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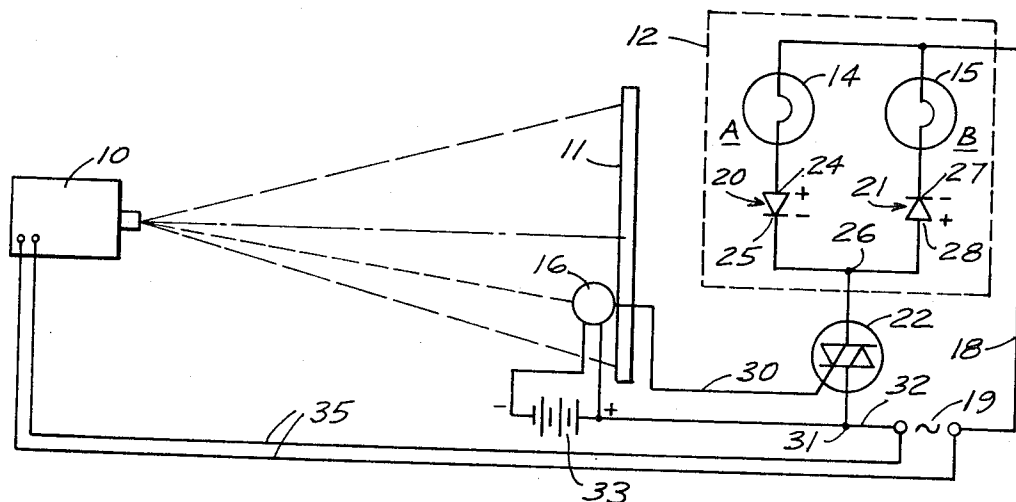
[54] **ELECTRICAL DISPLAY SYSTEMS**
7 Claims, 9 Drawing Figs.

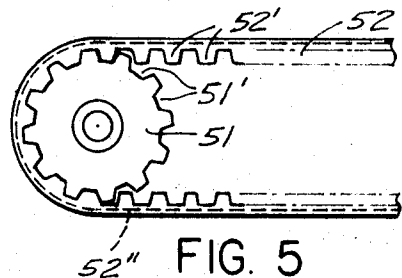
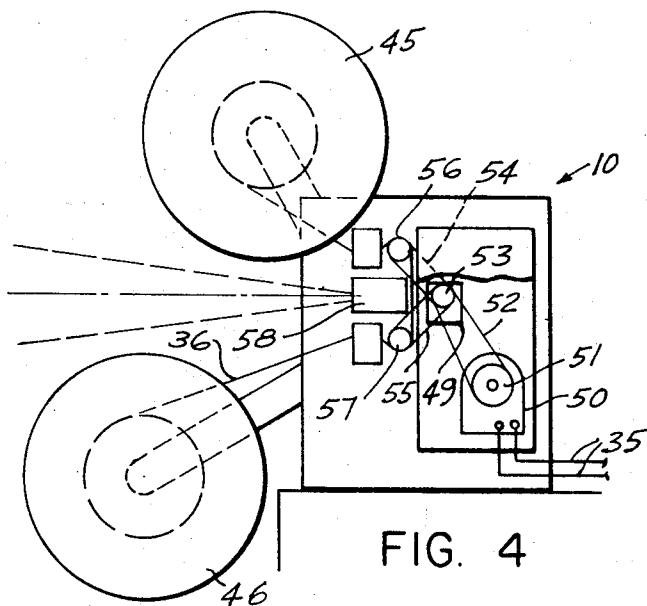
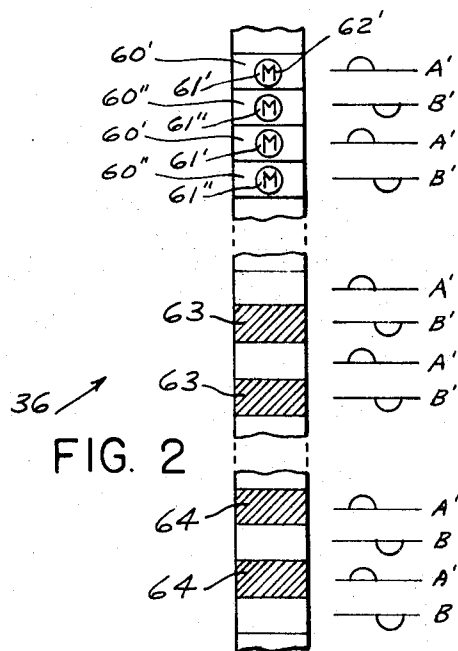
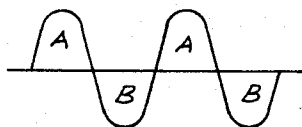
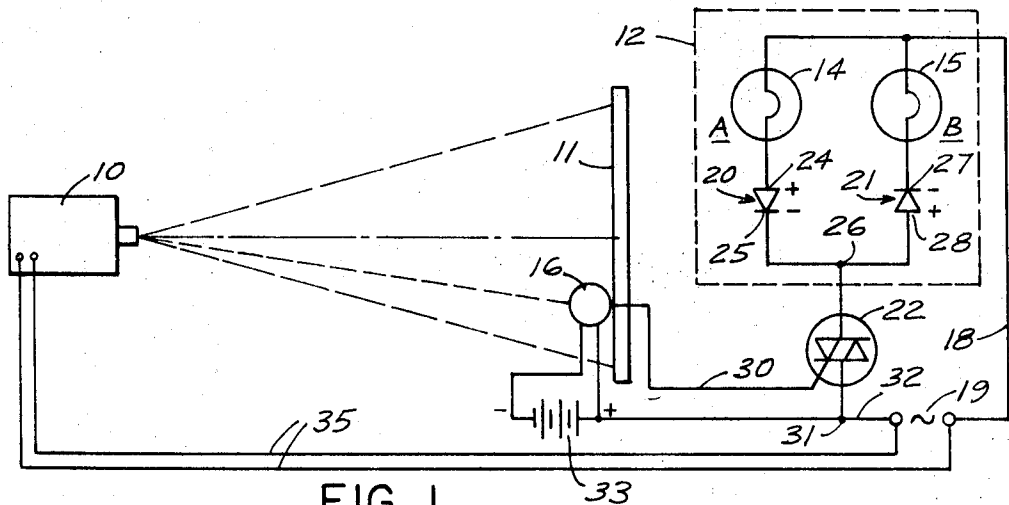
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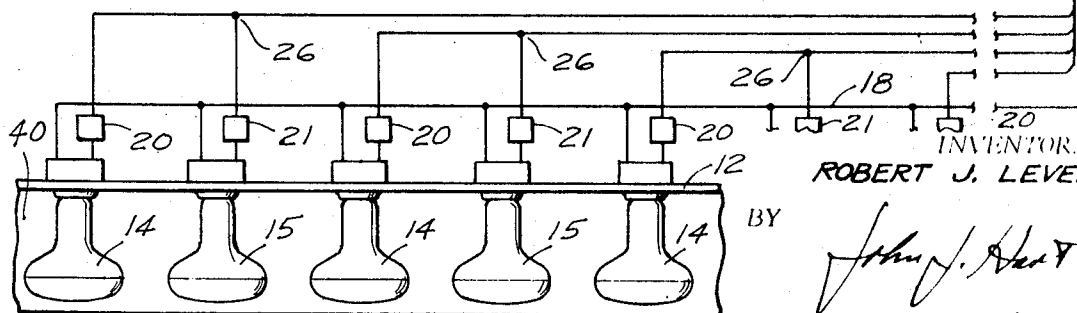
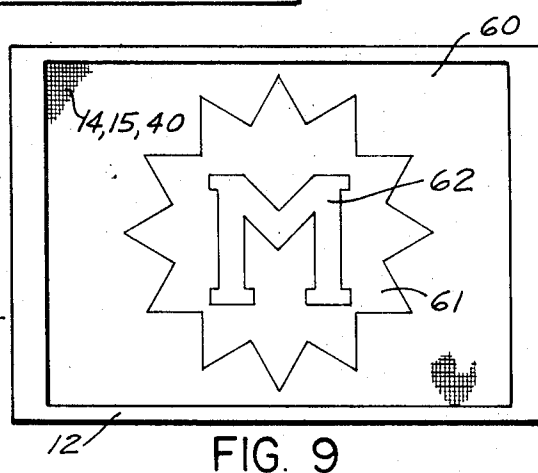
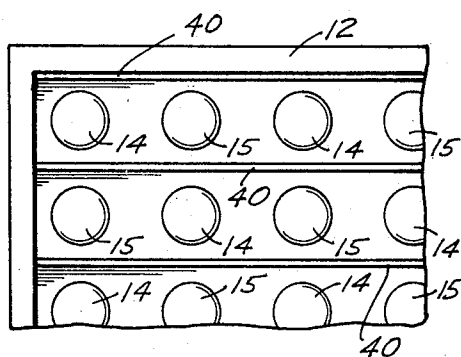
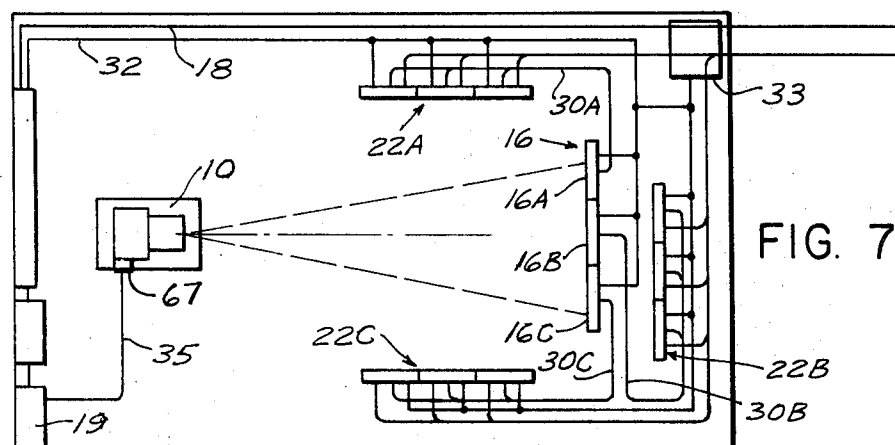
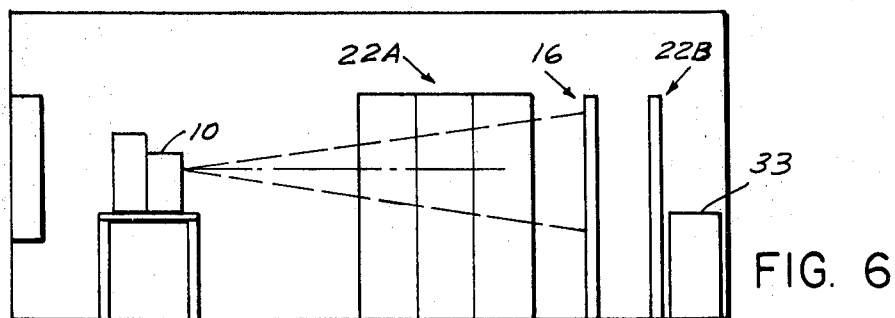
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ABSTRACT: The apparatus comprises an outdoor advertising sign composed of a multiplicity of electric lamps arranged in a given design and operated to provide a plurality of light effects by a multiplicity of alternating current bidirectional triode thyristors known as Triacs, whose operations are controlled by a motion picture film, a motion picture projector and a multiplicity of photocells connected to the Triacs and arranged to receive light rays from the projector.





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ELECTRICAL DISPLAY SYSTEMS

This application is a continuation-in-part of application Ser. No. 556,145, filed Jun. 8, 1966.

THE INVENTION

This invention relates to outdoor advertising signs and more particularly to the type thereof which are known as "outdoor electrical spectaculars" and which are capable of providing effective advertising displays during the daylight hours as well as at night.

The primary purpose of the present invention is to provide an outdoor advertising sign of the indicated type which is capable of providing variable visual effects using projecting means that are simple and inexpensive to construct and are practical and reliable in operation.

A further object of the invention is to provide an improved outdoor advertising installation that is capable of provided effective variable colored light advertising effects 24 hours a day.

Other objects of the invention, as well as the advantages and novel features of the invention, will become apparent from a perusal of the following description, when read in connection with the accompanying drawings, in which

FIG. 1 is a diagrammatic view showing one manner in which the invention may be practiced;

FIG. 2 is a diagrammatic view of a portion of film such as is employed in the projector of the display system shown in FIG. 1;

FIG. 3 is a diagrammatic view of an alternating current wave marked to designate wave portions corresponding to the frames of the film shown in FIG. 2;

FIG. 4 is a diagrammatic elevational view of the interior of a projector that may be employed in the practice of the invention;

FIG. 5 is a partial, elevational view of one of the driving belts employed in the projector;

FIG. 6 is a schematic view showing in elevation a room containing the projecting apparatus;

FIG. 7 is a schematic view showing in plan the apparatus in the room depicted in FIG. 6 and a top view of one of the rows of electric lamps in the outdoor advertising sign;

FIG. 8 is a diagrammatic, elevational, partial view of two of the rows of electric lamps in the advertising sign; and

FIG. 9 is a diagrammatic, elevational view of an outdoor advertising sign embodying the invention.

Referring to the drawings, which show a preferred form of an outdoor advertising installation embodying the invention, the sign of such installation is designated generally by the reference numeral 12. As indicated in FIGS. 7 and 8 of the drawings, the sign 12 is composed of a plurality of horizontal rows of alternately arranged electric lamps 14 and 15, each row of which is shielded by an overlying louvre 40. The lamps 14, 15 which are many thousands in number, may be all white light lamps of from 10—40 watts, or may be colored lamps. For example, a sign which may be built to have white and black areas may be composed of about 6,000 lamps of the 30 watt flood gas filled type. If the sign is designed to provide visual color effects, all of the lamps 14, for example, may be red lamps and all of the lamps 15 may be green lamps. If it is desired to obtain a further third color effect, namely yellow, this may be obtained by having both the red lamps 14 and the green lamps 15 lighted at the same time. To obtain such an effect, it would be necessary that the sign be constructed to include twice the number of lamps needed in the aforesaid plain black and white, or alternate colored signs, namely about 12,000 lamps. The sign 12 may be a plain bank of white light or colored lamps 14, 15 alternately arranged in the rows as above indicated, and the lighting effects of which are controlled by design features on a film, or by a regular motion picture type of film in order to obtain animated effects. Thus, for example, if it is desired to produce by the rows of lamps in a sign, the design shown in the sign 12 illustrated in FIG. 9 of the drawings, the frames in the film are made to control the

lighting of such lamps so as to produce on such sign the background designated 60 and the centerfield 61 in which is located the insignia 62. If the lamps in the sign are all similar, the lamps 14, for example, located within the centerfield 61 may be darkened when the lamps 15 located within the background 60 and insignia 62 are illuminated and vice versa. If colored lamps are used, the lamps 14, for example, located within the centerfield 61 may be illuminated to give a red light, while the lamps 15 located within the background 60 and insignia are illuminated to give a green light, or all the lights in one of such fields may be illuminated to give a yellow light effect. It will thus be understood that many variations may be utilized to provide a variety of different lighting effects.

The manner in which the installation of this invention makes it possible to obtain these varied visual effects will be better understood by considering the showing of FIGS. 1 and 7 of the drawings. In the installation shown in these FIGS., the numeral 10 indicates generally a projector which projects the desired pictures to be displayed by the display screen 12 upon a photoelectric panel 11 constituted of a bank of photocells 16. The photocells 16 in the panel 11 control a multiplicity of alternating current bidirectional triode thyristors 22 known as triacs, and each of which is contained in the circuit connections for each pair of lamps 14 and 15. The projector 10 and the triacs 22 are both connected to the same source 19 of alternating current, which may furnish for example, a 115 volt, 60 cycle current.

As is shown in FIGS. 6 and 7 of the drawings the projector 10, photoelectric panel 11 and the panels 22A, 22B and 22C of triacs may be mounted in a room constituting the control center for the installation. The projector 10 may be of suitable known construction, and as is shown in FIG. 4 of the drawings, includes a supply reel 45 from which the film 36 is fed through the projector to a takeup reel 46. The film 36 is fed through the projector by timing belt drives of the type manufactured by United States Rubber. As is indicated in FIGS. 4 and 5, the projector 10 includes a constant speed electric motor 50 of known construction and connected by the electric wiring 35 to the source 19. The motor shaft has connected thereto a timing belt pulley 51 provided with grooves 51' in which mesh the teeth 52' of a timing belt 52. The belt 52 also engages with a similarly constructed pulley 53 forming part of the mechanical gearbox mechanism 49 for changing the continuous drive of motor 50 into a suitable intermittent drive for advancing the film 36. The gearing mechanism in the box 49 intermittently drives two sprockets 56, 57 constructed similarly to pulleys 51 and 53 through two timing belts 54 and 55, respectively. The sprockets or timing belt pulleys 56, 57 drive pulleys which feed the tape in proper intermittent position past the lens system 58 of the projector. Each of the timing belts 52, 54 and 55 are constructed similarly and as is shown more particularly in FIG. 5 with regard to the belt 52, is composed of a neoprene backing in which is embedded continuous, helically wound steel cables 52'' and with which are integrally formed the neoprene teeth 52'. The neoprene is a strong, wear-resisting neoprene, and the teeth 52' are accurately formed and precisely spaced. As a result of this timing belt-pulley drive, there is provided a precise, nonslip power transmission which enables the proper coordination of the frames on the film 36 with the half cycles of the power supply 19.

The beams from the projector 10 are directed upon a photoelectric panel 11 which in the embodiment shown is divided into three banks 16A, 16B and 16C of photocells 16 which are connected by electric wiring 32 to the source 19, and by wiring 30A, 30B and 30C, respectively, to the banks 22A, 22B and 22C, respectively, of triacs 22. Referring now for the sake of clearness to FIG. 1 of the drawings, it will be understood that each photocell 16 is provided with a suitable source 33 of direct current of the order of 6 volts, and is connected through a triac 22 to a pair of lamps 14, 15. Each of the lamps 14 and 15 is connected to the source 19 by a main line 13, and through diodes 20 and 21, respectively, to the triac 22.

It will be noted that the anode 24 of the diode 20 is connected in series with the lamp 14, while the cathode 25 of such diode is connected to the load terminal 26 of the switch 22. On the other hand, the cathode 27 of the diode 21 is connected in series with the lamp 15, while its anode 28 is connected to the load terminal of the triac 22. As is known the triac 22 can be gate triggered from a blocking to a conducting state for either polarity of applied voltage by applying either positive or negative signals to its gate 30. These signals are applied through the terminal 31 on the main line 32 connected to source 19.

It will be understood from the foregoing that when the photocell 16 is illuminated by a light beam from the frame gate of the projector 10, whether the lamp 14 or the lamp 15 is connected for illumination, is dependent on whether the triac 22 which will be alternately supplied with the half waves of voltage that follow each other from the source 19, is at that time under the control of a positive or a negative portion of a wave from the source 19. If at the time the photocell 16 is illuminated, the gate signal at the terminal 31 of triac 22 is positive, i.e., by a half portion A of the wave shown in FIG. 3, the lamp 14 will be lighted. On the other hand, if at that time the gate signal to the terminal 31 is negative, i.e., by a half portion B of the wave in FIG. 3, the lamp 15 will be lighted.

As previously indicated, the projector 10 is operated in synchronism with the triac 22 by operating it on the same phase as the lamp bank, i.e., by connecting the driving motor 50 thereof through the conductors 35 to the source 19, to synchronize the movements of the film 36 with the alternating current supplied to the triac 22. By properly coordinating the frames designated A' of the film 36 shown in FIG. 2 of the drawings, with the positive half cycles A of the wave of current provided by the source 19 (compare FIGS. 2 and 3 of the drawings), the triac 22 will connect the lamp 14 for illumination whenever a frame A' is in the frame gate of the projector. Similarly, by coordinating the alternate frame B' of the film 36 with the negative half waves B from the current source 19, the triac 22 will connect the lamp 15 for illumination whenever a frame B' is in the frame gate of the projector. It will thus be seen that in the operation of the installation, whenever a film frame A' is in the frame gate the lamp 14 will light so long as a half A of the current cycle is controlling the triac or switch 22, and whenever a film frame B' is in the frame gate the lamp 15 will light so long as a half B of the current cycle is controlling the switch 22. However, since the half waves follow each other with sufficient speed, the human eye will not be aware of the alterations in the illumination of lamps 14 and 15, if such lamps are being alternately operated uninterruptedly. The film frames A' and B', however, are usually treated, so that in given or random periods each lamp 14 associated with a particular triac 22, alone will be illuminated during the travel of a plurality of such film frames past the frame gate of the projector, while in other periods the lamps 15 alone will be illuminated during the passage of a plurality of such film frames past such frame gate. Thus, if a film 36 is used on the frames A', B' of which is developed a message, or a moving action, certain of the lamps 14, 15 in the sign may be darkened throughout the whole action, while others of such lamps 14 or 15 may be illuminated during the travel of several film frames, and still other lamps may be alternately illuminated as the film travels. For example, in the operation of the sign 12 depicted in FIG. 9 of the drawings and provided with alternate red bulbs 14 and green bulbs 15 in the rows thereof, the film 36 may have developed in each of the film frames A' and B', the design of the sign 12. The background 60' in a given succession of film frames A' may be rendered opaque by development or paint to maintain for a given period the red lamps 14 darkened during the passage of such film frames, and the background 60'' in the alternate film frames B' associated with such frames A' may be made transparent to cause the background 60 in the sign 12 to be illuminated by the green lamps 15 during such period. Similarly, the central areas 61', 61'' may be treated so that in the same given period, the red lamps 14 in the area 61 of the sign 12 will be illuminated

and the green lamps 15 in such area 61 darkened to illuminate such area with a red light during such period. The areas 62' of the film in such succession of film frames A', B', may all be made transparent so that during such given period the insignia 62 in the sign 12 will be alternately lighted by lamps 14 and 15. As has been previously indicated, this alternate succession will occur with such rapidity, that the resultant light will appear to the observer to be a yellow light. As is indicated in FIG. 8 of the drawings, it is preferred that the lamps 14 and 15 in each row thereof be staggered with the lamps 14 and 15 in adjacent rows, so that a better density of the selected colors will be obtained in the sign 12. The film may also be prepared so that a succession of film frames B' may be rendered completely opaque by a coating 63 and that a different succession of film frames A' may be rendered completely opaque by a coating 64 as is indicated in FIG. 2 of the drawings.

It is believed to be apparent from the foregoing, that the installation of this invention is relatively simply in construction, is constituted of a minimum of parts, and is of such flexibility that it may readily be adapted to the operation of many varied types of signs simply by a proper selection of the film that is to be used. The installation therefore, possesses a universality that renders it capable of effective operation under a wide range of conditions. Due also to the simple, rugged nature of the installation, it is especially useful for heavy duty operation because it can effectively utilize flood lamps of relatively high wattage at costs that make such a use possible. This feature of the installation also renders it possible to provide effective advertising displays during the daylight hours as well as at nighttime. The installation readily lends itself to automatic operation in which the services of an operator is dispensed with, by installing a time switch 67 in FIG. 7, of known construction between its motor 50 and the source 19.

I claim:

1. An outdoor advertising installation comprising an outdoor advertising sign composed of a multiplicity of electric lamps arranged in paired relation in a plurality of rows, rectifying means connected to each pair of lamps, a triac connected to each pair of lamps through said rectifying means, a gate control circuit for each triac including a photocell connected to a source of direct current, said triacs and said photocells being arranged in separate panels, a source of alternating current of a given cycle having one terminal thereof connected through said triacs to said pairs of lamps and through said triacs supplying successive positive half cycles of a single electric wave to one of the lamps in each pair thereof and successive negative half cycles of such single wave to the other lamp in each pair thereof, a projector having a film provided with frames for projecting light to said panel of photocells to actuate said triacs to cause half cycles of said waves of alternating current from said source to pass therethrough to said paired lamps, said film being treated to provide opaque portions in the frames thereof capable of controlling the projection of light to said photocell panel so as to cause said triacs to control the passage of such half waves to said paired lamps, said projector including a constant speed motor connected to said source of alternating current, and means driven by said motor for feeding the frames of the film intermittently through said projector in synchronism with the half cycles of alternating current from said source.

2. An outdoor advertising installation as defined in claim 1, in which one of the lamps in each of the pairs thereof in at least one portion of said sign is constructed to give a light of one color, and the other lamp in such pair is constructed to give a light of a different color, and in which said film is treated to maintain the lamps of each color illuminated in such sign portion for periods long enough to permit the passage of a plurality of frames of said film through said projector.

3. An outdoor advertising installation as defined in claim 1, in which one of the lamps in said pairs thereof is constructed to give a light of one color, and the other lamp in said pairs thereof is constructed to give a light of another color comple-

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mentary to said one color so that when both lamps in pairs thereof are illuminated there is produced a third color, and in which said film is treated to produce the illumination of one, or the other, or both lamps in pairs thereof.

4. An outdoor advertising installation as defined in claim 1, in which the rows of lamps are each constituted of a plurality of paired lamps arranged in single file, and in which those lamps of the pairs in each row supplied with positive half cycle current are staggered with those lamps in the adjacent rows similarly supplied and in alignment with those lamps in the adjacent rows supplied with negative half cycle current.

5. An outdoor advertising installation as defined in claim 1, in which said rectifying means comprise a pair of diodes, one of said diodes in each pair having its cathode connected to one of the lamps in the associated pair thereof, and the other of said diodes in such pair having its anode connected to the other lamp in such pair thereof.

6. An outdoor advertising installation as defined in claim 2,

in which said film frames are provided with advertising matter capable of controlling the projection of light to said panel of photocells so that the paired lamps in said sign reproduce in color on said sign the advertising matter provided on said film frames.

7. An outdoor advertising installation as defined in claim 1, in which said means for feeding the frames of the film in synchronism with the half cycles of current supplied by said source, comprise film-feeding means engageable with the film, means for intermittently driving said film-feeding means, and a timing belt drive connecting said constant speed motor to said driving means and constructed to provide nonslip power transmission from said motor to said driving means, said driving means and timing belt drive being constructed and arranged to advance the film frames intermediate successive half cycles of the current from said source.

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