SEALED BEAM LAMP

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1. The present invention relates to vehicle lamps and particularly to lamps of the type comprising a metal reflector, a lamp bulb and a lens sealed as a unit, such lamps being commonly known as sealed beam lamps.

The sealing of such lamp units has been accomplished by clamping the lens and reflector flanges on an interposed rubber gasket cured to provide optimum elasticity and toughness. Such rubber gaskets would deform to receive projecting flanges in the lens and reflector but would not grip or adhere to the lens and metal reflector and consequently with aging or misalignment of lens and reflector they permitted the passage of air and contained moisture causing condensation on the inner lens surface and a reduction of reflection efficiency of the reflector surface.

Accordingly it is an object of the present invention to provide an improved lamp unit construction of the sealed beam type which has a high degree of resistance to leakage over indefinite periods of time.

This and other objects are attained in accordance with the present invention by providing a lamp unit construction having a sealing gasket of natural rubber characterized by a core of tough elastic cured rubber and a surface coating of a tacky or adhesive rubber constituent formed by a curing process known as reversion. Reversion as it is commonly known involves the heating of masticated rubber which has been mixed with sulphur. There is an improvement in mechanical properties as heating is continued until an optimum is reached. Thereafter with continued heating the physical properties decline, strength decreases and the rubber becomes shorter and softer. If the heating is carried further the rubber becomes tacky and plastic. Advantage of this characteristic is taken in the present invention to provide a lamp unit construction in which an overcured rubber gasket provides means for a substantially air-tight seal over indefinite periods of time.

For a better understanding of the invention reference may be had to the accompanying drawings wherein Figure 1 is a side elevation view of a lamp unit embodying the present invention, and Figure 2 is an enlarged cross-sectional view in perspective of a fragment of the sealing gasket.

Referring now to the drawing, there is illustrated a lamp unit of the sealed beam type comprising a metal reflector 2, a lamp bulb 4 and a lens 6. To provide a substantially air-tight unitary construction the metal base of the lamp bulb 4 is attached to the metal reflector by welding or soldering. To further seal the unitary structure the metal reflector 2 is provided with an annular flange which is adapted to clamp the lens to the reflector with a rubber gasket 8 interposed therebetween. The reflector flange is formed with a radially extending portion 10 and an axially extending portion 12 of sufficient length to be turned inwardly on the annular flange 14 of the lens. The lens flange 14 is provided with axially extending annular projections 16 which cooperate with the gasket 8 and a similar axially extending annular ridge 18 on the reflector flange to form the seal for the lens and reflector.

The gasket 8 is a natural rubber material which as been hereinafore indicated may be heat-treated to provide a tacky or adhesive surface which not only conforms to the contours of the surfaces of flanges 10 and 14 but adheres to the surfaces of the flanges.

To provide the tacky or adhesive surface the assembled reflector 2 and bulb 4 is placed on a traveling belt with the reflecting face upwardly. The gasket 8 of natural rubber which is substantially free of volatile material is placed in position on the flange 10 and passes with the reflector assembly into a furnace which is heated to a temperature of 360 to 380°F. The furnace belt speed are arranged so that that a time interval of seven minutes the gasket and reflector assembly pass a station where the lens is placed in position on the gasket and thereafter the reflector assembly, gasket and lens continue in the furnace for an additional three minutes. Thereafter the axially extending portion 12 of the reflector flange is bent inwardly on the lens flange 14 sealing the lamp assembly as a unit.

With the heat-treatment above described the gasket material reverts to a tacky or adhesive state on the surfaces thereof and to a sufficient depth to permit the plastic surface constituent to conform to the projections 16 and ridge 18 adhering with considerable tenacity to all flange surfaces in contact with the gasket. The core of the gasket remains tough and elastic being substantially unaffected by the heat-treatment. With such a heat-treatment the gasket provides optimum sealing characteristics while retaining a high degree of elasticity and strength at the core to withstand permanent deformation. With such a gasket treated in the manner described, I have found that the lamp units remain impervious to the atmosphere over indefinite periods of time.

While I have disclosed a preferred embodiment of the present invention, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow:

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a unitary lamp in combination, a reflector, a lamp bulb attached to said reflector, a lens clamped to said reflector and a gasket
terposed between said reflector and said lens, said gasket having a tough elastic core and an adhesive or tacky surface for adhesively bonding said gasket to said lens and reflector surfaces to seal said lamp against the admission of atmosphere.

2. In a unitary lamp in combination, a reflector, a lamp bulb attached to said reflector with its filament substantially coinciding with the focal axis of said reflector, a lens clamped at its annular edge to said reflector, a cured rubber gasket interposed between said reflector and said lens, said gasket having been heat-treated to provide an adhesive or tacky reverted rubber surface for adhesively bonding said gasket to the engaging surfaces of said lens and reflector and seal said lamp against the admission of atmosphere therein.

3. In a unitary vehicle lamp in combination, a metal reflector having an annular clamping flange thereon, a lamp bulb having its base attached to said reflector to provide substantial alignment of its filament and the focal axis of said reflector a substantially air-tight seal between said base and said reflector, a lens clamped to said reflector by said flange and a heat-treated natural rubber gasket interposed between said reflector and said lens, said gasket having a tough, elastic cured rubber core and a tacky, adhesive, reverted rubber portion surrounding said core for adhesively bonding said gasket to the engaging surfaces of said reflector and said lens to provide a substantially air-tight seal.

4. In a vehicle lamp unit in combination, a substantially parabolic metal reflector having an annular clamping flange with an axially extending ridge, a lamp bulb having its base attached to said reflector to provide a substantially air-tight seal, said bulb having its filament in substantial alignment with the focal axis of said reflector, a lens having an annular flange with axially extending projections clamped to said reflector by said flange, and a heat-treated natural rubber gasket interposed between said reflector and said lens, said gasket having a tough, elastic cured rubber core and a reverted rubber portion surrounding said core to provide a tacky, adhesive surface for receiving said ridge and said projections and adhesively bond said gasket to the engaging surfaces of said reflector and lens to provide a substantially air-tight seal.

5. The process of sealing a unitary lamp assembly comprising a metal reflector, a lamp bulb and a lens which includes interposing a natural rubber gasket between said reflector and lens, heating said gasket to form a tough elastic cured rubber core surrounded by a tacky adhesive surface layer of reverted rubber and adhesively bonding said gasket between said reflector and lens to cause said surface layer to adhesively bond said gasket to the engaging surfaces of said reflector and said lens.

6. The process of sealing a unitary lamp assembly comprising a metal reflector with an annular flange, a lamp bulb attached to said reflector and a lens which consists of placing a natural rubber gasket on the annular flange of said reflector, subjecting said reflector and gasket to a temperature of about 360 to 380° F. for about seven minutes to cause a revision of the rubber at the surface of said gasket, placing said lens with its annular edge in engagement with said gasket, further heating said lens, reflector and gasket at about 300 to 380° F. for about three minutes to cause further revision of the rubber adjacent the surface of said gasket and thereafter clamping said lens and reflector together in the adhesive or tacky reverted rubber surfaces formed on said gasket.

7. A gasket for positioning between the lens and reflector of a unitary lamp assembly including a reflector, lens and light source, said gasket comprising a tough, elastic core surrounded by adhesive or tacky surface portions for adhesively bonding said gasket to said lens and reflector surfaces to seal said lamp against the admission of the atmosphere.

8. A rubber gasket for positioning between the lens and reflector of a unitary lamp assembly including a lens, reflector and light source to seal said assembly against the admission of the atmosphere, said gasket comprising a tough elastic cured rubber core surrounded by reverted rubber portions providing tacky surfaces for adhesively bonding said reflector and lens.

9. An annular rubber gasket for positioning between the lens and reflector of a unitary lamp assembly including a lens, reflector and light source to seal said assembly against the admission of the atmosphere, said gasket comprising a tough elastic core of cured natural rubber surrounded by a layer of reverted natural rubber providing tacky gasket surfaces for adhesively bonding said gasket to the engaging surfaces of said reflector and lens.

10. An annular rubber gasket adapted to be interposed between the lens and reflector of a unitary lamp assembly commonly known as a sealed beam lamp, said gasket comprising a tough elastic core of cured natural rubber surrounded by a layer of permanently reverted natural rubber providing tacky gasket surfaces for adhesively bonding said gasket to the engaging surfaces of said reflector and lens.

11. In a unitary lamp assembly having a lens, reflector and light source, a gasket for positioning between said lens and reflector, said gasket comprising a tough, elastic core of cured rubber surrounded by a layer of permanently reverted rubber providing tacky gasket surfaces for adhesively bonding said gasket to the engaging surfaces of said reflector and lens.

12. The process of sealing a unitary lamp assembly comprising a metal reflector with an annular flange, a lamp bulb attached to said reflector and a lens, said process comprising the steps of placing a natural rubber annular gasket on said flange, positioning said lens on said gasket, heating the assembly to a temperature and for a period of time to provide said gasket with a tough elastic core of cured rubber and a surrounding layer of tacky reverted rubber and thereafter clamping said lens, gasket and reflector together to adhesively bond said gasket to the engaging surfaces of said reflector and lens to seal said assembly against the admission of the atmosphere.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,142,820</td>
<td>Knauff</td>
<td>June 15, 1915</td>
</tr>
<tr>
<td>2,253,616</td>
<td>Falge</td>
<td>Aug. 26, 1941</td>
</tr>
<tr>
<td>2,317,035</td>
<td>Dana</td>
<td>Apr. 20, 1943</td>
</tr>
</tbody>
</table>