July 24, 1928. 1,678,092

W. H. WOOD

AUTOMOBILE LAMP

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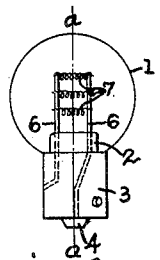


Fig. 1

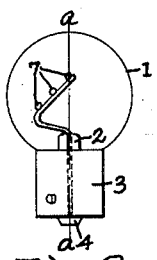


Fig. 2

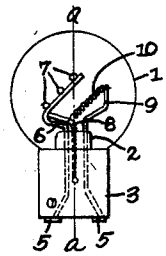
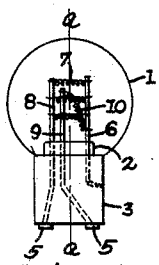


Fig. 3.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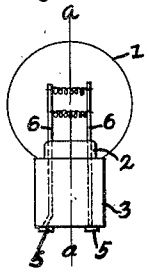
Fig. 5.

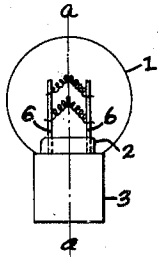
Fig. 6.

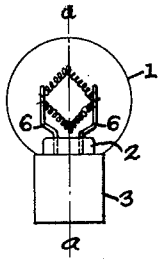
Fig. 7.

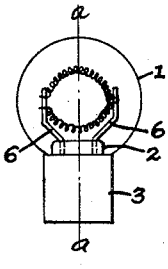
Fig. 8.

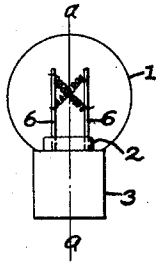
Fig. 9.

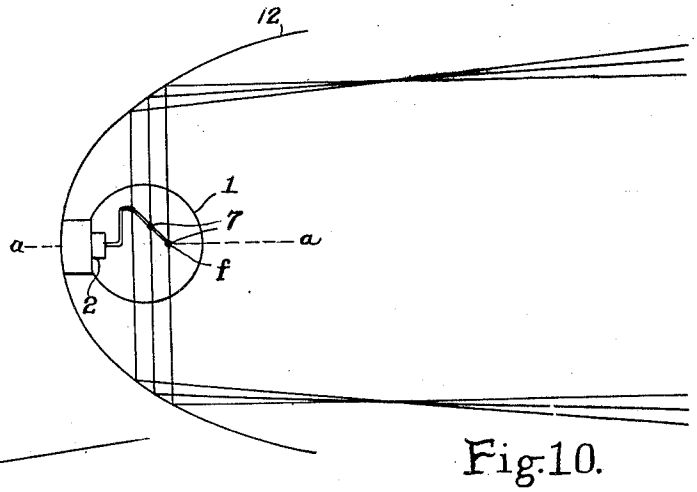
Fig. 10.

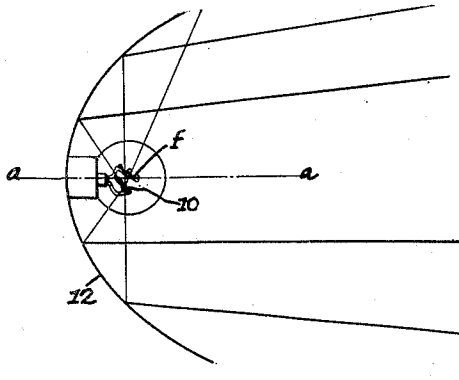
Fig. 13.

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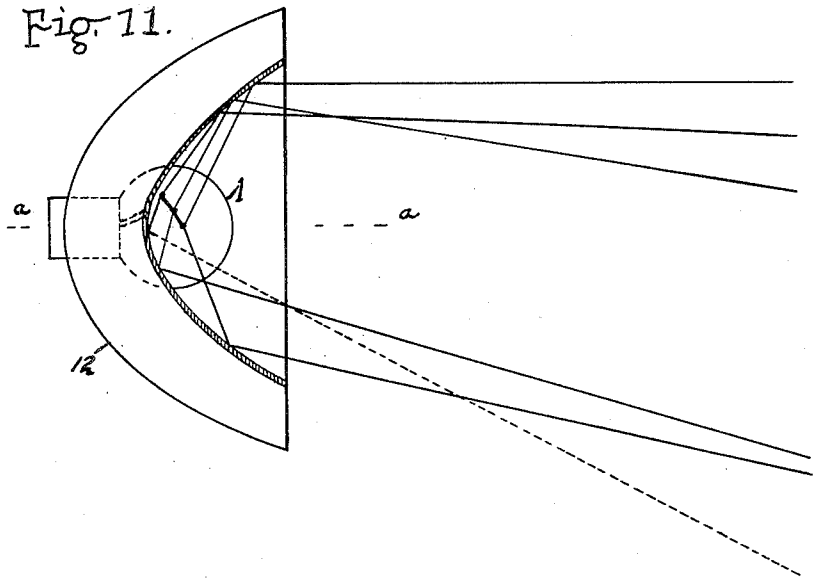
Fig. 11.



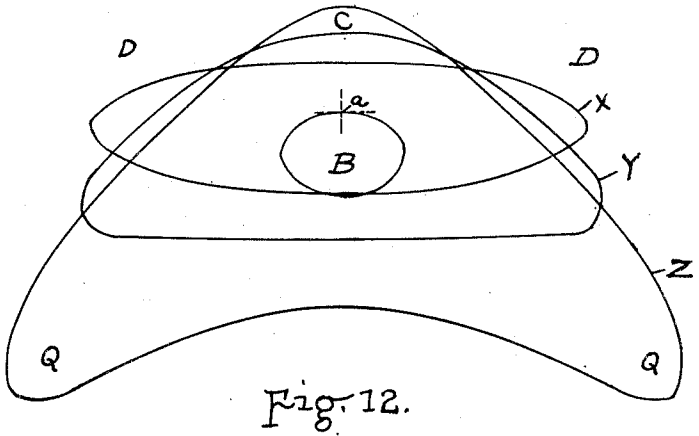


Fig. 12.

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Patented July 24, 1928. 1,678,092

UNITED STATES PATENT OFFICE.

WILLIAM H. WOOD, OF SOUTH EUCLID, OHIO.

AUTOMOBILE LAMP.

Application filed March 25, 1925. Serial No. 18,097.

This invention relates to automobile lights and has for its objects the provision of a new and improved lamp bulb having plural useful purposes, and particularly the production, when employed with light directing devices, of a more uniformly diffused beam whereby the field is illuminated more uniformly throughout a wide extent. By light directing devices I refer to reflectors and lenses, either separately or in combination; reflectors are generally made more or less paraboloid in shape and lenses more or less prismatic but each has ordinarily been illuminated by an incandescent filament concentrated as nearly as possible into a geometrical point. Such an arrangement tends to produce only a comparatively small illuminated field and if it be attempted to increase the size of such field the center of the same becomes black. I have discovered that if a light source of substantial width and length defining and confined within substantially a plane geometric surface be located inside such reflector at a certain peculiar angle and position, the shape of the reflected beam is peculiarly applicable to vehicle use, being cut off at the upper corners and extended at the lower corners and devoid of black spots or irregularities. Such a lamp affords a high degree of diffusion coupled with the most desirable distribution of the light rays. Another object of the invention is the employment of plural filaments spaced apart and both inclined to the reflector axis so as to modify this distribution at the will of the driver; while further objects and advantages of my invention will hereafter appear. This application is a continuation in part of my former application Serial No. 756,495, filed December 17, 1924, patented April 14, 1925, No. 1,533,360.

In the accompanying drawings I have shown several physical forms in which my inventive idea is embodied together with the result obtained by using different forms of my improved lamp bulb in connection with paraboloid reflectors. Fig. 1 is a plan view of a bulb showing one form of filamentary arrangement; Fig. 2 is a side elevation showing a preferred-shape of leading-in wires; Figs. 3 and 4 show a side elevation and plan of a bulb having multiple leading-in-wires and independently operable filaments also embodying my improvements; Figs. 5 to 9 inclusive illustrate alternative filamentary arrangements; Fig. 10 is a diagram of the lamp shown in Figs. 1 and 2 in combination with a parabolic reflector;

Fig. 11 is a vertical sectional view like Fig. 10 but taken sufficiently to one side of the center to intersect the ends of the filaments; Fig. 12 is an analysis of the light pattern as cast thereby upon a vertical screen; and Fig. 13 illustrates the use in a reflector of the bulb shown in Fig. 3.

My improved lamp comprises the usual glass globe or bulb 1 and press 2, the latter having the usual leading-in wires sealed therein, together with a suitable metal base 3, usually of cylindrical shape, having one or more insulated contact points 4, or 5, 5, carried thereby. The number of leading-in wires varies with the use of the lamp and the number of uses for which it is intended, and the number, shape and arrangement of filaments also varies. In Fig. 1 I have shown two leading-in wires 6, 6 having secured thereto at points spaced longitudinally along the bulb axis *a*—*a* three straight crosswise filaments, 7, 7. Usually these filaments are of fine wire coiled to helical form, and the term "straight" as I have used it relates to the axis of the helix. Because of their electrical connection these filaments are illuminated simultaneously. Usually they are of equal candle power, say each of 6, 10, 12, 15, or 21 candlepower, although they can be made of unequal candle power if desired. For example in sections where legal requirements are severely exercised upon drivers whose lamps have accidentally burned out it is possible to incorporate one filament of low efficiency but proof against burning out. Anything which will decrease the working temperature slightly will accomplish this, for example, use of a metal of higher specific resistance, or a wire which is slightly longer, or one of smaller section, or even one of the same length and section but having its helical turns slightly further apart so as not to heat each other so effectively. These filaments are spaced sufficiently far apart to come into focus at different times, whereby the light cast by one filament may dissolve any shadows produced by the others, either from its location or by reason of inequalities in the reflector (or other light controlling device). The considerations which determine the length and spacing of these filaments will be set forth hereafter. Here it is noted that I do not limit myself to using three filaments since either more or

less can be employed and arranged in numerous modes as shown for example in Figs. 5 to 9 inclusive, provided only that the arrangement of the light source be such as to define a plane surface having substantial width and length coupled with a very small thickness; and that they need not be straight but can be V-shaped as in Figs. 6 and 7, or arcuate as in Fig. 8; and that they need not be parallel but can intersect as in Fig. 9 or be otherwise disposed. Also as to their electrical connection, two leading-in wires can be attached, one to the base 3 and one to the center contact 4 as shown in Fig. 1; or each to an independent insulated contact 5, 5 as shown in Fig. 5.

This light source is located in a headlight reflector in such position as to be substantially confined to the region above the reflector axis, its plane intersecting such axis substantially at the focal point as illustrated in Figs. 10, 11, and 13.

The direction of the reflected beams arising from the middle points of the various filaments is shown in Fig. 10, from which it will be seen that a part is thrown above the reflector axis; but owing to the elevation of the filaments above the horizontal the light arising from the end portions thereof is deflected downwardly from all parts of the reflector as attempted to be shown in Fig. 11. As a result the light pattern as cast on a vertical screen is substantially shown in Fig. 12, wherein region X is illuminated by the first or focussed filament, region Y by the next filament and region Z by the third filament; this can be carried further if desired but three is sufficient to show the operation. The upper corners of the pattern ("the D points") which ordinarily cause the blinding and dazzling rays are eliminated and in their stead a curb and gutter light is produced known legally as the "Q points." The central upper portion above the axis *a—a*, known as the "C point" is feebly lighted and the most intense part of the beam comes at B.

My improved filamentary arrangement can be combined with an independently usable filament of the same or different candle power if desired for city driving or parking purposes. In this case three leading-in wires are employed as shown in Figs. 3 and 4, two of the same as 6 and 8 supporting the filaments 7, 7 and the third 9 supporting one end of the independent filament 10, whose other end is fastened to one of the first leading-in wires as 6. This common terminal is preferably grounded to the base, and the others are connected to the insulated contacts 5, 5. This independent filament can be used either with the straight or the deflected leading-in wires, but is preferably located with a substantial portion below the reflector axis as shown in Fig. 13 wherein 12 denotes a reflector of conic section form, e. g. parabolic, having its axis *a—a* horizontal and its focal point at *f*. I have shown a straight helix because that is simplest to make, but an angular or curvilinear form is equally useful.

It will be understood that the essential feature herein set forth is the shape of the light source and its relation to the axis and focal point of the reflector. While I have illustrated with some detail a plurality of lamp bulb constructions whereby this relation can be obtained in a commercial way, I do not limit myself to those formations or constructions; neither do I limit myself to the employment of a strictly parabolic reflector since other types of conic-section or composite reflectors can be employed provided only that they exhibit a substantially horizontal axis and a substantially definite focal region. Also I do not limit myself either to the use or omission of a glass or other lens for the purpose of additionally controlling the reflected or direct beams.

Having thus described my invention what I claim is:

In an automobile light, the combination with a substantially paraboloid reflector having its axis substantially horizontal, of two independently usable light sources inside said reflector, one of said sources defining and substantially confined within a plane which intersects said reflector axis substantially at its focal point and also confined substantially to the region above the reflector axis, the other source being substantially parallel to the plane of the first source and spaced slightly beneath the same.

In testimony whereof I hereunto affix my signature.

WILLIAM H. WOOD.