# United States Patent [19]

**Owen**

[11] **3,823,750**

[45] **July 16, 1974**


[54] **VACUUM NOZZLE DEVICE**


[75] Inventor: **Dave L. Owen,** Spartanburg, S.C.

[73] Assignee: **W. R. Grace & Co.,** Duncan, S.C.



[22] Filed: **Feb. 8, 1971**

[21] Appl. No.: **113,703**

**Related U.S. Application Data**

[62] Division of Ser. No. 844,883, July 25, 1969, Pat. No. 3,628,576.

[52] **U.S. Cl.** ..... **141/65,** 141/90

[51] **Int. Cl.** ..... **B65b 31/04**

[58] **Field of Search** ..... 27/24, 24.1; 53/112 B; 128/276–278, 350; 137/533.11; 141/8, 46, 64, 65, 66, 85, 86, 115, 90, 116, 119, 89, 367, 392; 184/1.5, 105 R; 222/525; 239/498, 596, 601



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 1,048,316 | 12/1912 | Johnson | 128/278 |
| 2,571,763 | 10/1951 | Robbins | 239/601 |
| 2,614,563 | 10/1952 | Devine | 128/176 |
| 2,638,976 | 5/1953 | Vixler | 239/601 X |
| 3,103,947 | 9/1963 | Mueller | 184/1.5 X |
| 3,109,426 | 11/1963 | Noonan et al. | 128/276 X |
| 3,153,682 | 10/1964 | Walker | 239/601 X |
| 3,312,256 | 4/1967 | Reisinger | 53/112 B X |
| 3,470,673 | 10/1969 | Tipper | 53/112 B |
| 3,511,020 | 5/1970 | Kraft et al. | 53/112 B |
| 3,527,018 | 9/1970 | Jahnke | 53/112 B |
| 3,580,300 | 5/1971 | Dunn | 141/86 X |



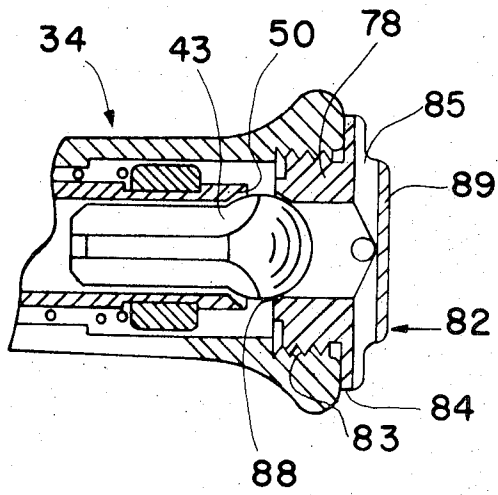
*Primary Examiner*—Houston S. Bell, Jr.
*Assistant Examiner*—Frederick R. Schmidt
*Attorney, Agent, or Firm*—John G. Toney; William D. Lee, Jr.



[57] **ABSTRACT**

A manually operated vacuum device for withdrawing air from a package, and positioning the package for closing. The device has only 4 basic parts that may be disassembled and assembled by hand, a suction tube, a slide tube mounted on the suction tube for reciprocation thereon, a nozzle at the entrance to the slide tube and a valve means trapped between the nozzle and the suction tube for valving the device in response to reciprocation of the slide tube. A special nozzle is of shallow depth and has a closed end with ports entering from the side. Another special nozzle member has a sump in its tip and narrow slot openings entering into its vacuum evacuated bore.


**2 Claims, 9 Drawing Figures**



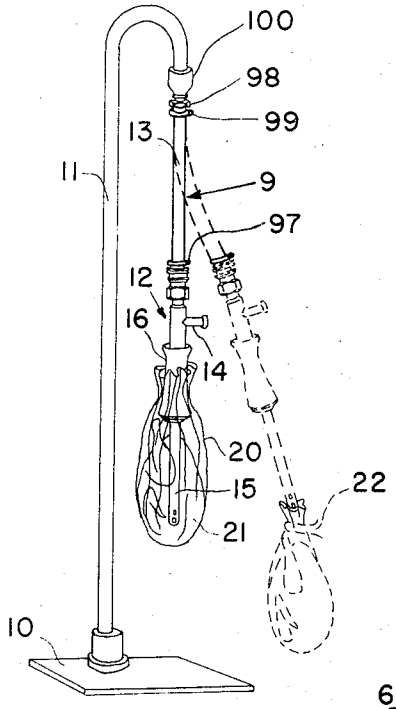



FIG. 1

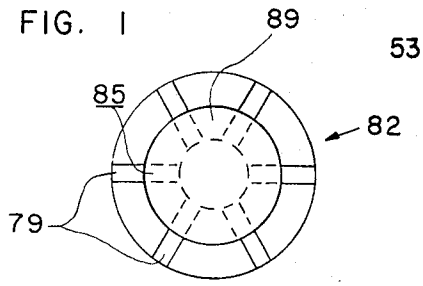



FIG. 3

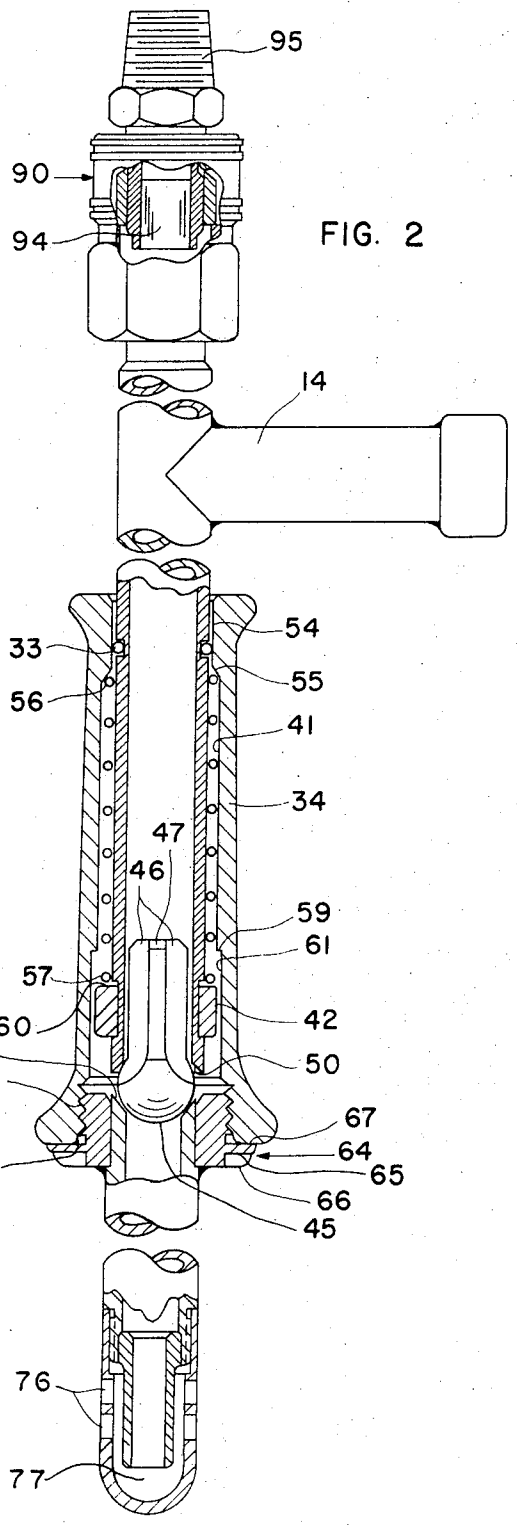



FIG. 2

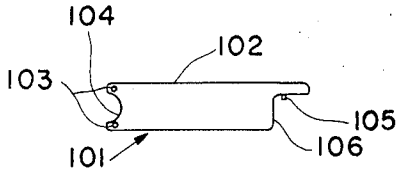



FIG. 7

FIG. 4

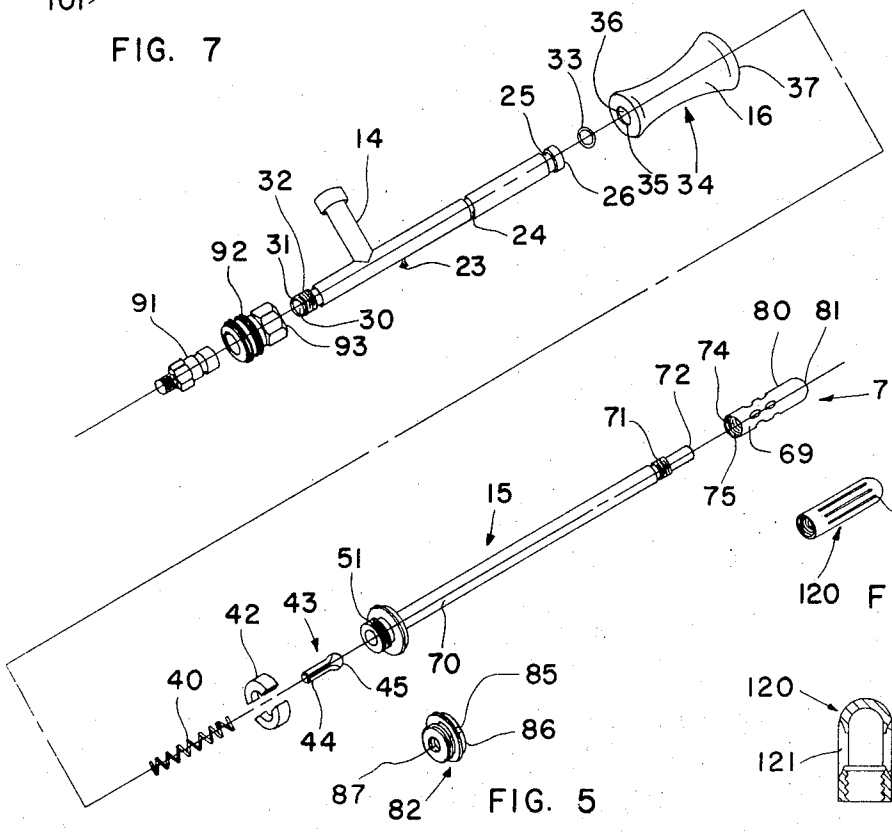



FIG. 5




FIG. 8




FIG. 9

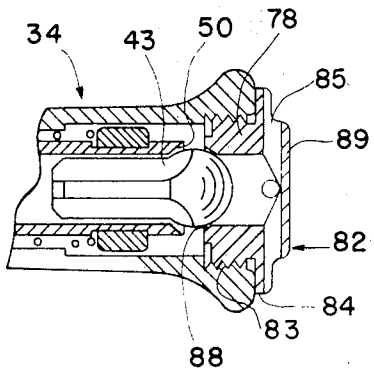



FIG. 6

# VACUUM NOZZLE DEVICE

This application is a division of my prior copending application Ser. No. 844,883, filed on July 25, 1969, now U.S. Pat. No. 3,628,576.

This invention relates to an improved device for removing air from a package. In another aspect, the invention relates to an improved vacuum packaging device. In a still further aspect, the invention relates to the vacuum packaging of poultry or the like in flexible film bags.

It is known practice for processors of turkeys, chickens, and poultry products to individually vacuum pack each bird in a collapsible air tight bag which may be made of any suitable thermoplastic such as biaxially oriented irradiated polyethylene. For simplicity, the invention will be described with reference to the packaging of poultry or the like; however, the invention is broadly applicable to the removal of air from any collapsible material in which a product may be placed.

A process has heretofore been proposed wherein a nozzle (in communication with a means for creating a vacuum) is inserted into the package to be vacuumized. After a sufficient period of time to effectively remove the air from the package, the package is twisted so as to prevent entrance of air into the evacuated package and the twisted neck is then sealed by means such as clipping or heat sealing. In one packaging method the bird is first placed in each bag in a substantially vertical position and disposed immediately below a fixed vertical nozzle. While the operator holds the bag mouth over the nozzle, the air is exhausted from within the interior of the bag.

In U.S. Pat. No. 3,312,256, issued to D. J. Reisinger and assigned to the same assignee as this application, an improved mechanism is provided that lifts the bird and the bag off the table during the package closing procedure. The patent illustrates a vacuum actuated lifting mechanism supported above a packing table and carrying an associated vacuum nozzle assembly. The arrangement is such that when a vacuum condition is established within the mechanism, the latter will operate to raise the nozzle, and consequently the bird and bag, upwardly a sufficient distance above the table to permit the operator to twist the bag after a vacuum has been obtained in the bag. The bag is then removed from the nozzle and sealed. After the package has been vacuumized and sealed, it is subjected to a heat shrinking operation so that the bag shrinks to form a skin tight package about the bird.

It is an object of this invention to provide a new and improved apparatus for vacuum packaging.

Still another object of the invention is to provide such apparatus having a minimal number of parts that can be easily disassembled for cleaning and reassembled with unskilled labor.

It is another object of the invention to provide a new and improved drip-free nozzle for a vacuum packaging device.

Yet another object of the invention is to provide a dripfree vacuum packaging device.

In carrying out one aspect of my invention in one form thereof, I have provided an improved vacuumizing apparatus. The improved vacuumizing apparatus has a base suction conduit with a slide mounted for reciprocation thereon and biased toward the upper end thereof. The slide has a hand grip on its outer surface and a nozzle connected to its lower end. A floating valve member is engaged between the nozzle and the suction conduit and clamped therebetween when the slide is in its raised rest position, closing the vacuumizing apparatus. The valve floats between the nozzle and the suction conduit when the handle is actuated by pulling against its bias.



In the preferred form of my improved vacuumizing apparatus the slide is biased toward the upper end of the base suction conduit by a helical spring that encircles the base suction conduit. The spring is held in its functional position between the base suction conduit and the slide by being engaged at its lower end by a spring retaining seat provided on the outer surface of the base conduit by a split-ring engaged in a split-ring seat formed in the outer surface of the conduit and extending radially around the base suction conduit, the split-ring projecting beyond the adjacent outer surfaces of the conduit. The slide has a spring retaining seat engaging the upper end of the spring. The slide extends wholly around the base suction conduit and the spring retaining seat is formed by part of an offset in the axial bore that extends axially through the slide. This offset is formed between an upper region of the slide that fits close to the base suction conduit and an intermediate, enlarged region fitting radially over the helical spring. This intermediate region has an inside radius smaller than the outside radius of the split-ring and therefore can not pass over the split ring. Part of the offset forms the stop that engages the upper surface of the split ring to stop the actuation stroke of the apparatus.

To form a seal between the slide and the base suction conduit, a seal extends around the base suction conduit. The seal is seated in a seal seat formed in the outer surface of the base suction conduit. The seal projects beyond the adjacent outer surface of the base suction conduit and is engaged against the inside surface of the upper region of the slide to form the seal.

A lower region of the axial bore in the slide is enlarged further than the region overlying the helical spring and encircles the split-ring and engages the split-ring's outer surface for guided reciprocation thereon. The terminal end of the bore in the slide tube has a threaded region which engages a mating threaded region on the outer surface of a nozzle to secure the nozzle in the vacuumizing apparatus.

A floating valve member is engaged between the nozzle and the lower end of the base suction conduit. The floating valve has a rounded head positioned below the base suction conduit. The head is larger than the inside of the lower end of the base suction conduit so that it is maintained outside of the base suction tube and can not pass into it. A stem on the floating valve member extends from the rounded head and is engaged in the channel of the base suction conduit and holds the valve member in alignment and in and below the base suction conduit. A plurality of channels formed in the valve member provide passageways for the flow of air between the valve member and the lower end of the base suction conduit and up through the conduit. The channels pass from below the lower end of the base suction tube to above the lower end of the base suction tube. The nozzle has an upwardly directed beveled region on its inside surface at its upper end, that is engaged by the rounded head of the floating valve when the spring is expanded to clamp the valve member between the noz-

zle and the base suction conduit to shut off the vacuum nozzle.

The vacuumizing apparatus desirably is mounted by a mounting means having a quick connect line coupling that connects the upper end of the base suction conduit with a stiff flexible tube. The stiff flexible tube extends above the quick connect line coupling and is equipped for direct connection to a suspending supporting means. The stiff flexible tubing supplies the pivoting characteristics needed in the usual case to enable a product being vacuumized to be slipped into the jaws of a clipper or other sealing means without the necessity of withdrawing the vacuum force from the package.

A new dripless vacuum nozzle also forms an important aspect of my invention. This nozzle has a closed tip with a sump in the tip and at least one narrow slot opening above the sump. The nozzle has the outer configuration of a cylinder with a rounded point at its outer closed tip, the inside of the nozzle is a cylindrical bore penetrating axially below the ports to form the sump. A threaded area is formed on the inside of the nozzle at its upper end above the ports and these threads are meshed with the threads on the nozzle tube securing the nozzle to the nozzle tube. This nozzle is a species of the nozzle claimed in a copending application of William H. Dunn, Jr., filed on even date with this application entitled Vacuum Apparatus and Snorkel Nozzle and assigned to the same assignee as this application.

Another new nozzle also forms an important aspect of my invention. This nozzle has a first disc shaped region and a second disc shaped region. The second disc shaped region is smaller than the first disc shaped region, projects from the first disc shaped region and is centered with respect thereto. A bore is formed in the nozzle and extends through the first disc shaped region and into the second disc shaped region perpendicularly to the radius lines of the disc. The bore terminates in a tapered point in the second disc shaped region. A plurality of ports enter the nozzle from the outer circumference thereof and intersect the bore. The ports enter the nozzle at the jucture between the first and the second disc region, intersecting both of said discs. The ports extend across the face of the first disc shaped region as a trough beyond the second disc shaped region. The ports radiate from the bore at a right angle thereto and intersect the bore in the bore region restricted to the tapered area of the bore. A third disc shaped region projects from the right disc shaped region opposite the second disc shaped region and is centered with respect to both the first and second disc shaped regions. Threads are formed on the outer circumferential edge of the third disc for mounting the disc.

FIG. **1** is an elevational view showing the vacuum nozzle assembly with a package engaged thereon and twisted and in phantom lines the device is shown with its flexible connection flexed to position the twisted neck of the bag in the throat of a clipper.

FIG. **2** is an enlarged partial vertical section of the nozzle assembly.

FIG. **3** is a view of an alternate nozzle.

FIG. **4** is an exploded view of the vacuum nozzle assembly of FIG. **2** with phantom lines depicting the order of assembly.

FIG. **5** is a view of the alternate nozzle of FIG. **1** shown in position for substitution in the assembly of FIG. **4.**

FIG. **6** is a partial vertical section showing a portion of the assembly of FIG. **2** with the alternate nozzle substituted in the assembly.

FIG. **7** is a plan view of one side of an auxiliary disassembly tool.

FIG. **8** is a side elevation of a different nozzle.

FIG. **9** is a vertical section through the nozzle of FIG. **8.**

Referring now to FIG. **1,** an embodiment of my invention is shown comprising a packing table **10,** a support assembly **11** and a vacuumizing apparatus or device **12.** The vacuumizing device **12** is connected to the support assembly **11** by a mounting means **9** that includes a stiff flexible tubing **13.** The vacuumizing device **12** has a conduit **14** that is connected to a means (not shown) for withdrawing air therethrough. The vacuumizing device **12** has a snorkel nozzle **15** that is in communication through the device **12** and its conduit **14** with the means for withdrawing air or pulling the vacuum. The operating handle **16** actuates the device to open the device for withdrawing air from a region such as a region enclosed by a bag **20.**

In operation, the operator places the item to be packaged such as a bird **21** (for example, a chicken, whole and dressed) on the table **10,** inserts the bird into the heat shrinkable plastic bag **20** in such a manner that the snorkel **15** can be inserted into the bird's body cavity. With the end of the bag **20** and the enclosed bird **21** resting on table **10,** the operator inserts the snorkel into the bird's body cavity and lifts the loaded bad upwardly gathering the open end of the bag around the lower portion of the device **12,** gripping the film of the bag **20** tightly about the handle **16.** The handle **16** is actuated and a vacuum is drawn through the snorkel **15** as hereinafter described in greater detail to evacuate the cavity of the bird and the bag **20.** After the bag has been evacuated the operator slides the bag down as desired to provide a clearance between the bird and the tip of the snorkel while simultaneously rotating the bag to twist the bags neck and close the vacuumized bag. The device **12** is at the same time swung on the tubing **13** to position the twisted neck portion of thebag in a clipper **22** (only the jaws of which are shown in phantom lines) and a clip is applied to the twisted neck to retain the vacuum. A suitable clipper is shown in U.S. Pat. No. 3,383,746 issued to Narduzzi, Wing and Forte and assigned to the same assignee as this application. The clipper would be mounted to one side of the table **10** at a height disposing its throat within the pivot arc of the bag's neck. The clipper's throat should, of course, be oriented for easy entrance of the neck of the bag in a manner such as is shown in phantom lines in FIG. **1.** Of course, other securing means could be employed to secure the bag's neck.

Referring now to FIG. **4,** an exploded view representing the assembly arrangement of my device **12** is shown. The base component is an axial cylindrical suction conduit or tubular member **23** which is hollow throughout its length and has an O-ring seat **24** formed radially in its outer surface and a split-ring seat **25** formed radially in its outer surface at its lower end **26.** The vacuum conduit **14** intersects the channel or bore **30** of the tube **23** between the O-ring seat **24** and the upper end **31** of the tube **23.** The upper end **31** of the

tube has threads 32 formed on the outer surface thereof radially therearound. An O-ring 33 is provided and sized so that in assembling the device, it may be slipped over the lower end 26 of the tube and seated in the O-ring seat 24. The O-ring projects radially outward beyond the outer circumference of the tube 23 when it is seated in the O-ring seat 24. An axial slide tube 34 is sized so that it may be slipped onto the tube 23 with the tube 23 passing through the throat 35 into the axial slide tube channel or bore 36. The outer surface of the slide tube is formed into the hand grip 16.

A helical spring 40 fits in the enlarged channel portions 41 (FIG. 2) of the slide tube 34 and around the axial suction tube 23. The split-ring or collar 42 is positioned in the split-ring seat 25 and held in position by the slide tube 34 which overlies it securing it on the seat 25.

Floating valve member 43 is positioned with stem 44 in channel 30 at the end 26 of the suction tube 23. The rounded head 45 is sized so that it will not fit into the channel 30. Therefore the floating valve member 43 is retained at the lower end 26 of the suction tube 23. A plurality of channels 46 are formed in the valve member 43 to provide a passageway for the flow of air between the valve member and the lower end 26 of the suction tube 23. A plurality of ridges 47 separate the channels 46 (FIG. 2) from one another and engage the walls of the bore 30 to stabilize the stem 44 therein. The entrance to the channel 30 at the lower end 26 of the suction tube 23 has a beveled entrance surface 50 that reduces the wear on the floating valve where it engages with the lower end 26 and enables the ball to seat properly and maintain its alignment capability over a long life.

The slide tube 34 extends below the end 26 of the suction tube 23 and the threads 51 on the outer surface of the nozzle 15 are mated with the threaded region 52 at the terminal end 53 of the bore 36 in the slide tube 34. It will be seen that the upper region 54 of the slide tube 34 extends radially about and fits close to the base suction tube 23 and sealingly engages the O-ring for reciprocation thereon. The intermediate enlarged region 41 overlies helical spring 40 and the offset 55 between the upper region 54 and the enlarged region 51 forms a seat engaging the upper end of spring 56. Offset 55 is beveled or tapered to prevent it from damaging the O-ring during assembly. The lower end 57 of the spring 40 is engaged against the upper surface or end 60 of the split-ring, which forms the opposed spring seat, the spring being held in compression between the offset seat 55 and the opposed spring seat 60 and being further compressible upon actuation of the handle 16. A lower further enlarged region 61 of the bore 36 overlies and is in guiding engagement with the outer surface of the split-ring which it encircles and is in guided engagement therewith for reciprocation thereon. The offset 59 between region 41 of the bore and enlarged region 61 serves as the slide stop by engaging the upper surface 60 of the split-ring 42.

The nozzle has an upwardly directed beveled valve seat 63 which is held biased against the rounded head 45 of the floating valve member 43 by the retention of the sping 40 under compression in the apparatus. The floating valve member 43 is preferably made of a slightly resilient material so that it will form a tight closure under the compression of the spring.

In the usually preferred form of my nozzle, as shown in FIGS. 2 and 4, the threads 51 are formed on a mounting collar 64 which collar has a flange 65 at its lower end 66, the upper side 67 of the flange 65 is engaged against the lower end 37 of the slide tube 34 when the nozzle is secured in position. A nozzle tube 70 is inserted through the collar 64 and welded therein. The nozzle tube 70 has a male threaded region 71 on its outer surface at its lower end 72. A nozzle tip or nozzle member 73 is mated with the lower end 72 of the nozzle The nozzle tip 73 has a bore 74 extending into its upper end 69 with threads 75 formed at the entrance end of the bore. The threads 75 are mated with the male threaded region 71 on the end of the nozzle tube 70. A plurality of ports 76 enter into the bore 74 from the exterior of the nozzle tip. A sump region 77 is formed by the lower end of the bore 74 which extends below the ports 76 in the lower end 80 of the nozzle tip 73. The tip 81 of the nozzle tip 73 is rounded for easy insertion into the bag 20 and into the products within the bag 20.

An alternate nozzle 82 is shown in FIGS. 3, 5 and 6 and it has a threaded region 83 and a flange region 84 that operate identically with the equivalent parts in the nozzle 15. The collar region is formed directly as a part of the nozzle itself and ports 85 are formed in its outer face 86 and pass under what is in effect a face plate portion 89 to allow easy passage of air from the sides of the nozzle into the nozzle. The ports 85 project beyond the face plate portion 89 in the face 86 as troughs 79. The nozzle passageways 85 feed into the nozzle bore 87. The face plate portion 89 prevents any solids, particularly soft solids like fat, from being forced into the nozzle in a glob should the nozzle be pressed directly against such materials as would be the case if the bore 87 opened directly out through the face of the nozzle. As may be seen in FIG. 6, when assembled, the parts mate identically as those previously described with respect to the nozzle 15. The alternate nozzle has a beveled region 88 which is the equivalent of the beveled region 63 of the previously described nozzle 15. The nozzle 82 produced for commercial use has circular ports 85 that have a diameter of 1/8 inch.

Another way to describe the nozzle would be as three discs, a first disc shaped region 84 which would be the flange, a second and smaller disc shaped region 89 which would be the face plate portion and a third disc shaped region 78 which projects from the first disc shaped region 84 and is opposite disc shaped region 89 and is also smaller than disc shaped region 84 and has threads 83 formed thereon. The ports 85 enter the nozzle at the juncture between the first and second disc regions 84 and 89 and intersect the bore 87 in the bore region restricted to the tapered area of the bore. While a symetrical and even disc shape is preferred any generally disc shape is operable. For example, one or more of the disc shaped regions could have the edges shaped as an octagon, most likely with the outwardly facing edges beveled so that they would not be sharp. Other shapes could also be imparted to the "disc" regions particularly to attempt to avoid a narrow reading of the claims. Thus it is to be understood that, as used herein "generally disc shaped region" includes all varient shapes, such as octagonal for example, that are basically circular rather than basically square.

The mounting means for the device 12 also serves as the means for permitting the device to be pivoted. The

mounting means **9** has a quick connect line coupling **90** that has a male member **91** and a female member **92,** FIGS. **1, 2** and **4.** The female member **92** has a lower female threaded region (threads not shown) at the lower end **93** of part **92** which mates with the threads **32** on the upper end of the suction tube **23.** The male member **91** of the quick connect line coupling **90** is shown in FIG. **2** to be plugged with a plug **94.** The upper end of the male member **91** has a male threaded region **95.**

The stiff flexible tube **13** has one end engaged over the upper male threaded region **95** of the male quick connect line coupling member **91.** A first hose clamp **97** encircles the stiff flexible tube over the male threaded region or the upwardly extending male extension **95** of the quick connect line coupling member **91** and is tightened to secure the tubing on the upwardly extending male extension **95.** A tube adaptor **98** has a male tube engaging extension tube adaptor **98** by hose clamp **99** in the same manner described with respect to hose clamp **97** and upwardly extending male extension **95.** An adaptor **100** is threadibly engaged with the tube adaptor **98** and with the support assembly **11** as may be seen in FIG. **1.**

A tool for removing the nozzle **82** should it be over tightened is shown in FIG. **7.** It may be seen that the tool **101** has a handle portion **102** and two pins **103** at one end with an arc cut out **104** formed therein. The end of the handle with the pins **103** fitting into troughs slots **79** on each side of the face plate **109** with the pins engaging the troughs so that the handle may be turned while the slide tube **34** is held stationary to screw the nozzle tip out of mating engagement with the slide tube **34.** It is usually necessary only to hand tighten the nozzle tip with the fingers. Usually the tip can also be removed without the aid of any tools. The nozzle **15** has sufficient means to it so that it is more easily gripped by the nozzle tube **70** for manual removal by twisting to dislodge if from threaded engagement in the sleeve **34.** However, the other end of the tool **101** has a pin **105** therein and should the nozzle tip **73** become too tight to remove by gripping it manually, the pin **104** may be inserted in a port **76** with the nozzle's curved outer surface resting against the curvature **106** of the tool **105.** The handle can then be turned like a crank to unscrew the nozzle **73.**

The assembly of the parts will now be briefly explained with particular relation to their assembly and disassembly in the plant for cleaning, sanitation and maintenance. To assemble the vacuumizing apparatus, the base suction tube **23** is grasped and held with the lower end **26** turned upwardly and the O-ring **33** is slipped over the lower end **26** and into O-ring seat **24.** Next the slide tube **34** is inserted over the lower end **26** of the suction tube **23** and pushed well down on the suction tube so that it is clear of the split-ring seat **25.** Next the helical spring **40** is slipped over the end **26** of the suction tube **23** and down into the slide's bore **36.** Then the split-ring **42** is positioned in the split-ring seat **25** and the stem **44** of the floating valve member **43** is positioned in the bore **30** of the suction tube **23.** Then while holding the split-ring in position the slide tube **34** is slipped upward, pressing the spring **40** against the split-ring **42.** The slide tube is advanced until its threaded region **52** is beyond the end of the suction tube **23** at which time the nozzle is secured in position with thread **51** mating with threads **52** thus securing all of the parts in position.

Quick connect line coupling piece **92** once assembled on the suction tube **23** remains thereon during routine cleaning and sanitation maintenance. To assemble the quick connect line coupling piece **92** on suction tube **23,** the coupling piece **92** is screwed onto the threaded end **31** of the suction tube **23.** This may be done conveniently before beginning the previously described assembly operations or after they have been completed. If the nozzle **15** is to be used, the nozzle tip **73** may be secured onto the nozzle tube **70** either before or after the nozzle is secured to the slide tube **34.** Of course, the device **12** is secured to its mounting means **9** through the coupling of the quick connect line clamp **90.**

To disassemble the device quick for cleaning it is only necessary to disconnect the quicl connect line coupling **90** to remove the vacuumizing apparatus for a thorough cleaning. These are the only parts of the apparatus that are exposed to fluid materials coming through the device with the withdrawn air. The fluid material is normally made up largely of the body fluids from the birds being packaged. Once the quick connect line coupling has been uncoupled, the parts will come apart in the reverse order from which they were assembled and may be readily cleaned with a cleaning solution and a brush.

In the usual packing house procedure, when poultry is being packaged, it is the practice to disassemble the vacuumizing apparatus at the end of each day's packaging and frequently more often as required by governing regulations. All the parts may be separated in substantially the reverse order of that described for their assembly. It may be seen that this is usually entirely a hand operation, no tools being necessary. One exception to this is when disassembling the nozzle **82** when the tool **101** may be needed as previously described. Ordinarily it would not be necessary to remove the O-ring **33** from its seat, but only to scrub past it with a cleaning brush, twisting the brush as it passes. However, the O-ring can easily be removed when desired.

While my invention is not limited to the use of specific materials in its construction, I have found the following materials to be optimum particularly when the device is to be used in its preferred application, to package poultry. The O-ring is made of food-approved nitrile rubber, the stiff tubing is made of a stiff clear vinyl plastic so that it may be inspected interiorly from the outside. The hose clamps are made of aluminum and all of the adaptors and the other parts are made of stainless stell type **303** or **304.** The valve member is made of Delrin (Reg. T.M.).

Turning now to a more detailed description of the operation of my device. After the device has been mounted on the support assembly **11** and starting from the rest position which is shown in solid lines in FIG. **1,** the slide tube **34** is held in the raised position on the suction ube **23** by the spring **40.** The beveled upwardly directed valve off seat **63** is thereby held in firm engagement with the rounded head of the floating valve member **43** closing the nozzle.

The operator takes a bag containing a product, such as is shown in FIG. **1,** places the bag on the table **10** and pulls the bag's open mouth up around and over the handle **16** inserting the nozzle tip **73** into the bird's cavity

by manipulating the bird (such as a small Cornish hen) to a position standing on end and lifting the bird slightly above the surface of the table. All of this is done in one quick motion during which time there is no vacuum on the nozzle tip. The operator will then pull down on the handle **16** while gripping the bag's neck tightly gathered about handle **16** with one hand. The handle **16** is pulled down until the upwardly directed beveled valve seat **63** is no longer engaged with the rounded head **45** of the floating valve member **43.** The offset **59** provides the stop to the downward movement of the handle **16** when it engages the upper surface **60** of the split-ring **42.** The length of stroke in the actual device made is 1/4 inch. This stroke opens the valve and connects the vacuum at the vacuum conduit **14** through the interior of the suction tube **23** with the nozzle **15** which opens through the nozzle tip **73** to the inside of the bird **21** through ports **76.** The vacuum draws air out of the bird's body cavity and out of the bag itself, which is open to the inside of the bag, up through the open, connected vacuum channel. This collapses the bag tightly about the bird. The operator maintains a down pressure on the handle **16** and pivots the apparatus by swinging it outwardly on the tube **13** while at the same time slipping the bag downwardly by sliding it down the nozzle tube until it is in the position shown in phantom lines in FIG. **1,** and positions the bag in the jaws **22** of the clipper for closing the bag and sealing it air tight. In this way the vacuum is allowed to continue to operate until the actual clipping occurs, at which time the handle is released and the spring returns the slide tube to its upper position closing the valve. A clip is applied sealing the bag and in the usual case, the bag's neck is severed just above the clip by a knife in the clipping apparatus. The severed bag is generally allowed to fall a few inches to a moving conveyor (not shown) positioned below the clipper's throat **22.** The conveyor transfers the bagged product to the next operation, for example to a shrink tunnel (not shown). The remaining bag portion is removed from the device by the operator releasing his grip on the tube **70.** The spring **40** then returns the slide tube to its upper position engaging the upwardly directed valve seat against the floating valve member **43** shutting off the vacuum. The apparatus, of course, also swings back to its starting position perpendicular to table **10.**

If it is not desired to have the longer snorkel nozzle **15,** of course, the nozzle **82** may be substituted therefor, and this is often desirable depending on the product being packaged. The long nozzle, however, is useful for packaging other products than birds, for example: meat loaf and corned beef, in which case the nozzle is inserted down along side the meat in a tubular bag and the air is withdrawn as the nozzle is allowed to slip out of the bag. This prevents the bag from collapsing against the meat part way up, which would prevent the removal of air in the bottom of the bag. In all other respects the process is the same as that previously described with respect to packaging birds.

A special nozzle tip **120** is shown in FIGS. **8** and **9.** This nozzle can be used for a prolonged uninterrupted period of packaging products, such as corned beef which have loose unground spice on its outer surface. Corned beef is usually packaged in a sleeve type bag. Thus the special nozzle tip is substituted in nozzle **15** and inserted between the bag and the corned beef. The nozzle is projected into the bag all the way to the bag's bottom to assure good evacuation of the bag. As the nozzle is withdrawn from the bag it scraped along between the corned beef and the bag. The device is, of course, also being pivoted as the nozzle is withdrawn to position the bag's neck in the clipper as previously described with respect to packaging a bird. The special nozzle has a plurality of slots **121,** each of which is long and narrow. The ends **122** and **123** of the slots **120** may be seen in FIG. **9** to be sloped or inclined from the inside of the nozzle to the outside. This is an important feature in the self cleaning functioning of the nozzle tip **120.** The slot should preferably be no wider than about 1/32 inches for a wide range of spiced food stuffs. Reducing the width of the slot more than absolutely necessary tends to cut down on the nozzle's evacuation efficiency. For other special or general applications sloted nozzle tips having slots larger or smaller than 1/32 inch may be used. The use of slot ports rather than rounded ports is particularly valuable when hard roundish particles that could be wedged in the rounded ports are going to been countered during the nozzle use. Slot ports have been found to have the facility of cleaning themselves under such conditions when used according to the general packaging procedures described in this patent application. Perhaps this is in part due to the bag material scraping passed the slot ports as the nozzle is withdrawn from the bag while its mouth is gripped tightly against the nozzle to maintain the vacuum prior to clipping. Rather than just being pushed into the ports and more tightly wedged therein particles lodging in the ports may be scraped upwardly and then rolled or slipped out of the slots on the inclined ends.

The nozzle tip produced for commercial use in 1½ inches long and 11/16 inches in diameter to its outside circumference the bore is 17/32 inches in diameter. Eight slots are spaced evenly around the nozzle tip and a sump is provided in the tip to prevent drip-back from one package to the next during packaging. The only difference between the nozzle tip **120** and **73** is the substitution of the slots **121** for the ports **76.**

There is an alternate vacuum withdrawal path that may be used in the device **12.** If the plug **93** was removed from the quick connect line coupling where it is shown in FIG. **2** and instead, conduit **14** was plugged, the means for withdrawing air through the device **12** may be connected to stand **11** below table **10.** Of course, the stand and all of the connecting elements would have to be hollow. This is generally not a very desirable arrangement because of the difficulty encountered in cleaning the fluid materials from the evacuation line particularly the numerous junctures in mounting means **9** and the curved stand **11.** However, some packing houses are equipped with such a stand evacuation arrangement and my device is adaptable for use therewith.

I claim:

**1.** In a vacuumizing apparatus a dripless nozzle normally used in a vertical position comprising an elongated hollow cylindrical chamber having one rounded closed end to provide a sump and an upper end adapted to be secured to a vacuumizing apparatus, a hollow cylindrical tube interior of and coaxial with said cylindrical chamber and having an open end which terminates in the lower portion of the closed end of the chamber and whose upper end is in communication with said vacuumizing apparatus, and a plurality of elongated

slots in the wall of said cylindrical chamber extending from above the open end of said tube to an upper region of said chamber, said slots having inclined end portions which are wider at the outside of the chamber wall than at the inside of the chamber wall to facilitate self cleaning of foreign particles trapped within said slot.

**2.** In a vacuumizing apparatus, a nozzle comprising a first generally disc shaped region and a second generally disc shaped region, said second region being smaller than said first region, projecting from said first region and centered with respect thereto; a bore formed in said nozzle and extending through said first region and extending into said second region perpendicularly to the radius lines of said disc shaped; said bore terminating in a tapered well portion in said second region; a plurality of ports entering said nozzle from the outer circumference thereof and radiating inwardly to intersect said bore in the tapered well portion, entering said nozzle at the juncture between said first and said second regions and intersecting both of said first and second regions, said ports extending across the face of said first region as a trough beyond said second region.

* * * * *