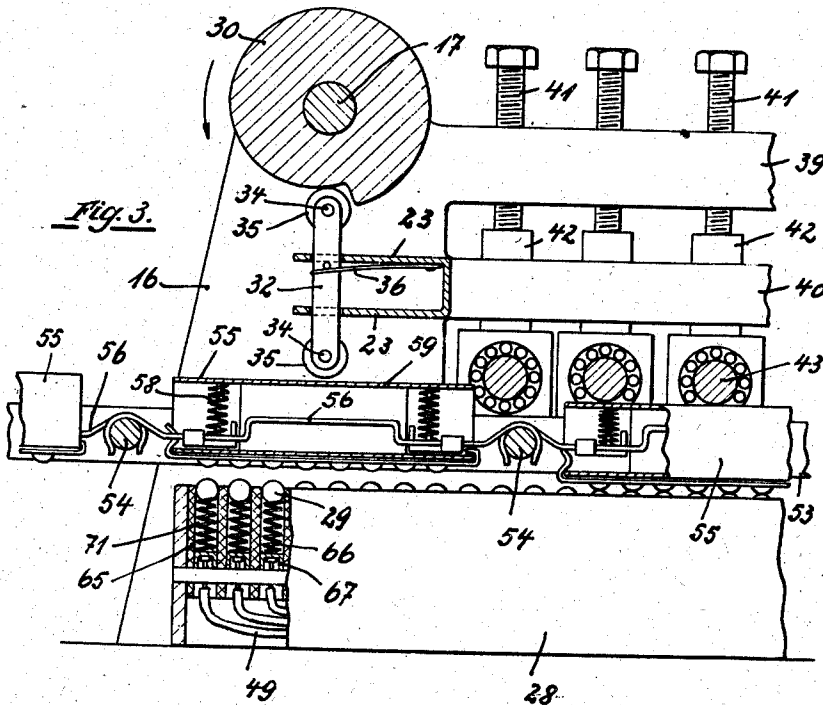
H. GRAUERT

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LUMINOUS SIGN

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3 Sheets-Sheet 3



Inventor:
Heinz Grauert
by *Karl Lischke*
Attu.

UNITED STATES PATENT OFFICE

2,177,771

LUMINOUS SIGN

Heinz Grauert, Stuttgart, Germany

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In Germany October 31, 1935

4 Claims. (Cl. 177—350)

My invention relates to news distributing and advertising systems and more especially to a system, in which electric lamps are relied upon to form letters, figures, etc. It has particular reference to that kind of apparatus, in which the letters, words and sentences appear to travel across a lamp board and it is one of the objects of my invention to provide means whereby the words or sentences formed by the lamps can be read more easily and during a longer period of time than in existing systems of a similar kind.

Other objects and the manner in which they are attained will appear as the specification proceeds.

In electrical apparatus hitherto in use traveling luminous signs are produced by perforated sheets being drawn by mechanical means over systems of electrical contacts, for instance ball contacts, which are arranged in close juxtaposition. In these apparatus the individual ball contacts are connected by wires with corresponding incandescent lamps and whenever a perforation in the traveling sheet meets a contact, the current is closed and the respective lamp lighted.

This known device involves the drawback that the perforated sheet must be drawn continuously from the right towards the left and therefore the letters can be made visible on the lamp board only in such manner that the letters first appear on the right-hand side and then travel towards the left. These devices involve the further drawback that as a rule the letters move too fast and consequently appear distorted and can only be read with difficulty. Moreover only a few words, of which the text is composed, can be read simultaneously. If it is desired to replace the text by a different one, new perforated sheets must be prepared and inserted in the device, it being impossible to bring in any changes in the text under operation.

In contradistinction to these devices the present invention, while also comprising a lamp board and contacts connected with the lamps, employs separate types for actuating the contacts serving to make the corresponding letters appear on the lamp board. These types are exchangeably mounted on a feed device or conveyor and are pressed down upon the contacts successively by mechanical means. Thus the traveling signs are here produced similarly as the letters printed on a sheet, since individual exchangeable types are pressed down on the contacts in predetermined succession according to the requirements of each individual case. The single types are passed one after the other over any desired num-

ber of rows of contacts corresponding to superposed rows of lamps. I thereby obtain that on the lamp board the individual luminous lines appear to gradually move upwardly so that any number of lines can be read simultaneously, each individual line remaining visible to the eye for a longer period of time.

By correspondingly arranging the printing device I can easily provide for the types assembled to form a line to be depressed in such succession, that the line of luminous letters appears to be formed in the direction from the left towards the right, similarly as is done in writing.

I am now going to explain more in detail my invention and the manner in which it can be carried through to the best advantage, having reference to the drawings affixed to the specification and forming part thereof, and which illustrate several embodiments of my invention in a purely diagrammatic manner by way of example.

In the drawings:

Fig. 1 is a diagrammatic showing of the first modification, being an elevation, partly in vertical section, with part of one side wall broken away.

Fig. 2 is a cross section, partly in elevation, on the line II—II in Fig. 1.

Fig. 3 is an enlarged showing of the left-hand portion of the device shown in Fig. 1, some parts being shown in section on the line III—III in Fig. 2.

Fig. 4 is a plan view, partly in horizontal section, of a type carrier.

Fig. 5 is a cross section on the line V—V in Fig. 4, and

Fig. 6 is a bottom view of this type carrier, while

Fig. 7 is a longitudinal section of a modified form of type carrier.

Referring to the drawings and first to Figs. 1 to 3, A is the driving means, B the printing device, C the table supporting the contacts and the conveyor, D the conveyor proper, E are exchangeable types, F is the lamp board, H the wiring and K a source of current.

1 is a ground plate and 2 are standards supporting the plate, while 3 is the driving shaft. 4, 4 are lever arms keyed on the shaft and 5 is one of the two sprockets mounted on the ends of the shaft. The shaft 3 is driven for instance by means of a sprocket 62, which may also be replaced by a pulley, a motor or the like.

Above the driving shaft 3 a shaft 6 is supported in the standards 2, which carries two cam disks 7. The gaps 63 in these disks can be entered by the

rolls 64 of the levers 4. On part of their circumference the cam disks 7 are formed with teeth 8 and they are further weighted each with a counter-weight 9. The teeth of each disk mesh with a rack 10 fixed to a slide 11 movably arranged in the groundplate 1. The slide supports a feeder 12, which carries a stop 13 tiltably mounted on an axle 14 and acted upon by a spring 15 tending to hold it in its position of rest shown in Fig. 1. The slides 11 and feeders 12 are so disposed in the groundplate 1, that the racks 10 are guided in slots 70 of the plate.

Sideways of the slides 11 the upper standards 16 are fixed on the groundplate 1, these standards supporting the cam shaft 17 of the printing device, which is driven by laterally arranged gear wheels or sprockets 18 having the same diameter as the sprockets 5 mounted on the driving shaft 3. The sprockets 5 and 18 are coupled by a chain 19 or the like and the shaft 17 thus revolves in synchronism with the shaft 3.

Between the upper standards 16 are arranged two locking members 20, each such member consisting of a gripper 21 formed with two notches 105 and a pressure rod 22 guided in a double bracket 23 fixed to the standards 16. Rollers 24 are arranged at the ends of the pressure rod and a coil spring 25 acting on one end of a double-armed lever 26 tends to force the rod 22 upwardly, whereby the gripper 21 is forced downwardly.

The position of the gripper 20 is influenced by a cam disk 27 mounted on the cam shaft 17. By depressing the rollers 24 and pressure rod 22 this cam causes the coil spring 25 to be compressed and the locking member 20 to be lifted.

On the groundplate 1 are arranged between the two standards 16 one or a plurality of box-shaped contact carriers, on which continuous or interrupted rows of ball contacts 29 are arranged. As shown in Fig. 3 these ball contacts may be formed in a well known manner of insulated tubes 65, in the borings 71 of which coil springs 66 are arranged, which force the contact balls 29 into the narrow top sections of the tubes. Conductive caps 67 serve to close the bottom ends of the tubes and are connected by means of wires 49 with the individual lamps.

Instead of ball contacts also other types of resilient contacts may be provided, such as for instance bent leaf springs in conductive connection with the terminals, or contact rollers.

Above the rows of contacts 29 is arranged the pressure device B, which substantially consists of cams 30 fixed to the cam shaft 17, the depressing members 31 and the type carriers 55. The juxtaposed cams 30 are formed with different cam faces, the circumferential length of which gradually diminishes from the left to the right. The depressing members 31 are formed similarly as the pressure rods 22, each consisting of a vertically guided rod 32 (Fig. 3) held between the brackets 23, and rollers 35 mounted on the cross pins 34 with the interposition of ball bearings. A leaf spring 36 permanently tends to force each depressing member upwardly.

Above the rows of ball contacts is arranged a frame 37 mounted on four supports 38. Between each pair of oppositely arranged supports extends a top strut 39 and a bottom strut 40. In the top strut 39 set screws 41 can be adjusted, which carry bearings 42 arranged to be lifted or lowered by adjusting the screws 41. Each pair of bearings 42 supports a depressing shaft 43 and the first bearing 42 is arranged directly to

the rear of the depressing members 31 above the ball contacts.

From each contact 29 a conductor 49 leads to the lamp board 59 carrying a number of lamps 51 which corresponds to the number of contacts present. Laterally of the rows of contacts guide rails 52 are arranged on which glides a conveyor chain formed with hinge pins 54, on which can be suspended the type carriers 55.

As shown more in detail in Figs. 4 to 7, such a type carrier 55 is formed of two leaf springs 56, the ends of which grip two adjoining hinge pins 54 of the conveyor. The springs may also be replaced by other members, for instance by sheet metal strips. The springs 56 are connected with each other by two bridge pieces 57, on each of which are mounted two coil springs 58 carrying a metal box 59, which in the modification shown in Fig. 7 is formed with a double bottom 72, 73. The outer ends of these bottoms are spaced at 60 to make room for the up-turned ends of the types 61, which may either be attached to the bottom by their upturned ends, as shown in Fig. 3, or may be held in place below the bottom by their upturned ends entering interstices 60 between the two bottom plates (Fig. 7).

In the modification illustrated in Figs. 4 to 6, the types have the form of metal plates 61 formed with projections 67. Instead of these projections caps fixed by soldering or in some other suitable manner or tongues produced by punching from the plate 61 may be provided. All these projecting parts are spaced exactly as the contacts 29 and, on the type carriers being depressed, will make contact with the contacts whereby the lamp current is cut in.

In the modification of Fig. 7, the type plate 61 is made of insulating material and formed with perforations 68 spaced like the contact balls, which, when the type carriers and types are depressed, will enter the perforations and make contact with the metal bottom 72.

The types can readily be exchanged so that in this manner any desired texts can be composed in the simplest manner.

The current of the battery K, which is connected to one terminal of the lamps and to the machine structure, is led to the lamps 51 through wires 49.

In order to place the machine into operative position, the text is composed on the type carriers by means of the respective types and the carriers are then attached, by means of the springs 56, to adjoining hinge pins 54, of the conveyor 53.

It is however also possible to fix the type carriers permanently on the conveyor and to attach the types to the carriers in such manner, that they can readily be inserted in the carriers for easy exchange (Fig. 7). Instead of the projections 67 or perforations 68 also depressions may be formed in the insulating type plate 61, whereby the bottom surfaces of the types will be plane throughout.

In the device above described as illustrating the principle underlying this invention only three type carriers 55 are shown in juxtaposition in Fig. 2 and since each type carrier here encloses a single type connected with a corresponding number of lamps to form a single letter, only three letters will appear, one after the other, in each line on the lamp board, it being here assumed that eight horizontal rows of lamps on the board are required to form the words or figures in each line. It is to be understood, however, that while merely three types with their carriers

are shown on the drawings, in actual practice the number of types and type carriers present in each row extending in parallel with shaft 17 will correspond to the number of letters or figures in one line, and the number of cams 30 on this shaft will equal this number of type carriers.

The operation of this device is the following:

The driving shaft 3 causes the cam shaft 17 to revolve by means of the chain transmission 5, 19, 18. Since the circumferential lengths of the cam faces 30 diminish gradually as shown in Fig. 2, the individual depressing members 31 are depressed one after the other by the cams and in consequence thereof first the left hand type carrier 55 in Fig. 2, thereafter the middle one and then the third one will be depressed together with the types 61 attached to them so as to meet the ball or other contacts 29. The lamps 51 corresponding to these contacts are thrown in and form the three letters of the bottom line by means of the lamps in the eight bottom rows on the lamp board. This arrangement also provides that the individual letters appear on the board from the left towards the right.

While one row of luminous signs is made to appear on the board in consequence of the pressing operation, the locking member 20 is pressed onto the conveyor chain by the springs 25 and any displacement of the chain and type carriers is rendered impossible, while the line of luminous signs is rendered visible. On this operation having come to an end, the lever arm 4 fixed to the driving shaft 3 comes to act on the cam disk 7, turning this disk in such manner that the teeth 8 of the disk cooperate with the teeth of the rack 10 to shift the slide 11 and the feeder 12 mounted thereon further. At the same time the cam disk 17 causes the pressure rod 22 and lever 26 to unlock the conveyor chain.

The feeder 12 now applies itself against the two ends of a hinge pin 54 and thereby shifts the chain 53 of the conveyor through a distance equalling the length of one link of the chain, so that the type carriers 55 and the types 61 attached to them also travel over the rows of contacts. During this operation the depressing spindles 43 arranged above the contacts exert pressure on the type carriers so that now the ball contacts are caused to feed current to the lamps of the higher rows of the lamp board. At the same time the second row (parallel to shaft 17) of three type carriers has depressed some of the contacts of the bottommost eight rows of lamps, so that now three other letters appear at the bottom of the board. In the meantime the first row of type carriers has been shifted over and pressed down upon another section of contacts (Fig. 3), thereby causing the letters formerly forming the bottom line to appear in the middle part of the lamp board, the contacts having on their way passed over and switched-in temporarily the lamps in the intervening rows of lamps, so that each line of letters appears to climb upwards on the board.

When the feeders 12 have shifted the two ends of the hinge pin 54 through the distance of a link, the pressure exerted on the cam disk 7 by the lever arm 4 will cease and the lever will now be free to revolve, while the counterweight 9 fixed to the cam disk 7 will carry the disk and its teeth back together with the rack 10 and slide 11 fixed to it. During this operation the back of the stop 30 of the feeder applies itself onto the ends of the next following hinge pin 54 and, in tilting forwardly, slides underneath the pin to

be thereafter returned into its original position by the spring 15.

The counterweight 9 returning the cam disk may also be replaced by a spring or by some other suitable returning device.

During the above operation the driving shaft 3 has passed through a full revolution and the same operations are now gone through anew, one type carrier 55 after the other being pressed downwards by the pressure members 31, until all the luminous letters of a line have been rendered visible in the bottom row of lamps on the board. Now the conveyor chain 53 is again shifted through the length of a link, whereby the two visible lines of the luminous script are also made to climb upwards on the board. The line first formed now reaches the top section of lamps, while the line formed in the second place appears in the middle section and the line about to be formed in the bottom section of the lamps. On the third line having been printed (rendered visible), all three lines ascend simultaneously and finally, in proportion to the height of the lamp board, the top line will disappear.

I thereby obtain that as many lines of luminous lines can be printed and rendered visible simultaneously by the machine as hinge pins are simultaneously arranged above the contacts.

I am further enabled to connect with a single printing or depressing device any desired number of lamp boards so that the printed lines can be rendered visible simultaneously in different places.

Preferably the printing or pressure device and the means for operating it may be arranged together with the lamp boards on a carriage, whereby a movable advertising apparatus with traveling luminous signs is obtained.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art.

The term "type" as used in this specification and in the claims appended to it is to be understood as including any device adapted, when passed over and actuated to close a plurality of contacts, will act on a selected number of lamps arranged to form a specific letter, figure, word, sentence or other sign.

I claim:

1. A device of the kind described comprising in combination, rows of lamps arranged in superposition, uniform groups of contacts, the contacts in each group being individually connected to the lamps of a row, a source of electrical energy for feeding current to said lamps, a row of type carriers, a type on each carrier, means for first causing the types of each row to successively actuate the contacts connected to one row of lamps and means for thereafter causing the same row of types to simultaneously actuate the contacts connected to a superposed row of lamps.

2. A device of the kind described comprising in combination, rows of lamps arranged in superposition, uniform groups of contacts, the contacts in each group being individually connected to the lamps of a row, a source of electrical energy for feeding current to said lamps, a row of type carriers, a type on each carrier, a cam shaft and cams of different shapes on said shaft and means inserted between said cams and said type carriers for first exerting pressure on the types of each row to successively actuate the contacts connected to one row of lamps and similar means for thereafter exerting pressure on the same row of

types to simultaneously actuate the contacts connected to a superposed row of lamps.

3. A device of the kind described comprising in combination, rows of lamps arranged in superposition, uniform groups of contacts, the contacts in each group being individually connected to the lamps of a row, a source of electrical energy for feeding current to said lamps, a row of type carriers, a type on each carrier, means operative by mechanical pressure for first causing the types of each row to successively actuate the contacts connected to one row of lamps, similar means for thereafter causing the same row of types to simultaneously actuate the contacts connected to a superposed row of lamps and similar means for temporarily locking each row of carriers in operative position.

4. In a traveling electric sign display device, in

combination, rows of type carriers and types exchangeably mounted on said carriers, the types in each row corresponding to the text of one line of the display, rows of contacts associated with said rows of type carriers and rows of lamps associated with said rows of contacts, means for causing the types in one row to successively actuate associated contacts and lamps whereby to successively flash the characters forming the bottom line of the display, means for moving said row of type carriers to a new row of contacts whereby to cause the text of the bottom line to gradually ascend to a higher line, and for simultaneously moving the next row of type carriers to the first named row of contacts, whereby to successively flash the new text in the bottom line while maintaining the higher line visible.

HEINZ GRAUERT.