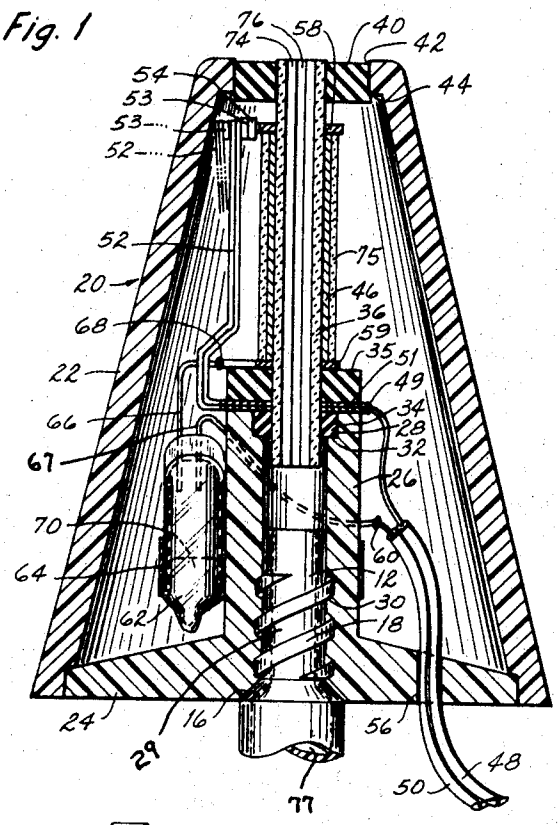
April 8, 1969 C. S. GARDNER 3,437,791

ELECTRICAL HEATING ATTACHMENT FOR AEROSOL CANS

Filed Oct. 21, 1965

Fig. 1



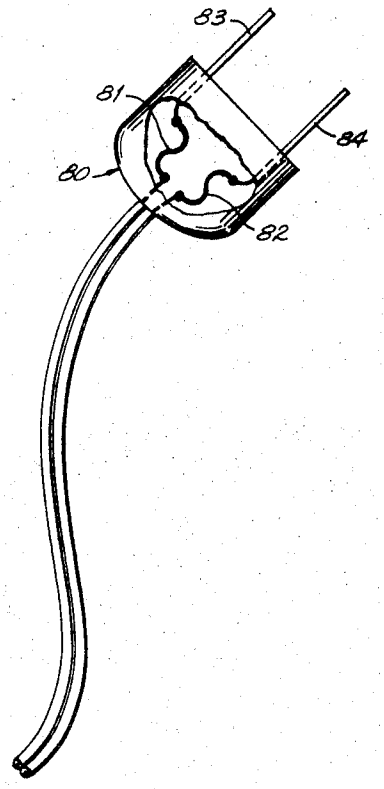


Fig. 2

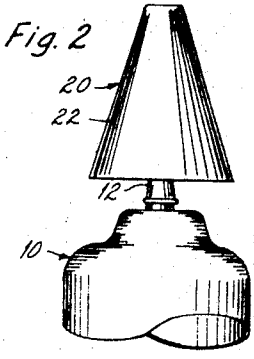


Fig. 3

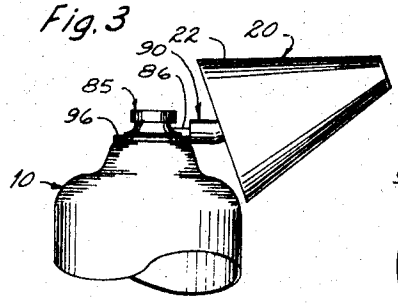


Fig. 4

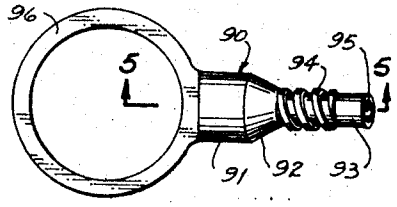


Fig. 5

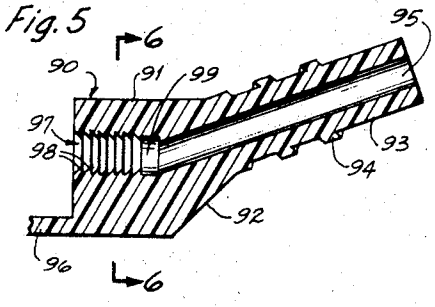
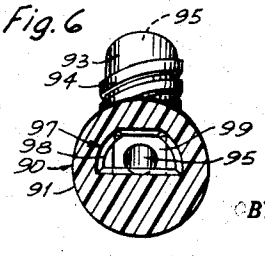


Fig. 6



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ELECTRICAL HEATING ATTACHMENT FOR AEROSOL CANS

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3 Claims

ABSTRACT OF THE DISCLOSURE

A heating attachment detachable securement to the valve stem of an aerosol can has a sealed chamber with a discharge passage extending therethrough. The passage is in communication with the valve stem and receives products discharged from the can. A thermostatically controlled electric heating coil is provided about the passage to heat the discharged products. A gravity operated switch in the housing permits energization of the heating coil only when the can is tilted. Short circuit protection is provided by fuses located in the plug portion of the attachment power cord. An adapter permits use of the attachment with cans having horizontally oriented discharge valves.

This invention relates to heating means and more particularly to an electrical heating unit particularly adapted to be utilized in combination with aerosol cans. The invention is an improvement of U.S. Patent 3,069,528, issued Dec. 18, 1962, to Charles S. Gardner.

The heating unit disclosed in the above identified patent performs admirably to provide heated shaving cream foam at an optimal temperature for the most comfort in shaving. When used, and stored properly, there is little danger that it will overheat. Inasmuch as there is the possibility that it will not be, however, it would be particularly desirable to have incorporated therein a control device to prevent it from overheating. Also, there is a possibility that the heating unit may be dropped and damaged to the extent that a leak may develop through cracks or breaks in the outer casing, or through separations in joints of abutting portions of the composite casing, or through the aperture admitting the electrical wires, or through the nozzle itself. Such leakage could allow conductive liquid (water or other similar liquid) to produce a short circuit which may be hazardous to the user. In this respect, it would also be desirable to incorporate in the heating unit a safety device to eliminate this hazard. The heating unit of the above identified patent is adapted to fit only one type of aerosol nozzle. At the present time there are many nozzles, for example, side oriented nozzles to which the heating unit of said patent cannot be adapted. Accordingly, it is an object of this invention to provide an improved heating unit and particularly a heating unit which is adapted for use with aerosol cans to heat the contents of the can as the contents is discharged.

It is another object to provide an improved heating unit of the type described having a safety control device to preclude its overheating.

It is a further object to provide an improved heating unit of the type described having a safety control device for eliminating electrical hazard to the user.

Still another object is to provide an improved heating unit which is adapted for use with various types of aerosol nozzles.

Other objects and advantages to be derived from the present invention will be obvious in the following description and enumeration of the accompanying drawing in which:

FIG. 1 is a sectional view of a heating unit exemplary

of the invention, including the male electrical plug, and including the valve stem portion of a typical vertically oriented aerosol valve;

FIG. 2 is an elevational front view showing the heating unit of FIGURE 1 mounted on a typical aerosol can having a vertically oriented aerosol nozzle;

FIG. 3 is an elevational front view showing the heating unit of FIGURE 1 mounted on an aerosol can having a horizontally oriented aerosol nozzle;

FIG. 4 is a top plan view of an adapter for fitting the heating unit of FIGURE 1 to a horizontally oriented aerosol nozzle;

FIG. 5 is a sectional view taken substantially along lines 5—5 of FIGURE 4; and

FIG. 6 is a sectional view taken substantially along lines 6—6 of FIGURE 5.

Similar reference characters refer to similar parts of the original invention and throughout the several views of the drawing.

Referring now to the drawing, and particularly to FIGURE 1 thereof, the numeral **20** represents a heating unit which can be affixed to the valve stem **12** of an aerosol valve (not shown) for heating effluent foam, such as shaving cream foam, as it is discharged from an aerosol can **10** (FIG. 2). The valve stem is urged into its normally closed position by a spring (not shown) within the aerosol valve which abuts flange **16**. In the conventional usage of the aerosol can **10**, the can **10** is inverted and finger pressure is applied on the valve stem **12**, to operate the normally closed aerosol valve. The pressure within the can **10** will then force the contents thereof outwardly through a cavity **77** in the valve stem **12**. Upon the release of finger pressure, the spring will carry the valve stem **12** back to its normal position to thereby close the valve. Threads **18** may be provided on the exterior surface of valve stem **12** for threadably receiving a cap thereon, however, in most cases the cap is press-fitted onto the valve stem, or to the aerosol can.

The heating unit **20** further includes a frustro-conical shell **22** which is preferably of an insulative generally rigid material such as plastic. A base **24** having a tubular boss **26** integrally formed therewith is affixed within the base **24**, extending with the boss **26** upwardly toward the apex of the frustro-conical shell **22**. A counterbored passage is provided through the tubular boss **26** and includes a wide upper portion **28** and a lower portion **29** which may have internal threads **30** formed therein for receiving a valve stem having threads **18**. A shoulder **32** separates the two portions **28** and **29** of the counterbore passage.

An insulative washer **34** is fixed in the upper portion **28** of the boss passage and is seated on shoulder **32**. The insulative washer **34** is preferably inserted into the mold in which the base **24** is cast and is integrally cast therewith so that a longlasting effective moisture seal is provided. The base **24** is also preferably cast about a pair of electrical wires **48** and **50**, as at **56**, thereby sealing another aperture in the overall casing against moisture. With this construction, the possibility of creating an electrical hazard due to leakage is minimized.

A tubular ceramic member **36** is received in the insulative washer **34** so that it is aligned with the valve stem **12**. The frusto-conical shell **22** is truncated near its apex and another insulative washer **40** is affixed within an aperture **42** formed therein. The washer **40** is forcibly seated and retained within the annular shoulder **44** so that it cannot be easily removed and provides a good seal. The ceramic member **36** is forced through and terminates in the washer **40**. A good seal is therefore also provided about the ceramic member **36**, to prevent leakage. It is apparent that a discharge path is provided from the can **10** through the valve stem **12**, through the ceramic member **36**.

An electrical heating element **46** is placed about and preferably in contact with the ceramic member **36** in such a manner as to effect an even distribution of heat about the periphery of the entire length of the ceramic member **36**. The heating element **46** is preferably fabricated of Nichrome or similar high heat intensity material so that efficient rapid heating is provided. The conductors **48** and **50** are connected in the following manner to complete an effective operative circuit:

Conductor **48** is connected, as at **49**, to a ring portion **51** of a bimetallic thermostat **52**, which ringed portion is rigidly sandwiched inbetween an insulative washer **35** and the flush surface resulting from the precast union of washer **34** and the top of the boss **26**. At the upper portion (as shown) of the thermostat **52** there is affixed a contact **53** which in its normal position physically touches another mating contact **54** which is connected to the upper terminus **58** of the heating element **46**. The lower terminus **59** of the heating element **46** is connected, at **68**, to a terminal **66** of a gravity operated switch **62**, which may be a mercury switch. The other terminal **67** of the switch **62** is connected, as at **60**, to the conductor **50** to complete the operative electrical circuits.

The switch **62** is affixed within the shell **22** so that the switch **62** is normally open. It may be easily glued and/or taped, as with tape **64**, to the boss **26** in proper position prior to inserting the base **24**. It will be apparent that upon inverting the aerosol can **10**, the pool of mercury **70** (in the event the switch **62** is a mercury switch) will move to a position so as to electrically bridge the terminals **60** and **66** to energize the heating element **46**. The conductors **48** and **50** may be therefore permanently connected to an electrical energy source if desired, and the heating element will not be energized until the aerosol can **10**, or the heating unit **20**, is inverted to close the terminals **60** and **66**.

An electrically insulative sleeve **75** is preferably positioned about the electrical heating element **46** to prevent misalignment thereof and to further direct heat therefrom to the ceramic member **36**. A central passage in the ceramic member **36** includes perpendicular paths **74** and **76** which have cross sections which may be cruciform in shape, star-shaped, fluted, corrugated or spiraled to provide optimal heat dispersement throughout and within the ceramic member. The exterior surface of the ceramic member **36** may be formed in the same manner, if desired.

In operation, the user places the heating unit **20** on the valve stem **12** of the aerosol can **10**, either by force fitting it or, if the valve stem is threaded, as illustrated, by threadably engaging the lower portion **30** of the passage through the boss **26** with the threads of the valve stem. As noted above, the electrical conductors **48** and **50** may be left connected to a conventional electrical outlet or receptacle, and the normally open gravity switch **62** will prevent current flow through the heating element **46**. When ready to use, the aerosol can **10** is simply inverted and finger pressure is applied to the heating unit **20**, to operate the valve stem **12**, in the well known manner. Upon inverting the aerosol can **10**, the gravity contact of the switch **62** will bridge the electrical terminals **60** and **66** thereby closing the electrical circuit so that current flows through the heating element **46**. The contents discharged through the valve stem **12** to the passage in the ceramic member **36** will be heated as it passes through the passages **74** and **76** in the ceramic member **36**.

The thermostat device **52** included in the above described circuitry precludes inadvertent or deliberate overheating of the heating element **46**. The bimetallic material on heating due to current flow through the heating element **46** will bow, in the well known manner, to open contacts **53** and **54** to thereby prevent further current flow through the circuit including heating element **46**. When the bimetallic material cools, contacts **53** and **54** will again close. It may therefore be seen that if the heating unit **20**, or an aerosol can with the unit affixed is accidentally tipped over and left in an inverted position, the heating element **46** would heat up, but the thermostat **52** would prevent it from overheating to the extent of damaging the heating unit **20**.

A further safety element has been combined with the heating unit **20** in the form of a dual fused male electrical plug **80** of a conventional variety. The plug **80** consists of low amperage fuses **81** and **82** electrically connected in series with conductors **48** and **50** respectively between male prongs **83** and **84** respectively of the plug **80**. A plug of this type is designed to permit only a low amperage current, and if a short circuit should develop, the fuse material will immediately melt to prevent electrical shock to the user. The heating unit **20**, of course, is thereafter inoperable until the plug **80** is replaced, but this is of minor importance when compared to the protection it affords a user in the event a short circuit should develop.

In FIGURE 3, the heating unit **20** is illustrated affixed to an aerosol can **10** having a horizontally oriented valve stem **86**. A valved button **85** which, in some cases, may be rotatable, may be provided to operate the aerosol valve (not shown) to discharge the contents of the can. Most horizontally oriented valve stems have a cross sectional shape that is either rectangular or semicircular.

As is partially seen in FIGURE 3 and as shown in more detail in FIGURES 4, 5 and 6, an adapter **90** fits over the end of a horizontally oriented valve stem, such as valve stem **86**, and is precluded by the pressurized contents from being forced from and off of the valve stem by an integrally formed ring **96** which slips over the shoulder portion of the valve assembly.

The adapter **90** is preferably of a resilient type material, such as plastic, and has a shank **91**, a tapered portion **92**, an annularly disposed barrel or stem portion **93** and an integral retaining ring **96**. A central passage **95** is formed through the stem **93** and intersects a main cavity **97** which is preferably semicircular in shape, formed in the shank **91**. The stem portion **93** may be threaded, in the manner described above, for use with a threaded valve stem. A number of annular serrations **98** are formed in the wall of the cavity **97** and a rectangular shaped cavity **99** separates the main cavity **97** from the passage **95**. With this construction, it is found that a valve stem which is semicircular in cross section will abut the outer most wall of rectangular cavity **99**, and one which is rectangular in cross section will extend beyond the semicircular main cavity **97** and into the rectangular cavity **99**. A good seal is therefore provided to prevent escape or leakage of the contents of the can as it is being discharged. The adhesive nature of the resilient material and the annular serrations **98** which function as fingers to grip a valve stem cooperate to provide a good seal about horizontally oriented valve stems. The stem **93** is angularly disposed to prevent actuation of the gravity operated switch **62** while the aerosol can is setting in its normal upright position. When the aerosol can is tilted and the aerosol valve operated, the contents are heated during discharge through the ceramic member **36**, in the manner described above.

It will thus be seen that the objects set forth above among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above construction without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

Now that the invention has been described, what is

claimed as new and desired to be secured by Letters Patent is:

1. A heating attachment for use with aerosol cans having an aerosol valve with a valve stem to heat the contents thereof as it is discharged from said cans comprising: an adapter having a ring adapted to be affixed to an aerosol can for securing said heating attachment to said can, a body portion having a valve stem cavity therein, said valve stem cavity having a plurality of serrations forming gripping teeth formed in its wall and a chamber adapted to receive the end of said valve stem to seal it therein, and a nozzle integrally formed with said body portion and angularly disposed substantially horizontally therewith; a heating device including a base having an aperture which is adapted to receive and to retain said nozzle therein; a tubular member defining a discharge passage having one end sealed within said aperture; a hollow shell affixed to said base and to the opposite end of said tubular member so as to form a sealed chamber therein; electric heating means adapted to heat said tubular member enclosed within said chamber; a source of power connected to said electric heating means; gravity operated switch means; and a thermostat, said switch means and said thermostat being enclosed within said chamber and serially included in the connections between said heating means and said source of power and operable to control the initial energization of said heating means and to prevent it from overheating.

2. A heating attachment for use with aerosol cans having an aerosol valve with a valve stem to heat the contents thereof as it is discharged from said cans comprising: an adapter having a ring adapted to be affixed to an aerosol can for securing said heating attachment to said can, a body portion having a valve stem cavity therein, said valve stem cavity having a plurality of serrations forming gripping teeth formed in its wall and a chamber adapted to receive the end of said valve stem to seal it therein, and a nozzle integrally formed with said body portion and angularly disposed substantially horizontally therewith; a heating device including a molded base having an enlarged end, an upstanding member integrally formed with said end and an aperture extending through

said end and said upstanding member which is adapted to receive and retain said nozzle therein; sealing means having an aperture therein molded into the upstanding member at its end during the molding of said base to provide a leakproof seal; a tubular member defining a discharge passage having one end sealed within said aperture in said sealing means; a hollow shell affixed to said enlarged end of said base and to the opposite end of said tubular member so as to form a sealed chamber therein; electric heating means disposed about said tubular member; a source of power; a pair of conductors for connecting said heating means to said source of power, said pair of conductors extending through said base and being molded therein during the molding of said base to provide a leakproof seal; a gravity operated switch affixed to said upstanding member in a fashion such that it is normally open and will close when tilted to a predetermined angular position; and a thermostat, said switch and said thermostat being enclosed within said chamber and serially included in the connections between said heating means and said source of power and operable to control the energization of said heating means and to prevent it from overheating.

3. A heating attachment, as claimed in claim 2, further including plug means affixed to one end of said pair of conductors including short circuit protection means for disconnecting said heating means from said source of power in the event a short circuit develops.

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ANTHONY BARTIS, *Primary Examiner.*

U.S. Cl. X.R.

222—146; 239—135; 219—517, 509, 308