

June 11, 1963

J. A. McROBBIE ET AL
"LIGHT-DOME", SUSPENDED SPONGE-WASHED
TRAFFIC LINE REFLECTOR

3,093,038

Filed March 20, 1959

4 Sheets-Sheet 1

FIG. 1.

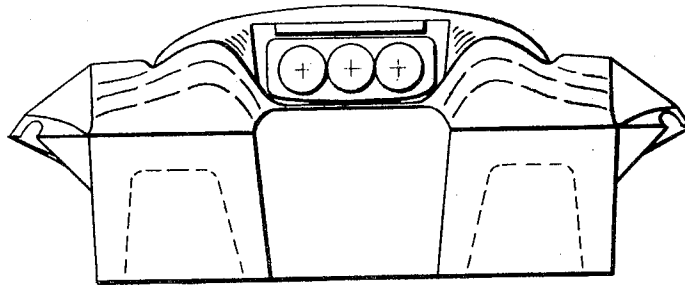


FIG. 2.

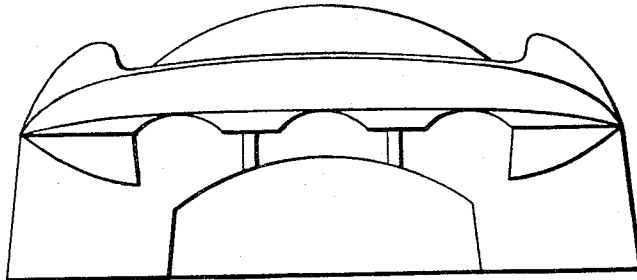
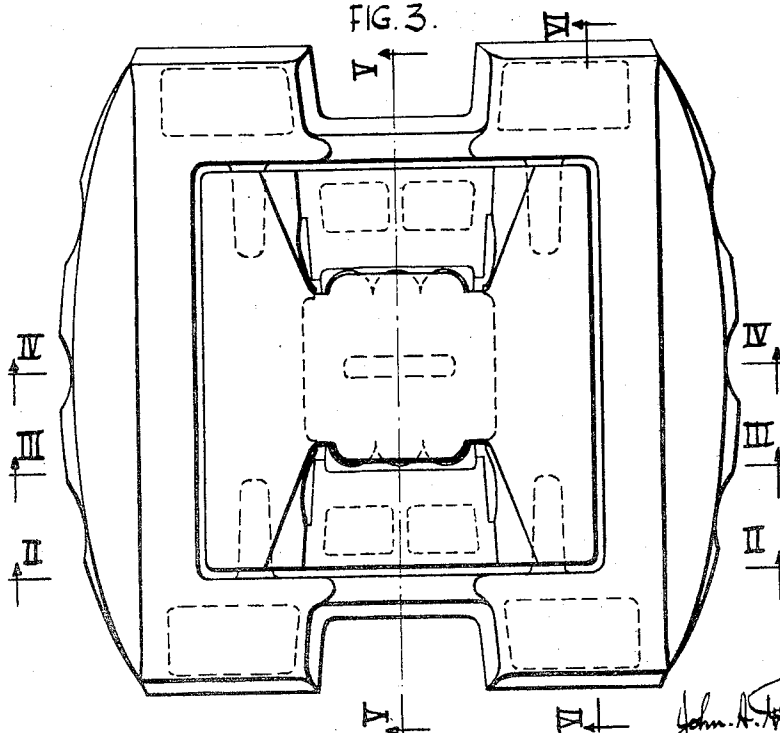


FIG. 3.



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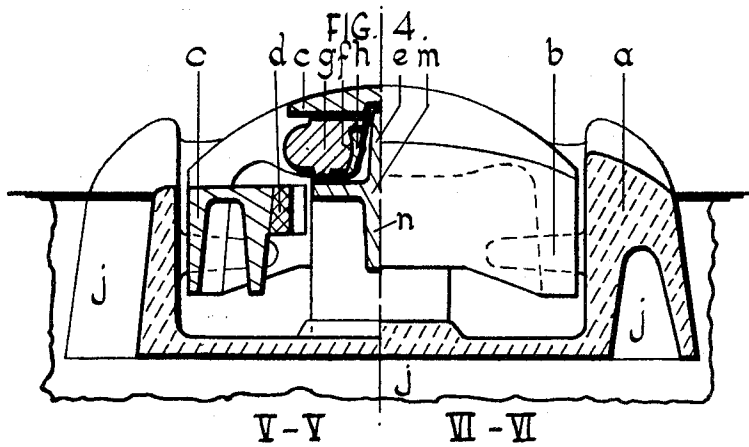
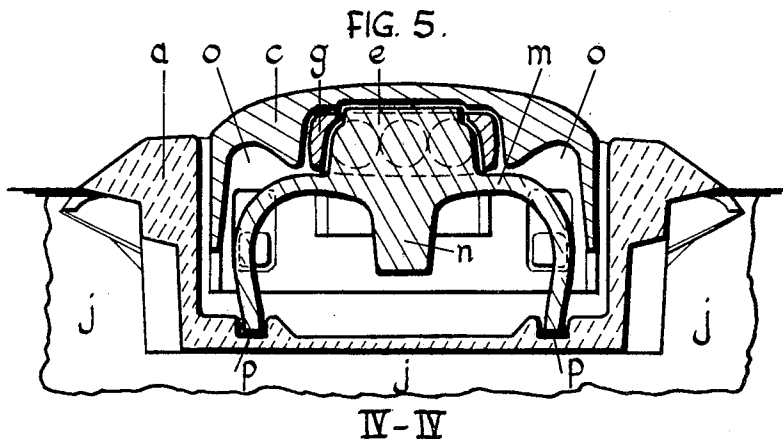
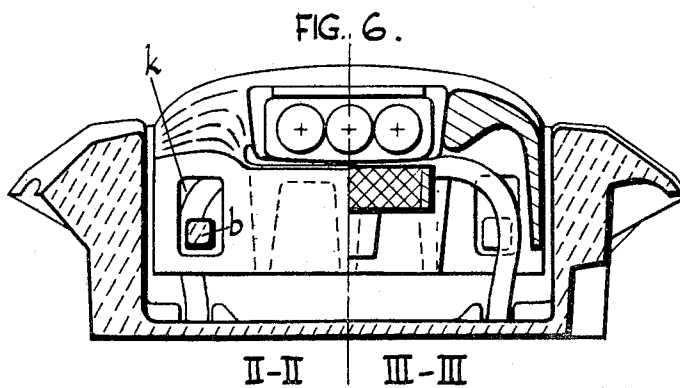
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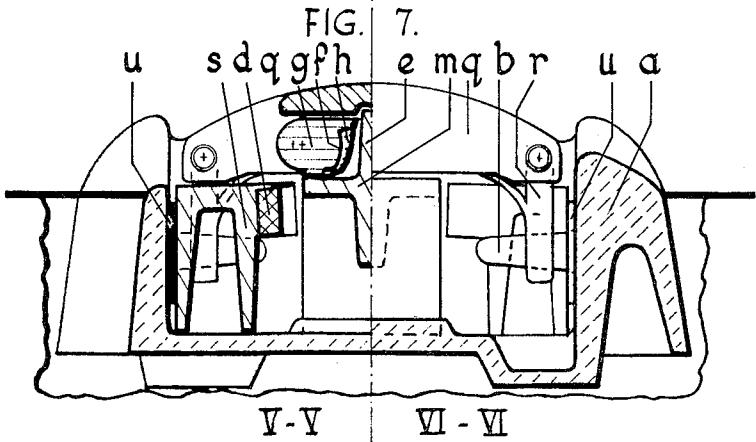
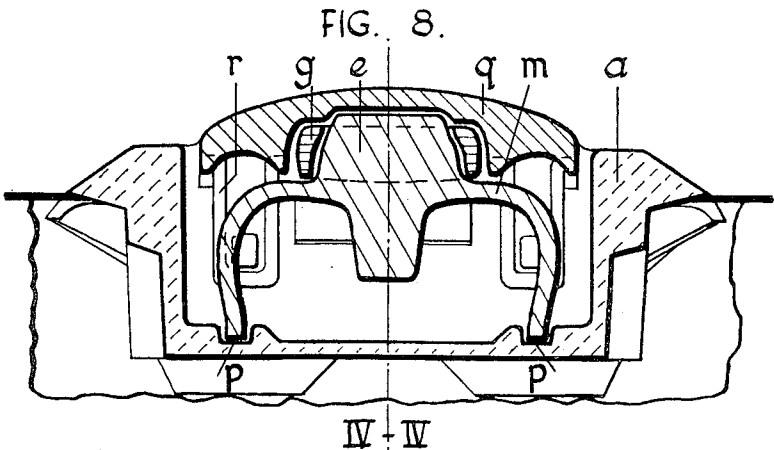
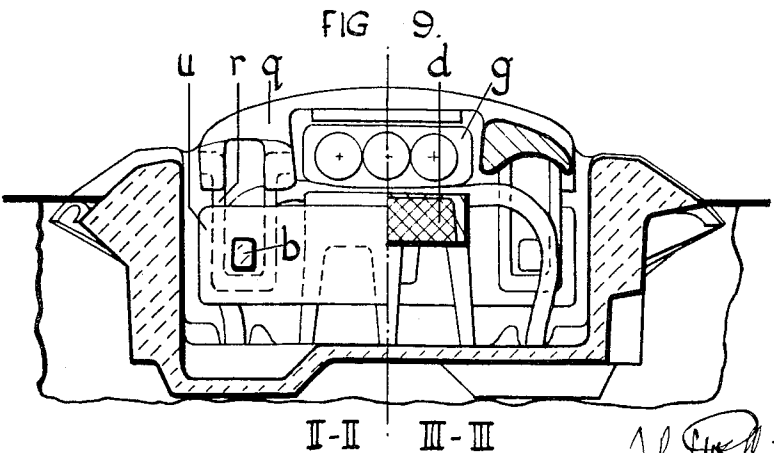
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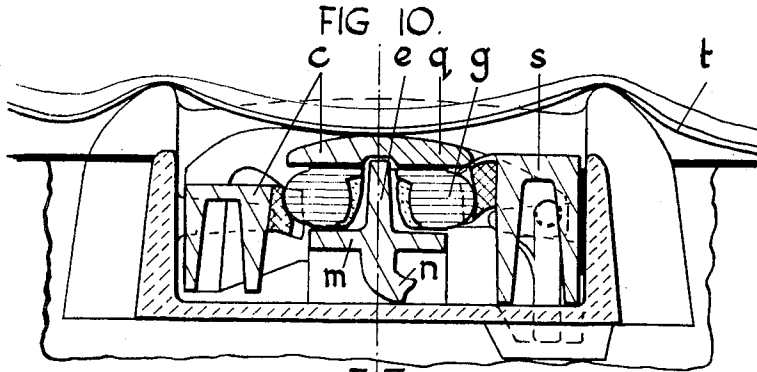
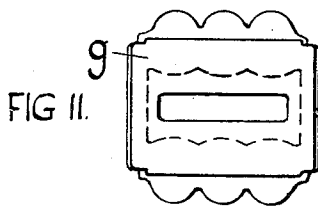
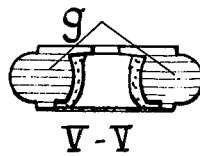
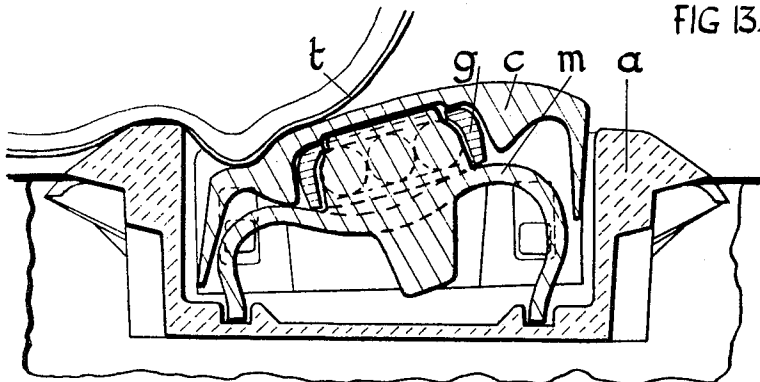
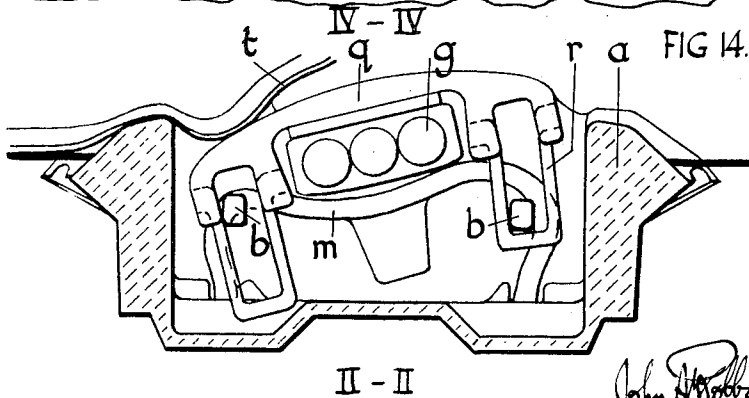
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"LIGHT-DOME," SUSPENDED SPONGE-WASHED TRAFFIC LINE REFLECTOR

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1 Claim. (Cl. 94-1.5)

This invention relates to road marking studs for the demarcation of centre lines, traffic lanes, and the like both by day and night, the studs being of the kind having an outer casing to be embedded in a road, and with reflectors adapted to reflect back the lights of oncoming vehicles along the road, set in a protecting mounting which is supported from within the outer casing, to permit the mounting to recede below road level when a load, such as might be applied by the wheel of a vehicle, passes over it, and in the process automatically cleans the reflectors.

In road studs of this type the proposals have previously been to mount a reflector or reflectors on a member which is either rigidly located at two opposite sides and being resilient deflects in the middle, or in piston fashion retracts vertically into an outer casing on the application of a load. Loads however at point of impact are often not vertical particularly from vehicles whose wheels are skidding across the stud and from vehicles with Caterpillar tracks or scraper blades such as snow-ploughs, and have caused the surfaces in contact in prior devices to be subjected to considerable wear resulting in some cases to such damage that the reflectors have fallen out leaving the stud non-reflecting, with consequential high maintenance costs.

The object of the present invention is to provide an improved type of road stud which will minimize the foregoing deficiencies. This invention is distinguished from prior proposals by the stud having a hollow outer casing with a reflex reflector mounted therein on an inverted U-shaped resilient member the legs of which are held against excessive lateral displacement within the casing by means of channels or grooves disposed within the base of the said casing, clearance being allowed between the reflex reflector and the casing to permit retraction of the reflector within the casing irrespective of the direction of the load thereon. The said means of holding the U-shaped resilient member against said lateral displacement comprises in addition to the channels or grooves within the base of the outer casing, guides formed integral with the outer casing and sliding with play in slots formed in a member mounting the reflex reflector on said U-shaped resilient member. The hollow outer casing is shaped externally with cantilevered raised edges above vertical, tapering, and arched sides, to divert upwards horizontally-moving objects such as skidding wheels or snow-plough blades, the sides being arched to reduce weight. The reflector mounting member is dome-shaped on top so that as a vehicle passes over the raised sides of the outer casing it progressively pushes the reflector mounting down into the protection of the casing and the U-shaped member, being resilient, at the same time permits the said mounting member to depress at its perimeter in any direction as occasioned by the thrust of the load, thereby reducing to the minimum the frictional wear on the said mounting member, the guides which project from the outer casing preventing the said mounting member from being displaced by the thrust beyond the limit of the slots in said mounting member. The said mounting member is interchangeably mounted on top of the U-shaped resilient member by means of a projection on the latter passing through the reflex reflector and engaging a recess in the former with a push fit. This projection locates the reflector in the

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stud and ensures that it cannot be worked out by impact or friction to leave the stud non-reflecting. The U-shaped resilient member has also a projection on the underside to prevent over-deflection.

Subsidiary objects of the invention are the provision of: (a) an improved type of road stud in which the interchangeable reflex reflector has surfaces, facing the lights of oncoming vehicles, without obstruction over same to the reflected light, whose lengths approximate $\frac{1}{3}$ of the overall rideable width of the outer casing, to give better guidance to motorists travelling at high speed or in fog; (b) a road stud in which the reflector may be quickly removed and replaced, to reduce maintenance costs in case of damage, and to permit appropriately coloured reflectors to be inserted as the studs are being embedded in a roadway to indicate traffic lanes and the safe speeds at which motorists may safely round bends of different curvatures in the road; and (c) a road stud in which the reflector is washed when brought into contact with sponges retaining rain water, on retraction within the outer casing on the application of a load.

An embodiment of the present invention is illustrated, by way of example, in the accompanying drawings; modifications are also possible which can be made by skilled designers within the framework of the present invention:

FIGURE 1 is a front view of the road marker,

FIGURE 2 is a side view,

FIGURE 3 is a plan view looking down,

FIGURES 4, 5, and 6 show sections of the road marker when a resilient cap protecting the reflector is used, as follows:

FIGURE 4 shows two longitudinal sections of the road marker on lines V—V and VI—VI of FIGURE 3 looking in the direction of the arrows,

FIGURE 5 is a cross section of the road marker on line IV—IV of FIGURE 3, and

FIGURE 6 shows two cross sections of the road marker,

FIGURES 7, 8, and 9 show sections of the road marker when a non-resilient cap protecting the reflector is used, as follows:

FIGURE 7 shows two cross sections on lines V—V and VI—VI on FIGURE 3,

FIGURE 8 is a cross section on line IV—IV on FIGURE 3,

FIGURE 9 shows two cross sections on lines II—II and III—III on FIGURE 3,

FIGURE 10 shows a section on line V—V of FIGURE 3 when the marker is under the weight of a vehicle's wheel, the section on the left hand side of the centre line showing a resilient cap, and that on the right hand side showing a non-resilient cap,

FIGURE 11 shows a plan view looking down, of the reflector ring, the dotted lines indicating the wall thickness.

FIGURE 12 shows a longitudinal section of the reflector ring on line V—V of FIGURE 3,

FIGURE 13 shows a section on lines IV—IV of FIGURE 3 when the weight of a vehicle's wheel is exerted on the perimeter of the cap when the latter is of resilient material,

FIGURE 14 shows a section on lines II—II of FIGURE 3 when the weight of a vehicle's wheel is exerted on the perimeter of the cap when the latter is of non-resilient material.

In the embodiment illustrated, *a* on FIGS. 4 and 5 indicates the outer casing of the stud constructed in an extremely hard-wearing material such as cast iron. The outer casing should be embedded in a roadway to the thick horizontal black line indicating the road surface. The sloping sides of the casing will prevent the latter

from being pulled from the road, and the upward raking undersurfaces will permit displaced air to escape as the backfill of bitumen and sand, or cement and sand grout indicated by *j* is worked in. *b* on FIGS. 4 and 6 indicates the guides or studs already referred to which project from the outer casing and on which the reflector cap *c* when of resilient material moves with play in slots *k* when pressed by a passing load into the outer casing *a*. Similarly *b* on FIGS. 7, 9, and 14 indicate these studs when *c* is of non-resilient material indicated by *q*, the slots *k* being replaced by member *r* of nylon or similar plastic or sprung-copper pressings of the same shape as slots *k* able to pivot to permit the insertion of the cap member *q* into the casing *a*, the curved projection from *r* acting as a spring to return *r* to a vertical position after the insertion of *q* into *a* is completed. The cap *c*, FIGS. 4, 5, 6, 10, and 13, may be manufactured in a resilient material such as rubber or plastic, or as *q* as on FIGS. 7, 8, 9, 10, and 14 in a non-resilient material such as aluminium; it will be appreciated that the inverted U-shaped portion of *c* on the left of section on line V—V on FIG. 4, to which is glued industrial rubber sponge *d* for the washing of the reflector *g*, would be manufactured separately from *q* and would be positioned in *a*, as indicated by *s* on FIGS. 7 and 10 by having a stiff backing piece *u*, provided with holes of the same size and alignment as studs *b* pressed over *b* with a tight fit. In lieu of *s* on FIGS. 7 and 10, an alternative arrangement is the use of one piece of industrial sponge of the same length, breadth, and thickness of *s* and *d* on FIG. 7, with a sealed top surface to prevent the entry of small stones, and a similar stiff backing piece *u*. *e* on FIGS. 4, 5, 7, 8, and 10, is a projection on an inverted U-shaped resilient member *m* which returns the reflector and cap to normal reflecting position after the marker has been transversely by a vehicle. *e* locates with a push fit the reflector member *g* in alignment with lights from vehicles passing along a road in which these markers would be embedded. *g* is a rectangular-shaped transparent reflex reflector ring of either clear or coloured glass or plastic, thickened on two opposite sides to form lenses, with reflective material of natural or coloured foil, or silvering, affixed to the rear of the lenses and protected by waterproof material, the projection *e* entering a transverse cavity behind the lenses as shown on FIGS. 4, 5, 7, 8, 10, 11, 12, and 13, ensuring that the reflector ring *g* cannot fall out of the stud. *n* as on FIGS. 5 and 10, is a projection from the underside of member *m*, prevents over-deflection of the latter, and assists in the upward return of *g* to normal reflecting position. *m*, manufactured in elastic rubber or plastic, permits the cap and reflector ring to retract in any direction on being loaded as on FIGS. 4, 5, 7, 8, 10, 13, and 14, and deflection into recesses *o* on FIG. 5, the end portions of the legs

of *m* being fitted into grooves *p* as on FIGS. 5 and 8, in base of casing *a*. It will therefore be seen that all the components *a*, *c* or *q*, *s*, *r*, *g*, or *m*, are separately renewable and do not rely on the use of mechanical fixings such as nails, screws, dowels, or bolts, for their positioning and retention in the road marker, and that the assembly of these components will take only a few seconds.

While we have illustrated and described the preferred embodiment of our invention, we do not desire to be limited to the details of construction shown or described herein, except as defined in the appending claim.

What we claim as new and desire to secure by Letters Patent is:

A road marker comprising, an open hollow casing having a bottom wall and four vertical side walls, said bottom wall having a pair of parallel grooves, an inverted U-shaped resilient member seated in said hollow casing and having legs seated within said grooves and spaced from the side walls of said casing to provide clearance, the top of said U-shaped member having projections on the upper and lower sides thereof, a rectangular transparent reflex reflector ring having a central transverse aperture, said ring being thickened on two opposite sides to form lenses, the lenses having reflective material affixed to the rear of lenses, said reflective material being covered by a waterproof material, said ring being seated on top of said U-shaped member with the top projection of the U-shaped member fitting within said central aperture, said U-shaped member and reflector ring being partially enclosed by a resilient cap having depending sides with a recessed portion exposing said lenses of the reflector ring, said open hollow casing having opposed pairs of studs projecting inwardly from the vertical side walls thereof, enlarged apertures in the sides of said cap for receiving with clearance the inwardly projecting studs, a cleaning sponge mounted on inside of the said sides with apertures, of said cap facing said lenses, whereby when said lenses are depressed they will engage said sponges, said cap being smaller than the distance between the sides of said casing whereby it may roll or depress vertically when subjected to a lateral load applied at any point on the perimeter thereof.

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