July 11, 1972 L. H. BOND 3,676,191

METHOD OF COATING A VEHICLE HEADLIGHT LENS

Filed Dec. 22 1969 2 Sheets-Sheet 1

Fig. 1

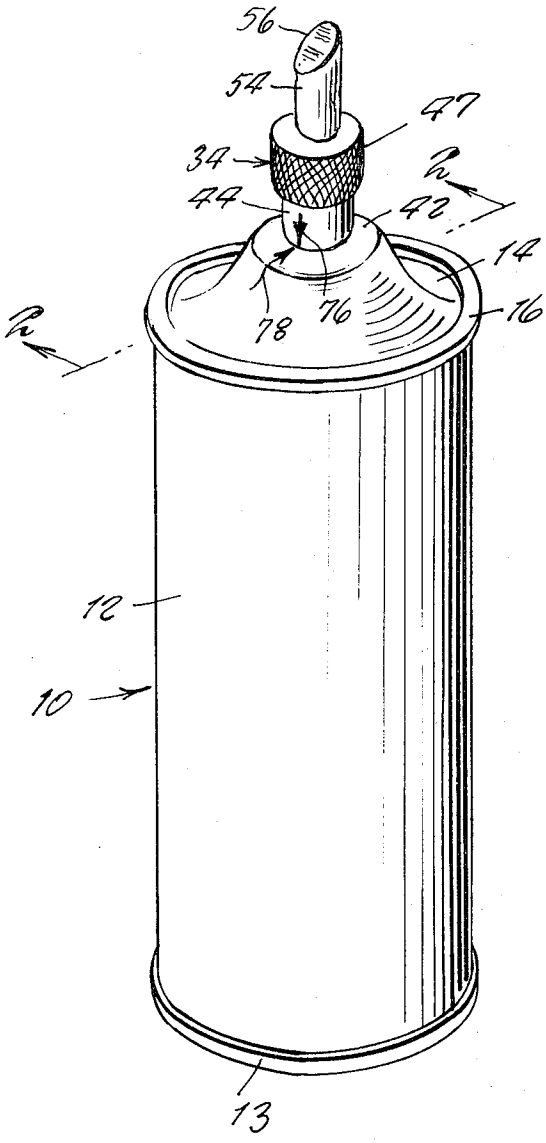


Fig. 2

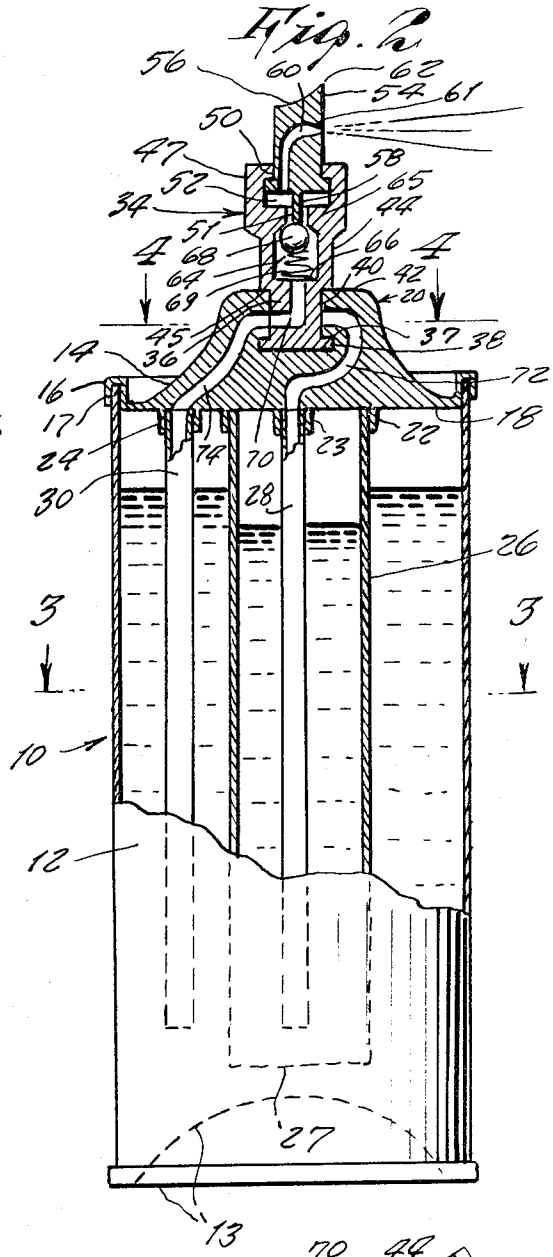
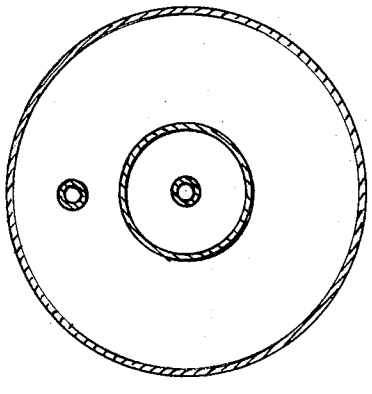


Fig. 3



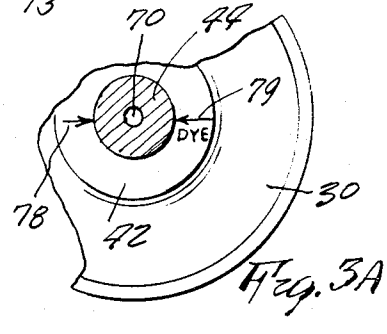


Fig. 3A

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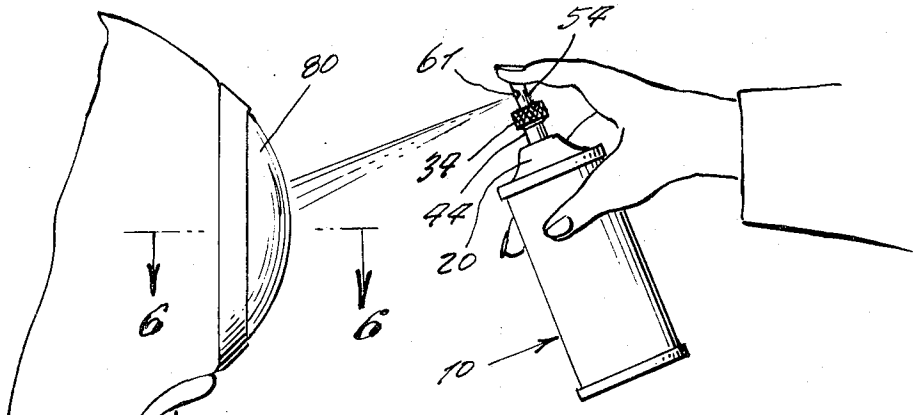
Fig. 5



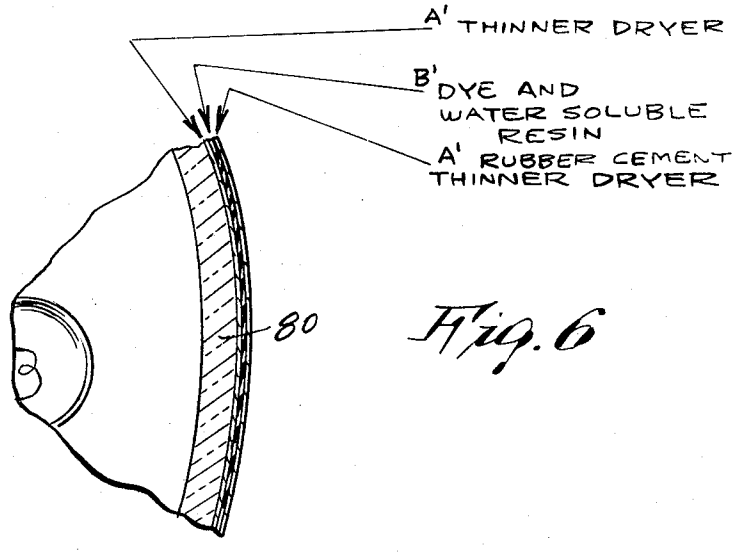


Fig. 6

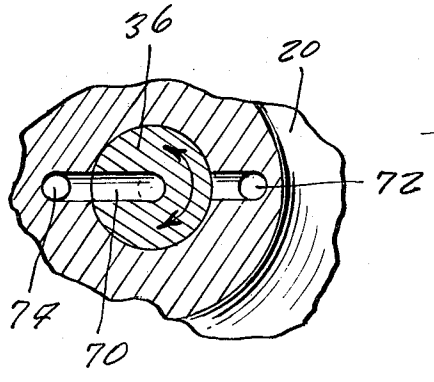


Fig. 4

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3,676,191

METHOD OF COATING A VEHICLE HEADLIGHT LENS

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Int. Cl. B44d 1/14; C03c 17/32
U.S. Cl. 117—77 2 Claims

ABSTRACT OF THE DISCLOSURE

A spray applicator of the aerosol container type having two separate receptacles therein and a two-way rotatable valve structure including a finger depressible plunger nozzle. Separate passages connect each receptacle with the rotatable valve structure which when rotated in one selected position and depression of the plunger nozzle that opens a valve in the valve structure will provide for the flow of a pressurized liquid from one receptacle through one passage through the valve structure for discharge as a spray from the plunger nozzle. Rotation of the valve structure to another selected position will effect a like spray discharge from the other receptacle. Contained in one receptacle is a liquid adhesive mixture of rubber cement, a thinner and a drying agent. Contained in the other receptacle is a liquid mixture of a yellow dye, a water soluble resin, a spreading agent and a deforming agent. Coating a headlight lens of a vehicle with three films of spray the intermediate film being a spray of the liquid dye mixture will convert the white light beam of the headlight to a yellow light beam that will penetrate fog.

This invention relates to fog lights and has for its primary object providing on the outside surface of a conventional vehicle headlight lens a sprayed on film that will convert the white beam of light shining through the headlight lens to a yellow beam of light that will more easily penetrate fog and increase visibility.

Another object of this invention is to apply the film on the outside surface of the headlight lens by a combination of spraying separate liquids from an aerosol container to form layers of separate films that will adhere to the lens surface and to each other, there being contemplated the use of two liquid mixtures one being an adhesive mixture and the other a dye mixture.

A further object of this invention is to first spray the adhesive liquid mixture on the lens surface to provide a base film, then covering the base film with a sprayed on film of the liquid dye mixture to be followed by spraying over the dye mixture film, a film layer of the adhesive mixture to seal and protect the dye mixture film.

Another object of this invention relates to having the multiple film sprayed on the headlight lens surface readily removable either by peeling the same off of the lens or by a scraping action.

Yet another object of this invention is to provide a spray applicator of the aerosol container type embodying two separate receptacles in one of which is contained the pressurized adhesive liquid mixture and in the other of which is contained the pressurized liquid dye mixture.

A further object of this invention is to provide the spray applicator with a cover top carrying a rotatable two-way valve structure having a plunger nozzle depressible to unseat a spring pressed ball valve and two passages in the cover body each individually opening into the valve structure, there being a tube in each receptacle each respectively connected to one such passage such that rotation of the valve structure to one selected position will provide for discharge of the liquid from one receptacle through the valve structure and plunger nozzle for spray

discharge therefrom, there being a like discharge of the liquid from the other receptacle when the valve structure is rotated to another selected position.

A still further object of this invention is to provide the rotatable two-way valve structure with an indicia marking, and the cover top with two separate indicia markings to determine proper positioning when rotating the valve structure to selectively align the passage in the valve structure with one or the other of the two passages in the cover body to effect selected discharge of liquid from one or the other of the separate receptacles.

Further objects of the invention will appear as the description proceeds.

To the accomplishment of the above and related objects, my invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that change may be made in the specific construction illustrated and described within the scope of the appended claims.

In the drawings to which reference will be made in the specification:

FIG. 1 is a perspective view of the spray applicator and valve structure of the invention which is of the aerosol type.

FIG. 2 is a partial vertical cross-sectional view taken on line 2—2, FIG. 1.

FIG. 3 is a transverse cross-sectional view taken on line 3—3, FIG. 2.

FIG. 3A is a fragmentary detail view of the top of the applicator with part of the valve structure in section, and showing the location of indicia markings thereon.

FIG. 4 is a detail cross-sectional view taken on line 4—4, FIG. 2.

FIG. 5 illustrates the manner of applying by spraying from the spray applicator the film coating on a headlight lens surface.

FIG. 6 illustrates in cross-section a portion of a headlight lens with the separate film layers applied thereto that are bonded to form a single film to provide the fog light.

Referring in greater detail to the drawings an aerosol container **10** is shown consisting of a cylindrical body **12**, an inwardly concaved bottom **13** and a cover top **14**. The cover top **14** is formed with a peripheral grooved flange **16** which fits over the upper terminal end **17** of the cylindrical body and is permanently secured in sealed relation thereto in any desired manner. The cover top **14** is formed with a flat bottom **18** and a central upstanding frusto-conical solid extension **20**. As with the cover top **14** the concaved bottom **13** is similarly secured in sealed relation to the cylinder body in any desired manner, the bottom **13** being concaved as shown to withstand the pressure of the gas within the container and the obviate bulging of the bottom.

Depending from the flat bottom surface **18** of the cover top **14** is an axial circular flange **22** of relatively wide diameter and at least one-third the inside diameter of the cylinder body **12**. Axially within the circular flange **22** is a depending smaller diameter circular flange **23**, and to one side of the circular flange **22** is a like smaller diameter circular flange **24**. An inner cylinder **26** provided with a closed bottom **27** has its upper end fitted within circular flange **22** in tightly sealed engagement in any desired manner. The length of the cylinder **26** is such that its bottom **27** is located slightly above the concave bottom **13** of the cylindrical body **12**, as seen in FIG. 2.

A tube **28** open at each end has its upper end fitted within inner circular flange **23** in tightly sealed engagement therewith in any desired manner. Likewise a similar tube **30** open at each end has its upper open end fitted within the outer circular flange **24** in tightly sealed engagement therewith in any desired manner. Tubes **28**, **30** at their

lower ends terminate in spaced relation, respectively to bottoms 27 and 13.

Carried axially by the frusto-conical extension 20 of cover top 14 is a rotatable two-way valve body or structure 34. The valve body or structure 34 is provided with a lower cylindrical spindle section 36 having at its lowermost end a radial flange 37 that fits within an annular groove 38 formed centrally in the frusto-conical section 20, as seen in FIG. 1. Provided axially in the frustoconical extension 20 is an axial bore that rotatably receives the spindle section 36, it being understood that the radial flange 37 also rotates in its annular groove 38. The frustoconical section may be initially horizontally and/or vertically divided (not shown) in order to assemble the spindle section 36 and flange 38 in its described position and the divided parts secured together in any desired manner so that the spindle section is locked against axial outward movement of the frustoconical section 20. Another method of assembly would be to mold the frusto-conical section 20 about the spindle section 36 particularly if at least the frusto-conical section 20 is made of a plastic material. The top or upper surface 42 of the frusto-conical section 20 is formed flat.

Above the spindle section 36 and integral therewith is a cylindrical valve section 44 of enlarged diameter forming a lower annular shoulder 45 that seats on the flat top surface 42. The entire construction of the spindle section 36, flange 37, annular groove 38, axial bore 40 and seating engagement of shoulder 45 on top surface 42 is such as to provide a non-leak proof sealed engagement of parts while permitting rotative movement of the spindle section 36.

The valve section 44 carries at its upper end an enlarged diameter hand manipulatable knurled knob 47. Knob 47 is formed with an upper axial bore 50 and a lower smaller diameter axial bore 51, and a cylindrical chamber 52 therebetween, the diameter of chamber 52 being larger than the diameter of the upper axial bore 50. Fitted for axial as well as rotative movement in upper axial bore 50 of knob 47 is a depressible plunger nozzle 54, the lower end of the nozzle 54 having a radial flange 55 slidable within chamber 52. The upper and lower end walls of chamber 52 serve as limit stops for the axial movement of plunger nozzle 54, as clearly shown in FIG. 2. Plunger nozzle 54 has its upper or top surface 56 concaved to serve as a finger engaging surface for depressing the nozzle. Integral with the plunger nozzle 54 and depending axially from the bottom thereof is a small diameter stem 58 of less diameter than the diameter of lower axial bore 51. Provided in the plunger nozzle 54 is a passage 60 of inverted L-shape, the lower open end of passage 60 opening into chamber 52 and to one side of stem 58, the upper open end of the passage 60 being tapered or constricted as at 61 being located in the cylindrical wall of the plunger nozzle vertically below the high point 62 of finger engaging surface 56 at the top of the plunger nozzle. The constricted or tapered opening 61 of passage 60 forms a spray nozzle.

Provided within the cylinder valve section 44 is a valve chamber 64 having an upwardly tapered upper wall 65 forming a valve seat and a flat lower wall 66. A ball valve 68 is adapted to seat in the upwardly tapered upper wall or valve seat 65 to close the lower axial bore 51 through which stem 58 extends and a compression coil spring 69 seated on the lower chamber wall 66 engages the ball valve 68 to forcibly hold the same in seated engagement in valve seat 65.

Formed in spindle section 36 is an L-shaped axial passage 70 the vertical leg of which opens into valve chamber 64 and the horizontal leg of which opens in the cylindrical wall surface of the spindle section 36, as seen in FIGS. 2 and 4. Also provided in the frusto-conical extension 20 are two passages 72 and 74. Passage 72 has its lower open end in registry with the upper open end of tube 28 within inner cylinder 26, and its upper open end opening into axial bore 40 receiving spindle section 36. Passage 74 has its lower open end in registry with the upper open end of tube 30 in cylinder body 12 and its upper open end opening into axial bore 40. The upper open ends of passages 72 and 74 are in horizontally diametrically opposed relation, 180° apart and in line with the open end of the horizontal leg of passage 70 in the lower spindle section 36, see FIGS. 2 and 4. In the position of the parts shown in FIG. 2, and FIG. 4, it is seen that there is a direct flow of fluid (as will be hereinafter described) from tube 30, passage 74 and passage 70 into valve chamber 64. When the spindle section 36 is rotated by turning knob 47 180° passage 70 in the spindle section 36 will be brought into registry with passage 72 such that there will be a direct flow from tube 28, passage 72 and passage 70 into valve chamber 64.

Applying finger pressure on plunger nozzle 54 will cause the same to move downwardly such that stem 65 will unseat ball valve 68 whereby depending on the location of the rotatable valve body, the flow of fluid will move past the ball valve upwardly through passage 51, chamber 52 and passage 60 to be discharged as a spray from the constricted opening 61.

Referring to FIG. 2, cylinder body 12 forms an annular receptacle A for one type of liquid there being a pressurized gas within the receptacle A above the level of the liquid to force the same upwardly through the tube 30. In a similar manner inner cylinder 26 which is completely sealed off from receptacle A provides a receptacle B for a different type of liquid subjected to a gas under pressure to force the liquid upwardly through the tube 28.

In accordance with the purposes of this invention receptacle A contains a liquid mixture compounded of rubber cement, a thinner and a drying agent. Receptacle B contains a liquid mixture compounded of a dye, a water soluble resin, a spreading agent and a de-foaming agent.

Provided on the exposed wall surface of the cylinder valve section 44 is an indicia mark 76 in the form of an arrow, and on the outer wall surface of the frusto-conical extension 20 and the top flat wall 42 thereof is an indicia mark embodying (the word "Dye" and) an arrow 78. With arrows 76, 78 in alignment as shown in FIG. 1, passage 70 in spindle section 36 will be in communication with passage 74, see FIGS. 1 and 4, such that the liquid mixture in receptacle A will be sprayed on depression of plunger nozzle 54. A suitable indicia mark which may be an arrow 79 identified by the word "Dye," see FIG. 3A, is further provided on the top surface 42 diametrically opposite arrow 78, so that when the spindle section is rotated by turning knob 47 so that arrow 76 registers with the "Dye" indicated arrow 79, FIG. 3A, opposite arrow 78, the liquid mixture in receptacle B will be sprayed on depression of the plunger nozzle 54.

The aerosol container 10 with separate receptacles A and B constitutes a spray type applicator making it convenient and easily and quickly usable to coat the headlights of a vehicle with a film that will convert the white beams of light into yellow fog lights. FIG. 5, illustrates a headlight 80 and the manner of using the spray applicator 10 for applying the fog light film to the outer surface of the headlight. The two-way valve 34 permits selective spraying of the liquid mixtures in receptacles A and B.

Receptacle A is provided with a liquid mixture consisting of:

Rubber cement, thinner, and a drying agent.

The liquid mixture contained in receptacle B consists of:

Dye, water soluble resin, spreading agent, and a defoaming agent.

The dye mixture contained in receptacle B is a rapid filter yellow consisting of a mixture of Naphthol yellow and Quinoline yellow. A spreading agent such as Saponin is used to cause a uniform dispersion of the dye. Saponin

is a preferred spreading agent. A defoaming agent such as propyl alcohol, octyl alcohol, or heptyl alcohol is used to inhibit undesirable foaming.

An example of a preferred soluble resin used in the liquid dye mixture is polyvinyl acetaldehyde acetal resin having a polyvinylacetate content of 1.6%, a hydroxyl content corresponding to 22.1% polyvinyl alcohol, and a polyvinyl acetal content of 76.3%.

The rubber cement is in the form of the conventional solution of rubber cement containing ordinary commercially used solvents used as thinning and drying agents. The exact composition of the solvent thinning and drying agent is not germane to this inventive concept, since the use of any known thinning or drying agent can be used to form the rubber cement solution. The function of the rubber cement in solution is to provide a base for the dye preventing the dye from permanently staining the lens and also facilitating stripping of the coating from the lens. The outer layer of rubber cement seals and protects the dye from wear and tear during its use in fog conditions and also facilitates stripping by adhering to the inner layer of rubber cement trapping the dye layer therebetween.

The proportions, by volume, preferred for the dye mixture can be within the following limits:

	Percent
Water soluble resin	20–80
Saponin (spreading agent)	0–10
Octyl alcohol (defoaming agent)	3–20

In applying the fog light film to the headlight, see FIG. 6, there is first applied as a spray to the headlight lens, a thin film of the rubber cement mixture A' from receptacle A to provide a protective layer. Then the liquid dye mixture from receptacle B (turning the valve knob **34** to the Dye arrow indicia **79**) is sprayed on top of the first layer as a film B', followed by a deposition of a third layer of rubber cement mixture A' to act as a sealer. The first film A' is a protective coat providing a base for the intermediate film B' which has the dye, thereby protecting the headlight from being stained by the dye. The third or outer layer A' seals the intermediate film B' preventing the dye from running.

While the combined three-film application of liquid mixtures A', B' and A' is preferred and more efficient, the liquid mixtures forming films A' and B' could be mixed together and sprayed on in one application.

After the mixtures have been applied and dried in place,

the film can easily be peeled off by hand or by a scraping tool (of plastic).

The combined film causes projection of a yellow light which is more effective in the penetration of fog than white light.

What I claim is:

1. The method of coating a vehicle headlight lens which comprises spraying on the lens, in sequence,

(a) a rubber cement mixture which forms a protective base layer on said lens,

(b) a liquid dye mixture comprising a colored dye, a water soluble resin, a spreading agent and a defoaming agent, which dye mixture forms an intermediate colored layer on said base layer, wherein said water soluble resin is a polyvinyl acetal, and

(c) a rubber cement mixture which forms an outer sealer layer on said intermediate layer,

wherein said base layer protects the lens from being stained by the dye and said outer layer seals the intermediate layer preventing the dye from running.

2. The method of claim **1** wherein said dye is a rapid filter yellow dye consisting of a mixture of Naphthol Yellow and Quinoline Yellow, said spreading agent is saponin and said defoaming agent is propyl alcohol.

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RALPH HUSACK, Primary Examiner

U.S. Cl. X.R.

117—6, 33.3, 72, 104 A, 124 E; 222—135, 144, 394