United States Patent
Babey

[15] 3,687,175
[45] Aug. 29, 1972

[54] APPARATUS FOR FILLING THIN TUBULAR CONTAINERS WITH A LIQUID

[72] Inventor: **Victor Stephen Babey,** 151 Canboro Rd. W., Welland, Ontario, Canada

[22] Filed: **Nov. 9, 1970**

[21] Appl. No.: **87,796**

[52] **U.S. Cl.** **141/59,** 23/259, 73/425.6, 141/115, 141/244, 141/327
[51] **Int. Cl.** **B65b 31/02**
[58] **Field of Search**.....222/130, 183, 205, 335; 73/425.4 D, 425.6; 141/8, 18, 31, 59, 67, 238, 242, 248, 325, 369, 115, 326, 327; 23/253, 259; 211/60, 68, 69, 32, 242

[56] **References Cited**

UNITED STATES PATENTS

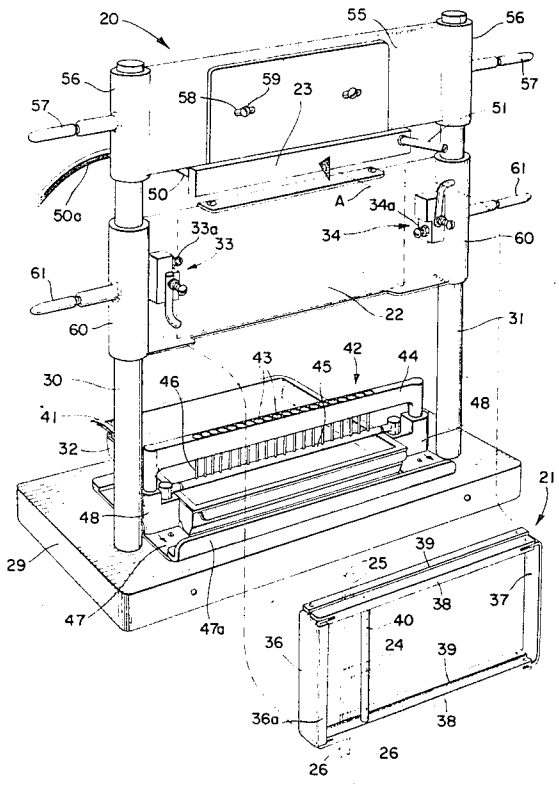
3,568,735	3/1971	Lancaster	23/259
2,994,349	8/1961	Demos	73/425.6

Primary Examiner—Houston S. Bell, Jr.
Attorney—George A. Rolston

[57] **ABSTRACT**

This specification discloses an apparatus for filling cartridges of tubular straw-like construction with liquid such as animal semen whereby a vacuum manifold is set over the ends of the plurality of straws to draw out entrapped air from the straws when the straws have been set down into a tray of the liquid, thereby to draw up under vacuum a specific quantity thereof.

11 Claims, 13 Drawing Figures



PATENTED AUG 29 1972

3,687,175

SHEET 1 OF 4

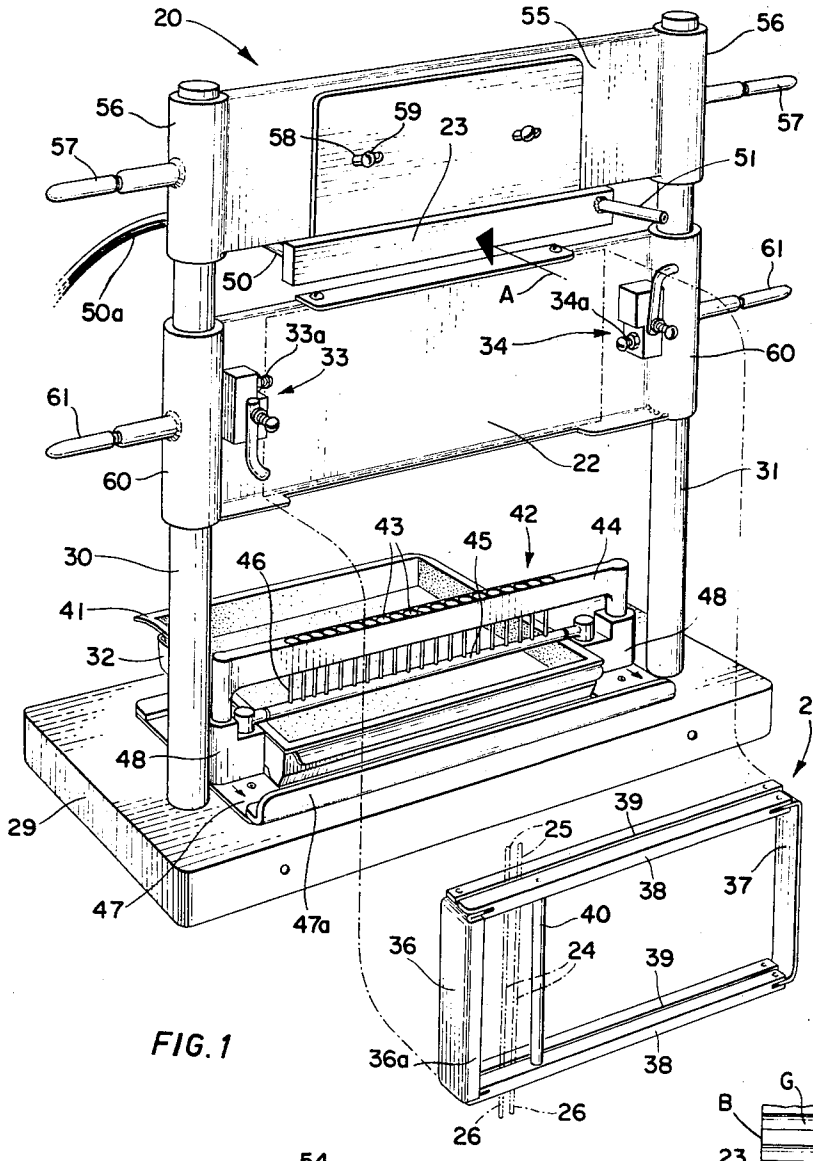


FIG. 1

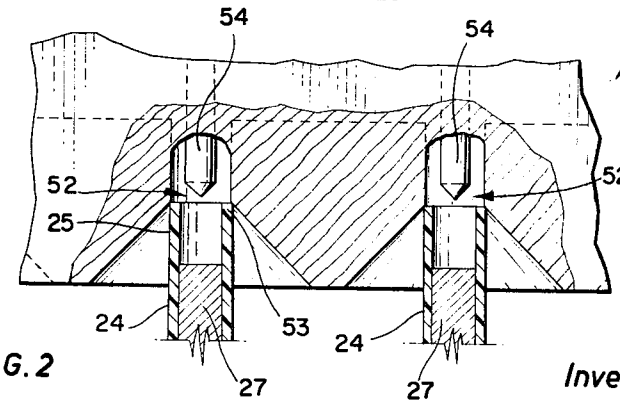


FIG. 2

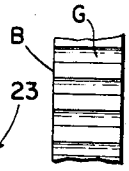


FIG. 6

Inventor

VICTOR S. BABEY

by: George N. Holston.

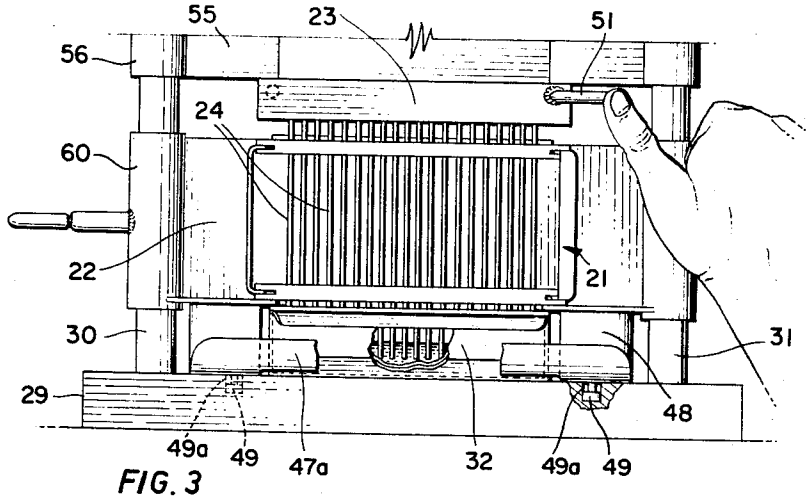


FIG. 3

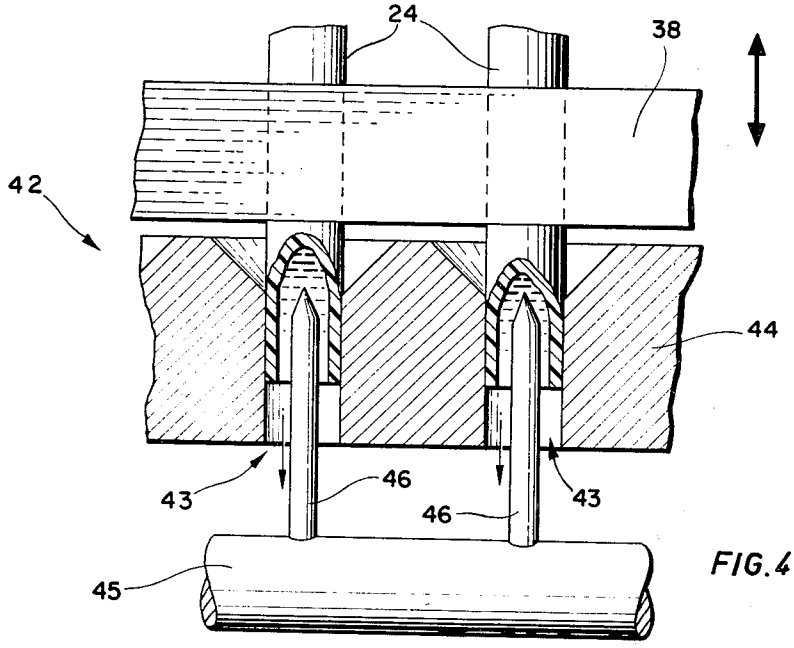


FIG. 4

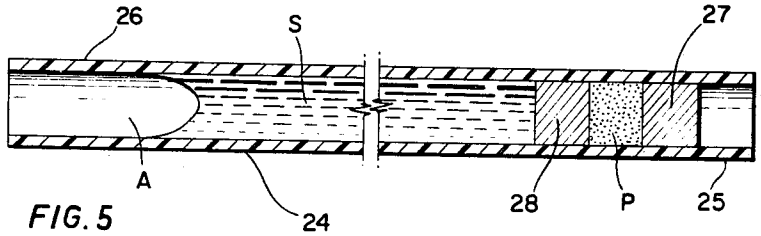


FIG. 5

Inventor

VICTOR S. BABEY

by: George A. Rolston.

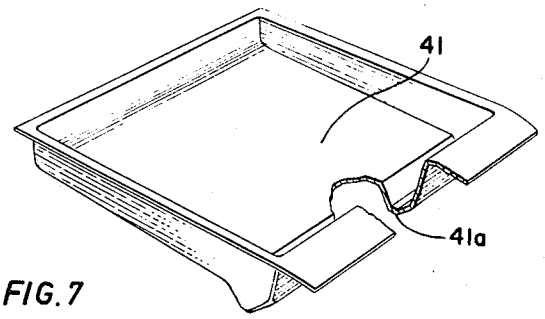


FIG. 7

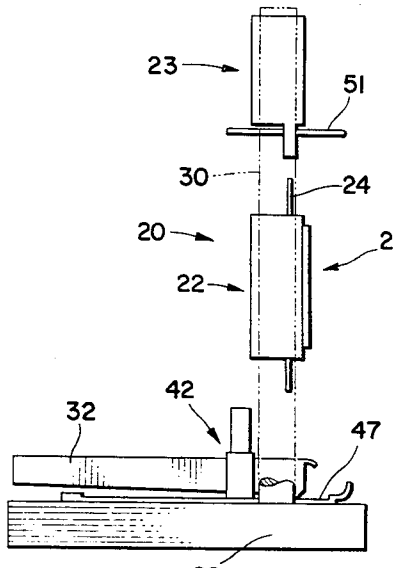


FIG. 8

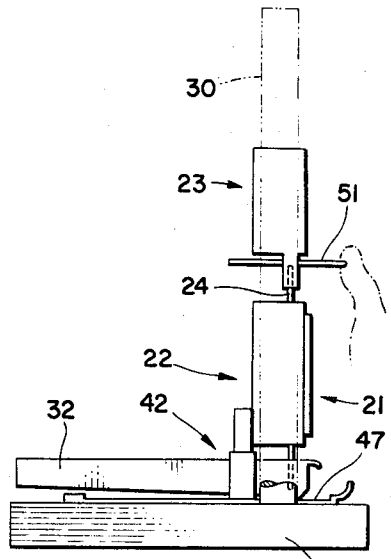


FIG. 9

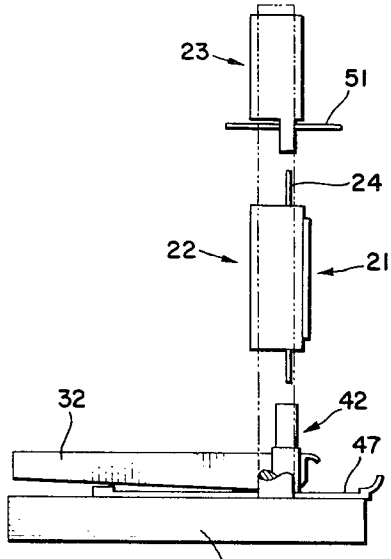


FIG. 10

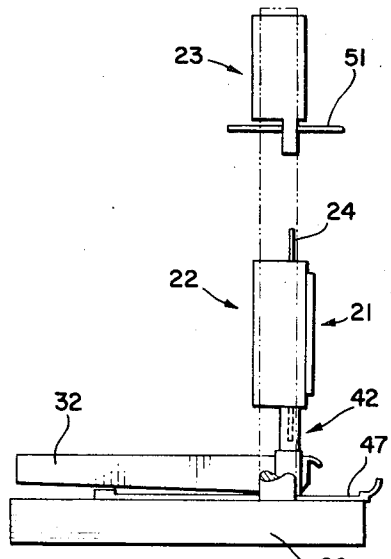


FIG. 11

Inventor

VICTOR S. BABEY

by: George A. Rolston

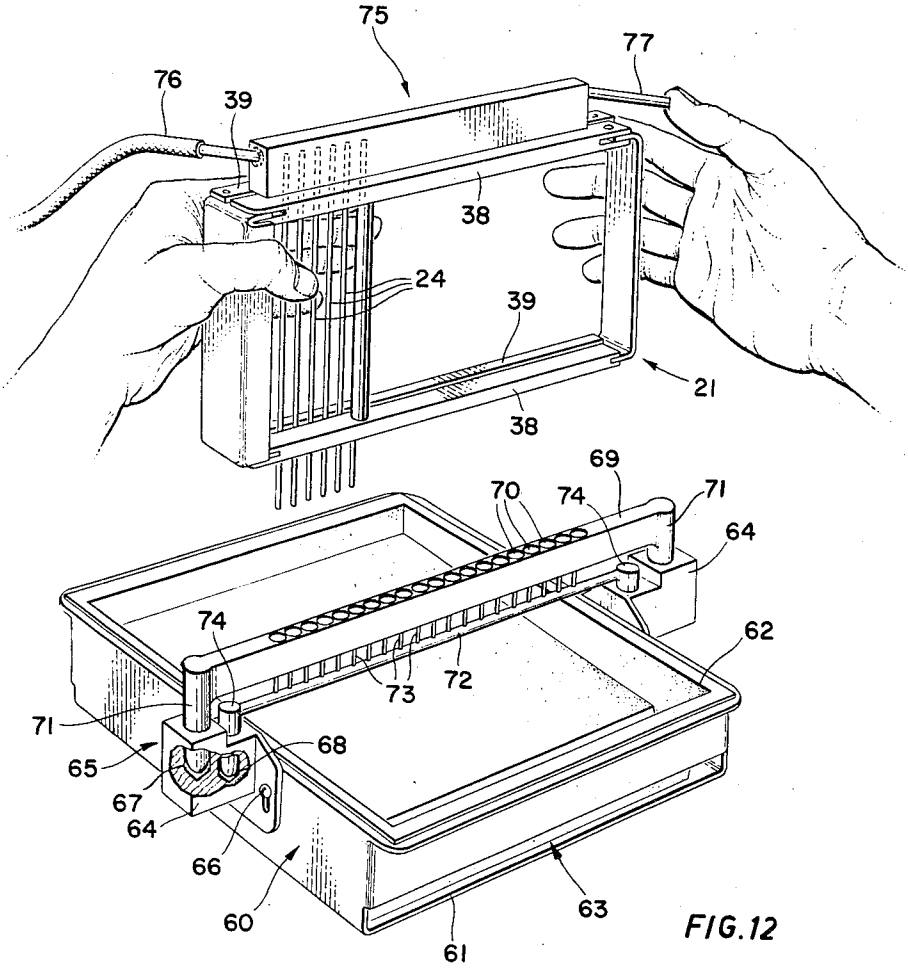


FIG. 12

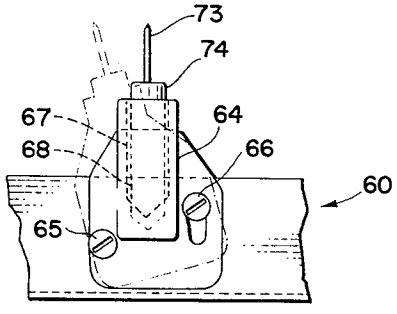


FIG. 13

Inventor

VICTOR S. BABEY

by: George A. Rolston

APPARATUS FOR FILLING THIN TUBULAR CONTAINERS WITH A LIQUID

The present invention relates to an apparatus for filling a plurality of cartridges or straw-like tubular containers with liquid such as animal semen.

BACKGROUND OF INVENTION

Artificial insemination has become a more and more common method of breeding female animals with the superior semen from selected sires. Where owners of dairy herds and the like are required to improve the quality of the offspring from their purebred stock, the demand for the semen from selected superior sires becomes great. The owners of superior sires, therefore, are able to demand a higher and higher price for the semen obtained from their superior sires. It follows that it is important for the owners of breeding sires that the limited quantities of semen obtained from their sires be conserved.

According to the known methods and practices, the semen collected from the sires is divided into unit dosage quantities and stored in thin cartridges or plastic tubes known as semen straws. The semen straws are heat sealed at one end and the other blocked with a movable plug member and the whole straw unit frozen according to a specific method and practice with the straws kept at the frozen condition until use is required.

It is important that the filling of the straws be carried out in extremely clean sterile conditions, and it is also important that the filling of the straws be done quickly in order that no deterioration in the quality and potency of the semen be allowed during the filling process.

It is also important that a machine be devised which does not permit any mixing of semen from different sires. Therefore, it is of the utmost importance that cleanliness and sterility be practised during the filling of the semen cartridge. The straws themselves are made disposable after a single use to ensure the sterility of the practice of artificial insemination.

In the past, it has been the practice to fill the straws individually, one at a time, more or less by hand, and there has been no machine designed or available to speed up the operation, or to ensure that it was carried out under sterile conditions. As a result, the straws were filled with varying dosages, and in some cases, were overfilled so that upon heat sealing, a portion of the contents was affected.

BRIEF SUMMARY OF THE INVENTION

The present invention, therefore, contemplates an apparatus for filling cartridges of tubular straw-like construction with liquid such as animal semen whereby a vacuum manifold is set over the ends of the plurality of straws to draw out entrapped air from the straws when the straws have been set down into a tray of the liquid, thereby to draw up under vacuum a specific quantity thereof.

A sealant material in the end of the tube nearest the vacuum manifold is able to pass the air drawn out of the tube into the manifold but which seals immediately upon coming into contact with the liquid drawn up into the straw.

The device further contemplates a guiding means which sets the other end of the straws in plurality formation over a bubbler mechanism to displace a set

quantity of the liquid from the bottom of the straws allowing the displaced liquid to pass back into the collection tray.

The end of the straw must have a free portion in order that entrapped semen can expand during freezing and also it must allow for a portion of the end of the straw to be clear in order that it can be heat sealed, thereby to seal the whole of the semen in the straw when it is set into the freezing mechanism.

It is the primary object, therefore, of the present invention to provide an apparatus which is able to fill a batch of straws or cartridges with semen simultaneously under quick sterile conditions which allows the batch of straws or cartridges to be taken to a sealing and freezing apparatus immediately when they are filled.

It is a further object of the present invention to ensure that the filling machine operates with a minimum of waste.

It is a further and related objective to provide apparatus having the foregoing advantages in which the filling of the batch of straws is carried out simultaneously, each of the straws being filled with a precisely regulated dosage.

More particularly, it is an object of the present invention to provide an apparatus having the foregoing advantage in which the straws are first filled to their full capacity, and a predetermined quantity is then removed from the open end of each straw, which then remains empty to permit heat sealing without damage to the contents.

The foregoing and other objects and advantages of the invention will become apparent from a perusal of the following description and drawings of the preferred embodiment of the invention which is here given by way of example and in which like reference numerals refer to like parts throughout the description and drawings. The following figures of drawings are given.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a perspective view of the apparatus showing in dotted lines, the disposition of the straw holding cartridge device and showing on the bottom of the apparatus the bubbler mechanism disposed in its inoperative position;

FIG. 2 is a sectional view of the vacuum manifold taken along the line of the arrow A of FIG. 1 and shows the means for butting the straw onto a shoulder of the air extractor manifold with a pin member disposed within the extractor to inhibit the plug from being drawn into the vacuum manifold;

FIG. 3 is a view of the apparatus with vacuum manifold and the straw-carrying cartridge guide member shown moved downwardly until the straws are inserted into the semen of the tray and with the thumb of an operator controlling the vacuum of the manifold during the filling of the straws;

FIG. 4 is a view of the bubbler means moved forward into its operative position in registration with the straws which are shown lowered onto the bubbler mechanism to extract a quantity of the semen from the end of the straws;

FIG. 5 is a view of a straw before and after filling with the apparatus described herein;

FIG. 6 is a plan view of a grooved block device employed to align and arrange the straws in the cartridge device;

FIG. 7 is a perspective partially cut away view of the tray;

FIGS. 8, 9, 10 and 11 are schematic side elevations of the apparatus showing four separate stages in its use;

FIG. 12 is a perspective illustration of an alternative simplified embodiment of the invention, and,

FIG. 13 is a side elevational view of the embodiment of FIG. 12.

A PREFERRED EMBODIMENT OF THE APPARATUS

A preferred construction of the apparatus is shown in the accompanying drawings in which 20 designates the filling machine with the straw-carrying frame 21 shown removed from the straw frame support plate mechanism designated 22, ad incorporating a movable vacuum manifold device 23. A batch of straws 24 are clamped in spaced location in the straw-carrying frame 21 with a portion of the straws 24 shown protruding as at 25, 26 above and below the straw-carrying frame 21. The straw 24 is the known type of plastic straw as described in my patent application 824,920 which is made of a plastic tube and is open at both ends. A quantity of powdered polyvinyl alcohol P is positioned at the one end of the straw and held in place by cotton wads 27, 28. The straw is shown in FIG. 5.

The apparatus 20 comprises generally a base member 29 with upright guide posts 30 and 31 attached in vertically spaced apart parallel relation on the base member 29. The guide posts 30 and 31 are spaced apart a distance sufficient to define an area for receiving the semen-holding tray 32 therebetween. It will be understood that tray 32 merely rests in position on the base 29, and is removable for sterilization. The straw frame support plate mechanism 22 is slidably mounted between the guides 30 and 31 by sliding sleeves 60, permitting the plate mechanism 22 to slide smoothly in an upward and downward path on the guide posts 30 and 31. Locking screws 61 on sleeve 60 permit the entire assembly to be fastened at any desired height. The plate mechanism 22 is provided with releasable straw frame holding arms 33 and 34 positioned to engage the side members 36 and 37 of the straw-carrying frame 21. In order to accurately position the straw-carrying frame 21 on the plate 22, adjustable abutment screws 33*a* and 34*a* are provided by means of which the transverse position of the frame 21 can be accurately registered.

As shown in FIG. 1, the straw-carrying frame 21 also comprises a pair of forward upper and lower clamping bars 38 and a pair of rearward upper and lower clamping bars 39, a bracing rod 40 extending between the forward clamping bars 38 as shown. Both clamping bars 38 and clamping bars 39 are each pivotally connected to the side member 37, and the opposite end of the rearward clamping bars 39 are further pivotally mounted to the side member 36. The side member 36 is provided with a locking flange 36a adapted to fit around the ends of the forward clamping bars 38 and hold the bars 38 and 39 in straw clamping relation.

It will be understood that in order to provide a good clamping fit on the straws 24, the inner surfaces of the bars 38 and 39 are preferably provided with some sort of resilient frictional material such as neoprene or the like which may be subjected to high temperature sterilization and rigorous cleaning. It will be understood that the arrangement and spacing of the straws 24 within the frame member 21 is of importance to the successful operation of the entire apparatus. Accordingly, the spacing of the straw 24 may readily be achieved by means of a simple die as shown in FIG. 6, consisting of a metal block B with a series of parallel spaced apart grooves G formed therein. The block B is dimensioned to fit within the straw frame 21, and the straws 24 are simply laid in position in the grooves G and the clamping bars 38 are then fastened in position and locked by operation of the side member 36. The block B itself is not deemed to form part of the invention, since obviously, the clamping bars 38 and 39 could, themselves, be formed with suitable notches or grooves (not shown) if desired.

The semen-holding tray 32 is provided with a disposable lining 41 formed of vacuum formed plastic material contoured to fit within the tray 32 and designed to hold a predetermined quantity of semen. After one usage, the tray 41 can be disposed of to avoid time-consuming additional cleaning. Preferably, the disposable lining 41 is formed as shown in FIG. 7 having an angled floor, terminating in a collecting groove 41*a*.

In order to remove the surplus semen and to provide an air pocket or bubble in the lower end of each straw 24, a bubbler mechanism 42 is provided spaced between the guide members 30 and 31 and located over the tray 32 as shown in FIG. 1. The mechanism 42 is seen to comprise a bar 44 and a number of straw-receiving holes 43 having enlarged upper ends positioned in a row, through bar 44. The holes 43 are arranged and oriented so as to register with the lower end 26 of the straws 24 when arranged in their predetermined location in the frame 21 as described above. Beneath bar 44 is a lower bar 45 having a plurality of bubbler pin members 46 extending upwardly therefrom in precise registration with holes 43. Each of the pins 46 is arranged to protrude a substantial distance into a respective hole 43, and is dimensioned to define a substantial spacing between itself and the sides of hole 43 as shown in FIG. 4. Mechanism 42 is slidably movable forwardly and backwardly across the base member 29.

For this purpose, the mechanism 42 is mounted on the slide plate 47 having an upturned handle 47*a*, by means of which it may be grasped and pushed to and fro. Preferably, both upper and lower bars 44 and 45 are removably mounted in the blocks 48 for ease of cleaning, blocks 48 being fastened to plate 47 as shown. Plate 47 is itself slidably mounted on the base member 29 by means of the downwardly dependent bearings 49, running in the recessed channels 49a formed in the block 29 as shown in FIG. 3.

The air extractor manifold 23 has a hollow interior and is provided with air extraction outlet 50 positioned on one side by means of which a vacuum may be applied to the interior of the manifold. A manifold air inlet pipe member 51 is positioned on another side of the manifold 23 permitting air to enter the manifold 23, and being manually controllable by thumb or forefinger of the operator. A vacuum hose 50*a* connects the outlet 50 as shown to a suitable vacuum source (not shown).

Manifold 23 is further provided with a row of parallel spaced apart air passages 52 adapted and arranged to register with the upper ends 25 of straws 24, when the same are arranged in their predetermined spaced apart location in the frame 21 as described above. Air passages 52 are arranged to communicate the vacuum within the manifold 23 to each straw 24 simultaneously in a manner to be described below. The lower ends of the passageways 52 are provided with bell mouths 53 designed to guide the ends 25 and the straws 24 into position. Passageways 52 are preferably just slightly smaller than the outer diameter of the straws 24 whereby to provide a good air-tight seal around the ends 25 of the straws 24 as shown in FIG. 2. When the vacuum is applied in the manifold 23, and is communicated to the straws 24, there will be a tendency for the plug means 27 and 28 and the powdered polyvinyl alcohol P to be drawn upwardly and out of the upper end 25 and into the passageway 52. Accordingly, in order to prevent this tendency, a stop member or pin 54 is provided for each of the passageways 52. The stop members or pins 54 are mounted internally within the interior of the manifold 23 in any suitable manner (not shown) the free ends of the pins 54 depending downwardly through the passageways 52 as shown. The pins 54 are of reduced diameter in relation to the diameter of the passageways 52 whereby to permit free passage of air therearound.

It will be noted that the manifold 23 is supported on the movable supporting plate 55 which is provided with sliding sleeves 56 sliding on the posts 30 and 31 and adapted to be fastened in any desired position by means of the locking pins 57. In order that the position of manifold 23 may be adjusted laterally, so as to register the openings 50 with respective straws 24, slotted openings 58 are formed through the upper portion of manifold 23, and screws 59 permit the same to be fastened in any laterally adjusted position.

In operation the first step is to assemble and arrange the straws 24 in the support frame 21. At this stage, the frame 21 is simply opened up by means of releasing the front bars 38 from the end member 36 and swinging them outwardly. The rear bars 39 are then laid on a flat surface and the block B is placed in position therein. A number of straws, for example 20 straws are then laid in position in the grooves G in the block B, and the front clamping bars 38 are then swung downwardly and fastened in position by means of swinging the end member 36 into clamping engagement as shown in FIG. 1. The frame 21 is then lifted away from the block B and is placed against the support plate 22, with the side members 36 and 37 contacting respective screws 33*a* and 34*a*. The fastening members 33 and 34 are then swung into position in contact with the end members 36 and 37 thereby holding the frame 21 firmly in position.

Referring now to FIGS. 8, 9, 10 and 11, FIG. 8 shows the apparatus 20 at the initial stage of its operation, with the support frame 21 held in position on the plate 22. It will further be noted that the bubbler assembly 42 is moved to its rearward position out of alignment with the plate 22, and that the tray 32 is positioned with its trough portion 41a located directly under the straw frame 21. The vacuum manifold 23 is shown in its uppermost or raised position.

The next stage of the operation is shown in FIG. 9. In this figure, it will be seen that the support frame 21 and the plate 22 have been moved downwardly until the lower ends of the straws are in the tray 32. The vacuum manifold 23 has been moved downwardly until the upper ends of the straws are located within the open mouth 53 of the passageways 52. Shown in phantom is the finger of an operator on the air outlet pipe 51. It will be understood that the pipe 51 being connected to the vacuum tube 50*a*, is constantly withdrawing air through the manifold 23 at this stage. When the operator closes up the air inlet pipe 51, no further air can enter, and a vacuum is drawn within the manifold 23 which is then communicated to the straws 24. The air within the straws is then drawn upwardly through the porous plug members 27, causing semen to rise upwardly from the tray 32 and until it reaches the plugs 27. At this point, the operator uncovers the pipe 51, and the straws will remain filled due to capillary action. The plug members 27 will solidify, under the action of the moisture, and it is then necessary to remove a certain proportion of the semen from the lower end of the tube to permit closing of the straw 24. FIG. 10 shows a further intermediate stage. The vacuum manifold 23 is shown raised upwardly, and the support plate 22 is shown raised partly upwardly, with the straws 24 out of the tray 32, and the bubbler mechanism 42 has now been drawn into its forward position into registration with the lower end of the straws 24. The final stage of the operation is shown in FIG. 11 wherein the support plate 22 is then moved downwardly, bringing the lower ends of the straws 24 over the pins 46 mounted on the bar 45 of the bubler mechanism 42. The entry of the pins 46 into the lower ends of the straws 24 will cause a certain proportion of the semen therein to flow downwardly around the pins 46 and return to the tray 32. The support plate 22 is then again raised upwardly, and the entire straw frame assembly 21 is then removed from the plate 22, and the lower ends of the straws will then be immediately sealed by heat sealing, after which the straws 24 are then placed in liquid nitrogen for immediate freezing.

It will of course be understood that while the invention described above, is particularly designed and suitable for the filling of tubular cartridges or containers, with semen, it is also applicable to the filling of such tubular containers in batches with any other liquid which may be desired to be separated into small unit volume containers.

Clearly, the entire process can be automated, by providing for power operated upward and downward movement of the vacuum manifold, and of the support plate mechanism, and, if desired, a much higher rate of production could be achieved. On the other hand, where the requirement was for a more economical machine, the entire stand and supporting mechanism could be done away with. Essentially all that will be required is a tray with a suitable bubbler mechanism, or other similar means for displacing a small fraction of the liquid contents from the end of the tube after filling, a supporting frame or other means for holding the tubes in spaced apart parallel relation for filling in batches, and any suitable vacuum manifold means which can be hand held if desired, which can simply be placed over the upper ends of the tubes so as to withdraw the air therefrom.

Such an alternative simplified form of the invention is shown in FIGS. 12 and 13. In this form of the invention, the same straw carrying frame 21 is provided as in the embodiment of FIG. 1, consisting of the forward upper and lower clamping bars 38 and the rearward upper and lower clamping bars 39, connected together by the same associated members as shown in FIG. 1. The straws 24 are held together in the same spaced apart predetermined relationship, having been arranged in such spacing by means of a suitable spacer member or die as described above.

A tray generally indicated as 60 is provided, having a flat space 61 adapted to stand on a table or other flat surface, and adapted to support the disposable plastic lining member 62 therein, which, as before would preferably be provided with an angle floor with a well or collecting groove at one end. The tray 60 is preferably formed of stainless steel or other easily cleaned sterilized material, and may be open at each end as at 63 to facilitate cleaning. Mounting block members 64 are fastened to either side of the tray 60 by means of the pivot screw 65 and the locating screw 66, permitting the blocks 64 to be swung through limited arcs for convenience of the user. Blocks 64 are provided with spaced apart parallel sockets 67 and 68 for the purposes to be described below. The so-called "bubbler" mechanism, for removing the lowermost fraction of the contents of the tubes or straws 24, is essentially the same as in the embodiment of FIG. 1, that is to say, it comprises a guide bar 69 provided with a plurality of guide holes 70 therealong located at predetermined spaced apart intervals, corresponding to the spacing of the straws 24 in the support frame 21. The guide bar 69 is removably supported at each end by the support rods 71 fitting within the sockets 67. A lower pin supporting bar 72 extends beneath and parallel to the guide bar 69, and is provided with pins 73 therealong fitting within the guide holes 70, while leaving a substantial clearance therebetween, essentially as shown in FIG. 4.

The pin support bar 72 is itself mounted on rods 74 at each end thereof fitting releasably within the sockets 68 as described above.

The vacuum manifold indicated generally as 75 is in this embodiment, a separate member, while being described essentially in the same way as the vacuum manifold 23 as shown in FIG. 2. The manifold 75 thus defines a hollow interior chamber, which may be connected to a suitable vacuum source by means of the pipe 76, and which is provided with a manually closable air inlet tube 77 to regulate the vacuum within the manifold 75. Although not shown in this illustration, the manifold 75 is of course provided with straw receiving openings, at regularly spaced intervals, adapted to register with the upper ends of the straw 24 when arranged in their predetermined spacing, and preferably provided with interior pin members as shown in FIG. 2.

In operation, in this form of the device the straws of tubular containers are arranged in the straw support frame 21 as described above in this predetermined spaced relation, after which the vacuum manifold 75 is then placed over the upper ends of the straws 24 as shown in FIG. 12. The lower ends of the straws 24 are then lowered into the liquid in the tray 62, and by means of controlling the air opening tube 77, a regulated vacuum may be drawn into the manifold 75, thereby drawing up a predetermined quantity of the liquid into the straws or containers 24 simultaneously. The vacuum is then released by removing the hand from the air opening pipe or tube 77, and if desired the entire vacuum manifold 75 can then be removed and placed on one side. The lower ends of the straws 24 are then inserted into their corresponding guide holes 70 in the bar 69, and they are allowed to pass downwardly therethrough, causing the pins 73 to extend upwardly into the interior of the lower ends of the containers or straws 24, thereby displacing a predetermined fraction of the liquid contents thereof which will then return to the tray 62.

After these operations have been completed the lower ends of the straws 24 are then sealed, and the straws 24 are immediately frozen.

In order to facilitate these operations, the operator may wish to tilt the bar 69 and support blocks 64 at an angle towards or away from himself, and for this purpose, he may loosen the screws 66, and manually tile the blocks 64 about the screws 65, and when in the desired position, the screws 66 are again tightened up.

As stated above, after use, the plastic liner tray member 62 can be disposed of, and the tray 60 and bar 69 and 72 are then disassembled and may be thoroughly cleaned and sterilized for example by autoclaving or a similar procedure. The vacuum manifold 75 and the support frame 21 may also be cleaned in the same way.

The foregoing is a description of a preferred embodiment which is given here by way of example only.

The invention is not to be taken as limited to any of the specific reatures as described, but comprehends all such variations as come within the scope of the appended claims.

What I claim is:

1. Apparatus for filling batches of thin tubular containers with a liquid for subsequent storage and shipping of said filled containers and comprising;

container support means for releaseably embracing and supporting a plurality of thin tubular containers intermediate their ends in predetermined spaced apart parallel relation, exposing both ends of said containers for access, said support means being adapted to release said containers after filling, for reception of another batch of containers therein;

tray means for supporting said liquid and dimensioned to receive one of said ends of all said containers simultaneously therein;

vacuum means removeably attachable to said other ends of said containers and operable to draw said liquid therein and fill the same to a predetermined level and being disconnectible therefrom after filling for attachment to a further batch of said containers; and,

liquid displacement means operable to remove a fraction of said liquid from each of said containers after filling, to provide a free space therein, the remainder of each said container retaining said liquid therein.

2. Apparatus as claimed in claim 1 wherein said container support means includes movable clamping means for engaging said containers intermediate their ends and being movable between clamping and releas-

ing positions, and fastening means for holding the same in said clamping position, thereby securely holding said tubular containers in their aforesaid predetermined relation.

3. Apparatus as claimed in claim 1 including tubular container register means adapted to be employed with said container support means, and arrange and locate the same in their predetermined spaced parallel relation.

4. Apparatus as claimed in claim 1 wherein said tray means is formed of thermoplastic material and is adapted to be disposable after use, and including means for locating and supporting said tray means in position during use.

5. Apparatus as claimed in claim 1 wherein said vacuum means includes a vacuum manifold member, means for withdrawing air from the interior thereof, a plurality of communicating passageways, arranged in spaced parallel relation, and being adapted to register with one of said ends of each of said containers, and operator controlled means for regulating vacuum within said manifold.

6. Apparatus as claimed in claim 1 wherein said liquid displacement means includes a plurality of spaced apart needle-like members, fixedly mounted in predetermined spaced apart relation, and adapted to register with and enter said one of said ends of said containers, after removal from said tray means thereby displacing a small fraction of said liquid therefrom.

7. Apparatus as claimed in claim 1 including a base means, spaced apart vertically oriented guide means supported on said base means, tray locating means between the lower ends of said guide means, and vertically slidable carriage means, adapted to receive and support said container support means, enabling the same to be moved vertically upwardly and downwardly towards any tray means.

8. Apparatus as claimed in claim 1 including base means, means for locating said tray means thereon in predetermined location, and horizontal slide means mounted on said base means, and adapted to receive and support said liquid displacement means, permitting the same to be slid to and fro over said tray means between operative and non-operative positions.

9. Apparatus as claimed in claim 1 including base means, vertically oriented spaced apart parallel guide means, mounted on said base means, tray locating means between the lower end of said guide means, vertically slidable carriage means, adapted to receive and support said container support means, enabling the same to be moved vertically upwardly and downwardly towards said tray means, and horizontal slide means mounted on said base means, and adapted to receive and support said liquid displacement means, permitting the same to be slid to and fro over said tray means between operative and non-operative positions.

10. Apparatus as claimed in claim 5 wherein said vacuum means further includes elongated stop members, in respective said communicating passageways, dimensioned and oriented to enter said ends of said containers, and being of reduced diameter in relation thereto whereby to permit extraction of air therefrom.

11. Apparatus as claimed in claim 7 wherein said container support means is removably attachable to said vertically slidable carriage means, and including releasable retaining means, operable to engage and secure said container support means on said vertically slidable carriage means.

* * * * *