

March 10, 1936.

J. L. KOUBEK ET AL

2,033,381

LIGHTING SYSTEM

Filed Jan. 27, 1933

4 Sheets-Sheet 1

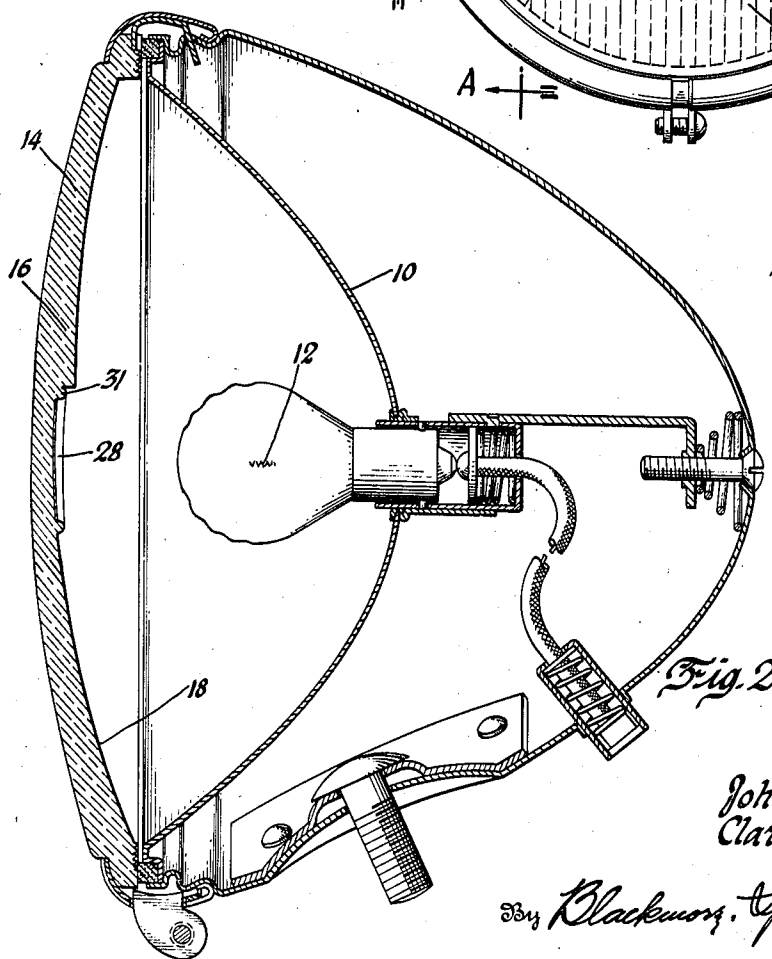
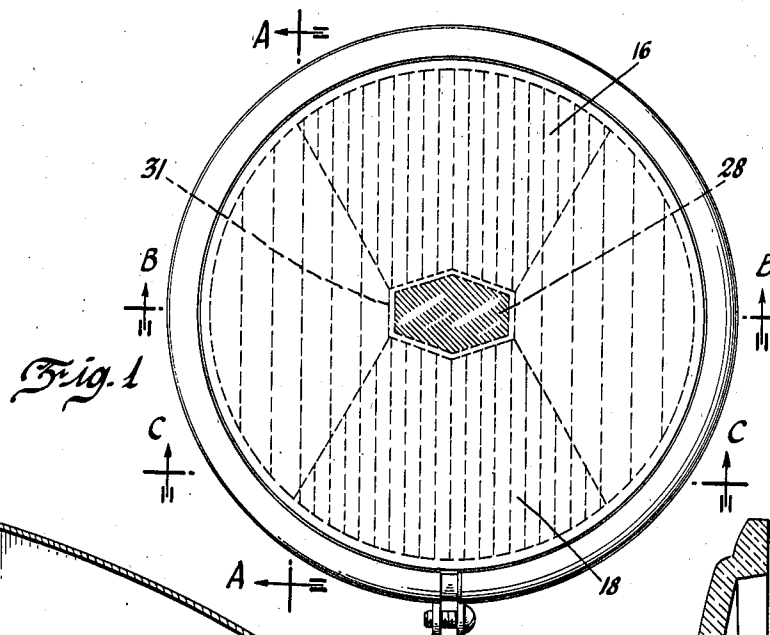
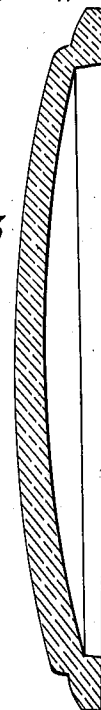


Fig. 3



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4 Sheets-Sheet 2

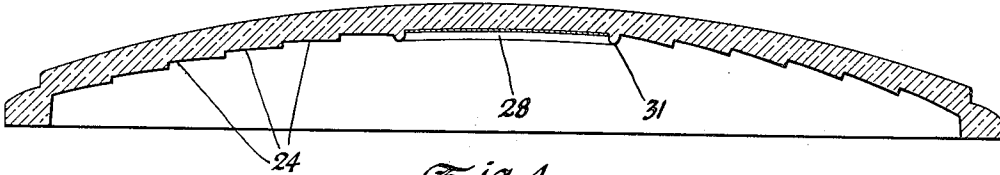


Fig. 4

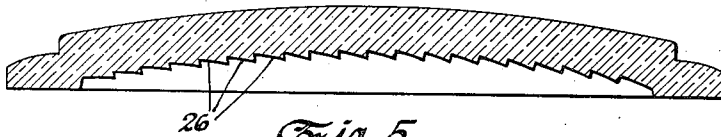


Fig. 5

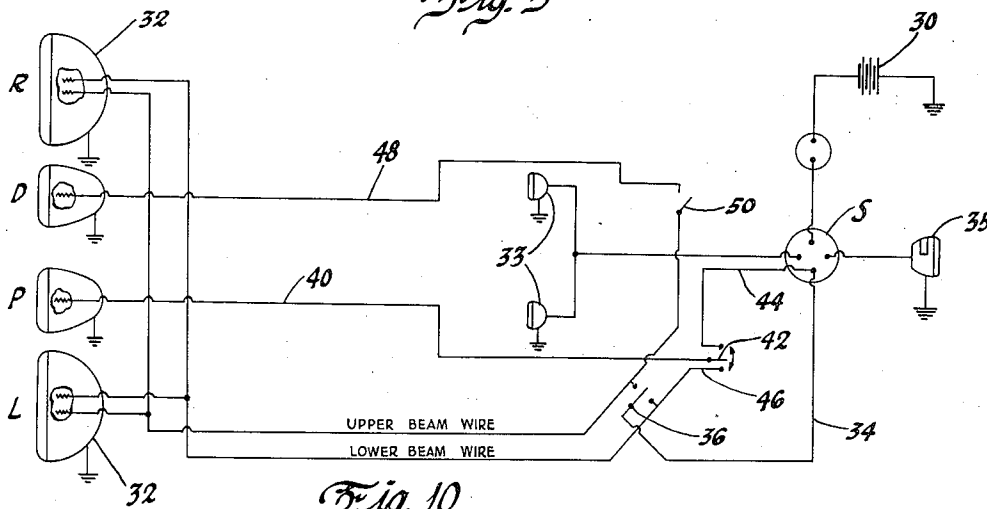


Fig. 10

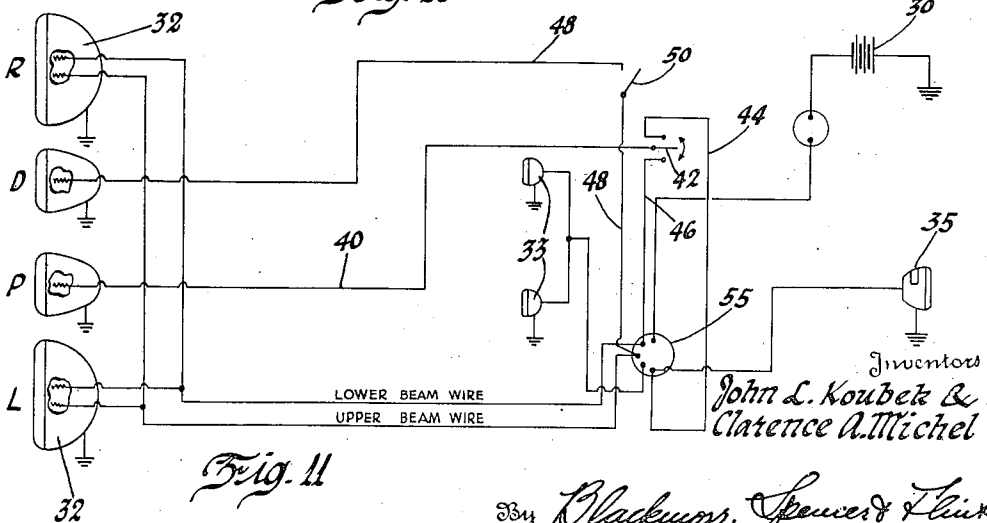


Fig. 11

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4 Sheets-Sheet 3

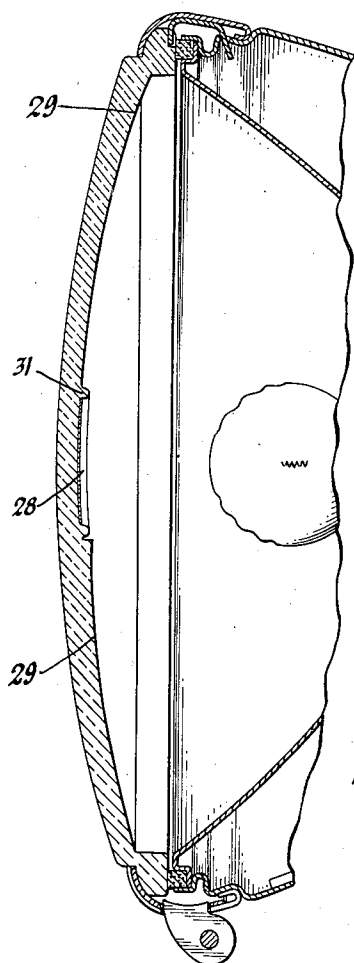


Fig. 6

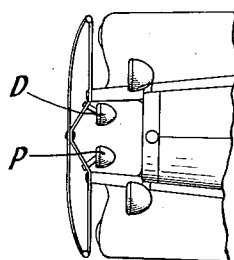


Fig. 18

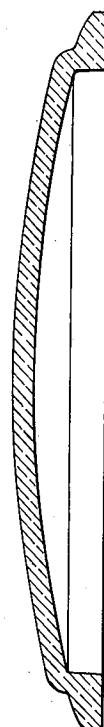


Fig. 7

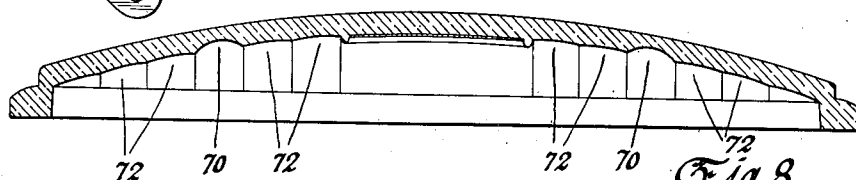


Fig. 8

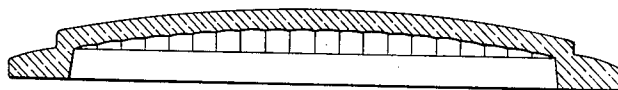


Fig. 9

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4 Sheets-Sheet 4

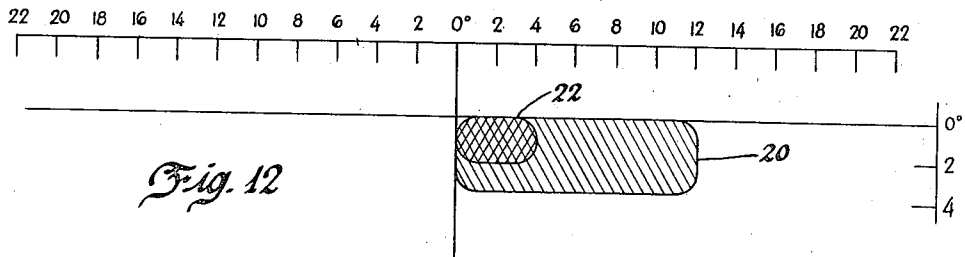


Fig. 12

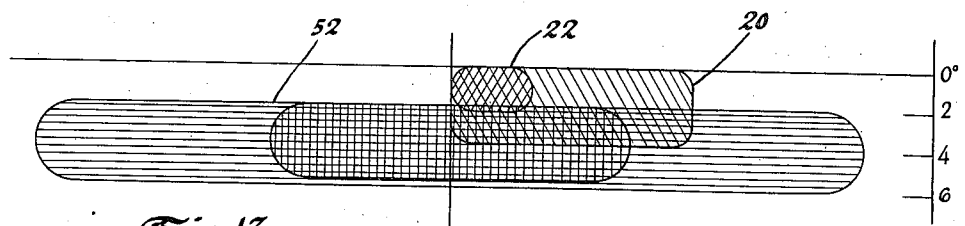


Fig. 13

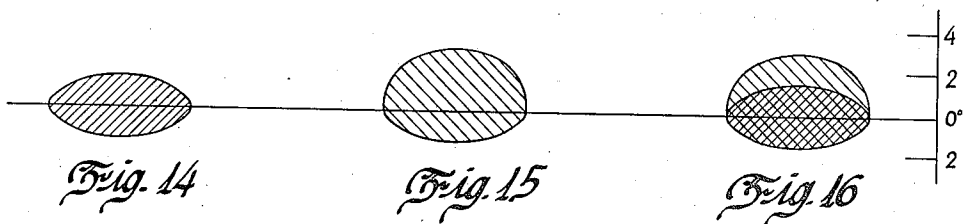


Fig. 14

Fig. 15

Fig. 16

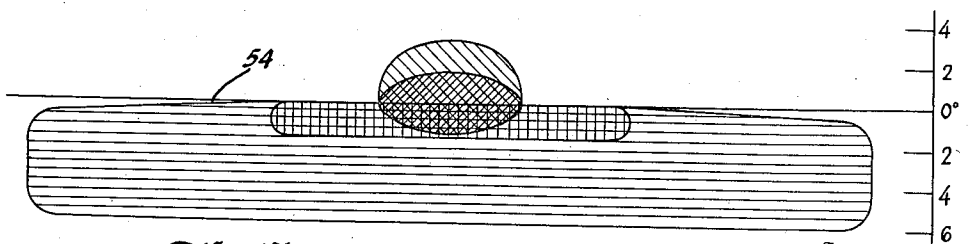


Fig. 17

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UNITED STATES PATENT OFFICE

2,033,381

LIGHTING SYSTEM

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Application January 27, 1933, Serial No. 653,788

3 Claims. (Cl. 240—7.1)

This invention has to do with a headlighting system in which one or more auxiliary lights are employed in conjunction with the usual headlights. While it has heretofore been common to employ spotlights on automobiles, these lights have, for the most part, provided, as their name implies, a spot of light of high intensity which is dazzling, and tends to make objects outside of the spot very difficult to see. The auxiliary lights disclosed in this application are on the contrary designed to provide correct distribution of light such that the illumination from the usual headlamps will be improved without producing glare or over-illuminating some parts of the road at the expense of loss of visibility in the parts of the road less brightly illuminated.

The system is especially designed for use with conventional headlamps designed to produce two beams, a high beam and a low beam. One of our auxiliary lamps, known as the driving lamp, is designed to supply light of high intensity down the middle of the road. This light is preferably used with the high beam to produce light above the usual top cutoff. It is desirable for use when driving at high speeds in the country at times when other cars are not approaching.

The other auxiliary lamp, known as the passing lamp, is designed to illuminate the right of the road only with the part of higher intensity adjacent the center of the road. This lamp will preferably be used with the low beam, and will provide light down the right side of the road beyond the approaching car so that the driver will be able to see sufficiently far ahead for safety instead of being half-blinded by the light from the approaching car. If desired, this lamp may be used with the high beam as well as with the low beam.

Figure 1 is a front view of one of our auxiliary lamps, these lamps being designed to have a similar appearance.

Figure 2 is a vertical section through the passing lamp.

Figure 3 is a section on line A—A of Figure 1 showing a detail of the lens of the passing lamp.

Figure 4 is a section on line B—B of Figure 1, and Figure 5 is a section on line C—C of Figure 1. These figures likewise showing details of construction of the passing lamp.

Figure 6 is a vertical section through the driving lamp.

Figure 7 is a section through the driving lamp taken on line A—A of Figure 1.

Figures 8 and 9 are horizontal sections through

the driving lamp taken on lines B—B and C—C, respectively, of Figure 1.

Figure 10 shows one type of lighting circuit with which these auxiliary lamps may be used, while Figure 11 shows a modified form of circuit.

Figure 12 shows the beam produced by the passing lamp, while Figure 13 shows the combination of this beam with the low beam of a conventional two beam headlighting system.

Figure 14 shows the beam projected from the sides of the driving lamp, while Figure 15 shows the beam projected from the top and bottom. The complete beam is shown in Figure 16.

Figure 17 shows the driving lamp beam combined with the conventional upper headlamp beam.

Figure 18 is a top plan view of a portion of the front of an automobile showing one way our auxiliary lamps may be mounted.

Referring now to the passing lamps shown in Figures 2, 3, 4 and 5, it will be noted that the lamp consists essentially of a reflector 10, a light source 12, and a lens 14 provided with a V-shaped down-bending prism 16 at its upper portion, and an inverted V-shaped down-bending prism 18 on its lower portion. As shown in Figure 3 the sides of the lens are either provided with very light down-bending prisms or are free of prisms. The prisms on the top and bottom portions throw the corresponding light downwardly, as indicated by the portion 20 of the passing lamp beam pattern shown in Figures 12 and 13. The light from the sides of the passing lamp produces the portion of the beam pattern marked 22. The greater angle of prisms 16 and 18 causes the center of the portion 20 of the beam pattern to be below the center of the portion 22. The greater vertical depth of beam 20 is due to the greater vertical depth of the filament images immediately behind the top and bottom sections of the lens.

The lens of the passing lamp is provided with half flutes. The half flutes 24 over the sides of the lens, as shown in Figure 4, are shallower than the half flutes 26 over the top and bottom of the lens, as shown in Figure 5, so that while all of the light passing through the lens is refracted toward the right, the light passing through the top and bottom portions is given more spread than that passing through the side portions. Hence the portion 20 of the beam pattern is wider than the portion 22. The result is a beam pattern confined to the right side of the road and having its most concentrated light in the upper left hand portion of the beam. The left side of the result-

ing beam is then aimed parallel to the center line of the road.

The driving lamp, for purposes of symmetry, is preferably made to have the same outside appearance as the passing light so that Figure 1 serves to illustrate both lamps. It may be noted here that we have preferred to provide a recessed portion 28 in the center of the lens surrounded by a rib 31. Within this recess we place a colored insignia. This may be done by the use of decalcomania, and preferably bears the name of the maker of the lamp in a color contrasting with the background. The coloring is preferably translucent so that the bright color will add to the attractiveness of the light when in use.

Referring now to the driving lamp illustrated in Figures 6, 7, 8 and 9, it will be noted that the construction is substantially the same as that of the passing lamp, except that the top and bottom of the lens carries up-bending prisms 29 and the flutes are all symmetrical. The purpose of the up-bending prisms is to take light that would otherwise go into the foreground and move it into the top of the beam, where it helps illuminate the distant roadway.

The flutes over the side portions of the driving lamp lens are somewhat shallower than those over the top and bottom portions.

Figures 14 and 15 show the components of the beam pattern of the driving lamp and Figure 16 shows the complete pattern. It will be noted that the pattern is the reverse of that produced by the headlamps in that the highest intensity is at the bottom of the beams. While we have illustrated the driving lamp lens provided with up-bending prisms 29 at top and bottom, if preferred, we may employ down-bending prisms at top and bottom as in the case of the passing lamp, or may employ no prisms at all.

In both the auxiliary lamps we have described the flutes over the top and bottom zones as of greater curvature than the flutes over the side zones. This description must not be taken in an absolute sense for in lamp design it is often found desirable to mix a few flutes of narrow spread among flutes of wide spread, or vice versa, or to mix a few full flutes among half flutes or vice versa. We have illustrated such variation in Figure 8 where one flute 70 of wide spread is inserted among side flutes 72 of narrower spread. Such changes in detail often give minor improvements in light distribution and their employment in a particular case will, of course, not take the structure outside of the scope of the appended claims if they are otherwise infringed. In the constructions illustrated we have accomplished all the bending and spreading of the light rays by properly shaping the lens. However, it will be understood by those skilled in the art that the same results may be accomplished by shaping the reflector, as by tilting the top and bottom sections up or down, or to one side, and by providing half flutes or full flutes on the lens. If preferred, part of the bending may be done in the reflector and part in the lens.

In Figure 10 we have shown a circuit which may be employed. Here 30 indicates the battery supplying current to the conventional lighting switch S which controls the flow of current to the usual headlamps 32, side lamps 33, and tail lamp 35. The headlamps are provided with two filaments, as indicated, to provide an upper beam and a lower beam. When the switch S is closed current flows from the battery 30 through the switch and through conductor 34 to a two-way

switch 36. In one position of switch 36 current passes through upper beam wire to the lower filaments and in the other position of switch 36 current passes through the lower beam wire to the upper filaments. The switch 36 may take the form of the usual foot operated lighting switch now commonly employed on automobiles. However, if preferred, it may be located on the dash, on the steering post, or elsewhere. The circuit as so far described is conventional. We have indicated our passing lamp at P. This lamp is supplied with current through conductor 40 and switch 42. This switch is likewise a two-way switch. In one position it connects conductor 40 with conductor 44, which is preferably connected to the same terminal on the switch S to which conductor 34 is connected. When switch 42 is in the position just described the passing lamp is supplied with current no matter which of the headlamp beams is employed.

In its other position switch 42 connects conductor 40 with conductor 46 connected to the lower beam wire. When switch 42 is in this position the lamp P receives current at the time that the lower beam wire carries current to the lamps.

The driving lamp D is supplied with current through conductor 48 which is connected through switch 50 with the upper beam wire so that if the switch 50 is closed driving lamp D is lighted when the upper beam is projected.

Switches 42 and 50 may be of any desired type, for example, toggle switches, push and pull switches, knife switches or the like, and may be mounted in any convenient place, preferably on the dash.

With the described arrangement if switch S is closed and switch 42 is moved to connector conductors 40 and 46, and switch 36 is moved to connect conductor 34 with the lower beam wire, the composite pattern illustrated in Figure 13, will be produced. The portion 52 of the pattern is the conventional lower beam produced by the headlamps 32 and upon this is superimposed the pattern produced by the passing lamp P. It will be noted that the passing lamp P is on the left side of the car, but projects its light to the right of the road. This arrangement gives the best illumination and at the same time relieves the approaching driver of glare.

When switch 36 is moved to connect with the upper beam wire the passing lamp is extinguished and the upper beam is projected. However, if this is not desired, it is but necessary to move switch 42 to its other position whereupon the passing beam will be projected at all times that the headlamps are on.

When switch 36 is moved to upper beam position, then if switch 50 be closed, the driving beam will be projected so that we will then have the combination pattern shown in Figure 17. Here 54 indicates the high beam produced by the conventional headlamps, and upon this is superimposed the driving beam of Figure 16.

In Figure 11 we have illustrated a slightly different circuit in that the switch 36 is no longer used. All lighting combinations are produced by switch 55. It will be noted that, as before, conductor 46 is connected to the lower beam wire, and that the conductor 48 is connected to the upper beam wire so that if switches 42—50 are in the proper positions the driving lamp will go on with the upper beam and the passing lamp will go on with the lower beam. The conductor 44 leading to switch 42 is, in this case, connected to the same terminal on the switch 55 as is the tail lamp so

that when switch 42 is connected to conductor 44 the passing lamp will come on whenever the switch 55 supplies current to the tail lamp.

With this arrangement by simply moving the switch 55 to the upper beam position the driving lamp comes on, and by moving the switch to lower beam position, the passing lamp comes on. If it is desired to have the passing lamp on at all times, it is but necessary to throw switch 42 into contact with conductor 44.

With either of these circuit arrangements if it is desired not to use the passing lamp, it is but necessary to leave switch 42 open, and if it is not desired to use the driving lamp, it is but necessary to open the switch 50.

Switch 55 may be located on the steering post or on the dash as desired.

We have illustrated in Figure 18 a convenient way of mounting our auxiliary lamps. Both the passing lamp P and the driving lamp D are here shown mounted on the bumper or on the bumper supporting bar. If preferred the lamps may be mounted on the usual cross rod connecting the headlamps, but the arrangement illustrated is usually more convenient.

We claim:

1. In a lighting system for vehicles the combination with two-beam light projecting means adapted to be manipulated to project either a high beam or a low beam of comparatively wide spread, of a pair of auxiliary light projecting means, one serving as a driving lamp and the other as a passing lamp, each of said auxiliary light projecting means including a reflector and lens comprising top, bottom and side segments and being provided with a light source adjacent the focus thereof, the top and bottom segments of the driving lamp being constructed to project light upwardly in a concentrated beam to provide light above the cut-off while the side segments of the driving lamp are constructed to project a concentrated beam of high intensity adjacent the top of the high beam but toward the bottom of the beam from the top and bottom segments, the top and bottom segments of the passing lamp being constructed to project light forwardly in a diffused beam confined to one side of the road but at substantially the same elevation as the upper portion of the high beam, while the side segments of the passing lamp are constructed to project a concentrated beam of high intensity into the upper portion of the beam from the top and bottom segments and adjacent the center of the road, and control means for the system operable to set the two-beam light projecting means to produce a high beam and simultaneously energize the driving lamp to produce increased illumination adjacent and above the cut-off, said control means being shiftable to set the two beam light project-

ing means to produce a low beam and simultaneously energize the passing lamp to produce a composite beam higher on one side than on the other for passing.

2. In a lighting system for vehicles the combination with two-beam light projecting means adapted to be manipulated to project either a high beam or a low beam of comparatively wide spread, of an auxiliary light projecting means serving as a driving lamp, said auxiliary light projecting means including a reflector and lens comprising top, bottom and side segments and being provided with a light source adjacent the focus thereof, the top and bottom segments being constructed to project light upwardly in a concentrated beam to provide light above the cut-off while the side segments of the driving lamp are constructed to project a concentrated beam of high intensity adjacent the top of the high beam but below the top of the beam from the top and bottom segments, and control means for the system operable to set the two-beam light projecting means to produce a high beam and simultaneously energize the driving lamp to produce increased illumination at and above the cut-off, said control means being shiftable to set the two beam light projecting means to project a low beam.

3. In a lighting system for vehicles the combination with two-beam light projecting means adapted to be manipulated to project either a high beam or a low beam of comparatively wide spread, of a pair of auxiliary light projecting means, one serving as a driving lamp and the other as a passing lamp, each of said auxiliary light projecting means including a reflector and a lens, and being provided with a light source adjacent the focus of the reflector, said driving lamp being constructed to project down the center of the road a concentrated beam of greater lateral spread than vertical spread at an elevation to provide light adjacent and above the cut-off, said passing lamp being constructed to project to one side of the center of the road a beam of greater lateral spread than vertical spread at substantially the same elevation as the upper portion of the high beam, and control means for the system operable to set the two-beam light projecting means to produce a high beam and simultaneously energize the driving lamp to produce increased illumination adjacent and above the cut-off, said control means being shiftable to set the two-beam light projecting means to produce a low beam and simultaneously energize the passing lamp to produce a composite beam higher on one side than on the other for passing.

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