May 5, 1931. R. M. CRAIG 1,803,597

REVOLVING SIGN

Filed Feb. 28, 1930 4 Sheets-Sheet 1

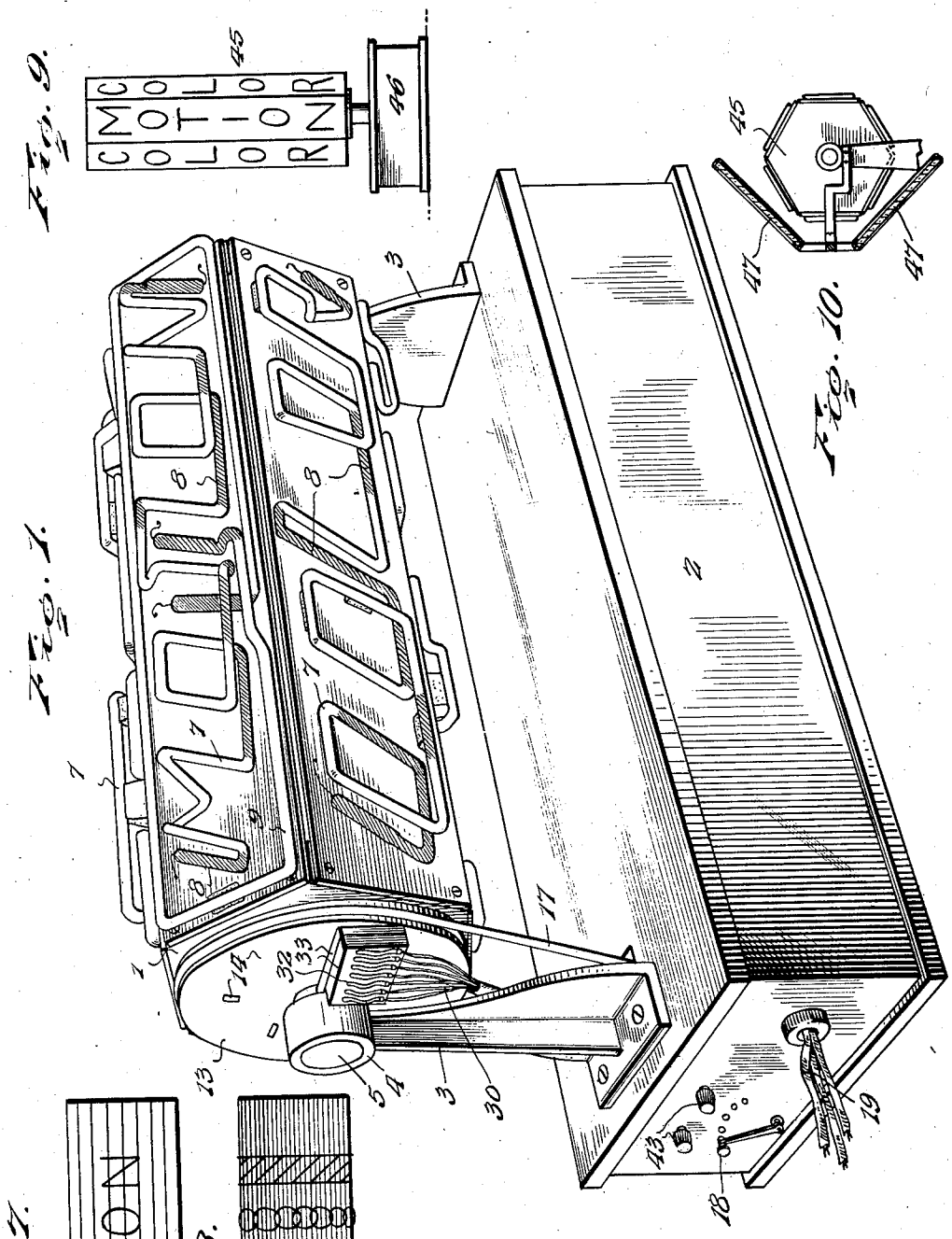


Fig. 9.

Fig. 10.

Fig. 7.

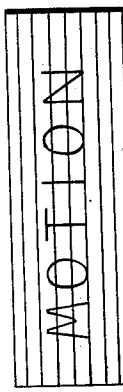


Fig. 4.

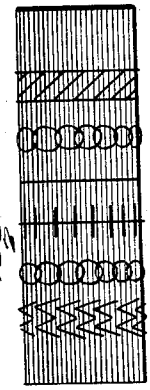


Fig. 8.

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REVOLVING SIGN

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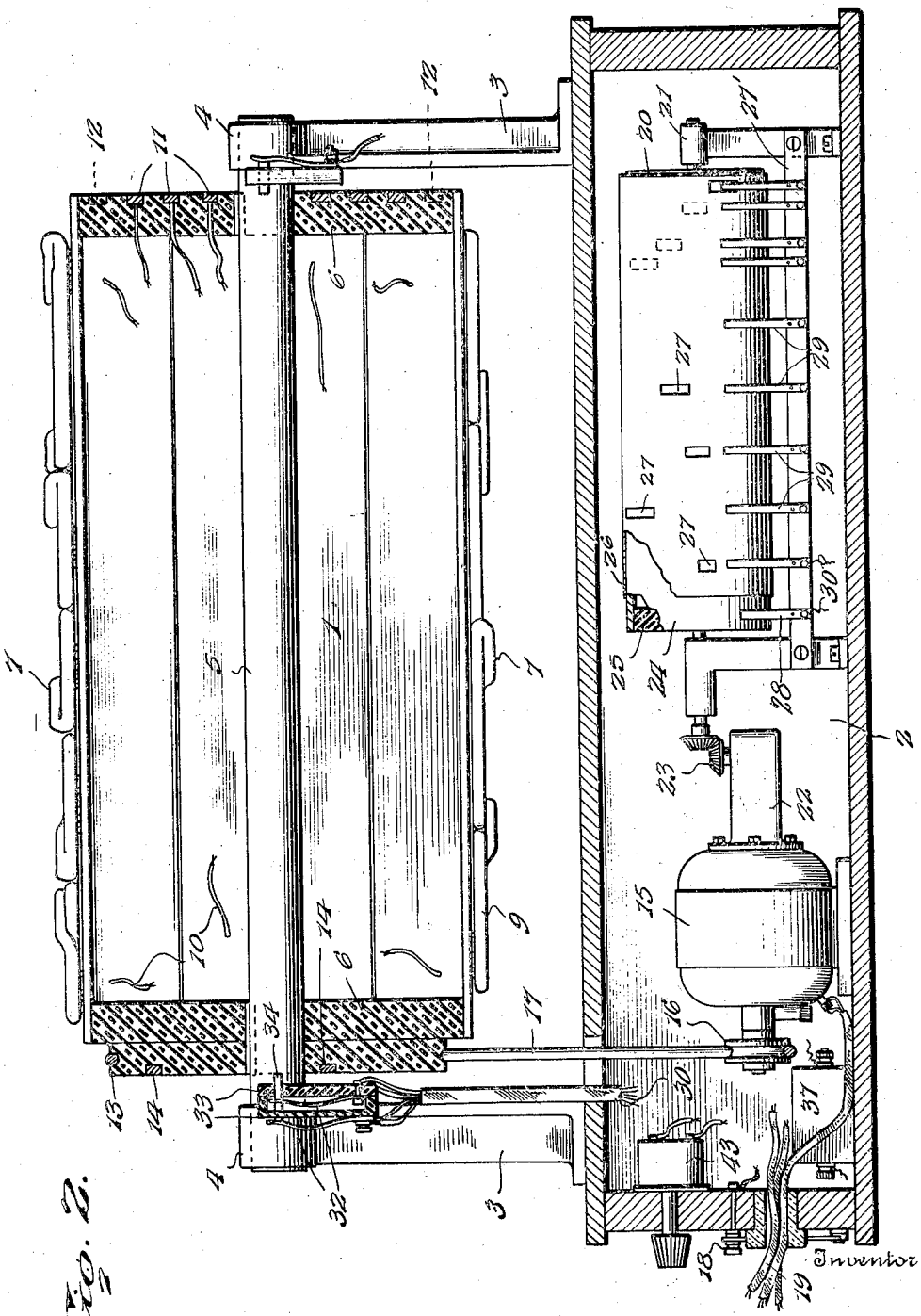


Fig. 2.

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May 5, 1931. R. M. CRAIG 1,803,597

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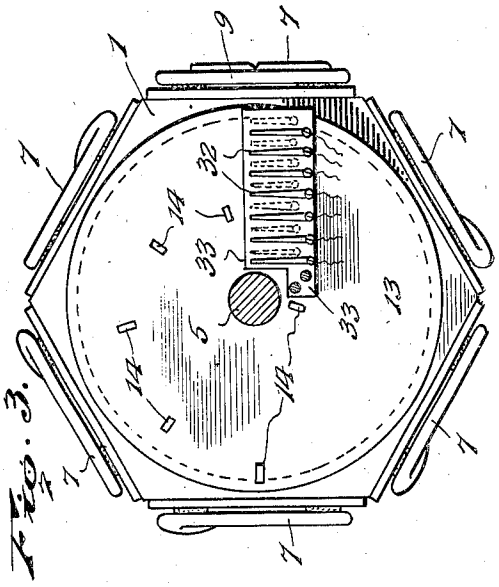


Fig. 3.

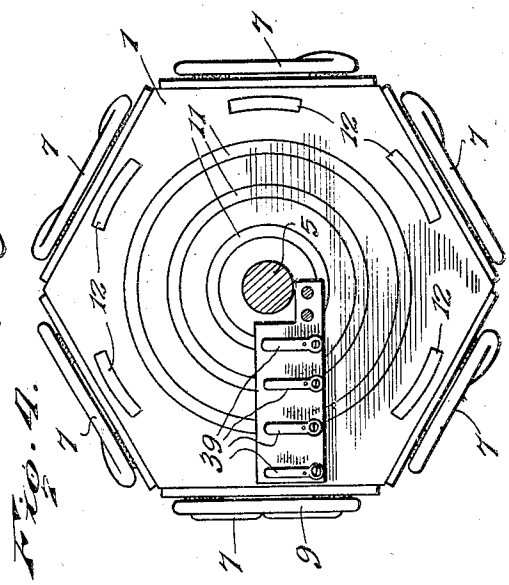


Fig. 4.

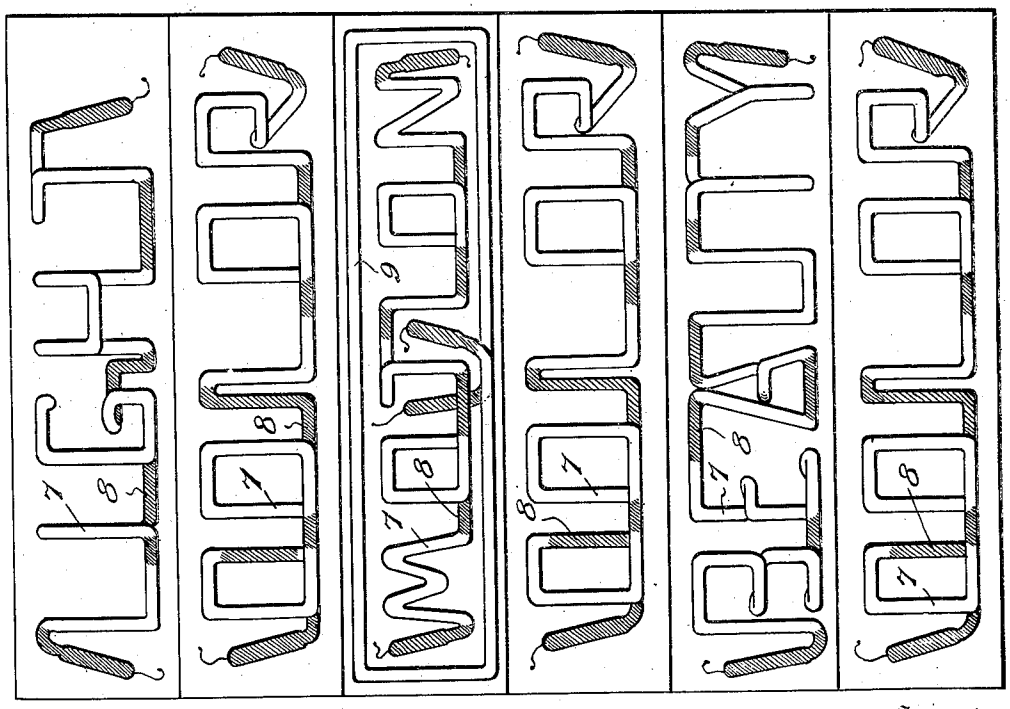


Fig. 5.

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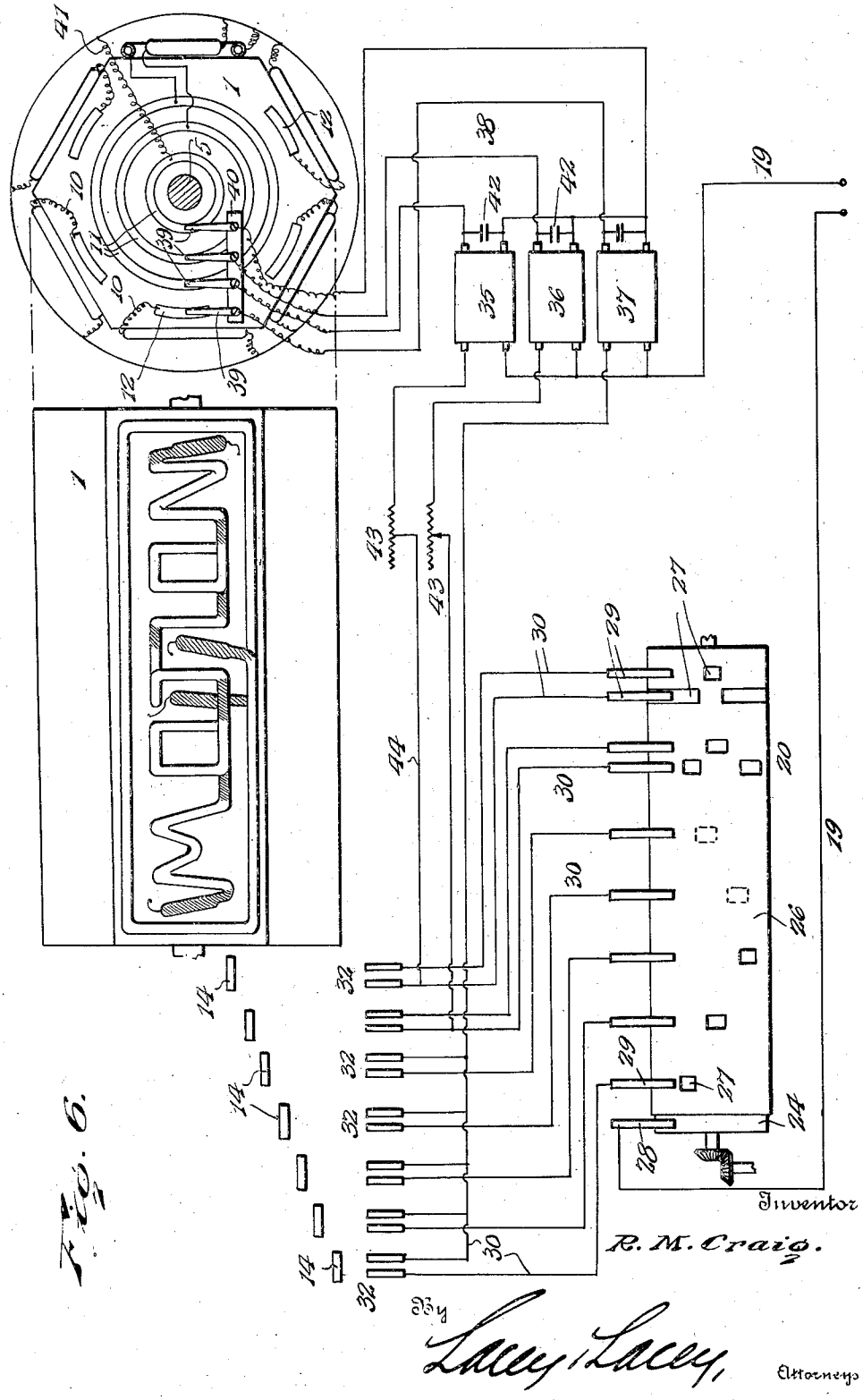


Fig. 6.

Patented May 5, 1931 1,803,597

UNITED STATES PATENT OFFICE

RICHARD M. CRAIG, OF SAN ANTONIO TEXAS

REVOLVING SIGN

Application filed February 28, 1930. Serial No. 432,170.

The object of this invention is to provide a display apparatus which will produce geometrical designs and at intervals in the operation will show announcements, advertisements or other matter which it is desired to impress upon the attention of observers. The invention provides an apparatus in which a plurality of spectral colors will be shown and these colors will appear to blend or to change without the means for effecting the changes being obvious so that the element of mystery will be present and be a factor in attracting attention and giving value to the apparatus as an advertising medium. Incidental objects of the invention will appear in the course of the following description, and the invention resides in certain novel features which will be particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a perspective view of one embodiment of the invention,

Fig. 2 is a longitudinal vertical section of the same,

Fig. 3 is an end elevation, partly broken away and in section,

Fig. 4 is an elevation of the end of the machine opposite that shown in Fig. 3,

Fig. 5 is a diagrammatic plan view of the display elements,

Fig. 6 is a diagram,

Figs. 7 and 8 are diagrams showing different effects which may be obtained in the operation of the machine.

Fig. 9 is an elevation showing a variation of the invention, and

Fig. 10 is a view showing a further variation.

The invention employes a drum 1 which is preferably arranged to rotate about its longitudinal axis which is arranged horizontally. As shown in Figs. 1, 3 and 4, the drum is six-sided or hexagonal in cross section but it is to be understood that it may be of any polygonal cross sectional outline and various effects will be obtained according to the number of sides which the drum has. In the particular form selected for illustration, there is provided a base 2 in the form of a box containing the driving elements and upon the top of this box are erected standards 3 arranged adjacent the opposite ends of the box, as clearly shown in Figs. 1 and 2. The upper ends of the standards are formed into or equipped with bearings 4 in which the axle 5 of the drum is journaled and the body of the drum is closed at its ends by disks 6 which are of insulation and are keyed or otherwise firmly secured to the axle or shaft. Upon the several sides or panels of the drum are mounted luminescent gas-filled tubes 7 which may be given any desired formation according to the design or the announcement which is to be displayed and portions of each tube are rendered opaque by painting or other means, as indicated at 8, whereby other portions of the tubes will be rendered visible when illuminated and words or sentences or designs may be shown. Upon one of the panels, there is an additional tube 9 which may be designated a pattern tube in order to distinguish it from the other tubes which may be properly referred to as announcement tubes, the pattern tube in the present illustration being substantially rectangular in outline and so located as to form a border or rim around the edges of the panel upon which it is mounted. The terminals of all the tubes are made opaque so that they will be practically invisible when the machine is operating and the illumination will, therefore, stand out sharply before the eyes of the observer. Conducting wires are led from the terminals of the several tubes to the interior of the drum, as indicated at 10, and some of these wires are connected to conductor rings 11 set in the outer face of one of the end disks 6, while others are connected to arcuate spaced contact plates or blocks 12 set in the outer face of the same disk. At the opposite end of the drum, there is rigidly secured a pulley 13 of insulated material and in the outer face of this pulley are set contact blocks 14 which correspond in number to the number of tubes mounted upon the drum and are arranged in such relation to each other that each one of said blocks will govern the illumination of one tube. Within the box or base 2 is disposed an electric motor 15 upon the shaft of which is a driving pulley

16 about which is trained a belt 17 which also passes about the pulley 13 whereby the drum will be rotated directly from the motor and the speed of the drum may be controlled by a rheostat 18 mounted upon the end of the box and connected with the motor in a manner well known in the electrical art, the current to drive the motor being supplied through cables 19, as will be understood. Also mounted within the box 2 is a circuit controlling drum 20 which is mounted to rotate in suitable bearings 21 and is driven from the motor 15 through reduction gears, indicated conventionally at 22, and connected through bevelled pinions 23 with the axle of the drum. This drum 20 comprises a cylindrical shell 24 of brass or other conducting material having its ends secured about disks 25 of insulation which are, in turn, secured upon the axle or drum shaft, and a sheath or cover 26 also of insulation which is placed around the shell and has portions cut out, as indicated at 27, whereby contact with the shell may be made. Carried by the supports for the drum is a bar 27′ of insulation and mounted upon said bar in position to bear upon the drum or the insulated cover are brushes 28 and 29, the brush 28 being arranged to bear constantly upon an exposed end of the shell and the other brushes normally resting upon the insulated cover at such points that the spaces 27 will be carried past the ends of the respective brushes when the drum is rotated and thereby close the circuit through the shell of the drum to govern the illumination of the tubes. From the several brushes, conductors 30 extend to one end of the display drum 1 and are there connected with brushes 32 which are arranged in pairs and are engaged at times by the contact blocks 14. Referring more particularly to Fig. 2, it will be observed that the coacting brushes are mounted upon bases 33 of insulation which are shown as superposed one upon another, this arrangement being merely a matter of convenience so as to economize space. The several brushes are in the form of resilient fingers bearing at their free ends upon presser pins 34 so that said pins will be held against the outer face of the pulley 13 in such position that the contact blocks 14 will readily ride under the same and bridge the members of the respective pairs of fingers so that a circuit will be closed therethrough, and it may be noted at this point that the spaces 27 upon the circuit-controlling drum 20 are arranged in the same relation to each other as the several contact blocks 14 so that the illuminating of the tubes will occur at the desired intervals and in the desired sequence.

At some convenient point in the input cables, there is arranged a series of transformers 35, 36 and 37 which are preferably of the closed core type, and these transformers upon their primary side have a common connection with the input cable, as will be understood upon reference to Fig. 6, the other terminals of the primary sides of the transformers being connected into the several conductors 30, as will be also understood upon reference to Fig. 6. The secondary sides of the transformers are connected through conductors 38 with brushes 39 carried by a bar 40 upon the end disk of the display drum and arranged to bear upon the respective rings 11 and the contact blocks 12, as will be understood upon reference to Figs. 4 and 6, the innermost brush and the conductor leading therefrom constituting a return common to all the tubes, one terminal of each tube being electrically connected to the drum and the drum being electrically connected through a wire 41 with the innermost ring 11, as shown most clearly in Fig. 6. Interposed in the secondary circuits of the transformers 35 and 36 are condensers 42 and interposed in the conductors leading from the primary sides of the same transformers to brushes 32 are variable resistances, indicated at 43.

The luminescent tubes are of the type which are generally referred to as neon tubes, this term being used somewhat loosely at times, and the tubes are filled with various gases and are formed from glass of various colors so that when illuminated a great variety of colors may be shown by the apparatus. These tubes operate upon alternating current and differ from incandescent-film tubes by being illuminated instantaneously when the current is fed into the tubes and becoming dark instantaneously without any afterglow when the current is cut off. This characteristic of these tubes causes them to be very desirable for advertising and display purposes inasmuch as the lines of color given out from the apparatus may be very sharp, and it will be understood also that the display drum is rotated at a speed faster than the speed of vision and the effects created by any one tube may be retained by the eye until effects created by a follwing tube have been observed by the eye and this overlapping of effect will produce various designs and is utilized to permit the words to be read at intervals or to be merged into designs between such intervals. As a matter of convenience, I have shown in the accompanying drawings, the words "Light," "Motion" and "Beauty" upon some of the panels and upon panels alternating with those carrying the mentioned words, I have shown the word "Color". The pattern tube 9 is shown upon the panel carrying the word "Motion" but it may, of course, be mounted on any one of the panels, and it is possible by timing the illumination of the various tubes to cause the pattern tube to apparently form a border around any one of the words, the periods of

illumination of the tube being more frequent than the eye can distinguish and by being properly timed with the illumination of the words, it may, of course, be made to appear as though formed around any one word. The several tubes are given contrasting colors, the pattern tube being preferably blue, while the words "Light", "Motion" and "Beauty" are shown in red. The several words "Color" are given different and contrasting colors, one being red, another blue and the third green. When the machine is in operation, if the tubes be continuously illuminated, they will form a broad band of color which will be a merger of the several constituent colors and if the illumination be interrupted so that it will occur at stated intervals in the period of rotation of the drum and always at the same point in the rotation, the words will appear to be stationary and readable, the period of non-illumination being too short to be appreciated by the eye of the observer and consequently the illuminations are superimposed upon the retina of the eye and the observer is enabled to read the word. The illumination of the several words "Color" will occur at the same point in the rotation of the pattern drum and this will have the effect upon the observer of a constantly changing color in the word so that a scintillating effect will be obtained. The effect will be varied also according to the speed of the motor and at a speed of two hundred revolutions a minute the colors will appear separately but constantly changing in the field of vision so as to be apparently superposed one upon another, whereas at a higher speed of about five hundred revolutions per minute the colors will blend, and I have obtained a nearly pure white light by using two blue tubes and one red tube which will blend as the tubes successively pass across the field of vision.

I have found that if the secondary circuits be operated without any impedance or interruption the lines of light given out by the several tubes will be very broad. Now, if the words be illuminated at regular intervals, they may appear upon a background of solid color, but by interposing the condensers 42 in the secondary circuits the background appears as a plurality of parallel bars extending longitudinally of the display drum, as shown in Figs. 7 and 8. If the word "Motion", for instance, be illuminated continuously during the rotation of the drum, the several letters of the word will merge so as to form a broad band or overlap to form a geometrical design, such as shown in Fig. 8, the closeness of the design being determined by the speed of rotation of the drum and the adjustments of the condensers. By properly adjusting the resistances 43, the tubes may be continuously illuminated but will appear only at intervals in the rotation of the drum, the periods of appearance being determined by the quantity of the resistance interposed in the line.

The transformer 35 controls the illumination of the pattern tube 9 and the transformer 36 controls the illumination of the word "Motion" while the transformer 37 controls the illumination of all the other tubes. Referring now to the contact block 14 at the extreme left in Fig. 6, the current enters over the intake line 19 at the left and passes to the brush 28 and thence to the metallic shell 24 of the circuit-controlling drum. From the shell, the current passes to such brush 29 as may be bearing upon the shell through an opening 27. Now assuming that the brush 29 at the left is in contact with the shell 24, the current will pass from said brush over a wire 30 to one brush 32 and if the contact block 14 has then reached said brush 32 it will bridge the same and its companion brush so that the circuit will be completed through the return wire 30 to the primary side of the transformer 37 and thence out over the other input line 19. The transformer 37 will thus be activated so that the brush 39 at the extreme left will be activated, provided one of the contact blocks 12 is then under said brush and the tube connected with said block will, of course, then be illuminated. The several word tubes, except the word "Motion", are illuminated in the same manner, the tube to be illuminated being selected by the arrangement of the blocks 14 and the blocks 12 as well as the spaces 27 upon the circuit closing or distributing drum, it being understood that a space 27, a corresponding block 14 and a corresponding block 12 must be in the circuit closing position to cause illumination of any one tube. There will be no arcing between a contact 12 and the brush 39 because the corresponding low frequency contact 32 will have broken contact simultaneously, the contacts at the two ends of the drum rotating in unison.

Now, referring to the brushes 29 at the right of Fig. 6, it will be noted that the conductors 30 leading from said brushes extend to a pair of brushes 32 but one of said conductors has a line 44 tapped thereinto which line extends to the primary side of the transformer 35 and has a resistance 43 set therein. The space 27 in the cover 26 of the distributing drum are arranged in two series corresponding to the respective brushes 29 at the right. When the current flows to the left brush 29 of this pair of brushes through the corresponding space 27, the circuit does not include the brushes 32 but passes at once to the transformer 35 so that the pattern tube is continuously illuminated but if the circuit is formed through the brushes and contact 27 at the right the course of the current is up to one brush 32 where it will be blocked unless the contact 14 is bridging the brushes,

whereupon it will flow through said contact and the brushes to the wire 44 and thence into the transformer as before, but the circuit will be closed only while the block 14 is bridging the brushes 32 and, consequently, the pattern tube will be illuminated only momentarily, or once in a revolution. The same action occurs in the illumination of the word "Motion" which is controlled through the transformer 36. On the secondary side the circuit for the word "Motion" is from the transformer to the outermost ring 11 and then through the tube and the common return wire 41 to the innermost ring 11, as will be understood.

While I have chosen the horizontal drum as the preferred form of the invention, it is not restricted to horizontal drums and may be embodied in a vertical drum, as shown at 45 in Fig. 9, rising from a box or base 46 in which the operating mechanism will be housed. In this form of the invention, the words will be read in a vertical position but otherwise the action is the same as for the horizontal drum.

Obviously, the horizontal drum may be set to extend across a sidewalk and be visible to persons approaching from either side, but only three signs could be shown consecutively since one set would be inverted to the observer. On the vertical sign six announcements may be read consecutively. On an octagonal vertical sign, the announcements may be read in four directions at one time.

By carrying the resistance in the primary side, the pattern may be made to repeat at different intervals, and will be slowly drifting in a direction opposite to the direction of rotation.

A very unique effect may be obtained with such an arrangement as is indicated in Fig. 10 in which mirrors 47 are placed at the back of a vertical drum so as to reflect the light from the sign and thereby multiply the designs produced by the several tubes.

Having thus described the invention, I claim:

1. A sign comprising a drum mounted for continuous rotation about its longitudinal axis, luminescent tubes fixedly mounted upon the exterior of said drum, means for illuminating the tubes, and means controlled by the rotation of the drum for selectively illuminating the several tubes.

2. A display apparatus comprising a drum mounted to rotate continuously about its longitudinal axis, luminescent tubes of various spectral colors rigidly mounted upon the exterior of the drum and extending longitudinally thereof, and means controlled by the rotation of the drum for selectively illuminating the respective tubes and controlling the periods of illumination.

3. A display apparatus comprising a polygonal drum mounted for rotation about its major axis, luminescent tubes mounted upon the respective sides of the drum and fashioned to form legible characters, a tube mounted upon one side of the drum and shaped to form an ornamental pattern, and means controlled by the rotation of the drum for selectively illuminating the several tubes and controlling the period of illumination.

4. A display apparatus comprising a drum mounted for continuous rotation about its major axis, luminescent tubes rigidly mounted upon the several sides of the drum and having distinctive colors, and means controlled by the rotation of the drum for selectively illuminating the tubes, the speed of rotation of the drum and the intervals of illumination being more rapid than the speed of vision whereby the colors of the tubes will blend to form a white light.

5. A display apparatus comprising a polygonal drum mounted for rotation about its major axis, luminescent tubes mounted upon the several sides of the drum and fashioned to form words in contrasting colors, a luminescent tube mounted upon one side of the drum and forming a border around said side and having a color contrasting with the colors of the several word-forming tubes, and means controlled by the rotation of the drum for selectively illuminating the several tubes whereby the pattern tube may be made to appear in connection with any one of the word-forming tubes.

6. A display apparatus comprising a drum mounted for rotation about its major axis, means for rotating the drum, a distributer driven by said rotating means, luminescent tubes mounted upon the several sides of the drum, means for selecting a tube to be illuminated comprising contact elements mounted adjacent one end of the drum and electrically connected with the distributer and other contact elements mounted on the end of the drum to cooperate with the first-mentioned contact elements, and means at the opposite side of the drum for illuminating the selected tube.

7. A display apparatus comprising a drum mounted for rotation about its major axis, luminescent tubes mounted upon the exterior of said drum, means for rotating the drum, a distributer driven by said rotating means at a speed lower than the speed of the drum, means directly controlled by the distributer for selecting a tube to be illuminated, a series of conductor rings at the opposite end of the drum connected with the respective luminescent tubes, and means controlled by the distributer and the tube-selecting means for closing circuits through the respective rings and the tubes to illuminate the selected tube.

8. A display apparatus comprising a drum mounted to rotate about its major axis, a plurality of luminescent tubes mounted upon

the exterior of the drum, a series of contact blocks at one end of the drum corresponding in number and relation to the respective tubes, a distributor rotating at a speed less than the speed of the drum, a plurality of contact fingers arranged to be engaged by the contacts in the end of the drum and electrically connected with the distributor whereby to select a tube to be illuminated, the distributor and all said contact elements being in a primary circuit and secondary circuits arranged to be energized by the primary circuits and including a plurality of conductor rings and contact blocks set in the opposite end of the drum and each electrically connected with one of the tubes, and brushes arranged to engage the several conductor rings and the spaced contact blocks.

9. A display apparatus comprising a many-sided drum mounted for continuous rotation, luminescent tubes mounted on the several sides of the drum and shaped to form legible characters, and means for illuminating the tubes selectively at intervals whereby to successively display a plurality of announcements.

10. A display apparatus comprising a polygonal drum mounted for continuous rotation, luminescent tubes mounted on the sides of the drum and having identical forms but of different spectral colors, and means for controlling the illumination of the tubes during rotation of the drum whereby the forms of the tubes will appear to be stationary and of scintillating changing colors.

11. A display apparatus comprising a pair of synchronously rotated heads, luminescent tubes carried between the heads, primary circuits including series of contacts on one head, secondary circuits including series of contacts on the opposite head electrically connected with the respective tubes, and means whereby the primary circuits will selectively activate the secondary circuits and effect illumination of selected tubes.

12. The combination of a drum having a plurality of display faces, a plurality of contacts on an end of the drum, brushes arranged in pairs at the paths of said contacts, pressed pins held to the drum by the brushes to engage the contacts, and means to supply electric energy to the brushes selectively to exhibit one or more display faces per revolution of the drum.

13. A display apparatus comprising a rotatable member, a plurality of luminescent tubes rigidly mounted thereon, a series of contacts on the rotatable member each connected with one of the tubes, and a plurality of secondary circuits having a transformer in common and each including one of said contacts.

14. A display apparatus comprising a drum mounted to rotate uninterruptedly about its longitudinal axis, luminescent tubes of various spectral colors carried by the drum and extending longitudinally thereof, and means controlled by rotation of the drum for selectively illuminating the respective tubes and controlling the periods of illumination.

15. A display apparatus comprising a polygonal drum mounted for rotation about its major axis, luminescent tubes mounted upon the drum and fashioned to form legible characters simultaneously illuminated and visible from opposite sides of said drum, and means controlled by the rotation of the drum for selectively illuminating the several tubes and controlling the period of illumination.

In testimony whereof I affix my signature.

RICHARD M. CRAIG.