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(54) AN IMPROVED MOUNTING CUP AND METHOD OF MAKING SAME.

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Description

Technical field

This invention relates to fluid sprinkling and more particularly to forming a fluid-tight seal between a mounting cup and an aerosol container.

Background art

The aerosol industry has undergone dramatic and substantial changes since the birth of the industry many decades ago. It has been a constant desire of the aerosol industry to increase the reliability of the aerosol devices while simultaneously reducing the manufacturing and the consumer costs of the aerosol device. Each individual part of the aerosol device has been investigated in an attempt to reduce the part cost as well as the cost of assembly of the aerosol device. The time required to fabricate each individual part as well as the time required to fabricate the device, has been investigated in a continuing attempt to further reduce the cost of aerosol devices. If a single step in the assembly process can be accomplished in a shorter period of time, a substantial reduction in overall cost will be realized by the increase in production.

Among the most time consuming steps in the fabrication of an aerosol valve is the application of a sealing gasket material to the aerosol mounting cup for sealing with the aerosol container. In general, the aerosol mounting cup is fabricated by first stamping a sheet material through a progressive die to form the mounting cup turret with a central through aperture and peripheral sealing rim for sealing with an annular bead disposed on the aerosol container. The stamped mounting cups are oriented for enabling a solvent based gasket material to be poured into the rim of the mounting cup. The solvent based gasket material is allowed to set at room temperature for approximately one hour and is then progressively passed through three curing ovens. The three progressive ovens are typically set at 150°C, 250°C and 350°C. The mounting cup is placed in each oven for approximately one hour in order to remove the solvent totally from the solvent based coating and gasket material and to leave a solvent residue of rubber to effect the seal between the mounting cup and the aerosol container. The heated mounting cups are allowed to cool to proper handling temperature prior to assembly with the aerosol valve and dip tube. Presently this prior art process requires approximately four and one-half hours of time for each mounting cup to provide a suitable coating for sealing with the aerosol container. However, since the solvent based coating and gasket material is allowed to flow into the mounting cup lip, the resultant solid residue of rubber is irregular in thickness and may result in a defective seal between the mounting cup and the aerosol container.

Others in the prior art used a precoated process wherein the mounting cup stock is unrolled and coated with a gasket material. The sheet stock is punched and formed to create the aerosol valve mounting cup. Since the sheet stock is coated prior to forming, substantial stresses are developed within the coating. In addition, the coating may be damaged during the punching and forming process.

U.S. Patent 3,417,177 illustrates a sealing gasket for an aerosol mounting cup formed by positioning a circular band of heat-shrinkable material over a portion of the skirt of the cup. The mounting cup is then heated to shrink the band of material into frictional contact with the skirt of the mounting cup.

U.S. Patent 3,443,006 pertains to a method of making a gasketed closure element by swelling a band of gasket material and positioning the band of gasket material about the skirt of the mounting cup. The band of gasket material is then allowed to return to a normal condition to be in frictional engagement with the mounting cup skirt.

Others in the prior art have utilized electrostatic spraying of paints on other coatings, but such processes have not been applied to the application of sealing gaskets.

Others in the prior art have utilized the immersion of heated items into a vessel of plastic particles but these patents relate to protective coatings and do not relate to sealing gaskets and the like.

US—A—4,000,338 relates to a coating process using a vibratory bowl for producing a protective coating.

US—A—3,864,798 discloses a method of encapsulating an end contacted electrical component with a layer of synthetic resin material by placing the component in a reservoir containing a suspended synthetic resin powder and heating the component indirectly by inductance using high frequency current to fuse powder deposited on the component to form the synthetic resin layer.

US—A—4,183,974 discloses a method of coating a cylindrical container with a thin, resinous coating by spraying resin particles into a beverage container. The container may be sprayed by directing a pulse of a predetermined quantity of resin into the container to deposit a substantially uniform coating or a continuous flow of resin at a predetermined rate. The resin particles are caused to adhere to the container by preheating the container to temperatures above the softening point of the resin. Post heating of the coated container also takes place.

US—A—3,503,778, GB—A—1,163,041, DE—A—2,539,880 and US—A—3,197,324 all disclose methods of coating an article with plastics material by heating the article sufficiently and applying particulate plastics material which then melts and forms a continuous layer.

Although many in the prior art have attempted various methods to reduce the time required to apply a gasket material to an aerosol mounting cup, the prior art has heretofore failed to provide an inexpensive and reliable method which is a suitable replacement to the solvent based coating

and gasket material which is presently universally used in the aerosol industry.

Therefore, this invention seeks to provide an improvement which is a significant contribution to the advancement of the aerosol art.

Accordingly, the present invention provides an aerosol valve and mounting cup assembly for an aerosol container having a container sealing bead disposed about an upper opening in the aerosol container comprising:

a mounting cup having a mounting cup rim extending about the periphery thereof for co-operation with the container bead;

a valve assembly disposed in said mounting cup for providing fluid communication between the interior of the aerosol container and the exterior of the aerosol container, and a plastics material sealing gasket disposed on the mounting cup to provide a fluid-tight seal when the mounting cup rim is secured to the aerosol container, characterised in that the sealing gasket has particles of the plastics material fused to the mounting cup to provide a resilient sealing gasket when the rim of the mounting cup is secured to the sealing bead of the aerosol container and to provide a continuous protective coating for the mounting cup from the interior of the aerosol container.

The present invention also provides a method of fabricating the aerosol valve and mounting cup assembly for an aerosol container having a container sealing bead disposed about an upper opening in the aerosol container comprising:

stamping the mounting cup from a metallic sheet material and characterised by forming the continuous coating of plastics material on the mounting cup by heating the mounting cup to a temperature sufficient to melt the plastics material;

applying the particles of the plastic material to the heated mounting cup to fuse the particles, thereby to provide a resilient sealing gasket when the rim of the mounting cup is secured to the sealing bead of the aerosol container and to provide the continuous coating for the mounting cup from the interior of the aerosol container;

cooling the coated mounting cup and securing the aerosol valve to the coated mounting cup.

In a preferred embodiment of the invention, the aerosol container includes a container sealing bead disposed about the periphery of an opening in the aerosol container. A rim is disposed about the periphery of the mounting cup for cooperation with the bead of the aerosol container. The sealing gasket is formed by fusing plastic particles to the heated mounting cup to provide a continuous plastic coating upon the entire interior and exterior surface of the mounting cup for providing a seal between the mounting cup and the aerosol container and for protecting the interior and exterior surface of the mounting cup. The coating provides a uniform coating on the mounting cup rim and may be colored to provide an integral color code for the mounting cup.

The invention may also be incorporated into an apparatus and method of coating mounting cups incorporating a non-metallic vessel for receiving plastic particulate material therein. The mounting cups are introduced into the vessel and are moved within the plastic particulate material. An induction heater is disposed adjacent the non-metallic vessel for heating the mounting cups when the mounting cups are immersed in the plastic particulate material to form a continuous plastic coating thereon. The coated mounting cups are then discharged from the vessel and are fused by either induction heating or conventional convection heating.

Brief description of the drawings

The present invention is further described hereinafter, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a side sectional view of a conventional mounting cup and aerosol valve assembly;

Fig. 2 is a partial side sectional view showing the fluid-tight seal between a conventional aerosol valve assembly and an aerosol container;

Fig. 3 is a side sectional view of a mounting cup and aerosol valve assembly in accordance with the present invention;

Fig. 4 is a partial side sectional view showing the fluid-tight seal between the mounting cup of Fig. 3 and an aerosol container;

Fig. 5 illustrates a prior art process for fabricating the mounting cup shown in Fig. 1;

Fig. 6 illustrates the improved method of forming the mounting cups as shown in Fig. 3 in accordance with the present invention;

Fig. 7 illustrates a section of a ribbon of mounting cups in the process shown in Fig. 6;

Fig. 8 is a second improved method of forming the mounting cup shown in Fig. 3;

Fig. 9 is a plan view illustrating the geometry of the vibratory bowl shown in Fig. 8;

Fig. 9A is a sectional view along lines 9A—9A in Fig. 9;

Fig. 10 is a third improved method of forming the mounting cup shown in Fig. 3;

Fig. 11 is an enlarged detailed view of the novel process and apparatus of Fig. 10;

Fig. 12 is a sectional view along line 12—12 of Fig. 11;

Fig. 13 is an enlarged sectional view along line 13—13 of Fig. 11;

Fig. 14 is a sectional view along line 14—14 of Fig. 11;

Fig. 15 is a side sectional view showing a coating utilizing a small particle size powder; and

Fig. 16 is a side sectional view showing a coating utilizing a larger particle size powder.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Best mode for carrying out the invention

Fig. 1 illustrates a side sectional view of a prior art aerosol mounting cup and valve assembly 10 which should be well known to those skilled in the art. The assembly comprises a mounting cup 12

having a central turret 14 and a mounting rim 16 extending about the outer periphery thereof. The turret 14 receives an aerosol valve assembly which may be of various designs to operate between an interior surface 17 and an exterior surface 18. In this embodiment, a valve body 19 communicates with the interior of the aerosol container through a dip tube 20. A valve stem 22 is biased by a spring 24 into sealing engagement with a sealing gasket 26 for controlling the flow of product and propellant through a metering orifice 28 communicating to a valve stem aperture 30.

The mounting rim 16 is provided with a sealing gasket 32 which is generally a solvent-based rubber material which forms a seal with a bead 34 of an aerosol container 36 as shown more fully in Fig. 2. Typically, the mounting cup rim 16 is inserted on the aerosol container bead 34 with a region 38 of the mounting cup rim being deformed to form a fluid-tight seal through the coating 32 on the mounting cup rim 16.

Fig. 3 illustrates a mounting cup and aerosol valve assembly 10A in accordance with the present invention. Under the practice of this invention the sealing gasket and coating 32A extends along the entire interior surface 17A of the mounting cup in addition to the coating 32B extending along the entire exterior surface 18A.

Fig. 4 illustrates the mounting cup 12A of Fig. 3 forming a seal with the sealing bead 34 of aerosol container 36 through deformed region 38A in a conventional manner as shown in Fig. 2.

Fig. 5 illustrates the steps in the formation of the mounting cup 12 shown in Fig. 1 under a prior art practice. A ribbon of roll stock 41 disposed on a drum 42 is passed through a series of progressive dies 44 to form the contour of the mounting cup 12 shown in Fig. 1. The formed mounting cups 12 are severed from one another and passed through an orienter 46 which orients the mounting cups 12 such that the interior surface 17 is face up, enabling an applicator 48 to apply a solvent-based coating and gasket material 32 to flow into the mounting cup rim 16. After the initial coating of gasket material 32, the mounting cups 12 are allowed to remain at an ambient temperature station 50 for a period of approximately one hour. The mounting cups are passed through progressive ovens 51, 52 and 53 which respectively have temperatures of approximately 150°C, 250°C and 350°C. The mounting cups 12 remain in each individual oven 51—53 for a period of one hour prior to being removed and cooled in position 54. After cooling, the mounting cups may be fabricated in a conventional manner as should be well known to those skilled in the art.

Fig. 6 illustrates the steps in the formation of the mounting cup 12A shown in Fig. 3 under the present invention. In a similar manner, the ribbon of roll stock 41 is disposed on a drum 42 to be passed through a series of progressive dies 44A to form the contour of the mounting cups 12A shown in Fig. 3. In this embodiment, the progressive dies 44A form the contour of the mounting cups 12A but do not sever the mounting cups 12A from one another as shown in Fig. 7. The mounting cups 12A are held together by tabs 12B in a ribbon 55 eliminating the need for the orienter 46 of Fig. 5.

The ribbon 55 of formed mounting cups 12A is carried by rollers 56 and 58 through an oven 60 to heat the mounting cup to a temperature sufficient to melt a selected plastic particulate material. The selected plastic material 62 is disposed in a vessel 64 having an input 66 and an output 68.

The plastic material is preferably finely ground powder of virtually any fusible plastic material capable of forming the desired seal and being able to associate with the product and propellant within the aerosol container.

Rollers 58 and 70 move the heated mounting cups 12A on ribbon 55 through vessel 64 enabling the plastic particles 62 to fuse to the internal and external surfaces 17A and 18A. The temperature of oven 60, the speed of ribbon 55 and the distance between the input 66 and output 68 of vessel 64 must be interrelated to produce a proper coating to the mounting cups 12A. The process is also dependent on the type of plastic selected and the particle size of the plastic powder. However, one skilled in the art could readily adjust these conditions to provide a proper coating for the specific use of the invention.

The ribbon 55 of mounting cups 12A exit vessel 64 through output 68 and are carried by rollers 70 and 72 through a fusing oven 74. The fusing oven 74, which may be optional in some applications, creates a unitary coating on the interior and exterior surfaces 17A and 18A of the mounting cups 12A. The mounting cup ribbons 55 are then severed from one another by a cutter 76 which cuts tabs 12B. The individual mounting cups 12A are ejected from cutter 76 for subsequent assembly with the valve mechanism.

Fig. 8 is a second method of forming the mounting cup 12A shown in Fig. 3. In this embodiment, a ribbon of roll stock 41 disposed on a drum 42 is passed through a series of progressive dies 44A to form the contour of mounting cup 12A shown in Fig. 3. The formed mounting cups 12A are severed from one another and passed through an oven 80 on a conveyor 82 driven by rollers 84 and 86. The oven 80 is sufficient to heat the mounting cups to a temperature to melt a preselected plastic material. The heated mounting cups are carried by a conveyor 88 driven between rollers 86 and 90 to a vibratory bowl 92 driven by a motor 94 shown more particularly in Fig. 9. The vibratory bowl 92 has a central portion 95 for receiving the mounting cups 12A. A channel 96 is defined between side walls 98 and 100 enabling the mounting cups 12A to move along the path to an exit 102 along channel 96. The channel 96 is arranged such that the mounting cups are preferably disposed at an acute angle, namely that neither the internal or external surfaces 17A or 18A are disposed facing a vertical direction as shown in Fig. 9A. The inclined position of the mounting cups 12A eliminates the formation of bubbles adjacent the interior and

exterior surfaces 17A and 18A which will cause a defective coating. Accordingly, the mounting cups 12A essentially roll as inclined wheels along channel 96. The interior of the vibratory bowl 92 includes plastic particles 62 enabling a substantially uniform coating to be provided to the interior and exterior 17A and 18A of the mounting cup 12A.

The coated mounting cups emanating from output 102 are passed to a conveyor 104 driven by rollers 106 and 108 through a fusing oven 110 which completes the fusing process of the coating on the mounting cups 12A. The function of the vibratory bowl 92 should be well known to those skilled in the art.

Fig. 10 illustrates the steps of forming the mounting cup 12A shown in Fig. 3 under a third method and apparatus. A ribbon of roll stock 41 disposed on a drum 42 is passed through a series of progressive dies 44 to form the contour of the mounting cup 12A shown in Fig. 3. The formed mounting cups 12A are severed from one another and passed through an orienter 46 which orients the mounting cups 12A into a preferred orientation. The oriented mounting cups 12A are discharged from orienter 46 into an input 120 of a vessel 122. The vessel 122 is a non-metallic vessel containing plastic particulate material 62. The mounting cups 12A pass along a channel 124 and are totally immersed within the plastic particulate material 62. An induction heating coil 126 is connected to an induction heating generator 128 shown in Fig. 11 to induce eddy currents within the metallic mounting cups 12A to heat the mounting cups while the mounting cups are immersed within the plastic particulate material 62. The heated mounting cups 12A melt the plastic particulate material 62 adjacent the metallic surfaces thereof and are coated to form a uniform resilient plastic coating to form a protective coating and a sealing gasket as shown in Figs. 3 and 4. The coated mounting cups 12A are expelled from the vessel 122 by a discharge means 130 and are placed on a conveyor 132 driven by rollers 134 and 136. The conveyor 132 is preferably non-metallic and made of a material which will inhibit the adhesion of the plastic particulate material 62 coated on the mounting cups 12A. The coated mounting cups 12A are passed through a second induction heating coil 138 connected to an induction generator 140 shown in Fig. 11 to induce eddy currents within the mounting cups 12A and thus fuse the plastic particulate material adhering to the mounting cups into a uniform resilient plastic coating which is suitable for forming a resilient sealing gasket and a protective coating. The mounting cups 12A are then discharged from conveyor 132.

Fig. 11 illustrates a specific example of the vessel 122 shown in Fig. 10 with a specific means for moving the mounting cups 12A through the vessel 122. The apparatus includes a frame 142 and a linear vibrator 144 for supporting the vessel 122 through support arms 145. The linear vibrator 144 causes movement of the mounting cups 12A from left to right in Fig. 11. The vessel 122 contains the plastic particulate material 62 and includes a flexible coupling 146 connected by conduit 147 to a pump 148. The pump 148, which may be of various types such as augers, impellers or other pumps suitable for pumping plastic particulate material, forces the plastic particulate material through conduit 149 terminating in orifice 150 adjacent an input support surface 152. The flow of particulate material 62 by pump 148 as illustrated by the arrows within the conduits 147 and 149 as well as the linear motion due to linear vibrator 144 insures a linear progression of the mounting cups 12A from left to right in Fig. 11. This embodiment illustrates a particular method and apparatus for moving the mounting cups 12A through vessel 122.

The apparatus illustrates input means 120 providing mounting cups 12A to the vessel 122. The plastic particulate material 62 is discharged from orifice 174 onto a support surface 152 and passed over an edge 154. The free-falling plastic particulate material 62 is aerated by the free-fall from input surface 152. The mounting cups 12A are introduced into the stream of aerated plastic particulate material by input means 120 at 121. The kinetic energy developed by the falling mounting cups 12A is of a sufficient level to insure that each mounting cup is completely immersed within the aerated plastic particulate material 62 prior to induction heating. The mounting cups 12A move towards the right through induction heating coil 126 as was heretofore explained.

Fig. 12 illustrates a sectional view along line 12—12 showing the mounting cup 12A within a channel 124 formed by vessel 122 and within the induction heating coil 126. It has been found that when a mounting cup is completely immersed within the plastic particulate material 62, that the mounting cup will, in many instances, maintain the given attitude such as the vertical attitude along the channel 124 in vessel 122.

The coated mounting cups 12A move toward the discharge means 130 shown more specifically in Fig. 13. The discharge means, which is secured to vessel 122 to vibrate therewith includes support members 160 and 162 for supporting porous means 164, such as a screen, enabling the mounting cup 12A to discharge the unmelted plastic particulate material 165 on the exterior surface 18A of the mounting cup in Fig. 13 into the vessel 122 under vibration of the linear vibrator 144. Concomitantly therewith, a vacuum head 166 connected by pipe 168 to a partial vacuum 170 removes any unmelted particulate material 171 from the interior surface 17A of the mounting cup 12A. Unmelted plastic particulate material is similarly removed from the interior and exterior surface 17A and 18A in the event the mounting cup 12A is inverted with respect to Fig. 13. The plastic particulate material removed by the vacuum head 166 is discharged through a conduit 172 to be recycled proximate the input support surface 152 by discharge orifice 174.

The vibratory motion of the linear vibrator 144 enables the mounting cups 12A to move up the discharge means 130 to conveyor 132. The conveyor 132 receives the coated mounting cups 12A enabling the induction heating coil 138 to fuse the plastic particulate material 62 into a resilient continuous uniform sealing gasket and protective coating. Fig. 14 illustrates a sectional view along line 14—14 illustrating the conveyor 132, the mounting cup 12A within the induction heating coil 138.

It has been found that a high temperature of approximately 315°C (600°F) is required to properly melt a suitable plastic particulate material such as polyethylene within the vessel 122 for a sealing gasket and protective coating. In cases where tin coated steel is used for mounting cups, it has been found that mounting cups disposed in an oven at 315°C (600°F) for more than three minutes experience discoloration due to the melting of the tin coating. However, tin coated mounting cups can withstand a heating of 315°C (600°F) for less than three minutes without discoloration. Accordingly, the present invention enables the very rapid heating of the mounting cups for proper coating without the discoloration of any tin coating on the mounting cup. For example, in the process shown in Figs. 6 and 8, using a polyethylene plastic material, mounting cups 12A are subjected to a temperature of approximately 315°C (600°F) for a period of one minute in ovens 60 or 80. Typically the coating process requires less than twenty seconds. The mounting cups 12A may then be fused in ovens 74 or 110 at a temperature of approximately 315°C (600°F) for a period of less than one minute. In the embodiment shown in Figs. 10—14, the mounting cups 12A are typically heated to the required temperature in a matter of approximately three seconds with the total coating operation taking less than twenty seconds. Fusing by induction coil 138 normally requires less than three seconds. It should be understood that the above parameters are by way of example only and should not be construed to be a limitation on the present invention.

Preferably, the mounting cups are rapidly heated to approximately 315°C (600°F) with the induction heating coil for providing the adherence of the plastic particulate material to the mounting cup. The power required by the induction generator is, in part, determined by the geometry of the induction heating coil as well as the type of plastic particulate material, the particle size of the plastic particulate material, and the speed at which the mounting cups 12A are passed through the induction heating coil. It should be appreciated by those skilled in the art that these parameters may be varied depending on the particular application.

Fig. 10 also illustrates an optional step of rapidly cooling the mounting cups 12A after discharge from conveyor 132. In this embodiment, the rapid cooling means is illustrated by a fluid bath including a fluid 180 shown as a liquid within a container 182 for rapidly cooling the mounting cups after proper fusion of the uniform protective coating and resilient sealing gasket by induction heating coil 138. The cooling bath further inhibits the discoloration of the mounting cup by rapidly reducing the temperature of the mounting cup after fusion of the plastic coating. It should be appreciated that the rapid cooling means shown as a liquid bath may be substituted by various cooling means and may be incorporated into all of the embodiments shown in the present application.

The method and apparatus heretofore described may be utilized with various types of plastic material which are capable of fusion to a metallic surface. Plastic material such as polyethylene, polypropylene, vinyl, nylon, acetate or other plastic materials may be utilized with this invention. It has been found that the most satisfactory material for use with the present invention is plastic material which is cryogenically ground to be within 4×10^{-4} to 7×10^{-4} cm (4—7 microns) in particle size as depicted by Figure 15.

Fig. 15 illustrates a surface 12A of the mounting cup with a plurality of particles of plastic material 32A disposed thereon. The particles size of the individual particles 62 enables a close spacing and a uniform coating thickness as shown in Fig. 15.

Fig. 16 illustrates a similar embodiment of a portion of mounting cup 12A with a coating 32C of particles 62C of larger particle size. Voids 112 within the coating surface are experienced by plastic particles having a larger particle size.

The prior art mounting cups typically use a precoated steel having a 0.23 Kg (one-half pound) of tin plate to 45.5 Kg (100 pounds) of steel. With the use of the invention set forth herein, reduced tin plate or black plate steel may be utilized in lieu of normally used tin plated steel, resulting in a substantial savings in material costs.

Claims

1. An aerosol valve and mounting cup assembly for an aerosol container having a container sealing bead disposed about an upper opening in the aerosol container comprising:

a mounting cup (12A) having a mounting cup rim (16) extending about the periphery thereof for co-operation with the container bead;

a valve assembly disposed in said mounting cup (12A) for providing fluid communication between the interior of the aerosol container and the exterior of the aerosol container, and

a plastics material sealing gasket (32A) disposed on the mounting cup (12A) to provide a fluid-tight seal when the mounting cup rim (16) is secured to the aerosol container, characterised in that the sealing gasket (32A) has particles of the plastics material fused to the mounting cup (12A) to provide a resilient sealing gasket when the rim of the mounting cup is secured to the sealing bead of the aerosol container and to provide a continuous protective coating for the mounting

cup (12A) from the interior of the aerosol container.

2. An assembly as claimed in Claim 1 in which the mounting cup (12A) has the plastics material sealing gasket (32A, 32B) on both an interior surface and an exterior surface of the mounting cup, the sealing gasket (32A, 32B) comprising particles of the plastics material fused to lock the interior and exterior surfaces of the heated mounting cup (12A) to provide the resilient sealing gasket when the rim of the mounting cup is secured to the sealing bead of the aerosol container and to provide a continuous protective coating on both the interior and exterior surfaces of the mounting cup.

3. An assembly as claimed in Claim 1 or 2 in which the sealing gasket (32A, 32B) is coloured to provide an integral colour code for said mounting cup (12A).

4. An assembly as claimed in Claim 3 in which the plastics material is coloured to provide the integral colour code for said mounting cup (12A).

5. A method of fabricating the aerosol valve and mounting cup assembly for an aerosol container having a container sealing bead disposed about an upper opening in the aerosol container comprising:

stamping the mounting cup (12A) from a metallic sheet material and characterised by forming the continuous coating of plastics material on the mounting cup (12A) by heating the mounting cup to a temperature sufficient to melt the plastics material;

applying the particles of the plastic material to the heated mounting cup (12A) to fuse the particles, thereby to provide a resilient sealing gasket when the rim of the mounting cup is secured to the sealing bead of the aerosol container and to provide the continuous coating for the mounting cup (12A) from the interior of the aerosol container; cooling the coated mounting cup (12A) and securing the aerosol valve (19) to the coated mounting cup (12A).

6. The method as claimed in Claim 5 in which the step of applying the plastics particles comprises immersing the heated mounting cup (12A) in a vessel (92) containing the plastics particles to form the continuous coating on the mounting cup (12A), and

heating the mounting cup to cure the plastics coating.

7. The method as claimed in Claim 6 in which the step of immersing the heated mounting cup (12A) in the vessel (92) includes orienting the mounting cup (12A) in a preferred orientation with the mounting cup disposed in an angular relationship relative to the vertical.

8. The method as claimed in Claim 6 or 7 in which the step of immersing the heated mounting cup (12A) in the vessel (92) includes immersing the heated mounting cup in a vibrating bowl, and

vibrating the vibratory bowl to move the heated mounting cup (12A) therethrough and to disperse the plastics particles into contact with the heated mounting cup.

9. The method as claimed in Claim 6, 7 or 8 further comprising: filling the aerosol container with an aerosol product;

securing the mounting cup (12A) to the aerosol container to form a seal therebetween with the resilient plastics material, and pressurising the aerosol container.

10. The method as claimed in Claim 5 in which the step of forming the continuous coating on the mounting cup (12A) comprises immersing the mounting cup in a vessel (92) containing the plastics particles;

heating the mounting cup within the vessel (92) to a temperature sufficient to melt the plastics particles adjacent the mounting cup (12A) to form the continuous plastics coating thereon;

removing the plastics coated mounting cup (12A) from the vessel (92);

heating the coated mounting cup (12A) to fuse the plastics coating to the mounting cup, and

securing the aerosol valve (19) to the mounting cup (12A).

11. The method as claimed in Claim 10 in which the step of heating the mounting cup (12A) within the vessel (92) includes heating the mounting cup (12A) by induction heating.

12. The method as claimed in Claim 10 or 11 in which the step of removing the mounting cup (12A) from the vessel (92) includes removing unmelted plastics particles from the mounting cup (12A).

13. The method as claimed in Claim 12 in which the step of removing the unmelted plastics particles from the mounting cup (12A) includes applying suction by vacuum to the plastics coated mounting cup (12A).

14. The method as claimed in any of Claims 6 to 13 including the step of moving the mounting cup (12A) through the vessel (92) containing the plastics particles by vibrating the vessel (92).

Patentansprüche

1. Aersolventil- und Befestigungskappenanordnung für einen Aersolbehälter mit einem um eine obere Öffnung in diesem Aerosolbehälter angeordneten dichtenden Behälterrandwulst,

mit einer Befestigungskappe (12A) die einen Befestigungskappenrand (16) aufweist, der sich zum Zusammenwirken mit dem Behälterrandwulst um deren Umfang herum erstreckt;

mit einer in dieser Befestigungskappe (12A) angeordneten Ventilanordnung zum Bereitstellen einer Fluidverbindung zwischen dem Inneren und dem Äußeren des Aerosolbehälters, und

mit einer Dichtungsmanschette (32A) aus Kunststoffmaterial, die auf der Befestigungskappe (12A) angeordnet ist, um eine fluiddichte Abdichtung bereitzustellen, wenn der Befestigungskappenrand (16) auf dem Aerosolbehälter befestigt ist, dadurch gekennzeichnet,

daß die Dichtungsmanschette (32A) Partikel aus mit der Befestigungskappe (12A) verschmolzenen Kunststoffmaterial aufweist, um eine federnde Dichtungsmanschette zu bilden, wenn der Rand

der Befestigungskappe an dem dichtenden Behälterrandwulst des Aerosolbehälters befestigt ist, und um eine kontinuierliche Schutzbeschichtung für die Befestigungskappe (12A) gegen das Innere des Aerosolbehälters bereitzustellen.

2. Anordnung nach Anspruch 1, wobei die Befestigungskappe (12A) die Dichtungsmanschette (32A, 32B) aus Kunststoffmaterial sowohl an ihrer inneren Oberfläche als auch an ihrer äußeren Oberfläche trägt, wobei die Dichtungsmanschette Partikel aus Kunststoffmaterial aufweist, die geschmolzen sind, um die innere und die äußere Oberfläche der erhitzten Befestigungskappe (12A) einzuschließen, damit eine federnde Dichtungsmanschette bereitgestellt wird, wenn der Rand der Befestigungskappe an dem dichtenden Randwulst des Aerosolbehälters befestigt ist und um eine kontinuierliche Schutzbeschichtung sowohl an der Innen- als auch an der Außenoberfläche der Befestigungskappe zu bilden.

3. Anordnung nach Anspruch 1 oder 2, wobei die Dichtungsmanschette (32A, 32B) gefärbt ist, um einen integralen Farbcode für die Befestigungskappe (12A) zu bilden.

4. Anordnung nach Anspruch 3, wobei das Kunststoffmaterial gefärbt ist, um einen integralen Farbcode für die genannte Befestigungskappe (12A) zu bilden.

5. Verfahren zum Herstellen einer Aerosolventil- und Befestigungskappenanordnung für einen Aerosolbehälter, mit einem um eine obere Öffnung in diesem Aerosolbehälter angeordneten dichtenden Behälterrandwulst mit dem Verfahrensschritt:

Ausstanzen der Befestigungskappe (12A) aus einem Metallblechmaterial, gekennzeichnet durch

— Ausbilden einer kontinuierlichen Beschichtung aus Kunststoffmaterial auf der Befestigungskappe (12A) durch Erhitzen der Befestigungskappe bis auf eine Temperatur, die ausreicht, das Kunststoffmaterial zu schmelzen;

— Aufbringen von Partikeln aus Kunststoffmaterial auf die erhitzte Befestigungskappe (12A), um die Partikel zu schmelzen, um dadurch eine federnde Dichtungsmanschette bereitzustellen, wenn der Rand der Befestigungskappe auf die Dichtungsmanschette des Aerosolbehälters befestigt ist und um eine kontinuierliche Beschichtung für die Befestigungskappe (12A) zum Inneren des Aerosolbehälters hin zu bilden;

— Abkühlen der beschichteten Befestigungskappe (12A) und

— Befestigen des Aerosolventils (19) auf der beschichteten Befestigungskappe (12A).

6. Verfahren nach Anspruch 5, wobei der Verfahrensschritt des Aufbringens von Kunststoffpartikeln beinhaltet

— Eintauchen der erwärmten Befestigungskappe (12A) in einen Kessel (92), der Kunststoffpartikel enthält, um die kontinuierliche Beschichtung auf der Befestigungskappe (12A) zu bilden, und

— Erwärmen der Befestigungskappe, um die Kunststoffbeschichtung zu härten.

7. Verfahren nach Anspruch 6, wobei der Verfahrensschritt des Eintauchens der erwärmten Befestigungskappe (12A) in den Kessel (92) ein Ausrichten der Befestigungskappe (12A) in eine bevorzugte Stellung umfaßt, in der die Befestigungskappe sich zur Vertikalen in einer Winkellage befindet.

8. Verfahren nach Anspruch 6 oder 7, wobei der Verfahrensschritt des Eintauchens der erwärmten Befestigungskappe (12A) in den Kessel (92) einschließt

— Eintauchen der erwärmten Befestigungskappe in einen Vibrationstiegel, wobei der Vibrationstiegel in Vibration versetzt wird, um die erwärmte Befestigungskappe (12A) durch ihn hindurch zu bewegen und die Kunststoffpartikel in Kontakt mit der erwärmten Befestigungskappe zu verteilen.

9. Verfahren nach Anspruch 6, 7 oder 8, mit den weiteren Verfahrensschritten

— Füllen des Aerosolbehälters mit einem Aerosolprodukt;

— Befestigen der Befestigungskappe (12A) an dem Aerosolbehälter, um eine Dichtung aus federndem Kunststoffmaterial zwischen den beiden Teilen auszubilden, und

— Druckbeaufschlagen des Aerosolbehälters.

10. Verfahren nach Anspruch 5, wobei der Verfahrensschritt des Ausbildens einer kontinuierlichen Beschichtung auf der Befestigungskappe (12A) beinhaltet:

— Eintauchen der Befestigungskappe in einen Kunststoffpartikel enthaltenden Kessel (92);

— Erwärmen der Befestigungskappe in dem Kessel (92) auf eine Temperatur, die ausreicht, die sich an der Befestigungskappe (12A) befindlichen Kunststoffpartikel zu schmelzen und auf ihr eine kontinuierliche Kunststoffbeschichtung auszubilden;

— Herausnehmen der kunststoffbeschichteten Befestigungskappe (12A) aus dem Kessel (92);

— Erwärmen der beschichteten Befestigungskappe (12A), um die Kunststoffbeschichtung mit der Befestigungskappe schmelzzuverbinden und

— Befestigen des Aerosolventils (19) auf der Befestigungskappe (12A).

11. Verfahren nach Anspruch 10, wobei der Verfahrensschritt des Erwärmens der Befestigungskappe (12A) in dem Kessel (92) das Aufheizen der Befestigungskappe (12A) durch Induktionserwärmung beinhaltet.

12. Verfahren nach Anspruch 10 oder 11, wobei der Verfahrensschritt des Herausnehmens der Befestigungskappe (12A) aus dem Kessel (92) des Entfernen nicht-geschmolzener Kunststoffpartikel von der Befestigungskappe (12A) einschließt.

13. Verfahren nach Anspruch 12, wobei der Verfahrensschritt des Entfernens nicht-geschmolzener Kunststoffpartikel von der Befestigungskappe (12A) die Anwendung eines Absaugens durch Vakuum der kunststoffbeschichteten Befestigungskappe (12A) einschließt.

14. Verfahren nach einem der Ansprüche 6 bis 13, wobei das Bewegen der Befestigungskappe (12A) durch den Kunststoffpartikel enthaltenden

Kessel (92) durch Vibration des Kessels (92) durchgeführt wird.

Revendications

1. Ensemble constitué par une soupape à aérosol et une cuvette de montage, destiné à un récipient à aérosol comportant un bourrelet d'étanchéité du récipient disposé autour d'une ouverture supérieure du récipient à aérosol, comprenant:

une cuvette de montage (12A) comportant un pourtour de cuvette de montage (16) s'étendant autour de sa périphérie en vue de coopérer avec le bourrelet du récipient,

un dispositif à soupape disposé dans ladite cuvette de montage (12A) pour permettre la communication du fluide entre l'intérieur du récipient à aérosol et l'extérieur du récipient à aérosol, et un joint d'étanchéité en matière plastique (32A) disposé sur la cuvette de montage (12A) pour constituer un joint étanche au fluide quand le pourtour (16) de la cuvette de montage est fixé au récipient à aérosol, caractérisé en ce que le joint d'étanchéité (32A) comprend des particules de matière plastique adhérant par fusion sur la cuvette de montage (12A) pour constituer un joint d'étanchéité élastique quand le pourtour de la cuvette de montage est fixé au bourrelet d'étanchéité du récipient à aérosol et pour constituer un revêtement protecteur continu pour la cuvette de montage (12A) depuis l'intérieur du récipient à aérosol.

2. Ensemble selon la revendication 1, dans lequel la cuvette de montage (12A) comprend un joint d'étanchéité (32A, 32B) en matière plastique à la fois sur une surface intérieure et sur une surface extérieure de la cuvette de montage, le joint d'étanchéité (32A, 32B) comprenant des particules de matière plastique fondues pour recouvrir les surfaces intérieure et extérieure de la cuvette de montage chauffée (12A) et déterminer le joint d'étanchéité élastique quand le pourtour de la cuvette de montage est fixé au bourrelet d'étanchéité du récipient à aérosol et pour déterminer un revêtement protecteur continu à la fois sur les surfaces intérieure et extérieure de la cuvette de montage.

3. Ensemble selon la revendication 1 ou 2, dans lequel le joint d'étanchéité (32A, 32B) est coloré pour déterminer un code coloré intégré pour ladite cuvette de montage (12A).

4. Ensemble selon la revendication 3, dans lequel la matière plastique est colorée pour déterminer le code de couleur intégré pour ladite cuvette de montage (12A).

5. Procédé de fabrication de l'ensemble constitué par une soupape à aérosol et une cuvette de montage, destiné à un récipient à aérosol comprenant un bourrelet d'étanchéité du récipient disposé autour d'une ouverture supérieure dans le récipient à aérosol, comportant:

l'estampage de la cuvette de montage (12A) à partir d'un matériau en feuille métallique et caractérisé par la formation du revêtement continu de matière plastique sur la cuvette de montage (12A) par chauffage de la cuvette de montage à une température suffisant e pour faire fondre la matière plastique;

l'application des particules de matière plastique sur la cuvette de montage (12A) chauffée pour faire fondre les particules, constituant ainsi un joint d'étanchéité élastique quand le pourtour de la cuvette de montage est fixé au joint d'étanchéité du récipient à aérosol, et pour fournir le revêtement continu pour la cuvette de montage (12A) depuis l'intérieur du récipient à aérosol;

le refroidissement de la cuvette de montage revêtue (12A) et la fixation de la soupape à aérosol (19) sur la cuvette de montage revêtue (12A).

6. Procédé selon la revendication 5, dans lequel l'étape d'application de particules de matière plastique comprend l'immersion de la cuvette de montage chauffée (12A) dans une cuve (92) contenant les particules de matière plastique pour former le revêtement continu sur la cuvette de montage (12A), et

le chauffage de la cuvette de montage pour polymériser le revêtement de matière plastique.

7. Procédé selon la revendication 6, dans lequel l'étape d'immersion de la cuvette de montage chauffée (12A) dans la cuve (92) comprend l'orientation de la cuvette de montage (12A) selon une orientation préférée, ladite cuvette de montage étant disposée selon une relation angulaire par rapport à la verticale.

8. Procédé selon la revendication 6 ou 7, dans lequel l'étape d'immersion de la cuvette de montage chauffée (12A) dans la cuve (92) comprend l'immersion de la cuvette de montage chauffée dans un bol vibratoire, et les vibrations du bol vibratoire pour déplacer la cuvette de montage chauffée (12A) dans ce dernier et pour disperser les particules de matière plastique et les amener en contact avec la cuvette de montage chauffée.

9. Procédé selon la revendication 6, 7 ou 8, comprenant en outre:

le remplissage du récipient à aérosol au moyen de l'aérosol; la fixation de la cuvette de montage (12A) sur le récipient à aérosol pour former un joint entre eux au moyen de la matière plastique élastique, et la mise sous pression du récipient à aérosol.

10. Procédé selon la revendication 5, dans lequel l'étape de formation du revêtement continu sur la cuvette de montage (12A) comprend l'immersion de la cuvette de montage dans une cuve (92) contenant les particules de matière plastique;

le chauffage de la cuvette de montage dans la cuve (92) à une température suffisante pour faire fondre les particules de matière plastique qui sont contre la cuvette de montage (12A) pour former sur elle le revêtement continu de matière plastique;

le retrait de la cuvette de montage revêtue de matière plastique (12A) de la cuve (92);

le chauffage de la cuvette de montage revêtue (12A) pour faire fondre le revêtement de matière plastique sur la cuvette de montage; et

la fixation de la soupape à aérosol (19) sur la cuvette de montage (12A).

11. Procédé selon la revendication 10, dans lequel l'étape de chauffage de la cuvette de montage (12A) dans la cuve (92) comprend le chauffage de la cuvette de montage (12A) par un chauffage par induction.

12. Procédé selon la revendication 10 ou 11, dans lequel l'étape de retrait de la cuvette de montage (12A) de la cuve (92) comprend le retrait des particules de matière plastique non fondues de la cuvette de montage (12A).

13. Procédé selon la revendication 12, dans lequel l'étape d'élimination des particules de matière plastique non fondues de la cuvette de montage (12A) comprend l'application d'une aspiration par un vide à la cuvette de montage (12A) revêtue de matière plastique.

14. Procédé selon l'une quelconque des revendications 6 à 13, comprenant l'étape consistant à déplacer la cuvette de montage (12A) dans la cuve (92) contenant les particules de matière plastique en faisant vibrer la cuve (92).

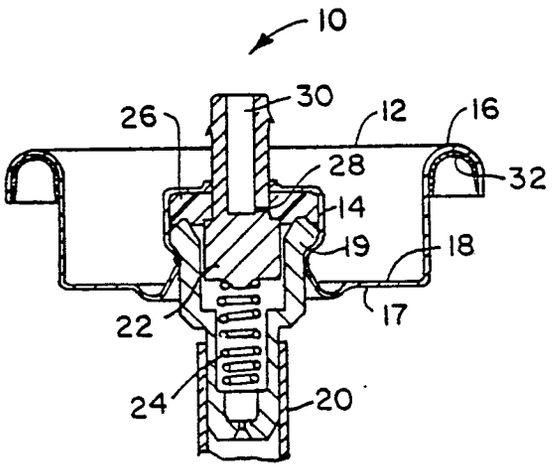

FIG. 1

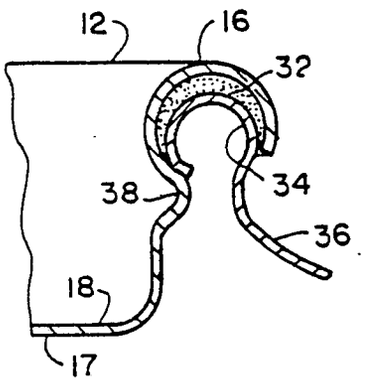

FIG. 2

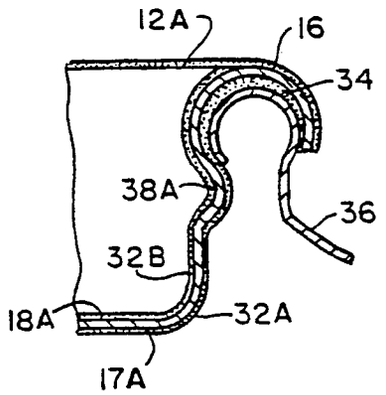

FIG. 4

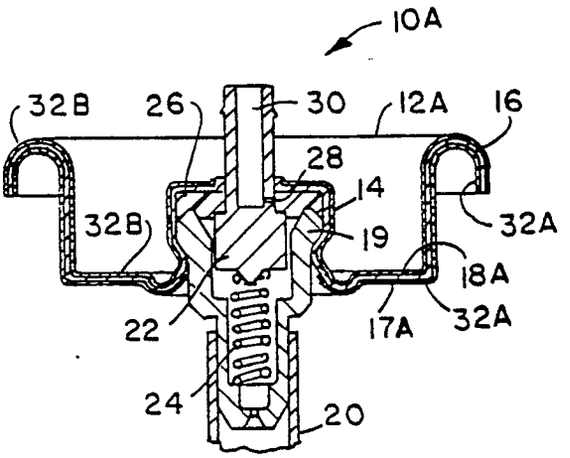

FIG. 3

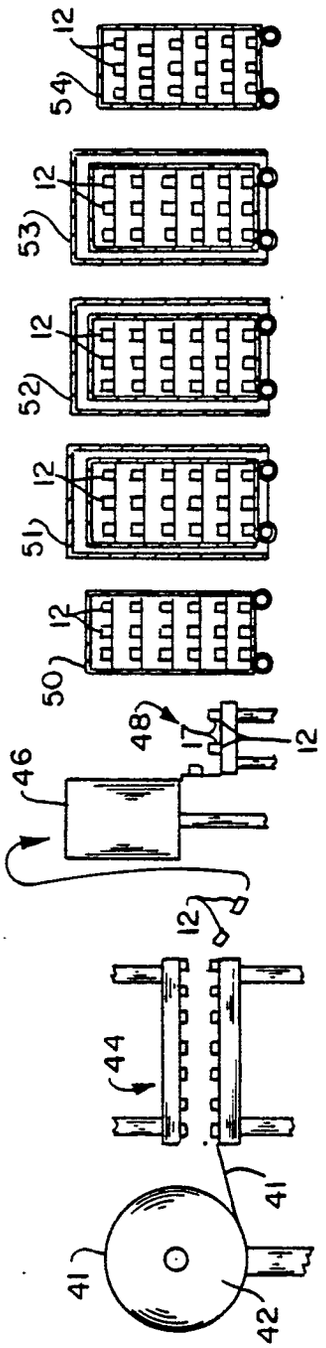
12
54
12
53
12
52
12
51
12
50
48
17
12
46
12
44
41
41
42

FIG. 5

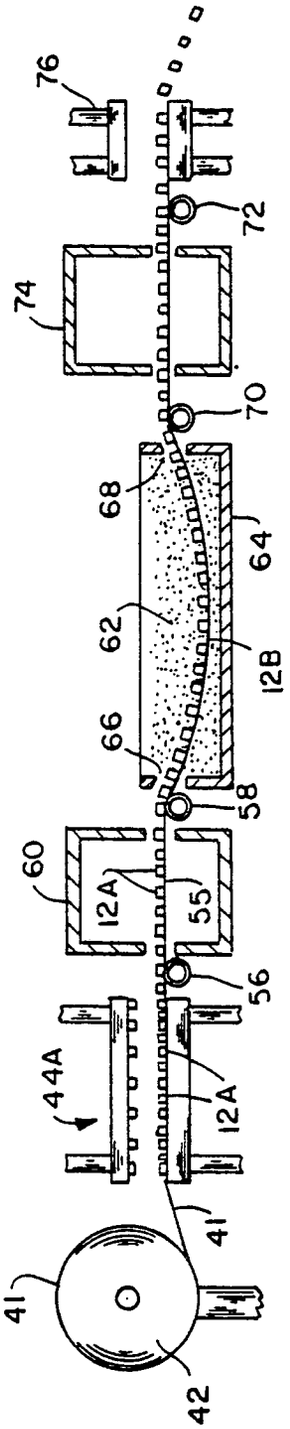
76
72
74
70
68
64
62
12B
66
58
60
12A
55
56
44A
12A
41
41
42

FIG. 6

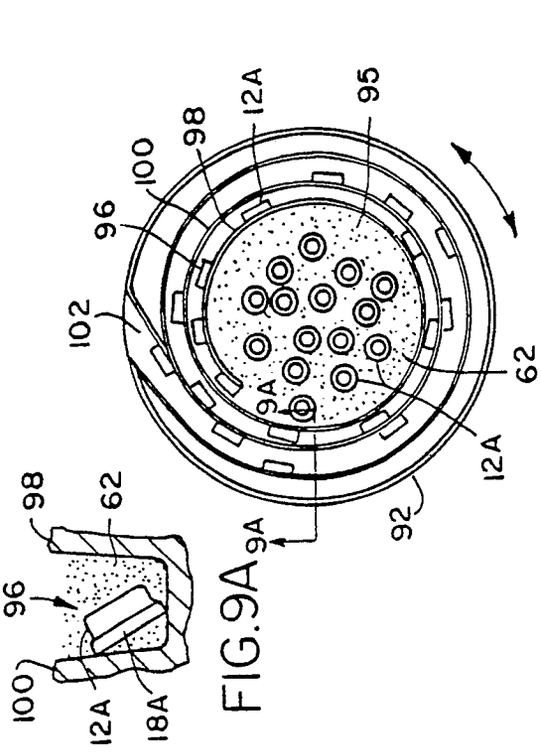

FIG. 9A

FIG. 9

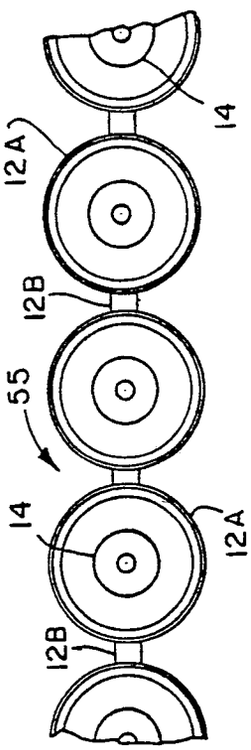

FIG. 7

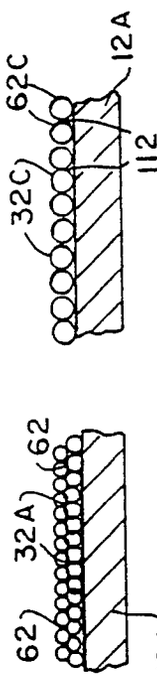

FIG. 16

FIG. 15

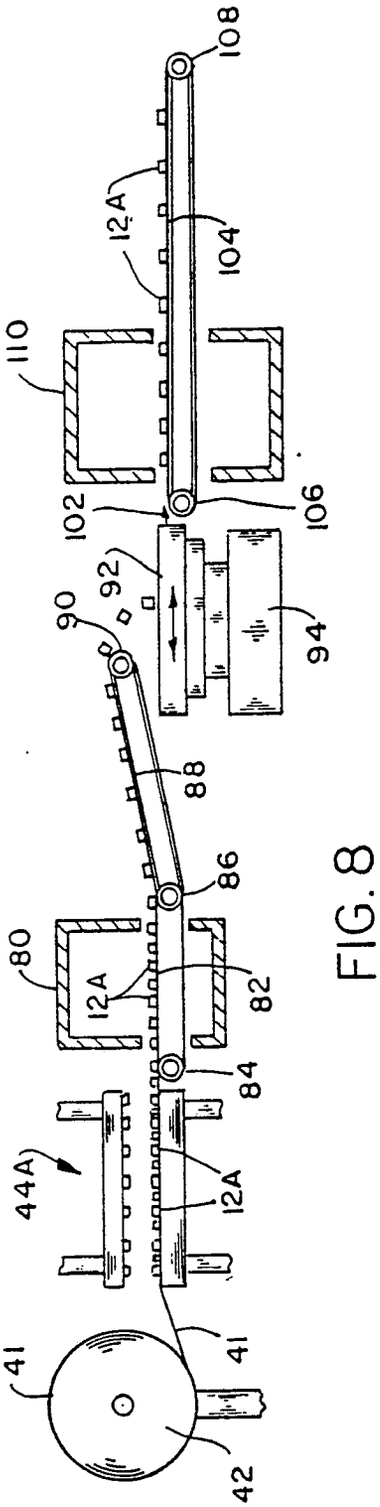

FIG. 8

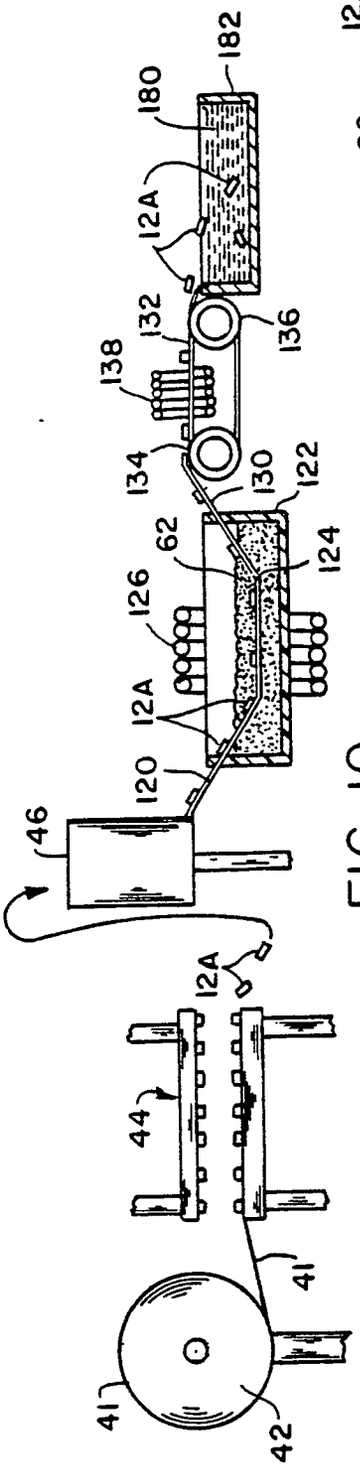

FIG. 10

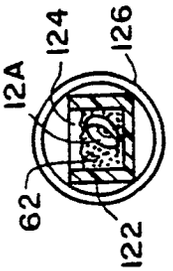

FIG. 12

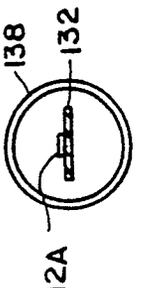

FIG. 14

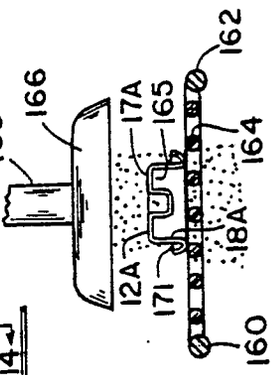

FIG. 13

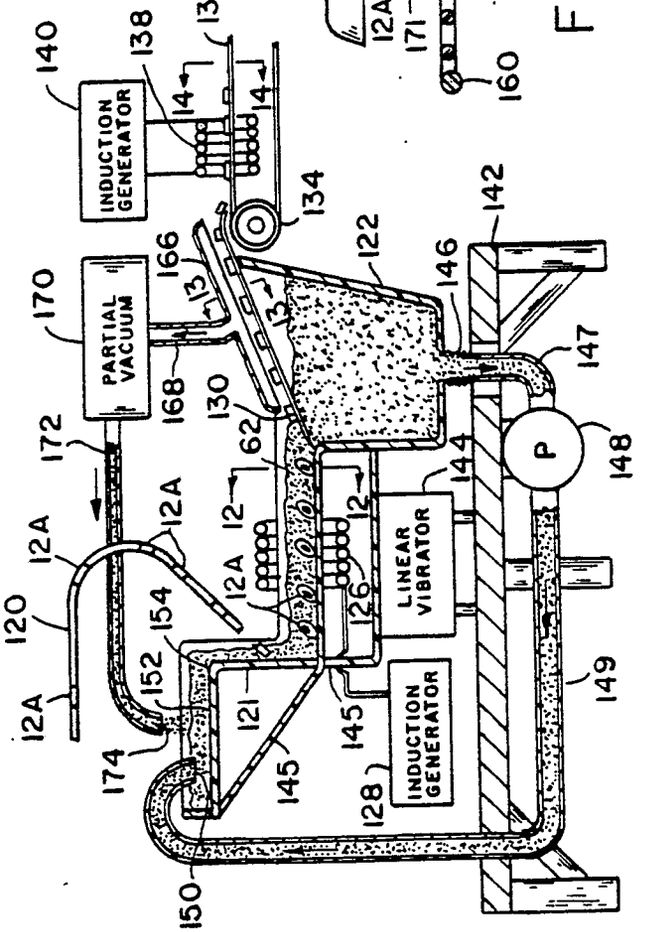

FIG. 11