

May 15, 1934.

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1,959,075

COLLAPSIBLE TRAFFIC SIGNAL

Original Filed Feb. 23, 1932

2 Sheets-Sheet 1

Fig. 1.

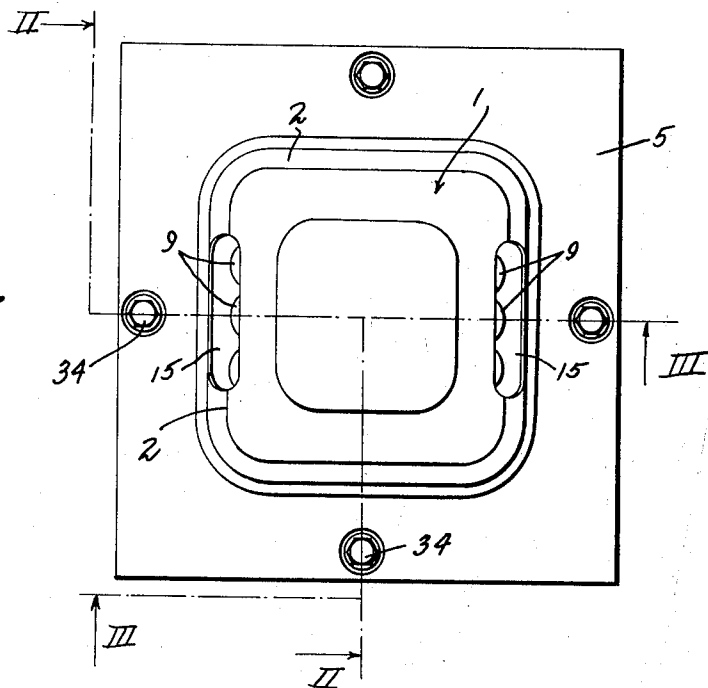
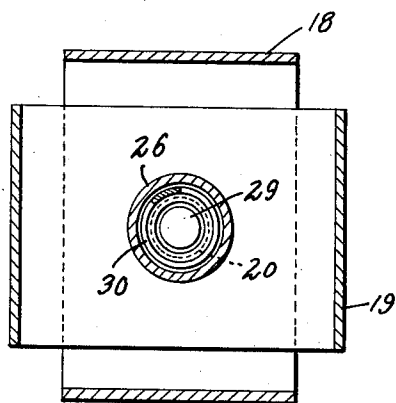


Fig. 4.

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Fig. 2.

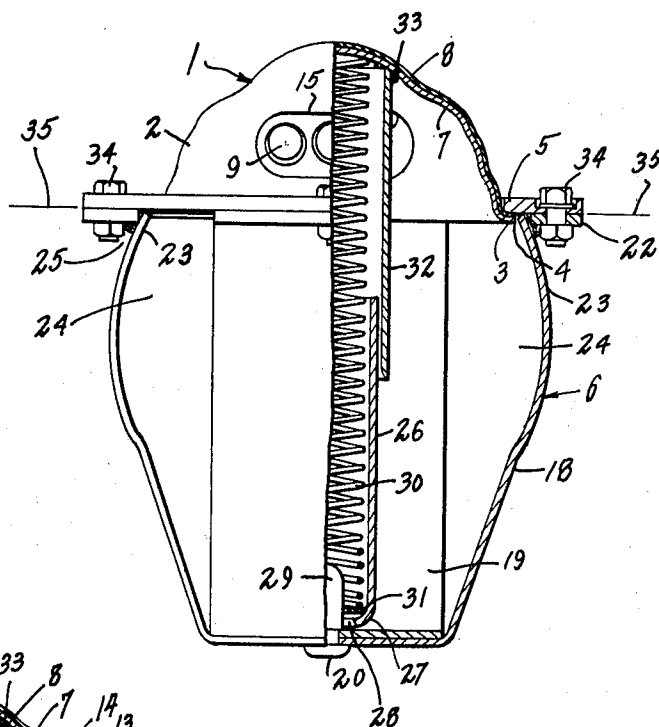
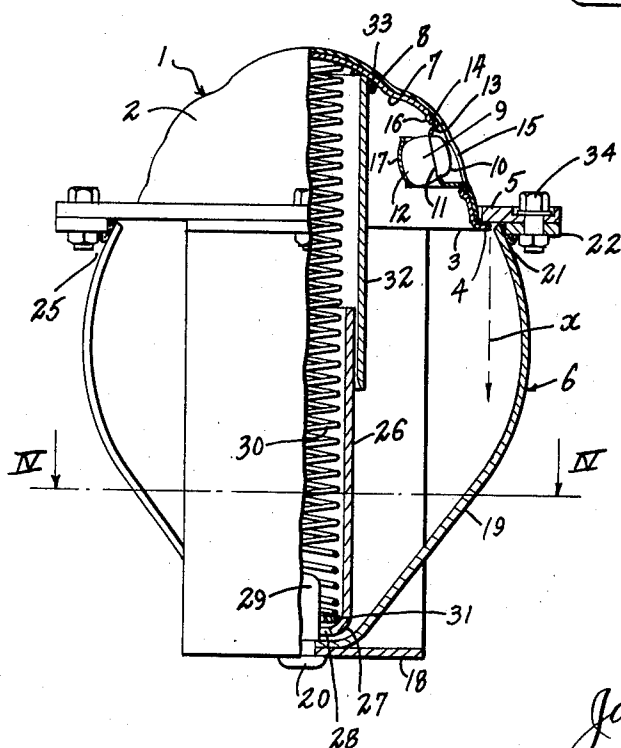


Fig. 3.

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UNITED STATES PATENT OFFICE

1,959,075

COLLAPSIBLE TRAFFIC SIGNAL

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8 Claims. (Cl. 40—125)

My invention relates to collapsible traffic signals, and has particular reference to a signal or traffic button adapted to be inserted in the surface of a roadway as a marker for vehicles. Collapsible traffic signals have been proposed in the prior art having the proposed object of permitting the signal to normally extend above the surface of the roadway, but capable of being depressed level with the surface of the roadway if struck by a vehicle passing thereover. However, all of these prior devices have had the disadvantage that due to their construction the friction between the projecting signal and the housing in which the same was designed was so great that when the button was struck by a vehicle traveling at any considerable rate of speed the extended signal housing would be clamped together in such manner as to prevent the descent of the signal.

It is therefore an object of my invention to provide a traffic signal of the collapsible type in which the extended dome and housing are so arranged as to reduce the friction thereof to a minimum degree and permit effective operation of the signal irrespective of the speed of the vehicle which strikes it.

Another object of the invention is to provide a traffic signal of the character described, in which the housing member is so shaped upon its interior that transverse forces which may be exerted as a result of the striking of the dome will be adequately taken care of so as to prevent the binding of the dome upon the housing.

Another object of the invention is to provide a traffic signal in which the extended dome is permitted considerable lateral motion as it descends into the housing and in which the employment of the signal is accurately guided to prevent undue displacement of the signal member.

Other objects and advantages will be apparent from a study of the following specifications, read in connection with the accompanying drawings, wherein

Fig. 1 is a top plan view of a collapsible traffic signal constructed in accordance with my invention;

Fig. 2 is a vertical, sectional view taken along line II—II of Fig. 1;

Fig. 3 is a vertical, sectional view taken along line III—III of Fig. 1; and

Fig. 4 is a detail, transverse sectional view taken along line IV—IV of Fig. 3.

Referring to the drawings, I have illustrated a collapsible traffic signal as comprising a dome member 1, substantially pyramidal in shape, the

side walls 2 of which rise with considerable abruptness from the lowermost portion or base 3 of the dome member. The base of the dome member is illustrated as extending outwardly to form a peripheral flange designated by the reference character 4 for the purpose of engaging the underneath side of a retaining flange or ring 5 to be secured to a housing 6.

The dome 1 is illustrated as being formed from a plurality of nested laminations of suitable material, such as steel stampings. For example, the inner lamination 7 may be formed of any relatively inexpensive steel which has the property of resisting distorting forces, while the outer shell or lamination 8 may be formed of some material which will take a relatively high polish or which will resist corrosion, stain, rusting, and other deteriorative effects which would tend to discolor or diminish the pleasing appearance of the material.

As is illustrated, the dome member 1 may be provided with a plurality of sets of reflectors 9 each of which is preferably constituted of a suitably shaped solid piece of glass or similar material having a curved outer surface 10 terminating in a radial shoulder 11 spaced a considerable distance from the rear end 12 of the reflector. A bracket for supporting the reflector or reflectors in the housing may comprise a stamping of sheet metal 13 having a peripheral flange 14 formed thereon adapted to be received in the space between the inner lamination 7 and the outer lamination 8 of the housing member 1 as by means of forming a suitable opening 15 through both of the shells or laminations extending over the area to be covered by the bracket 13 and bending rearwardly to form a border flange 16 around the opening to provide the necessary space between the two laminations. The bracket 13 may be provided with a suitable series of circular openings adapted to receive the curved outer end of the reflector 9 so that the shoulder 11 on the reflector abuts the periphery of these circular openings. A backing plate 17 may be provided to hold the reflectors in the assembled position.

By referring particularly to Figs. 2 and 3, it will be observed that the dome member 1 is adapted to be received in the housing member 6, which housing member 1 is composed of two relatively long strips of metal 18 and 19 arranged crosswise of each other and secured at their centers by means of a suitable securing device such as a rivet 20. The strip of metal 19 is illustrated as having both of its ends bent upwardly to form a curved side for the housing 6. It should be

observed that each end of the strip 19 is bent into a configuration extending outwardly a considerable distance beyond the normal vertical path described by the outer edge of the flange 4 of the dome 1, the metal 19 being bent inwardly near its upper end at 21 to engage a retaining ring or flange 22 at a position close to the periphery of the flange 4. The curved metal 19 therefore provides a side wall for the housing 6 which is formed with an outward arc extending beyond the normal vertical path of movement of the dome 1.

In like manner, the strip of metal 18 has each of its ends bent upwardly around the side edges of the strip 19, each of the ends extending upwardly and outwardly to form a similar arc at 23 to that arc which is formed by the ends of the strip 19.

The upper ends of each of the strips 18 and 19 are illustrated as being welded to the peripheral flange 22 so that the peripheral flange 22 and the two strips 18 and 19 constitute a unitary housing member, the corners 24 of which are open.

The assembled flange 22 and strips 19 may be set into a suitable opening in the roadway and concrete or similar material may be filled in around the housing 6 in such manner that a portion of the filling material will extend into the space 25 between the inwardly curved upper end of each of the ends of the strips 18 and 19 and the adjacent flange 22. Hence no other means of securing the housing in the road surface is required, as the material filling in the space 25 engages and holds the housing against either displacement or removal.

The housing member so set may then be assembled with the dome member as by inserting into the housing a guide tube 26 which has its lower end 27 bent inwardly to form a curved end upon the tube. The open end 28 of the tube 26 is placed directly over the projecting end 29 of the rivet 20, which preferably is of such construction that its end 29 extends a considerable distance into the interior of the housing 6.

A spring 30 may then be inserted into the tube 26 to abut upon a suitable washer 31 located at the bottom of the tube 26. The dome member 1 is illustrated as having a guide tube 32 secured to its inner surface immediately above the apex of the pyramid shape of the dome 1, such tube 32 being secured in any suitable manner as by welding the upper end of the tube to the inner lamination 7 of the dome, as is indicated at 33. Preferably the size of the tube 32 is such as to receive therein the upwardly extending end of the tube 26, since by employing the upper tube 32 of larger diameter a greater area is provided for welding the tube 32 to the housing 1. The dome 1 may then be assembled upon the housing by telescopically engaging the tube 32 with the spring 30 and then pressing the dome downwardly to telescopically engage the tube 26 within the tube 32.

The dome 1 may then be depressed to a position at which the flange 4 lies below the plane of the flange 22, after which the retaining ring or retaining flange 5 may be placed over the dome and secured to the housing flange 22 as by means of suitable bolts or screws 34.

The operation of my device is as follows: The assembled dome and housing, as described hereinbefore, when placed in the roadway permits the dome 1 to normally project above the surface of the roadway (indicated by the reference character 35) in such position that it may be readily

visible to drivers of vehicles passing over the roadway. The projection of the dome 1 is such that the reflectors 9 normally lie above the plane of the roadway so that they, too, may be readily visible to the drivers of vehicles on the road. However, if a vehicle should be driven over the dome 1, the forces exerted by the contact will force the dome downwardly within the housing 1, and thus remove the dome as an obstruction to the passage of the vehicle. It will be understood that the force which will be exerted by contact between the vehicle and the dome will be directed laterally and downwardly relative to the dome. For example, this force will be exerted in the direction of the arrow X and dependent upon the speed of the vehicle which strikes the dome the direction of this force will approach the housing in proportion to the increase in speed of the vehicle. That is, the normal inertia of the dome 1 against movement will be such that the effective force tending to drive the dome downwardly will be more nearly horizontal than vertical and hence the dome 1 will be struck with a considerable lateral force tending to swing the dome in a lateral direction rather than to depress it. However, the force of impact will result in a downward movement of the dome. The exertion of the lateral force will tend to push the dome sidewise against the flange 5 and against the inner surface of the plate 19, so that as the dome 1 is depressed it would bind upon the inner surface of the plate 19. However, by providing the outward curve upon the plate 19, a considerable lateral movement of the dome may be permitted without severe friction being exerted between the flange 4 and the surface of the plate 19. That is, the angle at which the upper portion of the plate 19 extends outwardly may be so designed as to present an angular surface to the flange 4 such that the lateral movement of the dome will be employed to aid in the downward movement of the dome and thus prevent binding of the dome upon the sides of the housing. The angle may be computed to adapt the dome for ready depression upon receiving an impact of an automobile or other vehicle traveling at any given rate of speed.

It will be observed that the telescopically assembled guide tubes 26 and 32 will tend to guide the dome toward the vertical center line of the base though lateral displacement of the dome by impact may occur. Moreover, the employment of the guide tubes 26 and 32 insures that a downward force applied anywhere over the area of the dome will cause the dome to be depressed in a substantially vertical direction except for the small amount of lateral displacement which is permitted, as hereinbefore described.

However, upon the return movement there is a tendency for the dome to move laterally, due to the reaction of the wheel passing off of the dome, hence the same curvature which assisted in the reduction of friction on the downward movement assists in reducing the friction on the upward movement by providing such lateral space as is required to overcome the slight lateral displacement of the dome.

Moreover, the curved lower end of the tube 26 constitutes substantially a ball and socket connection between the tube 26 and the housing 6, thereby permitting the lateral movement of the dome without injury to the assembled structure.

If it is desired at any time to remove the signal, such as where changing traffic conditions no longer require the location of such dome or signal,

the device may be readily removed by merely removing the flange 5, removing the dome 1, the spring and tubes 30, 32 and 26, after which the opening left by the removal may be filled in with suitable road material and the housing left in the roadway. Since the housing merely comprises the two strips of metal and their retaining flange and rivet, this amount of material is relatively inexpensive and therefore can be discarded without great expense and in fact the discarding of the material will ordinarily be less expensive than would be required to open the roadway necessary for its removal.

It will be further observed that by making the housing 6 of the two crossed strips of metal, the corners 24, which are left open, provide ample space for any dirt, dust or debris to pass out of the housing, preventing clogging of the housing and possible interference with the operation of the dome.

While I have illustrated and described the preferred embodiment of my invention, I do not desire to be limited to the details of construction shown or described herein, except as defined in the appended claims.

I claim:

1. In a collapsible traffic signal, a dome member having side walls extending upwardly and inwardly from a base toward a common center, a housing member for receiving said dome member when depressed, said housing member having an open top, the inner periphery of which is substantially equal to the periphery of the said base of said dome, means normally maintaining said dome in extended position with the base of said dome lying immediately below the plane of said open top, said housing having side walls extending outwardly and downwardly from said open top to provide an angular surface of engagement between said dome and housing to reduce friction between the base of said dome and said housing member when said dome is moved downwardly under lateral and vertical impact.

2. In a collapsible traffic signal, a dome member having side walls extending upwardly and inwardly from a base toward a common center, a housing member for receiving said dome member when depressed, said housing member having an open top, the inner periphery of which is substantially equal to the periphery of the said base of said dome, means normally maintaining said dome in extended position with the base of said dome lying immediately below the plane of said open top, said housing having side walls curving outwardly and downwardly from said open top to provide an angular surface of engagement between said dome and housing to reduce friction between the base of said dome and said housing when said dome is moved downwardly under lateral and vertical impact.

3. In a collapsible traffic signal, a dome member having side walls extending upwardly and inwardly from a base toward a common center, a housing member for receiving said dome member when depressed, said housing member comprising a peripheral flange forming an open top and side walls extending outwardly and downwardly from the inner periphery of said peripheral flange, means normally maintaining said dome in extended position with the base of said dome lying immediately below the plane of said open top.

4. In a collapsible traffic signal, a dome member having side walls extending upwardly and inwardly from a base toward a common center, a

housing member for receiving said dome member when depressed, said housing member comprising a peripheral flange forming an open top and having side walls extending from said peripheral flange to a bottom, the portion of said side walls immediately below said peripheral flange extending outwardly and downwardly, and means normally maintaining said dome in extended position with the base of said dome lying immediately below the plane of said open top.

5. In a collapsible traffic signal, a dome member having side walls extending upwardly and inwardly from a base toward a common center, a housing member for receiving said dome member when depressed, said housing member comprising a peripheral flange forming an open top, and a pair of elongated plates secured in cross relation to each other and having the ends thereof bent toward each other to engage said peripheral flange.

6. In a collapsible traffic signal, a dome member having side walls extending upwardly and inwardly from a base toward a common center, a housing member for receiving said dome member when depressed, said housing member comprising a peripheral flange forming an open top, and a plurality of substantially rectangular side walls each extending from said peripheral flange to a common bottom, the portion of each of said side walls immediately below said peripheral flange being bent outwardly relative to said flange.

7. In a collapsible traffic signal, a dome member having side walls extending upwardly and inwardly from a base toward a common center, a housing member for receiving said dome member when depressed, said housing member having an open top, the inner periphery of which is substantially equal to the periphery of the said base of said dome, and means normally maintaining said dome in extended position with the base of said dome lying immediately below the plane of said open top, said housing having side walls extending outwardly and downwardly from said open top to provide an angular surface of engagement between said dome and housing to reduce friction between the base of said dome and said housing member when said dome is moved downwardly under lateral and downward impact, and means for resiliently guiding said dome to bias said dome to movement in a vertical direction.

8. In a collapsible traffic signal, a dome member having side walls extending upwardly and inwardly from a base toward a common center, a housing member for receiving said dome member when depressed, said housing member having an open top, the inner periphery of which is substantially equal to the periphery of the said base of said dome, means normally maintaining said dome in extended position with the base of said dome lying immediately below the plane of said open top, said housing having side walls extending outwardly and downwardly from said open top to provide an angular surface of engagement between said dome and housing to reduce friction between the base of said dome and said housing member when said dome is moved downwardly under downward and lateral impact, and means for resiliently guiding said dome to bias said dome to movement in a vertical direction, said biasing means comprising a tube secured to the interior of said dome and a second tube movably secured to said housing member and telescopically engaging said-named tube.

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