March 20, 1934. L. L. LEWIS 1,951,699

VARIABLE LIGHT HEADLIGHT

Filed Jan. 15, 1930

FIG. 1.

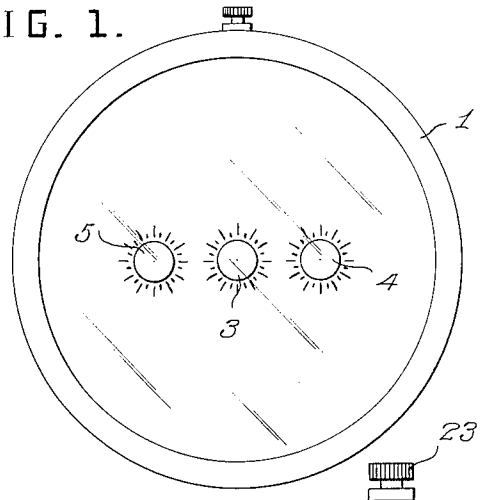



FIG. 3.

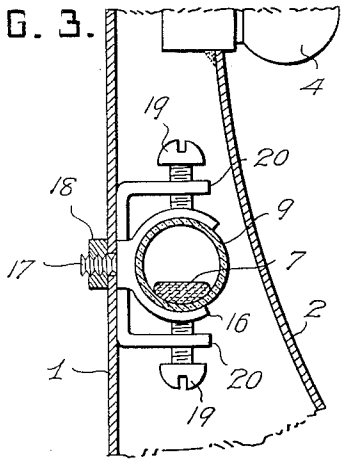
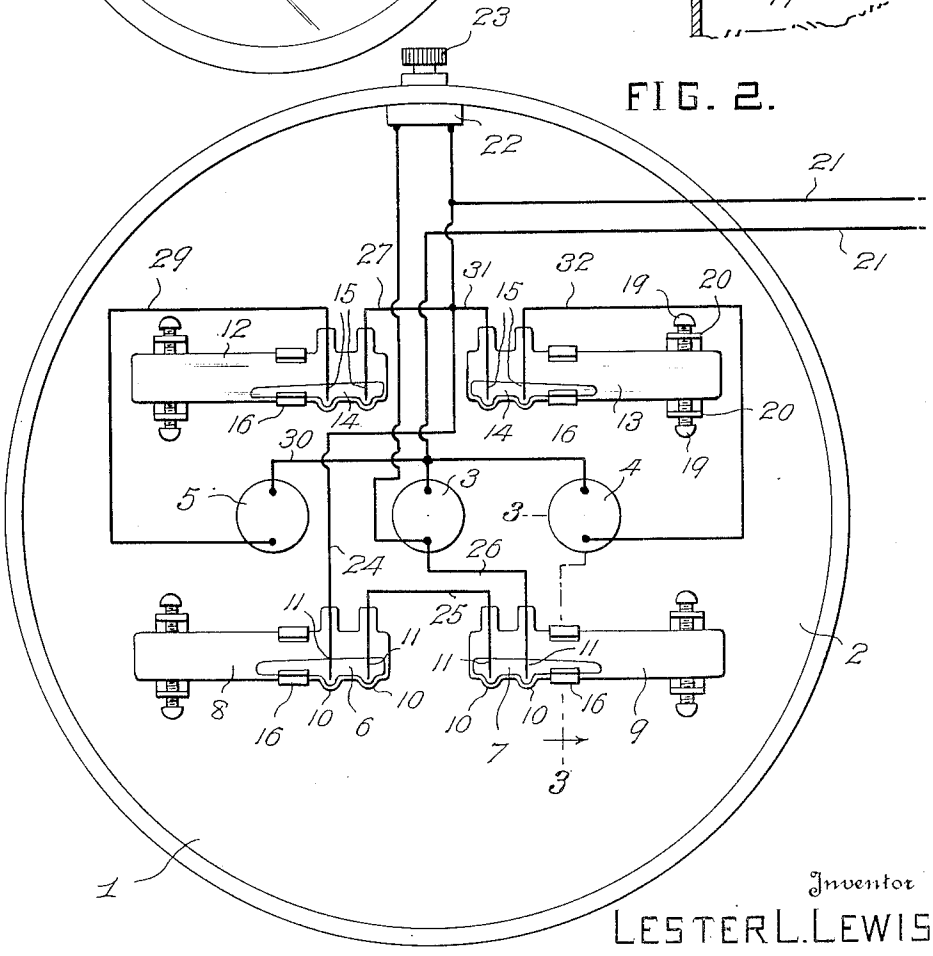



FIG. 2.




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## VARIABLE LIGHT HEADLIGHT

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2 Claims. (Cl. 171—97)

This invention relates to improvements in headlights for vehicles, such as locomotives, automobiles, and like apparatus, and has as its essential object the automatic direction of laterally projected rays along that side of the roadway or right-of-way at the inside of a curve.

A more detailed object is the automatic control of the circuits of a series of lights incident to variation in the inclination of the vehicle due to variation in road conditions.

With these and further objects in view, the invention comprises a unitary headlight including a series of light bulbs and automatic circuit closers therefor for causing lateral ray projection at that side only toward the inside of a curve as the headlight is moved about the curve.

The invention also comprises certain other novel constructions, combinations, and arrangements of parts as subsequently specified and claimed.

In the accompanying drawing,—

Figure 1 is a view in front elevation of a headlight embodying the features of the present invention.

Figure 2 is an enlarged view of the interior of the housing of the headlight with the reflector removed and the lights and circuits seen diagrammatically.

Figure 3 is a fragmentary, vertical section through a part of the headlight showing one of the gravity-responsive switches.

Referring to the drawing by numerals, 1 indicates any appropriate casing in which is arranged the usual parabolic reflector 2. Arranged in front of the reflector 2 is the center or main headlight bulb 3 and the lateral bulbs 4 and 5.

Arranged in the space between the parabolic reflector 2 and the rear wall of the casing or housing 1 are gravity-responsive switches for the light 3, and a separate gravity-responsive switch for each of lights 4 and 5, and properly connected therewith are the circuits for said lights. As best seen in Figure 2, the gravity-responsive switches for light 3 consist of mercury batches 6 and 7 arranged in vacuum tubes 8 and 9, respectively. Each of the tubes 8 and 9 is preferably formed of glass, and is provided with a pair of small wells 10, 10, at one end portion of the respective tube in position for receiving terminals 11, 11. It should be understood that the wells 10 remain filled with mercury constantly, and that the terminals 11 have their circuit closed only when the mass 6 is in position for connecting the mercury within the wells 10. Thus, the mercury 6 is the gravity switch. As the tubes 8 and 9 have the air exhausted from them, danger of oxidation of the mercury is eliminated.

A tube 12 similar to tube 8 is provided for the light 5, and a similar tube 13 is provided for the light 4, each of the tubes 12 and 13 containing a mass of mercury 14 which serves as the gravity-responsive switch to close the circuit between terminals 15, 15 arranged within the respective tubes 12 and 13.

Each of tubes 8, 9, 12, and 13 is mounted in an appropriate clasp or bracket 16, the detailed construction of each of which brackets is best seen in Figure 3, and includes a shouldered, threaded shank 17 projecting rearwardly through the rear plate of casing 1. A nut 18 engages each of the threaded shanks 17 for clamping the parts firmly in position. By relaxing any one of the nuts 18, the corresponding tube may be tilted incident to pivotal movement of the respective bracket 16. To facilitate exact adjustment of the several tubes to a position corresponding to parallelism with the horizon, set screws 19, 19 are preferably employed and passed through bracket arms 20 to engage and hold the respective tube in a given adjusted position. After the proper adjustment has once been given the parts, the nut 18 is tightened and the parts remain permanently in such position and require no further adjustment unless jarred or otherwise displaced by unusual strain.

The light 3 is supplied with current from line wires 21, 21, from any appropriate source of power. Lines 21 extend directly to the opposite sides of the light 3 through a hand-controlled switch 22, the use of which is optional. The switch 22 is adapted to be operated by a knurled, exteriorly-exposed handle 23, and may be closed after operation when it is desired to short-circuit and eliminate the control effected by the gravity-responsive switches 6 and 7.

When the switch 22 is open, current is supplied to light 3 through the wires 21, 21, the branch wire 24, terminals 11 of tube 8, wire 25 which leads from tube 8 to tube 9, terminals 11 of tube 9, and wire 26 which leads from the off-terminal 11 of tube 9, to the side of light 3 opposite that side in direct communication with one of the lines 21. It is thus apparent that, when the switch 22 is open, the light 3 will be illuminated only when the gravity-responsive switches 6 and 7 are in the position indicated in Figure 2, closing contact between all terminals 11. Should the headlight be tilted slightly to one side, so that one of the gravity-responsive switches would move to the other end of the respective tube, the broken circuit would leave the light 3 extinguished, and it would

not be restored until the normal or horizontal position of the tubes 8 and 9 had been restored.

Light 5 is supplied with current from a branch line 27 leading from one of the lines 21 to one of a pair of terminals 15 in tube 12 through the gravity-responsive switch 14 thereof to the other terminal 15, and thence through a line 29 to one side of light 5, the other side of the light being connected by a line 30 directly with the other line 21. The line 30 also extends as a common return to one side of the light 4. A wire 31 leads from the same line 21 from which wire 27 leads, and the wire 31 connects with one of the pair of terminals 15, which is connected through the gravity-responsive switch 14 to the other terminal 15 of tube 13, and thence through line 32 to the side of light 4 opposite to line 30. Thus, when the terminals 15 of tube 12 have their circuit closed through switch 14, the light 5 is illuminated, and when the terminals 15 of tube 13 have their circuit correspondingly closed, the light 4 is illuminated, but if the headlight be tilted in a direction for causing the mercury in either of the tubes 12 or 13 to flow out of the circuit-closing position, the respective light 5 or 4 will immediately be extinguished. Thus, the apparatus will operate at times when the headlight is tilted to extinguish lights 5 and 3 and leave only light 4 illuminated. This will occur only when the locomotive or other vehicle is passing about a curve to the right, and it is, therefore, desirable to have lateral radiation on the side of the road. Likewise, when the locomotive or other vehicle passes a curve to the left, the inclination given to the locomotive by the banking of the curve will cause such tilting of the tube 13 and of tube 9 as to break the circuits of lights 3 and 4 and to close the circuit of light 5, and thus throw light rays laterally at the left side of the roadway. It may be desirable at times to maintain the light 3 constant, and to accomplish this end, it is only necessary to close the switch 22, and current will be supplied directly to the light without the interposition of the switches 6 and 7. In that condition, the center light will continue to throw beams ahead, while respective side lights 4 and 5 will function either to be extinguished or to glow as they are needed, according to the direction of the curve being passed. It will be apparent, of course, that when the parts are maintained exactly on a level, the mercury 6, 7, and 14 will position itself to close the circuit for all of the terminals and maintain all lights glowing.

What is claimed is:—

1. In light circuit construction, the combination, with a series of lights comprising an intermediate light and lateral lights, of a circuit for the intermediate light, a circuit for each of the lateral lights, two gravity responsive switches in the circuit of the intermediate light, the said switches being located to close the circuit for the light when both of said switches are disposed substantially horizontally and for one of the switches to break the circuit of the intermediate light when the switches are tilted in one direction and the other switch to break the circuit of the intermediate light when the switches are tilted in the opposite direction, a gravity-responsive switch in the circuit of one of the lateral lights located to close the circuit when the switch is tilted in one direction and to break the circuit when the switch is tilted in the other direction, and a gravity-responsive switch in the circuit of the other lateral light located to close the circuit when the switch is tilted in the position breaking the circuit of the other lateral light and for breaking the circuit when the switch is tilted in a position closing the circuit of said other lateral light, and a common support for all of said switches for causing the switches to tilt all at the same time in the same direction.

2. The combination as claimed in claim 1 wherein the lights are carried by the common support for the switches and a headlight housing encloses said circuits, switches, and lights so that the lights, circuits, and switches with said support and headlight housing comprise a unitary headlight structure.

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