United States Patent

Magi

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[54] SHOCK RESISTANT MOUNTINGS FOR LIGHT BULBS

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 809,315, Mar. 21, 1969, Pat. No. 3,564,483.

[52] **U.S. Cl.** **240/90**, 248/204, 313/50

[51] **Int. Cl.** **F21v 15/04**, H01j 5/48

[58] **Field of Search** 240/90, 58, 153; 248/358, 18, 248/204; 313/50, 269; 267/160

[56] **References Cited**

UNITED STATES PATENTS

3,300,636	1/1967	Quelland et al	240/90
1,295,316	2/1919	Hines	267/160 X
3,327,110	6/1967	Baldwin	240/90
1,313,739	8/1919	Ryerson	240/90

FOREIGN PATENTS OR APPLICATIONS

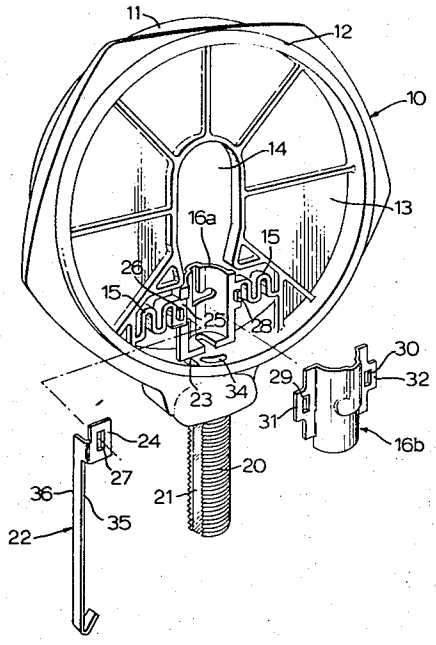
21,419	7/1914	Great Britain	267/160

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[57] **ABSTRACT**

A lamp includes a housing and a socket adapted to receive a light bulb, the latter being suspended from the housing by shock resistant mounting means comprising arms each having rigid points of connection formed integral with the housing and the socket, the arms being integral with the housing and the socket and extending therebetween with the arms each being fabricated of a strip of material formed into a corrugated and having a plurality of corrugations.

9 Claims, 2 Drawing Figures



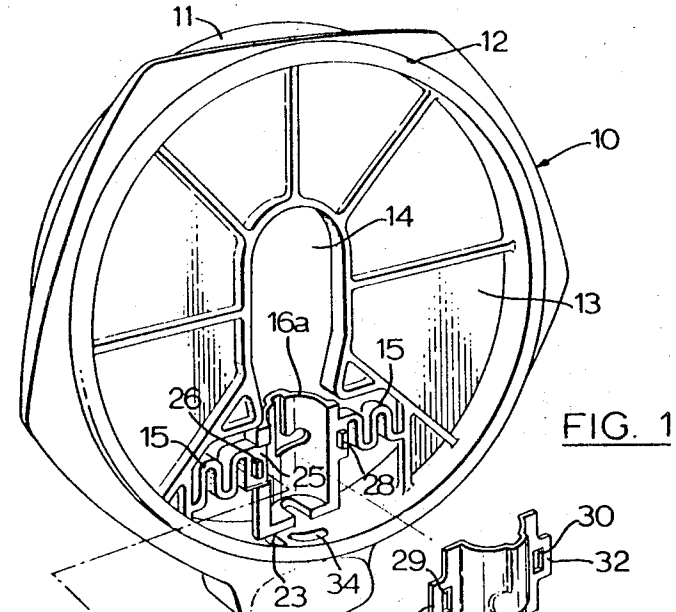


FIG. 1

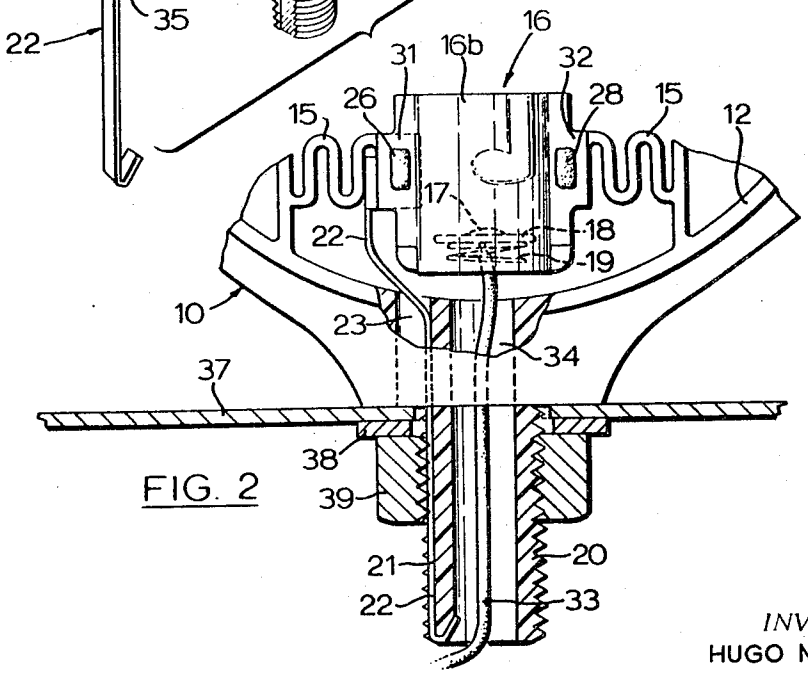


FIG. 2

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SHOCK RESISTANT MOUNTINGS FOR LIGHT BULBS

This is a continuation-in-part of application Ser. No. 809,315, filed Mar. 21, 1969 now U.S. Pat. No. 3,564,483.

This invention relates generally to lamps, and, more particularly, to shock resistant mountings for the bulbs of such lamps.

Many different types of lamps, for example, signal and other types of lamps used on motor vehicles, are subject to vibrations and shocks. Unless the light bulbs of such lamps are in some way protected from these shocks and vibrations, the light bulbs may fail prematurely. To this end many different types of so-called "shock-free" or "shockproof" bulb mountings have been designed, and typical of these are those shown in U.S. Pat. Nos. 3,300,636, L.H. Quelland et al., issued Jan. 24, 1967, and 3,327,110, G.D. Baldwin, issued June 20, 1967.

Prior art shock resistant bulb mountings generally attempt to cushion the light bulbs by damping vibrations before they are imparted to the bulbs, and varying degrees of success utilizing this approach have been obtained. One problem with such an approach is that there is a tendency for the bulbs to be permitted too high a degree of movement, which can result in displacement of the bulb from the location that it should be in relative to the lens of the lamp. On the other hand, restraining the degree of movement permitted severely limits the shock resisting capabilities of the bulb mounting.

In accordance with this invention there is provided a shock resistant mounting for a lamp bulb designed so that high frequency shocks or vibrations, which are the ones that can cause damage to the filaments of light bulbs, are converted to less damaging low frequency vibrations, the construction of the mounting being such that movement of the light bulb supported by the mounting is within optically acceptable limits.

This invention will become more apparent from the following detailed disclosure, taken in conjunction with the appended drawings, in which:

FIG. 1 is a perspective exploded view of part of a direction signal lamp having a shock resistant bulb mounting embodying the instant invention; and

FIG. 2 is a front elevation, partly broken away and partly in section, showing in greater detail a part of the lamp shown in FIG. 1.

While this invention will be described herein as used in a direction signal lamp for a motor vehicle, this is strictly by way of example and is not intended to be limiting.

Referring to the drawings, a direction signal lamp includes a housing **10** made of electrically insulating material, e.g., a suitable synthetic polymeric material such as "LEXAN" (a trade mark for a polycarbonate resin), to which is fastened by any suitable means lenses **11**. Only one lens **11** is shown, but it will be understood that an identical lens will project forwardly from the front of housing **10** being mounted on the rim **12** thereof. Lenses **11** are transparent or translucent and may be colored or plain. Generally one lens will be red and the other amber for a direction signal lamp. Lenses **11** may have semicircular flanges thereon that snap into mating grooves in rims **12**, or O-rings may be employed between lenses **11** and rims **12**.

Projecting inwardly from rim **12** but formed integral therewith and constituting a part of housing **10** is a strengthening partition **13** in which is provided a recess **14** that is occupied by the light bulb (not shown) of the lamp.

The light bulb may be a conventional single filament bulb with a bayonet type base, although a bulb with a screw-in type base could be employed, and when mounted in the bulb socket to be hereinafter described, its filament is directly aligned with the optical centers of lenses **11**, which may be so-called "bulls-eyes," for example.

Located below recess **14** and held in position by shock resistant members **15** to be described hereinafter in detail and which are formed integral with partition **13** is a light bulb socket **16**. Part **16*a*** of socket **16** is formed integral with the supports **15** and thus is fabricated of plastic, if this is the material used for housing **10**. The other part **16*b*** of socket **16** constitutes one contact for one terminal of the light bulb of the lamp and is made of metal. As may be seen by reference to the drawings, socket **16** is of the bayonet type, but obviously could be of the type to receive a screw-in bulb. The other contact **17** of socket **16** is conventional being an electrical contact disposed in or on a disc **18** of electrically insulating material that is biased upwardly by a spring **19**.

Formed integral with housing **10** and depending downwardly therefrom is a hollow, threaded stem or stud **20**. Stud **20** has an open channel **21** formed therein. Located in channel **21** is a metal ground strap **22** that is electrically connected to socket part **16*b*** and the other end of which is hooked over the end of stud **20**.

In the manufacture of the lamp shown in the drawings, the hooked end of ground strap **22** is inserted through an opening **23** in housing **10** that registers with channel **21**, strap **22** is positioned in the channel, and the hooked end of the ground strap is hooked over the end of stud **20**. The rectangular end portion **24** of ground strap **22** then is positioned in a recess **25** formed for it in socket part **16*a*** with the stud **26** extending through the opening **27** formed in end portion **24**, stud **26** being formed integral with socket part **16*a***. Socket part **16*b*** then is mounted on socket part **16*a*** with the studs **26** and **28** of socket part **16*a*** projecting through openings **29** and **30** formed in ears **31** and **32** of socket part **16*b***. After this has been done, socket part **16*b*** and ground strap **22** are physically secured together and positively electrically connected, as by ultrasonic welding. When this has been accomplished, studs **26** and **28** are melted over ears **31** and **32** to form caps that hold socket part **16*b*** in place. Of course, during the assembly of socket **16**, spring **19**, contact **17** and disc **18** are located within the socket and the insulated conductor **33** that is soldered or otherwise connected to contact **17** is passed through opening **34** in housing **10** and brought out of the lamp via hollow stem **20**.

As best shown in FIG. **2**, the depth of channel **21** preferably is such that the two edges **35** and **36** (FIG. **1**) of ground strap **22** extend above the roots of the threads on stem **20**. This ensures positive grounding of the lamp. In this regard, as best seen in FIG. **2**, reference numeral **37** designates a grounded part, say the fender, of a motor vehicle. In mounting the lamp on the fender, stem **20** is inserted through an opening in the fender, an electrically conductive washer **38** is placed over stem **20** and an electrically conductive nut **39** is screwed onto stem **20** and tightened. The threads on nut **39** will bite into edges **35** and **36** of ground strap **22** and, when the nut has been tightened, grounding of the lamp will be effected automatically via ground strap **22**, nut **39**, washer **38** and fender **37**.

The grounding means hereinbefore described are not per se a part of this invention but are described and claimed in copending application Ser. No. 809,315, filed Mar. 21, 1969, now U.S. Pat. No. 3,564,483 for "Signal Lamp with Built-In Ground Strap" and assigned to the assignee of this invention.

The shock resistant mounting of this invention consists of arms **15** that are of generally sinusoidal or corrugated configuration, each having a plurality of corrugations, and that are molded integral with partition **13** of housing **10** and part **16*a*** of socket **16**, the arms being rectangular in cross-section and fabricated of strips with a width dimension considerably greater than the depth dimension thereof. Arms **15** have a common axis and extend from diametrically opposite sides of socket **16**. The arms are oriented so that the convolutions or undulations thereof are in the vertical plane, i.e., a plane parallel to the longitudinal axis of socket **16**. With the arms so oriented, a limited degree of up and down movement of socket **16** in the vertical plane is permitted with flexure taking place at the peaks of the convolutions. A limited degree of side-to-side movement in the vertical plane with compression and expansion of the convolutions also is permitted.

The convoluted configuration of arms **15** coupled with the limited degree of compressibility and expansibility thereof makes the arms what could be referred to as frequency converters. High frequency vibrations are reflected from the walls that define arms **15**, and the movement of these walls as arms

15 flex lowers the frequency of these vibrations so that they are relatively low frequency and relatively harmless vibrations by the time that they are imparted to socket 16. The greater the number of convolutions, the greater will be this frequency conversion effect, but, on the other hand, care must be taken to avoid using so many convolutions that extensive up and down and side-to-side movement of socket 16 is permitted.

It is highly desirable that each arm 15 be connected to part 16*b* of socket 16 as high up on socket 16 as possible, since the closer this connection is to the filament of the bulb supported by socket 16, the shorter is the radius of curvature described by the filament as the bulb moves back and forth out of the vertical plane, so the smaller is the chance of the bulb becoming "out of focus" with respect to lenses 11 as a result of such movement. Thus arms 15 are connected to part 16*a* of socket 16 adjacent the open end thereof and at the "positive" peaks of the corrugations. For the same reason, attachment of arms 15 to partition 13 at the lowermost point or "negative" peaks of arms 15 is desirable.

It should be noted that with the construction of arms 15 shown and described, a shock resistant mounting that is formed integral with the lamp and the socket, which is simple and inexpensive to fabricate, and yet which permits limited movement in two perpendicular directions and even more limited movement in a third direction perpendicular to the other two is obtained without any pivot pins being required, the points of connection of arms 15 to the socket and housing being rigid and integral with the socket and housing.

What I claim as my invention is:

1. A lamp comprising a housing; a socket adapted to receive a light bulb; and shock resistant mounting means comprising first and second arms each having rigid points of connection formed integral with said housing and said socket, said arms being integral with said housing and said socket and extending therebetween to suspend said socket from said housing, said arms each being fabricated of a strip of material of greater width than thickness and being formed into a corrugated configuration which includes a plurality of corrugations, the plane in which the corrugations of said corrugated strips undulate being parallel to the longitudinal axis of said socket and perpendicular to said width of said corrugated strips.

2. A lamp according to claim 1 wherein the corrugations of said corrugated strips have "positive" and "negative" peaks and wherein said socket has an open end for reception of a light bulb, said points of connection of said arms and said socket being at "positive" peaks of said corrugations and being adjacent said open end.

3. A lamp according to claim 2 wherein said points of connection of said arms and said socket are at "negative" peaks of said corrugations.

4. A lamp according to claim 1 wherein said housing, said arms and at least the part of said socket connected to said arms are formed of a synthetic polymeric material.

5. A lamp according to claim 1 wherein said strips are rectangular in cross-section.

6. A lamp according to claim 1 wherein said arms lie on a common axis and extend from diametrically opposite positions on said socket.

7. A lamp according to claim 2 wherein said arms lie on a common axis and extend from diametrically opposite positions on said socket.

8. A lamp according to claim 7 wherein said strips are rectangular in cross-section.

9. A lamp according to claim 8 wherein said housing, said arms and at least the part of said socket connected to said arms are formed of a synthetic polymeric material.

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