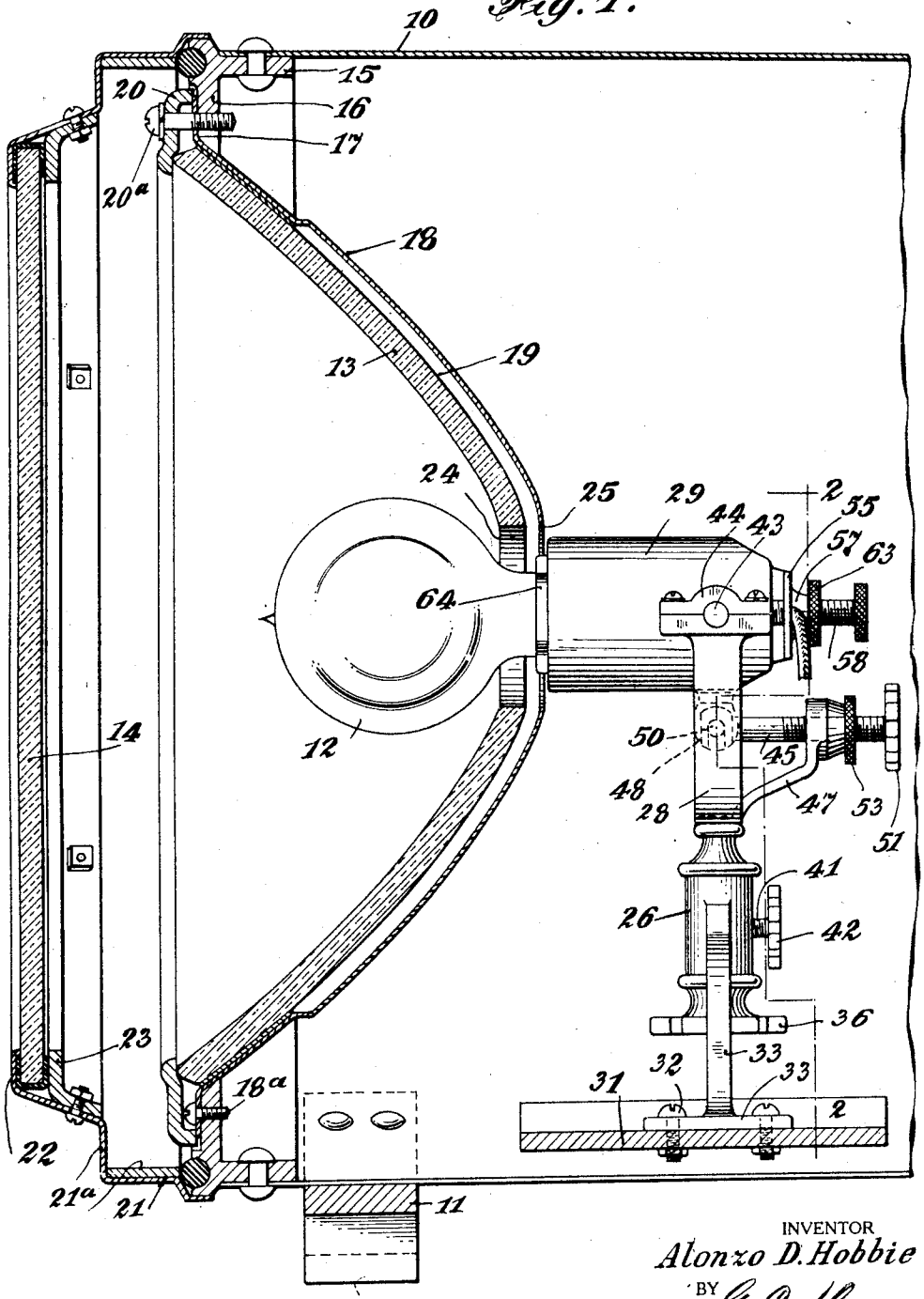
Aug. 28, 1928. 1,682,567

A. D. HOBBIE

LIGHT PROJECTING DEVICE

Filed May 1, 1924 2 Sheets-Sheet 1

Fig. 1.



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Fig. 3.

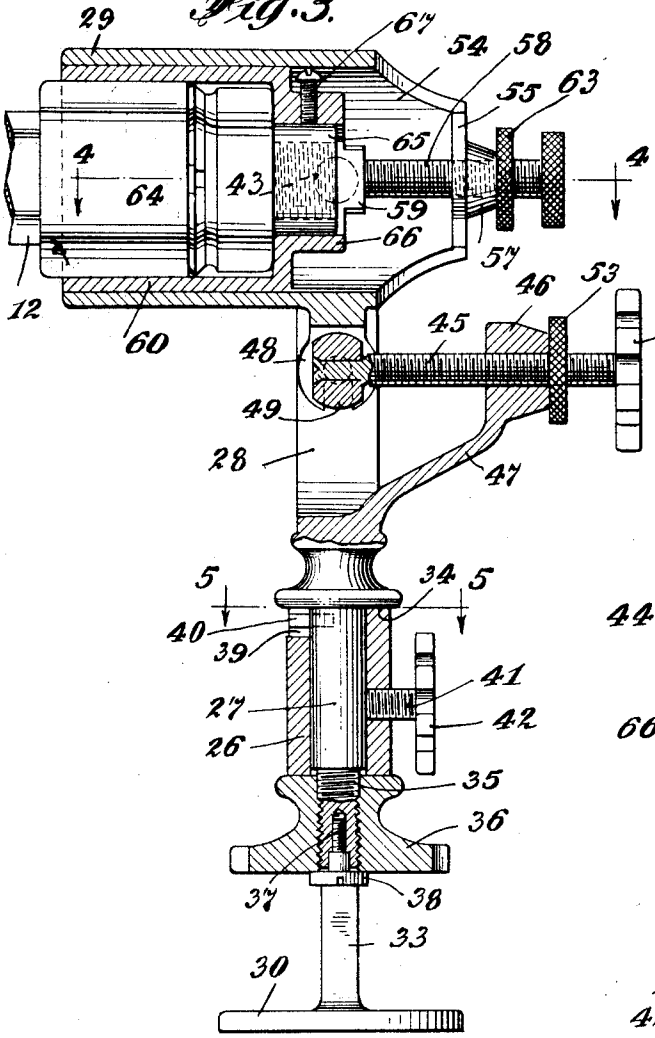


Fig. 5.

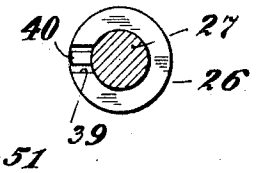


Fig. 2.

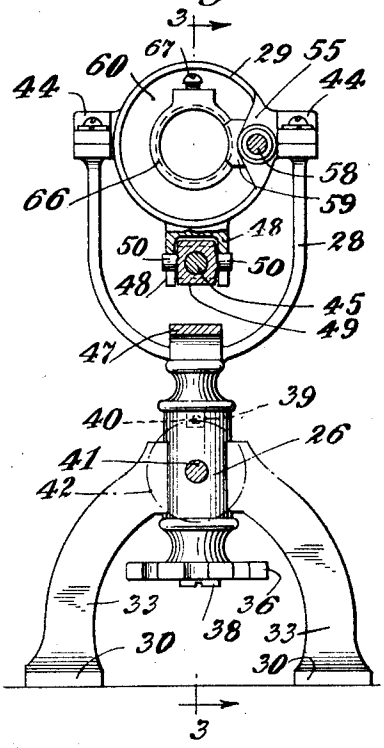
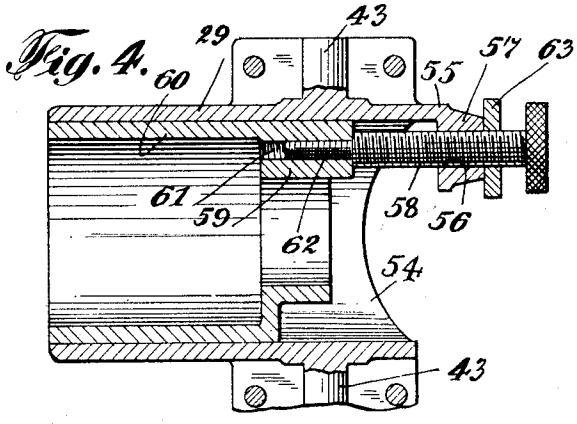


Fig. 4.



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UNITED STATES PATENT OFFICE.

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LIGHT-PROJECTING DEVICE.

Application filed May 1, 1924. Serial No. 710,256.

My present invention relates more particularly to light projecting devices of the type in which a light concentrator such as a lens or a reflector having a more or less definite focus is used to concentrate a more or less definite beam in any desired direction and is particularly applicable where the concentrator is rigidly mounted in normally fixed position, and the direction and concentration of the beam being adjusted by adjustment of the lamp bulb or other source of light.

The specific purpose in view has been to provide a locomotive head light wherein the concentrating reflector that projects the beam may be rigidly fixed with reference to the locomotive, while the support for the light is provided with simple adjusting means whereby it may be displaced from the exact focus of the reflector an amount sufficient to direct the beam upward, downward or sidewise, as well as to concentrate or expand it within the narrow limits necessary for use on a locomotive; also to provide the adjusting means in such rigid construction and with such secure locking means that the vibration of the locomotive cannot operate to cause objectionable vibration of the light bulb nor to change the adjustments. It will be evident, however, that certain features of the invention are applicable to light concentrating projectors designed or used for other purposes.

The present embodiment of my invention involves mounting the light bulb in a socket securely supported independently of the reflector and to provide a hole in the apex of the reflector large enough to permit bodily movements of the socket and the bulb carried thereby to the extent necessary for the purposes above described.

One feature of my invention consists in rendering the lamp bulb universally adjustable within the limits necessary, by means located on an independent socket support. It has been common to provide such sockets with screw means for fore and aft adjustment of the light bulb in the axis of the projector for the purpose of causing the projected beams to diverge much or little or to be nearly parallel or to cross, and I may provide my device with an axially adjustable socket not materially different from those now in use. For my purpose, however, the socket is mounted on horizontal pivots about which said socket is capable of fine adjustment and rigid locking by means of a screw. This screw is normally parallel with the axis of the socket and engages it approximately at a right angle to the vertical radius of the pivots.

This pivotal socket, the pivotal bearings therefor and the screw by which it is adjusted are mounted on a vertical post swiveled in a suitable support for adjustment in a horizontal plane, suitable means being provided for locking the post to the support in desired adjusted position.

It will be noted that the two primary adjustments are by pivoting about axes at right angles to each other and hence are confined to arcs of two intersecting circles, whereby the center of the bulb is universally adjustable in the surface of a single sphere only. However, in the preferred form, the pivotal axes are a substantial distance behind the focus of the reflector so that the surface of said sphere, for the small area to be covered by the adjustment, does not differ very much from a true plane. Moreover, the fore and aft adjustment of the lamp socket makes the thing completely universal because the center of the bulb may be swung circularly and shifted longitudinally either simultaneously or successively throughout the limited region that would be useful for the purpose in view.

For a locomotive, the beam is directed downward so that the axis of it will center on the track 100 yards or more ahead, although the axis of the head light itself is substantially horizontal. The right and left adjustment to center on the track is obvious.

The above and other features of my invention will be more readily understood from the following description in connection with the accompanying drawings, in which

Fig. 1 is a view and vertical section through a lamp and reflector housing showing my improved lamp adjusting mechanism secured in operative position within the housing;

Fig. 2 is a view partly in rear elevation and partly in vertical section on the staggered line 2—2, Fig. 1;

Fig. 3 is an enlarged vertical sectional view on the line 3—3, Fig. 2;

Fig. 4 is a transverse sectional view on the line 4—4, Fig. 3; and

Fig. 5 is a transverse sectional detailed view on the line 5—5, Fig. 3.

The light projector, as for instance a locomotive head light, is shown as comprising a cylindrical housing 10 supported upon feet or brackets 11. The housing contains a lamp bulb 12, a light concentrator having a more or less definite focus such as a parabolic reflector 13 and a transparent closure 14, which may be a lens or plane glass, as desired. A convenient means for mounting a glass reflector comprises a casting having a cylindrical portion 15 riveted within the forward end of the housing 10 and formed with an internal flange 16 to which the turned-back marginal edge 17 of a metallic supporting cup 18 is secured as by screws 18^a. The glass reflector 13 is approximately parabolic and has the usual reflecting material 19 on its rear face but a silver plated copper reflector may be used if desired. The reflector is clamped within the protective cup 18 by clamping ring 20, held by bolts 20^a. The window 14 is supported by front casing member 21 formed with an inwardly directed lip 22 cooperating with a removable clamping ring 23, all of said parts being carried by frame ring 21^a and usually secured to housing 10 by a hinge and clamping fastener (not shown). The construction thus far described is merely illustrative of what an ordinary locomotive headlight may be.

For purposes of my invention, the openings 24 and 25 in the apices of the reflector 13 and its protecting and supporting member 18 are substantially larger than the neck of the lamp 12 so as to permit a universal adjustment of the lamp whereby it may be displaced from the axis or from the focal center of the reflector. The universal adjustment is characterized by means for swinging the lamp either vertically or horizontally, about a common center located well behind the reflector, in combination with a means for varying the radius of such swinging movements, by axial adjustment of the lamp.

The lamp supporting means includes a two-legged hollow pedestal 26 in which a standard 27 is swiveled for rotary adjustment about a vertical axis lying in or near the vertical plane of the axis of the projector. The standard is formed at its upper end with a yoke 28, wherein a lamp carrying socket member 29 is cradled for rotary adjustment about a horizontal axis in or near the horizontal plane of said axis of the reflector.

Various expedients might be resorted to for securing the pedestal in fixed position within the housing 10, but I prefer to firmly secure the feet 30 of the pedestal upon a relatively wide platform member 31 of relatively thick-gauge metal, which extends across the bottom of the housing behind the reflector. Bolts or similar securing devices 32 secure the feet of the pedestal to the bridge member, which by virtue of its substantial nature and its rigid connection at each end to the housing, prevents vibration of the pedestal. The pedestal is carried upon oppositely curved legs 33 converging at their upper ends and rigidly united in any convenient manner to the hollow pedestal.

The swiveled standard 27 is formed with an external annular shoulder 34 adapted to rest upon the upper end of the pedestal and includes a reduced threaded lower extremity 35 engaged by a nut 36 which screws against the under side of the pedestal and firmly binds the shoulder 34 against its supporting surface. A locking screw 37 threaded in the lower end of the standard is formed with an enlarged head 38 engaging the nut 36 and securing the same against accidental loosening. Before tightening the nut 36 and the screw 37 the standard should be swiveled to the desired position. Such partial rotation of the standard for adjusting purposes is limited by a slot 39 in the upper end of the pedestal receiving a key pin 40 on the standard. The slot affords play enough for adjustment purposes but serves as a stop to prevent swinging the bulb into contact with the edges of hole 24 in reflector 13. After this adjustment has been made the nut 36 and screw 37 are operated to secure the parts in adjusted position. If desired, a further safeguard against accidental turning of the standard or its vibration within the pedestal may be provided in the form of a set screw 41 mounted in the pedestal and manually operated by a peripherally notched head 42.

Trunnions 43 extending radially from the rear portion of the cylindrical socket member 29 are accommodated in sectional bearings at the upper ends of the arms of the yoke 28. Preferably half of each bearing is integral with a yoke arm, and complementary bearing members 44 are clamped in place to hold the trunnions.

The mechanism which I prefer to use for vertical adjustment of the socket member 29, about its trunnions, includes a screw 45 disposed parallel to the normal horizontal axis of the socket member and screw threaded in a boss 46 at the end of a rearwardly and upwardly extending arm 47 integral with

the intermediate portion of the yoke 28. Ears 48 depending from the socket member 29 straddle the end of the screw 45, and also straddle a block 49 which is swiveled upon the forward end of the screw. The ears have vertical slots open at their lower ends receiving oppositely disposed cylindrical studs 50 on the block 49. Turning of the screw 45 feeds it through the boss 46 and operates through the medium of the studs 50 and ears 48 to swing the socket member 29 on its trunnions. The slots are cut high enough to permit this swing adjustment without binding the studs even though the movement of the latter is rectilinear. The screw is rotated through hand wheel 51 and there is a lock nut 53 screwing against the boss 46 to lock the same in adjusted position.

The parts are arranged so that the axes of socket member 29 and trunnions 43 intersect in the horizontal axis of reflector 13, Such positioning may be perfected by shims under the feet 30 or washers under annular shoulder 34. Thus the socket member is oscillatable both vertically and horizontally, the axes of such oscillatory movements intersect the axis of the reflector at a common point, and the common center of oscillation is disposed well behind the reflector and the light source. By shifting the light source axially of the socket member, both radii of oscillation are simultaneously and similarly increased or decreased.

To effect such axial shifting I provide a rearward extension 54 of the cylindrical socket member 29, formed with an inturned ear 55 having a threaded opening 56 therein and surrounded by a threaded boss 57. A hand screw 58 working in the threaded boss has threaded engagement with a lug 59 on the rear end of a sleeve 60 fitting and sliding within the socket member 29. Preferably the lug is formed with a threaded opening 61 therein receiving the reduced forward end 62 of the hand screw. In practice the threads of the main section of the screw which works in the boss 59 and the threads of the reduced end 62 of the screw which works in the lug 59, are of reverse pitch so that comparatively rapid axial shifting or sliding of the sleeve may be had upon turning the screw. A locking nut 63 on the screw 58 serves to hold the same in any desired position of adjustment.

A lamp socket 64, of porcelain and with the usual terminals for the lamp 12, is secured within the sleeve 60 in any desired manner. I have shown a socket member with a reduced portion 65 held within a reduced extension 66 of the sleeve 60 by a set screw 67 and interiorly threaded to receive the threaded end of a complementary member (not shown) carrying electrical conductors.

Further description of the manner of manually making the various adjustments for positioning the lamp 12 in any desired relation to the focal center of the reflector is deemed unnecessary. Adjustment of the bulb in a vertical plane will regulate the vertical angle of the beam and thereby the distance ahead at which the main beam centers upon the ground. Lateral adjustment of the bulb will regulate the lateral direction of the beam, usually for centering it midway between the tracks. Axial shifting of the source regulates the concentration or the expansion of the beam to control the area of the surface effectively illuminated and the brilliance of such illumination in the usual way, when the axis of the bulb is in the axis of the reflector. Theoretically this will be combined with a slight directional component when the bulb axis is at an angle to the reflector axis, but these adjustment angles are usually too small to be of much practical effect in this connection. As pointed out above, the reflecting means, whether it be of parabolic or other shape, is always fixed, while the light source is universally adjustable about the focal center of the reflector, or other concentrator.

One of the principal advantages of this invention from a practical standpoint is that the lamp bracket can be reached and manually adjusted through the usual side door in the head light casing without disturbing any electrical connections and while the lamp is in operation so that light beam offers visible evidence of the correctness of the adjustments which are being made.

Various changes and alterations might be made in the general form and arrangement of the parts described without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. A head light, including a casing, a concave reflector of the beam projecting type supported in the casing and having an opening therein at its rear end in combination a vertical, swiveled standard secured against vibration within the casing and disposed behind the reflector, an adjustable socket member on the standard, a lamp bulb within the reflector connected to said socket member through said opening, horizontal, symmetrically projecting trunnions on the socket member, and a yoke at the upper end of the standard in the arms of which the trunnions are cradled.

2. A head light, including a casing, a concave reflector of the beam projecting type rigidly supported in the casing and having an opening therein at its rear end, in combination with a vertical, swiveled standard secured, within the casing and disposed behind the reflector, an adjustable socket member on the standard, a lamp bulb within the reflector connected to said socket member

through said opening, horizontal, symmetrically projecting trunnions on the socket member, a yoke at the upper end of the standard in the arms of which the trunnions are cradled, a vertical arm rigid with the yoke, a screw mounted in the arm and operatively connected to the socket member for oscillating the socket member on its trunnions.

3. A head light, including in combination a casing, a concave reflector of the beam projecting type rigidly supported in the casing and having an opening therein at its rear end, a standard adjustable by a vertical axis, secured within the casing and disposed behind the reflector, an adjustable socket member on the standard, a lamp bulb within the reflector connected to said socket member through said opening, horizontal symmetrically projecting trunnions on the socket member, a yoke at the upper end of the standard in the arms of which the trunnions are cradled, an arm fixed to the yoke, a screw working in the arm, depending slotted ears on the socket member, a block carried by the screw and including studs engaged with the slotted ears to oscillate the socket member upon movement of the screw.

Signed at Arlington in the county of Hudson and State of New Jersey, this 30th day of April, A. D. 1924.

ALONZO D. HOBBIE.