May 23, 1933. F. LEBIUS 1,910,702

ILLUMINATED DISPLAY

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Fig. 1.

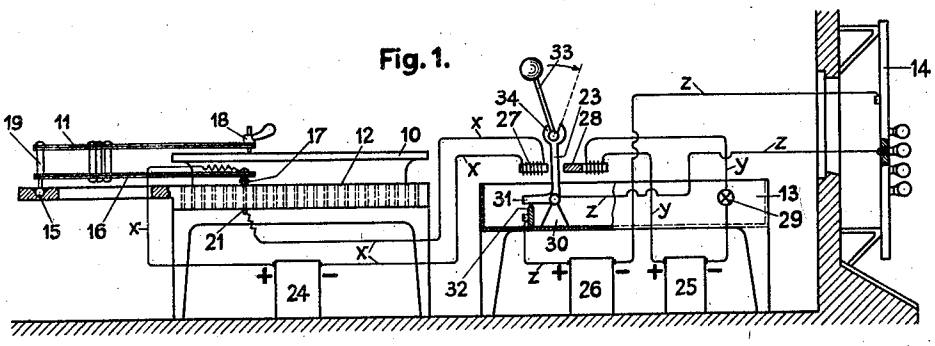


Fig. 2.

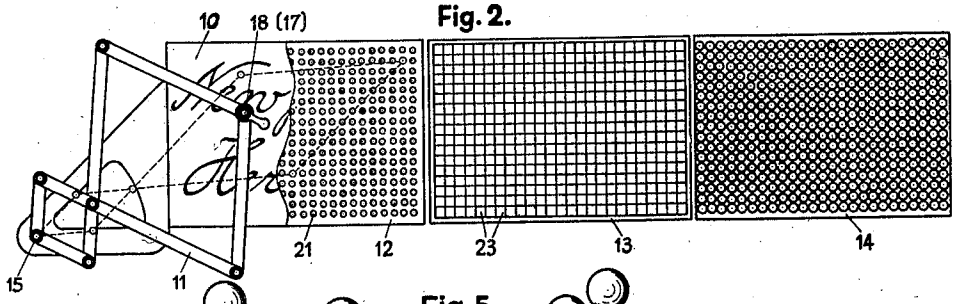


Fig. 5.

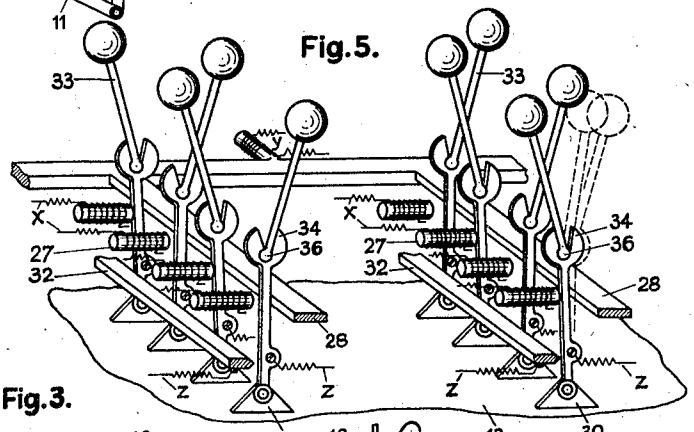


Fig. 3.

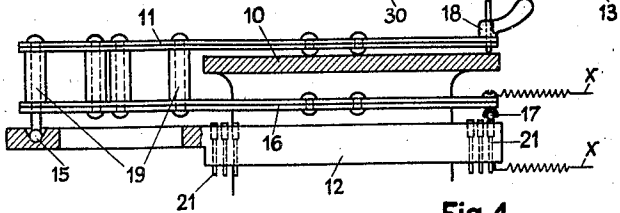


Fig. 4.

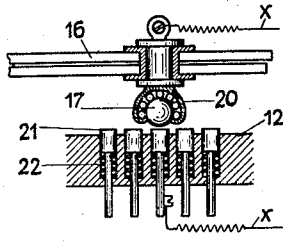
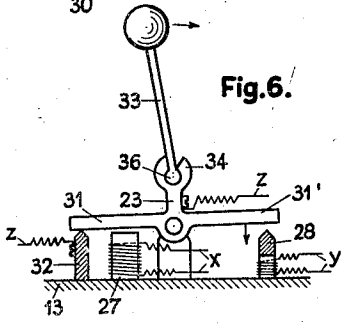


Fig. 6.



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Fig. 9.

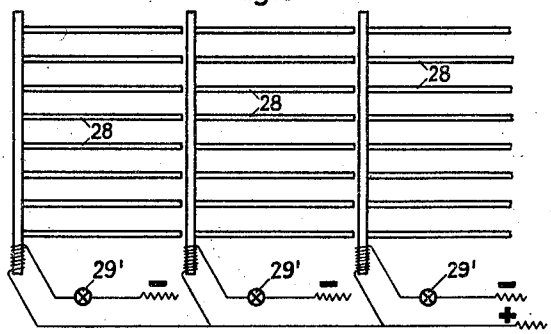


Fig. 7.

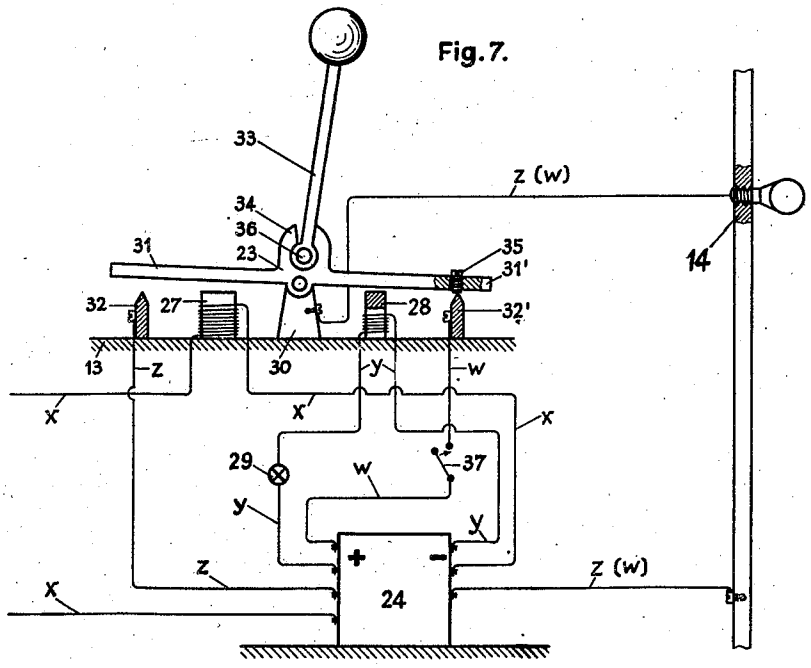
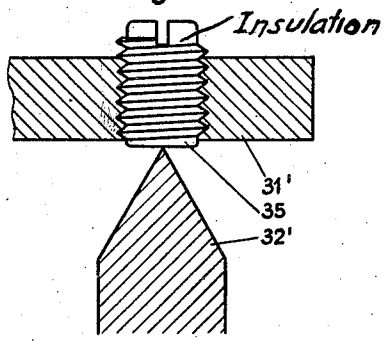


Fig. 8.



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UNITED STATES PATENT OFFICE

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ILLUMINATED DISPLAY

Application filed June 24, 1930, Serial No. 463,515, and in Germany February 9, 1928.

The invention relates to a movable illuminated display apparatus on which the lettering is not visible as traveling characters, but on which the lettering or appropriate drawing as drafted by the operator is immediately transferred to the illuminated panel so that it is visible thereon in the nascent state. The invention consists in particular in that the possibility is given of allowing the operator to constantly supervise the lettering or drawing as drafted by him. In addition, the invention ensures that the operation of the arrangement can be checked by the corresponding adjustment of the contacts on the contact table serving as an intermediary.

With a similar object in view, the proceeding was hitherto adopted of writing on a pole plate either directly with a pen connected up with a current or an electro-magnet, however, the operator was only able to approximately bear the lettering in mind by practice; at any rate, he could see nothing of what was written or drawn. In order to remedy this, iron filings were used by way of example which dropped out of the pen when used for writing, thus acting as contact makers; however, with this method the contacts were only made quite by chance, at any rate without any certainty whatever; moreover, the work produced lacked neatness. The filings were certainly visible on the pole plate, but security was not yet given as to whether and how they had made contact. According to another process, writing is effected by a blow-pipe into which lead dust is blown and melted on the pole plate as a stencil. The written characters are certainly visible on the pole plate, and the operator is aware that the displayed lettering possibly corresponds with the written characters; however, the melting process is so dependent upon chance that the desired characters are distorted by irregularities in the melted on stencil in a wholly undesired measure. Moreover the risk of the insulating material being destroyed is very great. Besides, the operator has to so draft the characters or lines by approximately estimating the space at his disposal that sufficient space is left within which he can complete the writing.

Other methods of a similar nature have, it is true, been attempted, but all of them have the disadvantage of not operating with certainty and producing lines or characters with any degree of accuracy. In particular, security is never afforded that the control is actually transmitted to the illuminated display panel, moreover, no checking means are provided on the contact table proper.

In accordance with the invention, the drawing or display lettering is visibly drafted on a drawing board with a corresponding drawing pen instead of directly on the pole board, and transmitted to the pole plate by means of a system of links. On the pole plate contact can then be made by a contact ball or the like in an exactly corresponding manner. Hence the characters written by the operator remain visible and can naturally be copied by using stencils according to a pattern written or printed beforehand. Even if it should happen that, through lack of skill or practice, there is no possibility of completing the writing within the available space, it suffices in this case to quickly extinguish what has already been written and appeared on the illuminated panel by means of a push-button, whereupon the operator can immediately start writing again.

Now, in order to have additional means of supervision on the contact table, the contact levers provided are furnished with movable heads formed of upright pendulums which, on being connected up, drop down from one of the positions corresponding to the position of rest. Security is in the first instance thus given that the contact concerned remains in the contact position whilst the letters are being developed so that the lamps concerned remain cut in with certainty on the lamp panel when the contact ball on the pole board has released the corresponding contact. At the same time a copy of the originally drawn lines or characters is produced in the position of each of these contact levers thrown over whilst writing was being done, this copy showing the operator immediately and constantly that the whole arrangement is work-

ing accurately. If troubles should actually occur, the source of the trouble can at once be detected.

The reversal of the contact levers into the position of rest with consequent extinguishment of the lamp characters is effected by an ordinary push-button which excites a magnet conductor bar carried in front of all contact levers, and attracts all contacts uniformly. The possibility is also given of interposing a stationary display between every second exhibition of the written display proper, this stationary display always being switched on by a specially adjusted closed circuit of the contact levers in their position of rest; this lettering, which corresponds with a specific stationary display, may also be changed from time to time by interposing other contacts.

In the drawings the arrangement forming the subject of the invention is indicated in a simplified form, individual members, such as contact makers, control levers, etc., which in reality are provided in a plurality, being shown only once in most cases. Fig. 1 shows a general arrangement of the mechanism of the illuminated display apparatus, and Fig. 2 a diagrammatic view of the pole plate, contact table and display panel or sign board. In this figure the three panels, the pole plate, the plate with the control levers, and the lamp panel or sign board are drawn to equal size in order to show the coincidence in the arrangement of the members in the three panels. In practice the pole plate will be the smallest, the control-lever plate the next largest and the lamp panel or sign board the largest of the three. Practically the contact table is not located at the side of the writing table or pole table, but rather above them so that the writer can observe the contacts while writing. Fig. 1 is an elevation partly in section. Fig. 2 is a plan. Fig. 3 is a detail elevation partly in section on a larger scale of the means for transferring the lettering or drawing from the writing table to the pole plate and including a double parallelogram, whereby the writing is effected of the same size as the pole plate. Fig. 4 is a detail sectional view showing the construction of the writing contact arranged on the transferring link system with part of the pole plate and the pole pins carried therein. Figs. 5, 6 and 7 show three different constructions of the control lever, while Fig. 8 shows a detail of Fig. 7. Fig. 9 shows part of a control sheet of the disconnecting magnet bars on the contact table.

In the illuminated display apparatus according to the invention five main portions are distinguished, namely:

1. A drawing plate 10 upon which the operator drafts the display text or drawing with an ordinary drawing pencil in visible lines,

2. A copying device 11 which transfers the drafted display lettering to the pole plate,

3. A pole plate 12 in which the individual pole pins are arranged in the same manner as the control contacts on the control table and the lamps on the display panel,

4. A contact table or board 13 which carries the contacts for each lamp,

5. An illuminated display panel or sign board 14 which carries the lamps.

Each main portion is connected to the other by various circuits to form a unified system.

The object to be displayed is drafted by the operator on the drawing board 10 arranged above the pole plate 12 and transferred to the pole plate through the medium of the coupling device 11. The coupling device consists of two double parallelograms, so-called "scissors", arranged above each other, which are pivoted at one side in the ball joint 15 and positively connected by bolts 19 and which (scissors) extend with the other free end over the drawing board 10 and the pole plate 12. The lower joint quadrangle extending over the pole plate carries a stylus-like contact ball 17 at its extreme end, while the upper joint quadrangle extending over the drawing board is provided with a writing means 18 of any kind (for instance writing pencil) situated exactly above the contact ball. The contact ball 17 and the writing pencil 18 are coordinated in such a manner that with the drawing of a line on the drawing board simultaneously the contact ball 17 moves in the same movement over the pole plate and operates the respective contacts, while a slight lifting of the drawing pencil 18 suffices to lift the writing contact 17 from the pole plate 12 at the same time. The writing or stylus-like contact ball 17 which is held by a socket 20 facilitates the drawing or writing as the friction on the pole pins 21 is considerably reduced.

In the pole plate 12 are arranged the pole pins 21 which are separated by insulating material and forced slightly out of the plate each by a spring 22. The pole pins 21 are distributed over the plate 12 in a manner similar to the distribution of the lamps over the display panel 14.

On the contact table proper 13, which is located between the pole plate 12 and the display panel 14, a control lever 23 is arranged for each lamp, these levers being likewise distributed in the same manner. In the whole equipment four different circuits are provided. The circuit x is fed from the source 24, and serves mainly for moving over the control levers 23 selected by the lettering into the operating position, while the circuit y, fed from the current source 25, serves for returning all levers 23 into the position of rest. Each lamp in the display panel is fed from the current source 26 through the circuit z.

It is proposed to explain the method of control by means of the example according to Fig. 1. From the current source 24 a conductor wire is led to the link system or the contact ball 17 of the copying device 11, while a second conductor wire is led from the pole pin 21 through the magnet 27 on the contact table 12 to the current source 24. Each pole pin 21 is provided with a magnet 27 and a control lever 23. On the opposite side of the pole pins 21 is located the through pole piece 28 which can be fed with current from the current source 25 through the push-button 29.

The operator writes the subject of the display with a free hand or copies the lines of a pattern on drawing paper by using an ordinary drawing pencil secured in the copying device. This causes the writing or stylus-like contact 17 in the same line to come in contact with the pole pins 21 so that the appropriate magnets 27 are successively excited and the levers 23, which are all in engagement with the pole piece 28 in the position of rest, and moved over into the working position. The levers 23 are pivotally supported in such a manner in a bracket 30 on the table 13 that they are capable of being moved over through their middle position either to the left or right. In the construction shown in Fig. 1 the levers 23 are angular-shaped, the arms 31 resting on the conductor 32 in the working position and thus closing the circuit *z* through connections with the appropriate lamp, the current source 26 and the socket frame of the display panel.

The moment the writing contact 17 leaves a pole pin, the appropriate magnet is without current, the induction bar being likewise without current when the push-contact 29 is opened. Though the two functions, in the first case the lighting of a lamp, in the second case, the extinguishing of a lamp, are then already completed, certainty of contact being made, or of the levers being in the "on" position, is effected in the following manner: Each lever carries above its fulcrum a lever 33 projecting upwards which is provided with a weighted head and so connected with the lever 23 by a joint 36 furnished with abutments 34 that every time the lever 23 is moved beyond its right or left-hand inclined position, it is further moved through a definite angle, thereby pressing the lever 23 or the arm 31 firmly against its abutment.

In addition, however, a glance at the changing position of the thrown over lever heads, which, if required may be made conspicuous by coloring with paint, permits the operator to check whether the desired contacts have acted with certainty on the pole plate. On the other hand it facilitates the detection of a trouble point as, in case the lever has been reversed and the lamp in the display panel is not burning, the fault can only be found in the circuit *z*.

Figs. 5 and 6 show other constructions of the control lever 23. For example in Fig. 5 the lever bears directly against the conductor 32 and pole piece 28, while according to Fig. 6 a double-ended control lever is used whose arm 31 bears against the current conductor, the arm 31′ engaging with the pole piece. The latter construction possesses the advantage that the conductor, magnet and pole piece are readily accessible when the lever is taken out of its bearing.

Fig. 7 shows another construction in accordance with the invention which possesses further essential advantages. In this construction all current circuits are fed from one current source 24′. When writing the text of a display, or drawing a display picture according to patterns, the interval caused by changing the patterns may be employed for interposing a stationary display when the display drawn by the operator is cut out. To this end another through conductor 32′ is arranged on the side on which the induction bar 28 is situated which is fed with current by the wire *w*, and with which the levers corresponding with the stationary display are brought in contact, this being achieved in the following manner:

A screw pin 35 made of insulating material is inserted in the arm 31′ of the contact lever 23 or of all levers, this screw pin being capable of adjustment so that its bottom surface either projects beyond the arm 31′ or is entirely within the bore. Now, if no stationary display is to appear when a written display is cut out, all insulating screw pins 35 are screwed out until they engage with the conductor 32′ so that no contact is established. In the other case, that is, if a stationary display is to be interposed, this is first written by the operator similarly to the normal written display. Thereupon the insulating pin 35 in each arm 31′ of the levers, which are attracted into the working position by the magnets 27, are screwed into the bore again. The levers prepared in this manner now drop directly on the conductor 32′ every time a display picture drawn by the operator is switched off, the conductor being then fed with current by operating the switch 37 so that the stationary display appears repeatedly on the lamp panel. When the operator has prepared the stencil for a new pattern, the circuit of the stationary display is again broken by the switch 37, whereupon he may again start writing.

Similarly, a trade-mark, which was written beforehand, may, for instance, be left standing on a written display, while writing of the appropriate text may be proceeded with in continuations after the text has been cut out. In this case provision must be made for switching on the induction bars in groups, as shown in Fig. 9, this being effected

by operating the push-contacts 29′ at will, while in the case of the non-operated contacts 29′, the levers remain in the operative position. To extinguish the entire display with this arrangement, all push-contacts 29′ must be closed.

What I claim is:

1. An electric display system comprising a lamp board including a plurality of lamps, a first and second circuit for each lamp, means for closing the first or the second circuit for each lamp comprising a conducting switching member for each lamp movable to two positions and means cooperating with the switching member in the first position to close the first circuit and in the second position to close the second circuit to the lamp, means on the switching member adjustable at will for rendering it effective or ineffective to close the first circuit when in said first position, electromagnetic means individual to each switching member for moving it to said second position to close the second circuit, common electromagnetic means for moving all of the switching members to the first position to close all of the first circuits rendered effective by the adjusting means, means for individually energizing the first means and means for energizing the common means.

2. An electric display system as claimed in claim 1, wherein said adjusting means comprises a screw of insulating material adjustably mounted in the conducting switch member.

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