May 18, 1943 S. GOULD ET AL 2,319,450

GASEOUS TUBE SIGN

Filed March 8, 1940 2 Sheets-Sheet 1

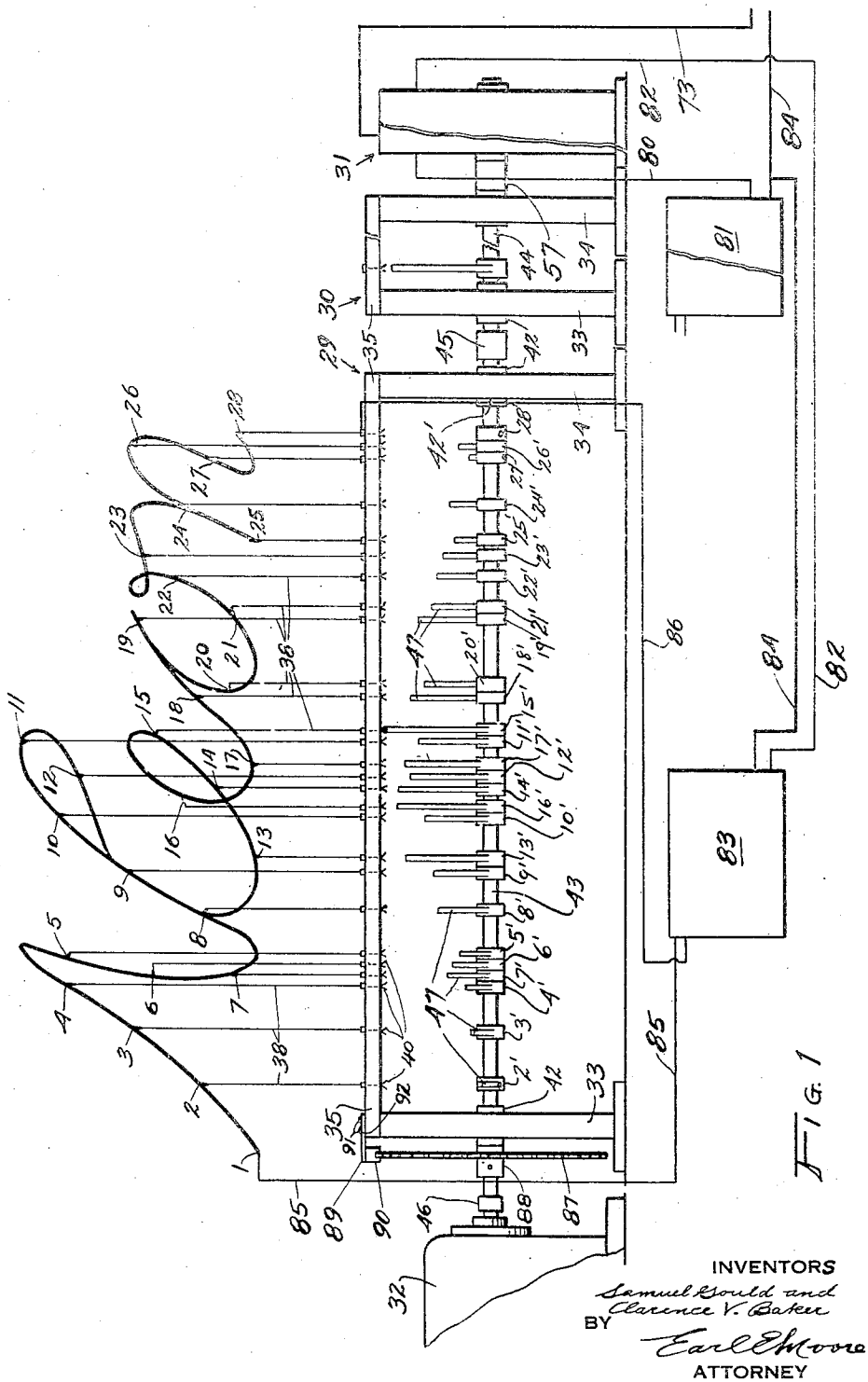


FIG. 1

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2 Sheets-Sheet 2

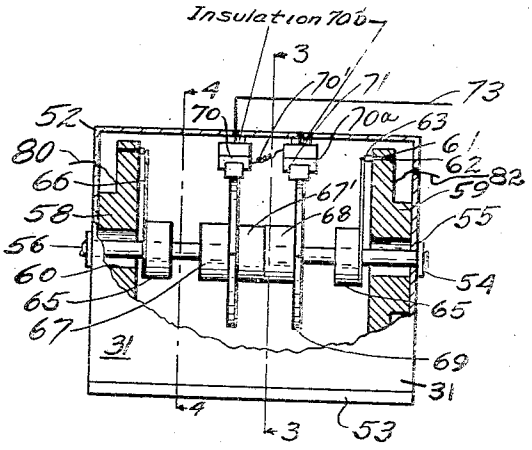


FIG. 2

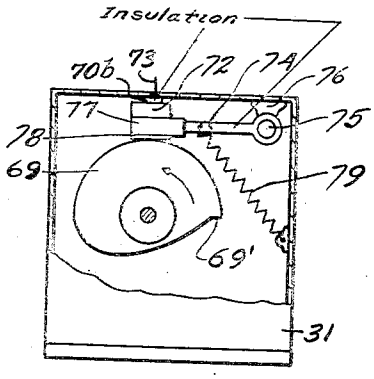


FIG. 3

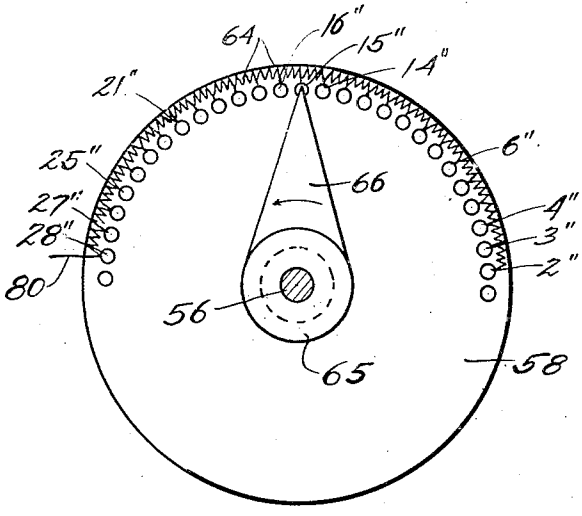


FIG. 4

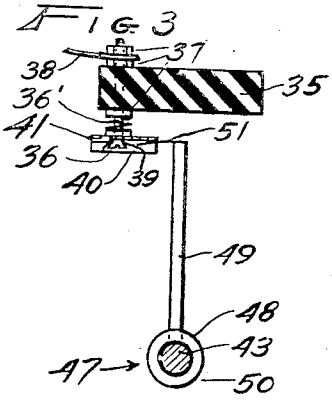


FIG. 5

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2,319,450

GASEOUS TUBE SIGN

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Los Angeles, Calif.

Application March 8, 1940, Serial No. 322,982

5 Claims. (Cl. 200—26)

This invention concerns gaseous tube signs and the like and especially means and methods for effecting the manner in which the tubes of the signs are illuminated. Although this invention can be readily adapted for specific uses to attain some particular result or lighting effect, its prime object is to cause letters and words to be formed as though written by an unseen hand, that is, an animated script effect is produced.

Another object is to present mechanical means for controlling the lighting of signs and the like which is simple in construction and economical to manufacture, all the parts being arranged for direct action and control with a minimum of elements.

A further object is to provide a complete sign operating device as a single compact unit which is versatile in arrangement of its contact elements so that the unit can readily be installed for controlling the lighting of any type of electric sign.

Other objects, advantages and features of my invention will appear from the accompanying drawings, the subjoined detailed description, the preamble of this specification and the appended claims.

Applicants are about to illustrate and describe one of the forms of their invention in order to teach one how to make and use the same, but it is to be understood that the drawings and description thereof are not to limit the invention in any sense whatsoever, except as limited by the appended claims.

In the drawings:

Fig. 1 shows the invention in side elevation.

Fig. 2 shows a part of the invention in side elevation, part being broken away to show internal elements in section.

Fig. 3 is a view taken substantially along the line 3—3 of Fig. 2.

Fig. 4 is another view of Fig. 2 taken substantially along the line 4—4.

Fig. 5 is a vertical view of a detail with parts being shown in section.

In Fig. 1 of the drawing, the word "Neon" is shown as constituting an electric gaseous tube sign, which in this particular case is a single word formed of a single tube. The reference characters 1 to 28 inclusive on the tube represent electrodes at evenly spaced points and arranged in a predetermined sequence along the tube in agreement with their numbered position.

A secondary switching mechanism unit 29 is provided for controlling the lighting of the sign "Neon" and a similar unit 30 is shown for controlling another word of the sign (not shown). The reference number 31 indicates a primary control switch and the number 32, an electric motor.

The units 29 and 30 comprise metallic end standards 33 and 34 which support a structurally strong strip 35 of insulating material such as hard rubber, glass or porcelain, or any other material suitable for the purpose. Through this strip and along its entire length are a large number of holes adapted to receive current conducting screws 36 (see Fig. 5). The head of the screw is held below the insulating strip 35 by the lock nuts 37 and coil spring 36', as shown. An insulated wire 38 is electrically and mechanically fastened between the two top lock nuts and connects its respective screw to its proper electrode upon the gaseous tube. The shank of the screw is provided with an integral squared portion 39 which snugly fits a squared hole in a hinge-like contact plate 40. These plates, one for each electrode, have two leaves held together by a pin 41, see Fig. 5.

The standards 33 and 34 are provided with journals 42 through which pass a shaft 43 for the unit 29 and a shaft 44 for the unit 30. When two or more secondary switching units are employed, the shafts thereof are joined together by an insulating coupler 45. One end of the shaft 43 is connected to the electric driving motor 32 which is a variable speed one so that the shaft or shafts can have their speeds regulated in accordance to the lighting effect desired upon the sign. An insulating type of coupler 46 is provided to prevent current leakage between the motor and the shaft.

Along the shaft of each switching unit are a plurality of switch arms 47. These arms, see Fig. 5, comprise a sleeve 48 having a threaded bore into which screws a rod 49, as shown. The arms are adjustable along the shaft and to hold them in fixed position, they are provided with set screws 50. At the top of each rod is fixed, by soldering or welding, a spring wire or flat piece of spring metal 51 for making sliding connection with its respective connector 40. The element 51 is varied in length to allow the following arm to make contact before the prior one breaks contact.

The primary switching unit 31 comprises a housing shell 52 fixed in any suitable manner to a base plate 53. Each side of the housing shell has a hole 54 with an attached journal 55 for rotary supporting a shaft 56 as shown. This shaft is attached to the secondary switching shaft 44

through an insulating coupling 57; the motor 32 turning this shaft as well as shafts 44 and 43.

The internal surfaces of the end walls of the shell 52 has fixed thereto plates 58 and 59. These plates are made of good electrical insulating material and have holes 60 through their centers which are concentric with the holes 54 of the shell. Each plate is provided with a large number of holes 61 near the perimeter thereof which are snugly fitted with studs 62 having contact buttons 63. Between adjacent buttons and connected thereto are resistance coils 64, the coils all being connected in series as shown.

Fixed to the shaft 56 adjacent each plate, 58 and 59, is a sleeve 65 having fixed thereto an arm 66 which is a good conductor of electricity. The end of the arm 66 is adapted to ride over all the buttons of the plate and make good contact therewith.

Near the longitudinal center of the shaft 56 and fixed thereto are sleeves 67 and 68, each of which is provided with a cam-disc 69 fixed thereto. The disc is preferably permanently fixed to its respective sleeve whereas the sleeves, including sleeves 65, are provided with set screws so that they can be adjusted around the shaft to various positions. The sleeves 67 and 68 are spaced apart by an insulating coupler unit 67' which connects the shaft sections but insulates one from the other.

At the top of the housing shell are switching contact units 70 and 71. Each unit has an upper half make and break element 72 fixed to the top of the shell in any suitable manner, but insulated therefrom by the insulating washer 70*b*. An insulated electrical wire 73, from a suitable source of electrical energy, supplies current to only the top half 72 of the master primary switch. The lower part of each switching unit comprises an arm 74 of insulating material having pivot connection with a bracket 76 extending from the top of the shell. The other end of the arm has fixed thereto a make and break element 77 which is provided with a metallic rider 78 for contact with the cam-disc 69. A tension coil spring 79 has one end fixed to the arm, as shown, and the other end fixed to a wall of the shell. The primary switches, cam-discs, sleeves, arms and shaft sections are all made of good electrical conducting material and provide a good electrical path from the wire 73 to the contact buttons 63 of the selector plate or rheostat 58, through selector arm 66, and also to the buttons of the selector plate or rheostat 59 via of wire 79' when the primary switch 70 is closed. One of the buttons on each selector plate is connected to a wire leading to the primary side of its respective transformer; from the plate 58, a wire 80 leads to one side of the primary winding of transformer 81, and from the plate 58, a wire 82 connects with one side of the primary winding of the transformer 83. The other side of the primary of each transformer is connected to a main feeder 84 which leads to the source of electrical supply. By this arrangement of the master primary switch 70 and its subordinate switch 70*a*, the transformer 83 is energized and its connected sign lighted until the transformer 81 and its connected sign is timed for breaking, then the master switch 70 is disconnected and darkens the entire sign.

The electrode 1 of the gaseous tube is connected to one side of the secondary coil of transformer 83 by wire 85, and the other side of the secondary is connected to the shaft 43 by way of wire 86 which connects with the bearing 42 at 42' and also to the end electrode 28 of the sign. By this arrangement, the sign is always connected across the secondary of its respective transformer. All the switch arms 47 are set to make contact with their respective contactors 40 before the rheostat arm 66 closes with the button thereon which is related to the particular contact 40; that is, arm 2' closes with its contact 40 just a little before rheostat arm 66 connects with button 2'', and so on through the other contacts. The secondary of transformer 81 is similarly connected to the switching unit 30 and its associated word sign, not shown. In order to facilitate the setting of the switch arms 47 of each secondary switching unit, a toothed wheel 87 is fixed to the end of shaft 43 by a sleeve 88 which is provided with a set screw so that the wheel can be removed from the shaft if desired. Fixed to the top of the insulating strip 35, is a short flat or ribbon spring 89 having a curved metallic dog 90 arranged to snap into the grooves between the teeth on the wheel. The spring 89 is preferably fixed to strip 35 by a pivot bolt 91 and a dowel pin 92 so that the dog 90 can be shifted to one side when the mechanism of the stitching unit is properly set.

Operation

The selector plate shown in Fig. 4 regulates the potential across the various spaced electrodes of the sign word "Neon." The buttons on the selector plate are consecutively numbered 2'' to 28'' inclusive.

The electrodes of the sign are also consecutively numbered from 1 to 28 inclusive. The switch arms 47 on the shaft are numbered from 2' to 28' to indicate their order for contacting their respective contacts 40 which lead to the numbered electrodes of the sign which correspond to the primed numbers on the switch arms and the double primed numbers on the selector plate 58.

The total resistance between contacts 2'' and 28'' on the selector is sufficient to cause the correct voltage drop across the secondary of the transformer 83 to supply the proper current flow from electrode 1 to electrode 2 of the sign. This is accomplished by working the arm 66 of the selector in synchronism with the shaft movement and its switch arms 47. When the selector arm is on button 2'', the switch arm 2' closes the transformer circuit 85—86 across electrodes 1—2. When the selector arm is on button 3'', the switch arm 3' contacts its respective element 40 and closes the circuit 85—86 across electrodes 1—3, and so on until the entire sign is lighted in which event, the selector arm would be on button 28'' and the switch arm 28' would cause current at proper voltage between electrodes 1 to 28. These various steps of lighting along the word "Neon" is accomplished in a smooth manner so as to imitate hand writing by an unseen writer. At no time during the writing progress does any part of the sign blink or become dark.

During the lighting period of the sign, the cam disc 69 has held its respective switch contacts 72 and 77 closed; but when the selector arm has passed over the button 28'', the primary circuit of the transformer 83 is broken by action of the spring 79 which pulls the switch arm 74 downwardly as the cam edge 69' passes from beneath the rider 78. The primary switch is not closed again by the cam until the selector arm 66 is about to contact button 2''.

The above is true when one sign or when just one section of the sign is working. But when a

plurality of signs are connected for sequence operation, the switch 70 becomes the master primary switch and the others subordinate primary switches like 70a. The master switch, when broken, operating to darken all signs.

An important feature in this invention is that the switch arm 47 in advance of the one actually shunting the current to a particular electrode, is in contact with its respective contactor 40. The purpose of this arrangement is to avoid any possibility of sparks in the system at any time, and particularly where the arms make or break contact with their respective contactors 40.

Having thus described our invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a switching mechanism having a support with a rotary shaft journalled thereto, a wall parallel with the shaft and spaced therefrom, a plurality of arms attached to the shaft and a plurality of contacts attached to the wall and facing the shaft, the ends of the arms having means to wipe the contacts, said contacts each comprising an inverted V-shaped channel adapted to receive the means in the acute angle portion thereof and make good electrical contact between them, resilient means for spacing the channel from the wall.

2. In a switching mechanism for electric loads, a cross-bar having end supporting members, a shaft parallel with the cross-bar and spaced therefrom, a plurality of spaced apart contacts along the cross-bar facing the shaft, a plurality of sleeves along the shaft having arms with ends to wipe said contacts, adjustable means to position the sleeves along the shaft and their arms in a plurality of radial positions, a wire leading from a source of electric current having electrical contact with the shaft, means to rotate the shaft and cause said arms to rotate and break connection with said contacts on the cross-bar, and each arm end having a resilient wire to temporarily connect with its respective contact.

3. In a switching mechanism for electric loads, a cross-bar having end supporting members, a shaft parallel with the cross-bar and spaced therefrom, a plurality of spaced apart contacts along the cross-bar facing the shaft, a plurality of sleeves along the shaft having arms with ends to wipe said contacts, adjustable means to position the sleeves along the shaft and their arms in a plurality of radial positions, a wire leading from a source of electric current having electrical contact with the shaft, means to rotate the shaft and cause said arms to rotate and break connection with said contacts on the cross-bar, and each contact comprising a channel having its groove side facing the shaft.

4. In a switching mechanism for electric loads, a cross-bar having end supporting members, a shaft parallel with the cross-bar and spaced therefrom, a plurality of spaced apart contacts along the cross-bar facing the shaft, a plurality of sleeves along the shaft having arms with ends to wipe said contacts, adjustable means to position the sleeves along the shaft and their arms in a plurality of radial positions, a wire leading from a source of electric current having electrical contact with the shaft, means to rotate the shaft and cause said arms to rotate and break connection with said contacts on the cross-bar, each contact comprising a channel having its groove side facing the shaft to guide the arm ends for positive connection between it and the contact, and a compression spring between the channel and cross-bar to urge the channel to its farthermost position from the cross-bar.

5. In a switching mechanism for electric loads, a cross-bar having end supporting members, a shaft parallel with the cross-bar and spaced therefrom, a plurality of spaced apart contacts along the cross-bar facing the shaft, a plurality of sleeves along the shaft having arms with ends to wipe said contacts, adjustable means to position the sleeves along the shaft and their arms in a plurality of radial positions, a wire leading from a source of electric current having electrical contact with the shaft, means to rotate the shaft and cause said arms to rotate and break connection with said contacts on the cross-bar, said shaft having attached thereon a toothed wheel, and dog means resiliently fixed to the frame to engage the teeth of the wheel, said wheel and dog operating to aid in positioning the arms radially upon the shaft.

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