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Miles

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[54] **ICING GUN SYSTEM FOR DECORATING CONFECTIONARY ARTICLES**

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[51] **Int. Cl.** **A62c 13/25**

[58] **Field of Search** 239/372, 373, 526; 222/394; 137/525

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[57] **ABSTRACT**

An icing gun system for decorating confectionary articles in which the icing material in an enclosed container is pressurized by compressed air, propelling the material up through a hose line and through the hollow handle into the gun barrel. A pressure-balanced valve arrangement in the gun includes a plunger passing out through the rear of the barrel with a convoluted flexible cylindrical bellows surrounding this plunger and extending between it and the rear of the barrel. This plunger is connected by a valve control rod to a tapered valve member movable within a nose cone and coacting with an apertured barrier for controlling the stream of icing material discharged from an interchangeable conical tip. Anti-drip clean shut off action occurs because the tapered valve member pulls back on the icing material in the nose cone whenever the trigger lever is released to shut off the flow. Toggle clamps permit ready access to the pressurizable container.

12 Claims, 10 Drawing Figures

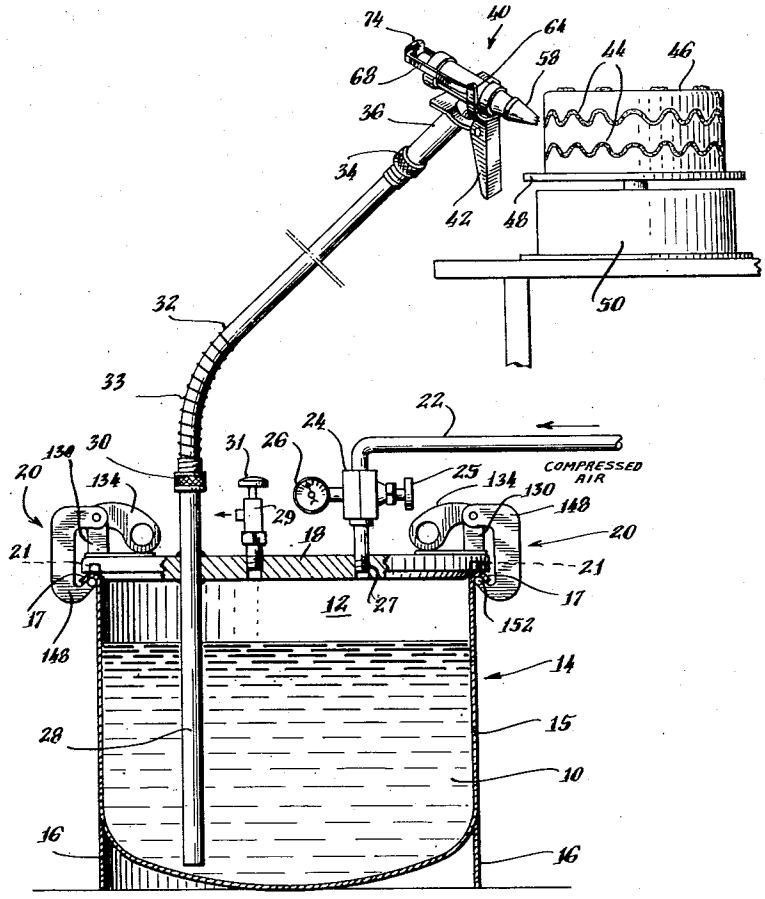

Fig. 1.

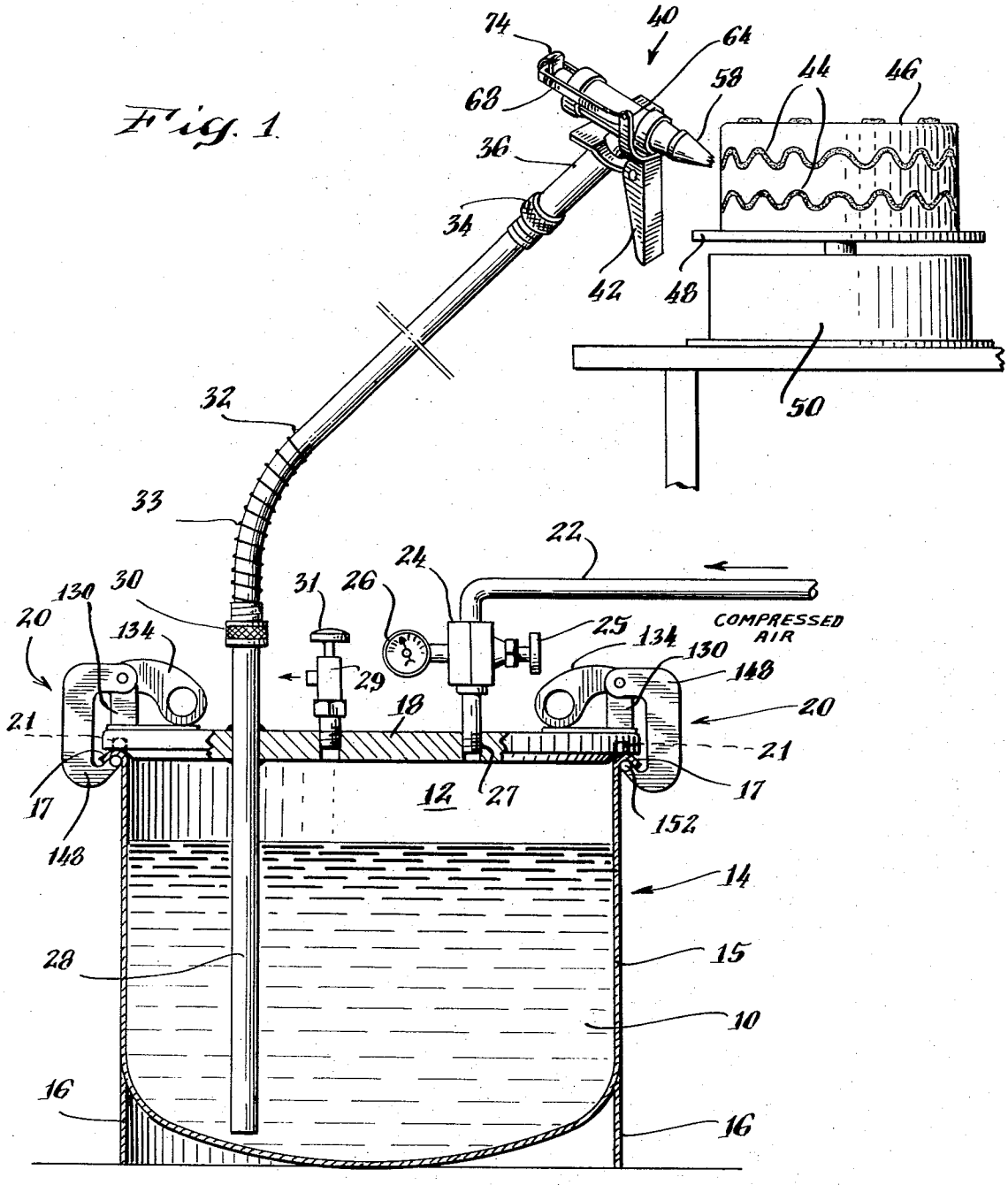

Fig. 5.

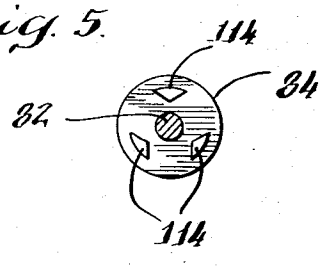

Fig. 6.

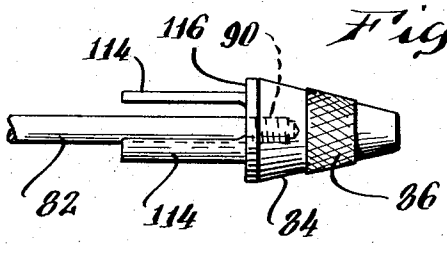

Fig. 3.

Fig. 2A.

Fig. 2.

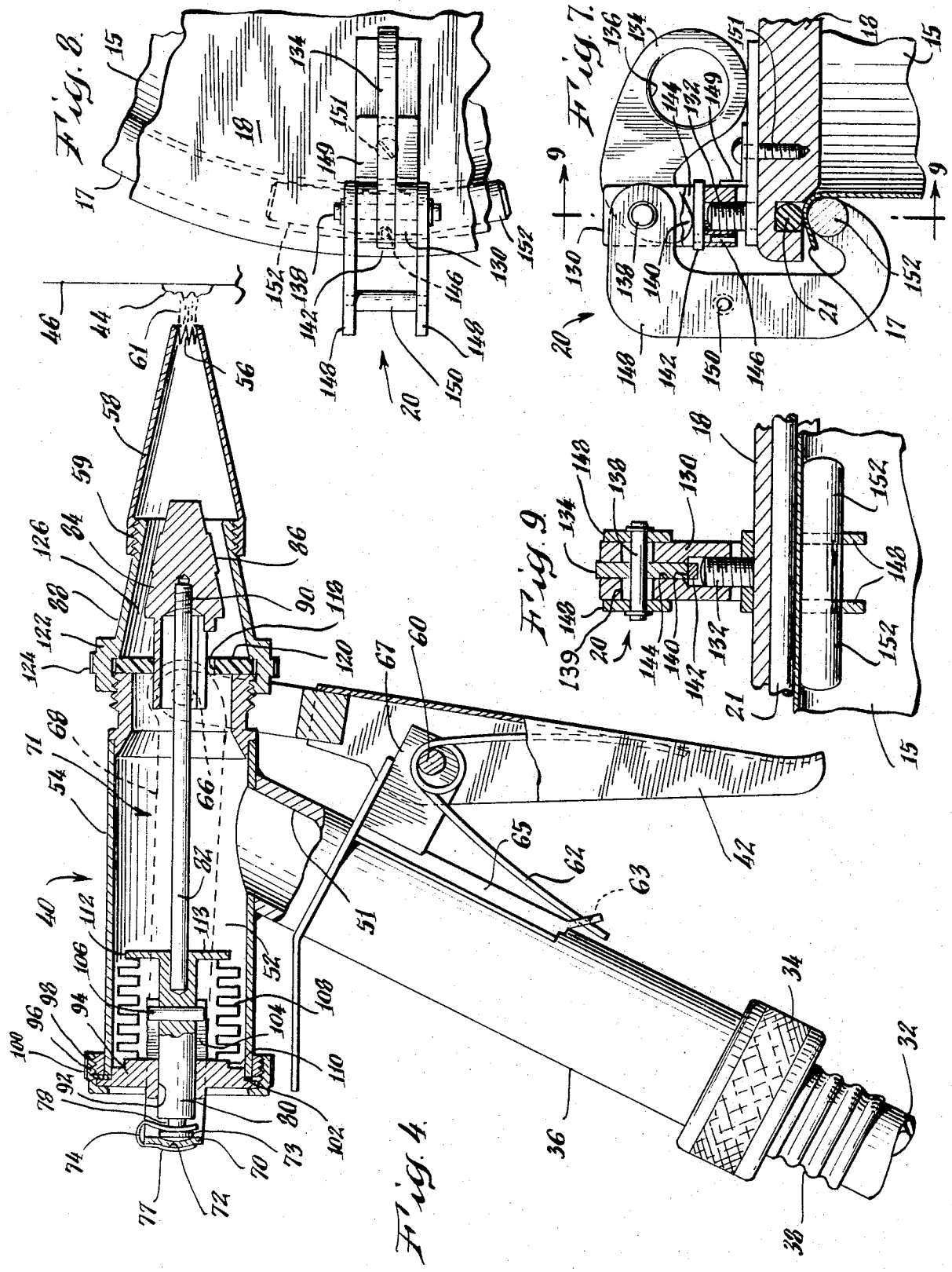
Fig. 8.
Fig. 7.
Fig. 9.
Fig. 4.

ICING GUN SYSTEM FOR DECORATING CONFECTIONARY ARTICLES

BACKGROUND OF THE INVENTION

The present invention relates to a confectionary icing gun system for use in commercially decorating candies, cakes, figurines, and other fancy confectionary articles.

Prior to the present invention, icing decorations were commercially applied to fancy confectionary articles by initially putting the icing material into collapsible paper cones. The operator manually squeezed the cone to push the icing material out through an outlet at the tip of the cone. The icing material typically is thick and viscous. Thus, it required a great deal of fatiguing effort on the part of the operator to squeeze the cone as well as to move the tip about to produce the desired decorative patterns on the articles being produced. Substantial amounts of time were consumed in delivering the icing material in buckets to the operator, removing the material from the buckets for filling the paper cones, and interruptions occurred in using one cone until fully collapsed and then replacing with a full cone, and so forth.

SUMMARY OF THE INVENTION

Among the advantages of the present invention are those resulting from the fact that it enables an operator to produce fancy decorations with much less fatigue and effort. Moreover, the operator can work without interruptions because the icing material is fed directly from the buckets in which it is delivered. In using the confectionary icing gun system as described, the operator conveniently squeezes on a trigger lever to control the stream of icing material being extruded out through the tip of the gun.

When the operator releases the trigger lever, the flow of icing material is shut off. The valve mechanism near the tip of the gun acts to pull back somewhat on the stream of icing material which was previously being extruded through the tip. Thus, advantageously, the flow of icing material is shut off cleanly without subsequent dripping occurring from the tip of the gun.

In order to propel the icing material from the supply container to the gun apparatus, a substantial pressure is applied to the icing material. The valve mechanism in the gun apparatus is advantageously pressure balanced such that the operator can readily actuate the trigger lever to control the stream of pressurized icing material. Moreover, the balancing of the valve mechanism is so effective that the flow of the pressurized material can be controlled over a wide range of flow rates, e.g. from a thin delicate stream to a thick gushing stream. These variations in flow rates are used by the operator to produce many different decorative figurines and decorative patterns.

Further advantages of the confectionary icing gun system of the present invention are that it is readily assembled and disassembled into its component parts. All of these parts can be cleaned and sterilized without injury to them.

As used herein the term "confectionary articles" is intended broadly to include cakes, tarts, candies, fancy candy dolls or figurines, candy decorations, decorative objects, Christmas tree decorations, holiday decorations, and the like.

The term "icing material" is intended to mean a fluid material used to decorate such confectionary articles. The icing material is edible and usually contains sugar with other flavorings and food elements. It usually has a thick viscous texture. After it has been applied to the confectionary articles the icing material stiffens or hardens to produce the desired attractive decorative patterns.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

The various aspects, objects and advantages of the present invention will be more fully understood from a consideration of the following detailed description in conjunction with the accompanying drawings, in which:

FIG. **1** is a perspective view and a sectional view illustrating the confectionary icing gun system as a whole;

FIG. **2** is a side elevational and partial sectional view of the gun apparatus, being a section taken on the plane **2—2** in FIG. **3**;

FIG. **2A** is a perspective view of a clip used in the gun apparatus;

FIG. **3** is a front elevational and partial sectional view of the gun apparatus, being taken on the plane **3—3** in FIG. **2**;

FIG. **4** is a view similar to FIG. **2** showing the trigger lever and valve mechanism in the actuated position for discharging a stream of icing material from the tip of the gun;

FIGS. **5** and **6** are rear and side elevational views of a movable valve member;

FIG. **7** is an enlarged elevational view, approximately actual size, of a toggle clamp for holding the lid on the pressurized supply container. Portions of the lid and container are shown in section;

FIG. **8** is a top view of the toggle clamp of FIG. **7**; and

FIG. **9** is a cross-sectional view of the toggle clamp mechanism taken along the plane **9—9** in FIG. **7**.

As shown in FIG. **1**, the fluid icing material **10** is placed in a pressurizable chamber **12** in a metal container **14.** This container includes a cylindrical bucket or pot **15** of stainless steel or aluminum having a support flange or skirt **16** adapted to stand on the floor. The bottom of the pot **15** is convex; so it can withstand internal pressurization without difficulty. There is a removable lid **18** held onto the outwardly flaring rounded rim **17** of the pot by means of a plurality of toggle clamps **20.** This lid or cover is formed by a thick rigid plate of stainless steel or aluminum, and a sealing gasket **21** is seated in a groove in the underside of the cover to engage the rim **17.**

In order to propel the icing material **10** out of the container **14,** compressed air is fed through a supply line **22** into the chamber **12.** The compressed air passes through a pressure regulator **24** having a manual adjustment handle **25** and a pressure gauge **26.** The air supply line **22** is screwed into an inlet opening **27** in the lid such that the air enters the region in the chamber **12** above the fluid icing material **10,** thereby pressurizing this material.

The cover **18** is equipped with a pressure relief valve **29** having a manual release knob **31.** Pulling up on the knob **31** serves to discharge the pressure from the chamber **12.**

There is a rigid outlet line **28** which is welded into the cover **18** and has a length to extend down near to the

bottom of the bucket **15,** when the cover is clamped in place. This outlet line **28** is of relatively large internal diameter, for example one inch, to facilitate the flow of the pressurized icing material up out of the container.

A flexible hose line **32** of comparable inside diameter is attached to the upper end of the rigid line **28** by a screw coupling **30.** A bending stress distributing spring **33** surrounds the lower portion of the hose **32** near the coupling **30** to prevent the formation of sharp bends or kinks in the hose near this coupling.

The pressure of the compressed air in the chamber **12** above the surface of the icing material forces this fluid material up into the lower end of the line **28** and then up into the hose **32** as indicated by the flow arrow in FIG. **1.** Depending upon the viscosity or fluidity of the icing material, a greater or lesser pressure of the compressed air may be used. For example, this compressed air may conveniently be supplied by a shop air compressor with a capacity ranging up to approximately 100 pounds per square inch gauge pressure (psig.). For most icing materials a pressure in the range from 15 to 65 psig. is utilized in the chamber **12,** but other pressures may occasionally be used if desired.

The upper end of the flexible hose line **32** is attached by another screw coupling **34** to the lower end of the hollow handle **36** of the controllable gun applicator **40.** The gun applicator is shown in FIG. **1** in use commercially applying decorative wave-like bands **44** to a cake **46** mounted on a turntable **48** which is revolved by a motor drive in the base **50** of the turntable. The operator squeezes the trigger lever **42** to increase the rate of flow of the icing material from the tip of the gun, and vice versa.

As shown in FIG. **2** there is a hose reinforcing sleeve **37** within the hose and a ferrule **38** which is crimped around the end of the hose near the coupling **34.** A similar sleeve and ferrule is used with the coupling **30.**

The handle **36** (FIG. **2**) has a hollow bore **51** which communicates directly with the cylindrical space **52** within the barrel **54** of the gun. At the forward end of the barrel is a conical tip **58** having an opening **56** of the desired shape to produce the particular decorative pattern being made. For example, FIG. **2** shows a star-shaped opening **56.** The conical tip **58** can be disconnected from the gun by unscrewing the threaded screw connection **59** at the large end of the cone to replace the cone with another having a differently shaped opening **56.**

As shown in FIG. **4,** in order to discharge a controllable decorative stream **61** of icing material from the tip opening **56,** the operator squeezes the trigger lever **42** toward the handle **36,** swinging the lever about its pivot **60** against the action of a spring **62.** One end of this spring is held in an eye **63** in a bracket **65** secured to the handle. This bracket **65** has a pair of projecting parallel legs **67** which hold the pivot **60.** The spring **62** passes around the pivot and its other end pushes outwardly against the trigger lever **42.**

As seen most clearly in FIG. **3,** above the pivot **60,** there is a yoke **64** fastened to the trigger lever **42,** with the two arms of this yoke **64** straddling the barrel **54.** Aligned pivot connections **66** located near opposite sides of the barrel **54** pivotally attach the two arms of the yoke **64** to the forward ends of two legs of a U-shaped link **68.** The two parallel legs of link **68** extend rearwardly from the respective pivots **66** to the rear of the gun. A back portion **70** of this link **68** extends across behind the gun and joins these two parallel legs together.

When the trigger lever **42** is squeezed, the yoke **64** and the two pivot connections **66** are swung forward (toward the right in FIG. **4**) pulling forward on the U-shaped link **68** and causing its back portion or bight **70** to move forward. This bight **70** serves as means for actuating a pressure-balanced valve mechanism **71** positioned within the barrel of the gun, as will be explained.

The pressure-balanced valve mechanism **71** includes a plunger **80** at the rear of the barrel connected by a valve control rod **82** with a movable valve member **84** located partially within the tapered nose **88** of the gun. The valve member **84** is tapered toward the front with a generally conical configuration which converges at approximately the same angle as the interior of the nose cone **88.** A knurled band **86** on the member **84** provides a grip to facilitate disassembly by unscrewing its threaded socket **90** from the threaded front end of the rod **82.**

For detachably fastening the plunger **80** to the bight **70,** there is a rounded socket **72** in the bight, and the plunger **80** has a rounded head **73** which engages in this socket. A U-shaped snap retainer spring clip **74,** as shown also in FIG. **2A,** has a slotted front end **76** which snaps into a groove **78** near the head **73** of the plunger **80.** The rear part **77** of this clip fits down behind the socket **72.** By pulling this clip off of the bight **70,** the link **68** is conveniently disconnected from the plunger **80.**

The plunger **80** passes through a central opening **92** in a breech plug **94** which closes off the rear end of the barrel **54.** A ring collar **96** holds this plug **94** in place. The collar **96** has a threaded socket **98** which screws around a threaded area at the rear end of the barrel **54.** The exterior of the collar **96** is knurled at **100** to facilitate assembly and disassembly. A gasket **102** of sterilizable material such as "Teflon" plastic (polytetrafluoroethylene) fits between the rim of the plug **94** and the end of the barrel **54** to seal the barrel space **52.**

The breech plug **94** has a hollow boss **104** which surrounds the plunger **80,** and a pin **106** extends transversely through the plunger **80.** This pin **106** engages in a pair of opposed slots in the boss **104** to prevent the plunger **80** from attempting to twist during assembly or disassembly, thus protecting from torsional stresses a bellows **108** attached to the plunger **80,** as described below.

For pressure balancing the valve mechanism **71,** there is a convoluted cylindrical spring metal bellows **108.** The back end of this bellows is soldered onto an annular shoulder **110** in the breech plug **94.** The front end of this bellows is soldered onto the rim **112** of a flange **113** on the front end of the plunger **80.** The annular shoulder **110** and the rim **112** have equal diameters (and their diameters are midway between the diameters of the interior and exterior convolutions) so that the effect of the pressurized icing material on the convolutions of the bellows **108** is exactly balanced out. Thus, the icing material as it pushes on the bellows **108** per se does not tend to move the valve mechanism **71** either forward or backward.

The icing material does exert a rearward force on the projected net effective cross-sectional area of the flange **113.** This net effective cross-sectional area lies in the circular band larger than the rod **82** and smaller than the interior convolutions of the bellows **108.**

Acting in the opposite direction, the icing material exerts a forward force on the valve member **84.** This valve member, as seen also in FIGS. **5** and **6,** includes a plurality of parallel guide fingers **114** extending rearwardly from a radially extending shoulder surface **116.** The parallel guide fingers **114** have cylindrical exterior surfaces so that these fingers slidingly fit through a central aperture **118** in a disc barrier **120.** This barrier is made of slippery sterilizable resin, such as "Teflon" plastic.

To hold this barrier disc **120** in place, the nose **88** has a threaded socket **122** which screws onto the front end of the barrel **54.** The disc **120** is thereby clamped against the barrel **54** and serves as a gasket to seal the barrel chamber **52.** A knurled band **124** around the socket **122** facilitates disassembly.

When the shoulder surface **116** of the valve member **84** is seated against the barrier disc **120,** the flow of icing material is shut off. When the valve member **84** is moved forward as shown in FIG. **4,** the icing material flows forward between the fingers **114** and through the aperture **118** into the nose **88** and thence out through the conical tip **58** to form a decorating stream **61.**

As shown in FIG. **6,** the roots of the fingers **114** are enlarged near the shoulder surface **116** to narrow and taper down the spaces between these fingers. Thus, a throttling action is provided as the shoulder surface **116** approaches the barrier **120,** because the flow spaces between adjacent fingers **114** progressively close off. In this way the operator can effectively control the flow rate over a wide range to produce a thinner, thicker or intermediate sized stream **61.**

The balancing achieved by the rearward force on the plunger flange **113** offsetting the forward force on the valve member **84** enables the operator to move the valve member **84** easily and to control its position accurately without being hampered by the large forces generated by the pressurized icing material acting on this valve member.

An anti-drip action is also achieved. When the operator releases the trigger lever **42** to shut off the flow, the conical valve member **84** is retracted within the conical nose **88.** The tapering annular space **126** within the nose cone **88** around the valve member **84** is enlarged by retraction of the valve member, as can be seen by comparing FIG. **2** with FIG. **4.** The enlargement of the region **126** during shut-off motion effectively pulls and sucks the icing material back into the tip **58.** The stream is shut off cleanly and neatly with no dripping, which is very desirable from aesthetic and cleanliness viewpoints.

The toggle clamps **20** each include a notched block **130** (FIG. **9**) screwed onto a threaded stud **132** mounted in the cover. A dog-leg shaped toggle lever **134** has a finger hole **136** and is pivoted on a thrust pin **138** passing through vertical slots **139** in the block member **130.** The toe **140** of the lever **134** pushes down against a bearing plate **142** located in the notch **144** of the block **130.** This bearing plate is held in place by a retainer pin **146.**

The thrust pin **138** is fastened in a pair of parallel C-shaped clamp elements **148** whose ends curve in beneath the bucket rim **17.** A spacer pin **150** holds the two C-shaped clamp elements parallel. To distribute the clamping pressure under the rim **17,** there is a curved rod segment **152** welded onto the lower ends of the clamp elements **148.** This rod segment is curved, as shown in FIG. **8,** to nest in the curve beneath the rim.

To release the clamps **20,** the handles **134** are swung up so that the toe **140** slides along and off of the bearing plate **142,** thus releasing the cover. If it is desired to tighten the clamping action of any clamp, an L-shaped retainer **149** (FIG. **7**) is temporarily removed by loosening a screw **151.** The block **130** is now freed to be screwed one or more turns further onto the threaded stud **132,** thereby tightening the clamp. Conversely, unscrewing the block **130** from its stud **132** loosens the clamp **20.** When the clamp tightness is properly adjusted, the L-shaped retainer **149** is replaced.

The gun handle **36** is angled fowwardly as it meets the barrel **54** for a comfortable grip and to aid in forward flow of the icing material toward the aperture **118.** A hand rest or skirt **154** surrounds the handle beneath the barrel and is attached to the bracket **65.**

Referring again to the toggle clamps **20,** they can be constructed in an alternate manner. The notch in the block **130** is widened so that the two C-shaped clamp elements **148** can be placed immediately adjacent to the opposite sides of the lever **134.** By placing the clamp elements **148** adjacent to the lever **134** the bending stress on the thrust pin **138** is reduced. This alternate construction thereby strengthens the clamps **20.**

What I claim is:

1. An icing gun system for decorating confectionary articles with icing material comprising a pressurizable container adapted to hold the icing material, said container having a removable cover, clamp means for releasably clamping the cover onto the container, an applicator gun having a tip opening for discharging the icing material onto the confectionary articles to be decorated, a flexible hose line connectible between the pressurizable container and the gun for feeding icing material to the gun, a manually operable trigger on the gun, a movable valve member which is exposed to the pressure of the icing material and is actuatable by said trigger for controlling the flow of icing material out of said tip opening, and a second movable member in opposed relationship to said valve member and connected to said valve member, said second movable member being exposed to the pressure of the icing material for balancing out the effect of the pressure on said valve member, whereby the valve member is readily controllable by said trigger.

2. An icing gun system for decorating confectionary articles with icing material comprising a pressurizable container for holding the icing material having a removable cover, means for releasably clamping the cover onto the container, an applicator gun having a tip opening for discharging the icing material onto the confectionary articles to be decorated, a flexible hose line connected between the pressurizable container and the gun for feeding icing material to the gun, a manually operable trigger on the gun, and valve mechanism in the gun operable by said trigger for controlling the flow of icing material out of said tip opening.

3. An icing gun system for decorating confectionary articles as claimed in claim **2,** in which said gun has a hollow barrel communicating with said tip opening and said valve mechanism includes a movable valve member located near the front of the barrel for controlling the flow of icing material from said barrel out of said tip opening, a plunger located near the back of the barrel and a control rod interconnecting said valve mem-

ber and said plunger, whereby the pressure of the icing material on said movable valve member is balanced by the pressure of said material on said plunger.

4. An icing gun system for decorating confectionary articles as claimed in claim **3,** in which said hollow barrel has an opening therein at the back, said plunger extends out through said opening and is movable forward and backward through said opening, a flexible bellows is interconnected between said plunger and the body of the gun, a fixed barrier is located near the front of the barrel having an aperture therein, and said movable valve member coacts with said aperture to control the flow of icing material.

5. An icing gun system for decorating confectionary articles as claimed in claim **4** in which said movable valve member has a plurality of guide fingers extending through said aperture, said guide fingers having spaces between them through which the icing material can flow in passing through said aperture.

6. An icing gun system for decorating confectionary articles as claimed in claim **3,** in which said hollow barrel has a nose tapering in a forward converging direction toward said tip opening, a barrier extending across the barrel near the larger back end of said tapering nose, said barrier having an aperture therein, said valve member being movable forwardly within said tapering nose away from said barrier for increasing the flow of icing material through said aperture to said tip opening, and vice versa, said valve member being retractable against said barrier for shutting off the flow, and said valve member also tapering in a forward converging direction within said nose, whereby the space around said tapering valve member and within said tapering nose increases when said valve member retracts against said barrier, thereby sucking the icing material back into said space to prevent dripping of the icing material from the tip opening to provide a clean shut off when the valve member is retracted.

7. An icing gun system for decorating confectionary articles as claimed in claim **1,** in which said gun has a hollow handle connected at an intermediate location with said hollow barrel, said flexible hose line is connectible with the lower end of said handle, said movable valve member is positioned in the forward portion of the barrel in front of the location where the handle connects with the barrel, said second movable member is positioned in the rear portion of the barrel behind said location, and said second member is connected to said valve member by a rod extending longitudinally within the barrel.

8. An icing gun system for decorating confectionary articles as claimed in claim **1,** in which a rigid outlet line extends through said cover, said line commencing near the bottom of said container when the cover is clamped in place, and said flexible hose line being connectible to said outlet line outside of said cover.

9. An icing gun system for decorating confectionary articles as claimed in claim **7,** in which said manually operable trigger is a lever extending down near the handle and having a pivot mounting below the barrel, a yoke is attached to the upper end of said lever having its arms straddling said barrel, a U-shaped link has two parallel legs extending along opposite sides of said barrel with a bight extending behind said barrel, and said bight of said U-shaped link is operatively connected with said second movable member.

10. An icing gun system for decorating confectionary articles as claimed in claim **9,** in which the back of said barrel is closed by a removable plug having an opening therethrough, said second movable member is a plunger extending through said opening, the bight of said U-shaped link is detachably attached to said plunger, and a flexible convoluted cylindrical bellows is positioned within the rear of said barrel, said bellows surrounding said plunger and being attached at one end to said plug and the other end attached to said plunger.

11. An icing gun system for decorating confectionary articles as claimed in claim **6,** in which the smaller forward end of said tapering nose is threaded, and said tip opening is located in a cone removably screwed onto the threaded forward end of said tapering nose.

12. An icing gun system for decorating confectionary articles with icing material comprising a pressurizable container for holding the icing material having an outturned rim and a removable cover, means for releasably clamping the cover onto the container, an applicator gun having a tip opening for discharging the icing material onto the confectionary articles to be decorated, a flexible hose line connected between the pressurizable container and the gun for feeding icing material to the gun, a manually operable trigger on the gun, valve mechanism in the gun operable by said trigger for controlling the flow of icing material out of said tip opening, said means for releasably clamping the cover onto the container including a member mounted on the cover having slots therein directed toward the cover, a dog-leg shaped lever pivotally mounted by a thrust pin extending through said slots, said lever having a free end adapted to be manually swung into a toggled position and having a toe-shaped end on the opposite side of said thrust pin from said lever and being engageable down toward the cover to exert a force upwardly on said thrust pin in a direction away from the rim of the container, and C-shaped clamp means having one end engageable beneath said rim of the container and having the other end pivotally connected to said thrust pin for pulling the cover down firmly against the container when said lever is swung into its toggled position.

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