Dec. 24, 1935. L. P. NEAL 2,025,356

DISPLAY DEVICE

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Fig. 1.

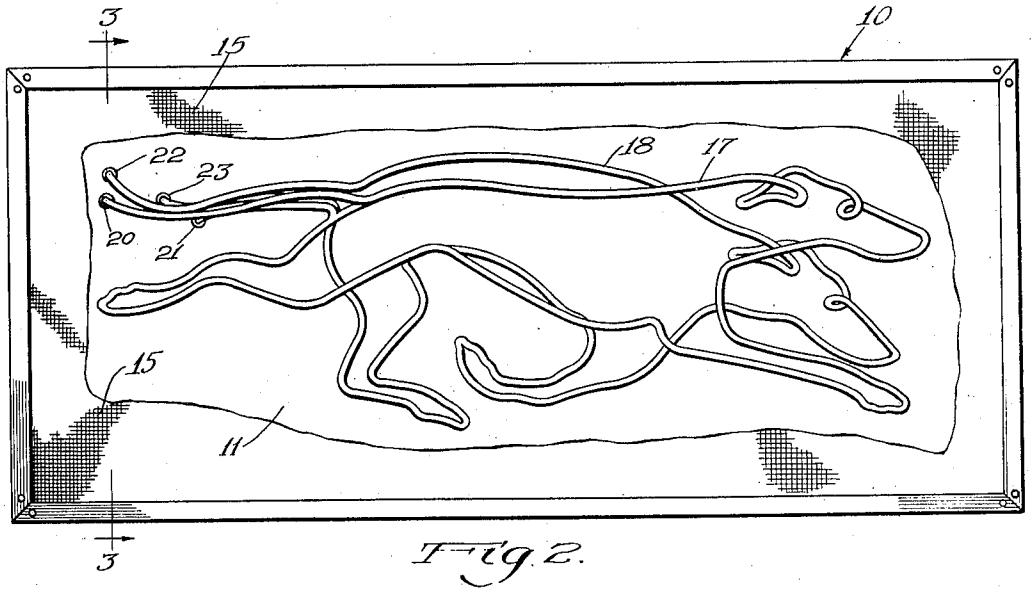


Fig. 2.

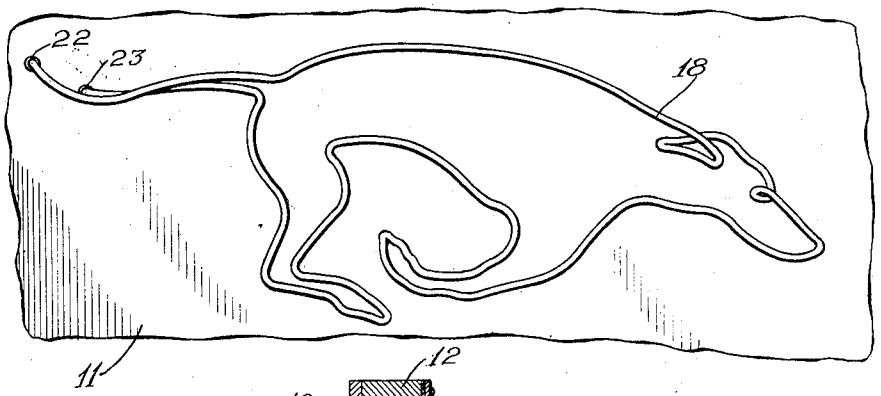
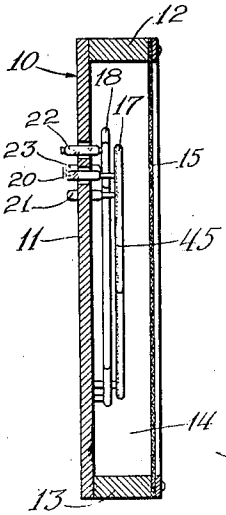


Fig. 3.



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Fig. 4.

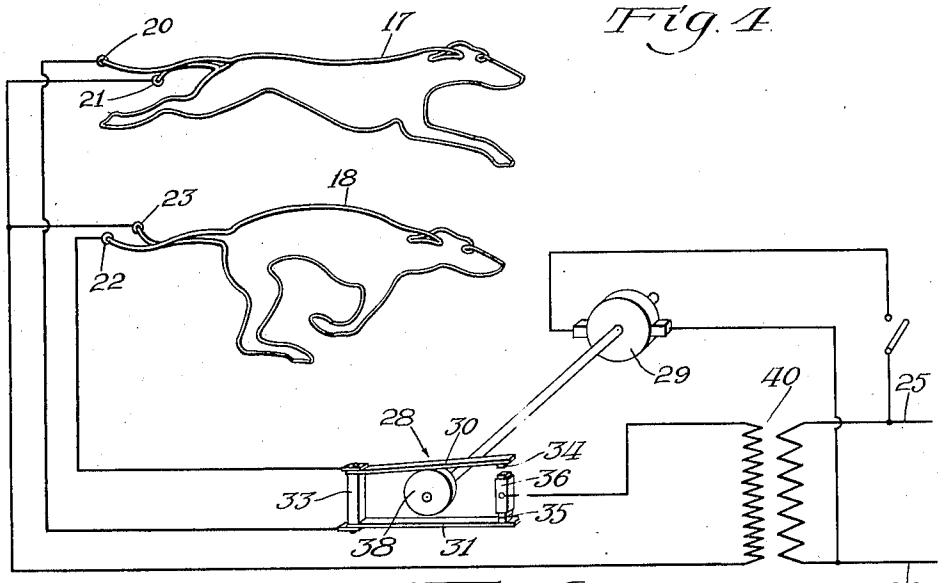


Fig. 5.

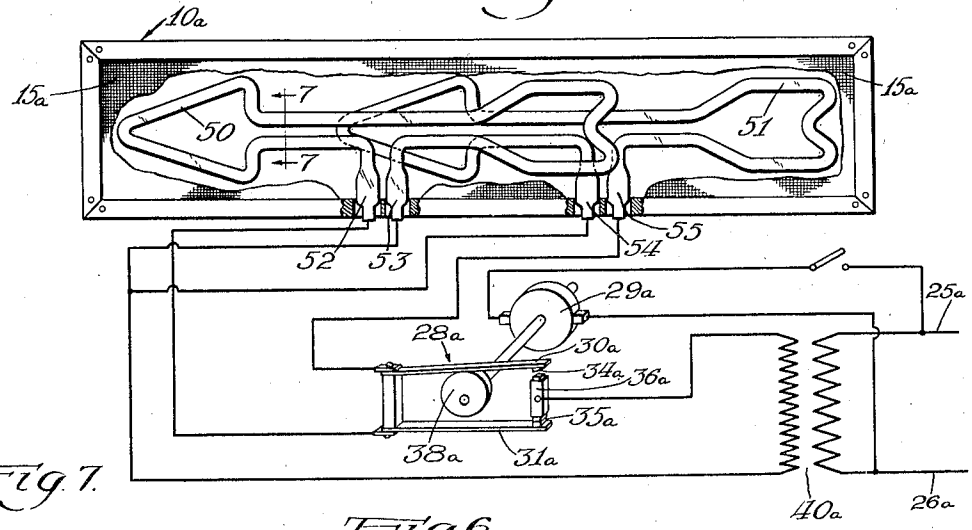


Fig. 7.

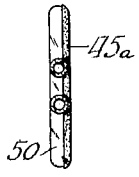
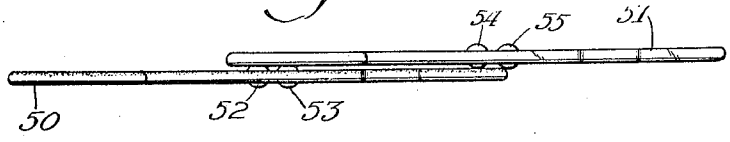


Fig. 6.



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UNITED STATES PATENT OFFICE

2,025,356

DISPLAY DEVICE

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Application March 14, 1932, Serial No. 598,835

8 Claims. (Cl. 177—346)

The invention relates to display devices and particularly to display devices which employ gaseous conduction tubing, such as neon tubing, or the like, to form display characters or designs.

It is a primary object of the invention to provide characters or designs of the kind described which appear to change form or move bodily back and forth, the result in each instance being one which creates the illusion that the character or design is in actual motion.

One form of the invention is embodied in a sign which comprises neon tubing bent to form a running animal in two of the positions which the animal repeatedly assumes while running, the neon tubing forming one of the positions and being super-imposed or overlapped upon the tubing forming the other position. The two tubes are illuminated alternately by means of an associated electrical circuit at a speed which creates the illusion that the animal is actually running. The observer does not get the impression that there are two animals in different positions as the illusion is such that it appears to be the same animal in the two positions. Means is preferably provided to prevent inactive tubing at any instant from reflecting light to the eyes of the observer with sufficient intensity to destroy, or tend to destroy, the illusion.

Another form of the invention is embodied in a sign which comprises one length of neon tubing bent to form the outline of an arrow and a second piece of tubing bent to form a similar arrow, the two tubings being arranged to overlap each other to some extent and being illuminated alternately so that it appears that there is one arrow traveling back and forth. The arrow may be made as part of a display to attract the attention of the observer to the display.

Other objects and advantages will become apparent as the following detailed description progresses, reference being had to the accompanying drawings wherein:

Figure 1 is a front elevation of a display device which embodies the invention, a portion of the device being broken away to illustrate certain details of construction.

Fig. 2 is a fragmentary elevation of a portion of the improved sign in Figure 1.

Fig. 3 is a section taken on line 3—3 of Figure 1.

Fig. 4 is a diagrammatic view illustrating the electrical circuit which is associated with the sign shown in Figure 1.

Fig. 5 is a somewhat diagrammatic view of another form of the invention.

Fig. 6 is a plan elevation of display characters or designs forming part of the device shown in Figure 5, and

Fig. 7 is an enlarged section taken on line 7—7 of Figure 5.

Referring for the present to Figures 1 to 4, inclusive, wherein an improved embodiment of the invention is illustrated, the reference character 10 designates generally a box-like frame which comprises a back wall 11, a top wall 12, a bottom wall 13 and side walls 14. The front of the box-like frame 10 is covered by a screen 15 which is preferably formed of thin fabric. Mounted within the box-like frame 10 are neon tubes 17 and 18, each of which is bent to form the outlines of a dog. In one of the positions it repeatedly assumes while running, the tube 17 shows the dog with both its back and front legs extended while the tube 18 shows the legs of the dog turned under it at the end of one of the leaps it takes while running. The tube 17 is provided with electrodes 20 and 21 and the tube 18 is provided with electrodes 22 and 23 which project through the back wall 11 and are connected to a source of electrical energy as diagrammatically illustrated in Figure 4.

As best shown in Figure 4, the tubes 17 and 18 are operated by electrical energy obtained from mains 25 and 26 which are connected to any suitable source of alternating current (not shown). The means for delivering current to the tubes 17 and 18 preferably comprises a switch device which is designated generally by the reference character 28 and is driven by an electrical motor 29, the motor 29 being operatively connected to the mains 25 and 26.

The switch device 28 preferably comprises leaf springs 30 and 31, each of which has one of its ends rigidly secured to a block 33 of electrical insulation. The free ends of the leaf springs 30 and 31 are provided with contacts 34 and 35, respectively, which are engageable with a contact 36. The springs are tensioned so that they tend to hold the contacts 34 and 35 in engagement with the contact 36.

A disc or cam 38 is secured to the shaft of the motor 29 and is adapted to displace the springs 30 and 31 alternately so that the contacts 34 and 35 are disengaged alternately from the contact 36. The construction is preferably such that before one of the contacts 34 and 35 has been disengaged from the contact 36, the other of the contacts 34 and 35 will have been brought into engagement therewith.

The mains 25 and 26 are connected to the

terminals of the primary winding of a transformer 40 which is preferably of the current limiting type. One terminal of the secondary winding of the transformer 40 is connected to the contact 36, the other terminal of the secondary winding being connected to the electrodes 21 and 23. The springs 30 and 31 are connected to the electrodes 22 and 20, respectively.

The operation of the above described apparatus is substantially as follows: If it is assumed that the contact 35 is in engagement with the contact 36 (as illustrated in Figure 4) and that the contact 34 is disengaged from the contact 36, it will be readily understood that current will flow as follows: from one terminal of the secondary winding to the contact 36, and thence through the contact 35, the spring 31, and the tube 17 back to the other terminal of the secondary winding. The neon gas in the tubing 17 will glow and the tube 17 will outline the dog with such distinctness that the observer will not note the tube 18. When the disc or cam 38 has rotated sufficiently to bring the contact 34 into engagement with the contact 36 before the contact 35 has been disengaged therefrom, the neon gas in the tube 17 will continue to glow but no current will flow through the tube 18 as the active tube 17 offers a path of much less resistance. However, when the contact 35 is subsequently disengaged from the contact 36, the tube 18 will become active instantaneously. Therefore, it is readily understood that the tubes 17 and 18 will become active alternately as the disc or cam 38 continues to rotate. The cam or disc is preferably rotated at a speed of 135 R. P. M. and when it is rotated at this speed an illusion is created which gives the observer the impression that there is one dog running continuously. The feet of the dog appear to travel from the position wherein they are shown in one tube to the position wherein they are shown in the other. In other words, the form of the superposed tubes is such as to represent opposed phases of motion, preferably of a forward translation, so that when the tubes are lighted alternately at a sufficiently high rate, an illusion of motion will be presented.

Good results have been obtained by rotating the cam or disc 38 at speeds ranging from 115 R. P. M. to 155 R. P. M., but the best results have been obtained by rotating the cam or disc at a speed of approximately 135 R. P. M.

The sign may be used without the screen 15, but in the preferred embodiments the screen is employed as it prevents the inactive tube from reflecting light to the eyes of the observer with sufficient intensity to detract attention from the active tube.

The back surface of the tube 17 is preferably coated with a dark paint, or the equivalent, as indicated by stippling at 45. This coating is omitted from those sections of the tube 17 which lie directly in front of sections of the tube 18. Therefore, the tube 18 may be viewed through the unpainted sections of the tube 17. The coating 45 prevents light from being projected from the tube 17 into the tube 18 and then reflected to the eyes of the observer. Of course, it will be readily understood that the coating 45 may be omitted if it is so desired. The practice has been found advantageous to use either the coating 45 or the screen 15, although in some cases both are employed.

Referring now to Figures 5 to 7, inclusive, wherein another form of the invention is illustrated as showing a fragmentary portion of a frame 10a which is preferably identical in construction with the frame 10 described above. The frame 10a is provided with a screen 15a which is preferably identical with the screen 15 described above. Mounted within the box-like frame 10a are two neon tubes 50 and 51 each of which is bent into the form of an arrow, the arrows being of the same shape and size. The tube 50 overlaps the tube 51 and is disposed in front thereof (see Figure 6).

The tube 50 is provided with electrodes 52 and 53, the tube 51 being provided with electrodes 54 and 55. The tubes 50 and 51 are connected to any suitable source of electrical energy by means comprising a switch device 28a, a motor 29a, a transformer 40a and mains 25a and 26a. The motor is operatively connected to the mains 25a and 26a in such manner that when current flows through the primary winding of the transformer 40a, the motor will function.

The switch device 28a is preferably identical in construction with the switch device 28 described above. Thus it comprises leaf springs 30a and 31a which are provided with contacts 34a and 35a, respectively, adapted to engage a contact 36a corresponding to the contact 36 of the switch device 28. The switch device 28a also comprises a cam or disc 38a which functions in the same manner as the cam or disc 38 described above and is driven by the motor 29a. The cam or disc 38a is preferably driven at the same speed as the cam or disc 38.

One terminal of the secondary winding of the transformer 40a is connected to the contact 36a. The other terminal of the secondary winding 40a is connected to the electrodes 53 and 54. The electrode 52 is connected to the spring 31a and the electrode 55 is connected to the spring 30a.

The operation of the apparatus shown in Figures 5 to 7, inclusive, is substantially as follows: Assuming that the contact 35a is in engagement with the contact 36a and that the contact 34a is disengaged therefrom as shown in Figure 5, it will be readily understood that current will flow from one terminal of the secondary winding through the contact 36a add thence through the contact 35a, the spring 31a of the electrode 52, the tube 50 and back through the electrode 53 to the other terminal of the secondary winding. Then as the disc or cam 38a continues to revolve, it will permit the contact 34a to engage the contact 36a before the contact 35a is disengaged therefrom. However, current will not flow through the tube 51 until the contact 35a has been disengaged from the contact 36a. When the contact 35a is disengaged from the contact 36a, the current will immediately flow through the tube 51. Therefore, continued rotation of the disc or cam 38a will cause the tubes 50 and 51 to be lighted alternately. As pointed out above, disc 38a may be rotated with good results at speeds ranging from 115 to 155 R. P. M., but is preferably rotated at a speed approximating at 135 R. P. M. When the disc or cam 38a is rotated in this maner, the arrow appears to travel back and forth from the positions defined by the tubes 50 and 51. The arrow does not have the appearance of first being at one position and then at the other, but seems to travel between the positions.

In this instance, the forward tube 50 has its back surface provided with a coating 45a which prevents light from the tube 50 from being reflected from the tube 51 to the eyes of the observer. Those portions of the tube 50 which pass

in front of sections of the tube 51 are left uncoated so that the tube 51 may be viewed in its entirety through the tube 50 when it is active.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims, in which it is my intention to claim all novelty inherent in my invention as broadly as possible, in view of the prior art.

I claim:

1. In a display device, a gaseous conduction tube bent to form the outlines of a display character, a second gaseous conduction tube of substantially the same length bent to form the outlines of the same character in a different position and in an altered shape, one of said tubes being superposed on the other, means for causing said tubes to become lighted alternately, and means for preventing the light of one tube from being reflected toward the observer by the other tube.

2. In a display device, a gaseous conduction tube bent to form the outlines of a display character, a second gaseous conduction tube of substantially the same length bent to form the outlines of the same character in a different position and in an altered shape, one of said tubes being superposed on the other, means for causing said tubes to become lighted alternately, and a coating on the back surface of one tube for preventing light from said tube from being reflected toward the observer by the other of said tubes.

3. A display device comprising a gaseous conduction tube bent to form the outlines of a character, a second gaseous conduction tube of substantially the same length bent to form the outlines of the same character in a different position, one of said tubes being superposed on the other, means for causing said tubes to light alternately, and means for preventing one of said tubes from projecting light on the other so that it will be reflected toward the observer.

4. A display device comprising a gaseous conduction tube bent to form a display character capable of uni-directional movement, a second gaseous conduction tube of substantially the same length bent to form the same display character in a different position, one of said tubes being superposed on the other and of such form as to show an opposed phase of motion of a lineal translation in contrast with the other tube, means for lighting one of said tubes at from 115 to 155 times per minute and for lighting the other tube when the first tube is not lighted.

5. A display device comprising a gaseous conduction tube bent to form the outlines of a display character capable of movement, a second gaseous conduction tube forming the outlines of the same display character in a position shifted in one direction with respect to the first display character, said tubes being in substantial super-position and of such form as to show opposed phases of motion of a lineal uni-directional translation, means for alternately lighting said tubes at a sufficiently high rate to create the illusion of motion, and means for preventing the first tube from projecting light on the second tube so that it will be reflected toward the observer.

6. In a display device, a gaseous conduction tube bent to form the outlines of a display animal, a second gaseous conduction tube bent to form the outlines of the same animal in a different position, said tubes being substantially superposed and of such form as to show opposed phases of motion of a forward translation, and means for lighting said tubes alternately at a sufficiently high rate to give the illusion of motion.

7. A display device comprising a gaseous conduction tube bent to form the outlines of a display character capable of movement, a second gaseous conduction tube forming the outlines of the same display character in a position shifted in one direction with respect to the first display character, said tubes being substantially superposed and of such form as to show opposed phases of motion of a uni-directional translation, and means for lighting said tubes alternately at a sufficiently high rate to give the illusion of motion.

8. In a display device, a gaseous tube bent to form the outlines of an animal, a second gaseous conduction tube bent to form the outlines of the same animal in a different position, said tubes being substantially superposed and of such form as to represent opposed phases of motion of a uni-directional translation, and means for lighting said tubes alternately at a sufficiently high rate to give the illusion of motion.

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