

F. B. SHAW

MEANS FOR FILLING POUCHES

2 Sheets-Sheet 1

Fig. 1

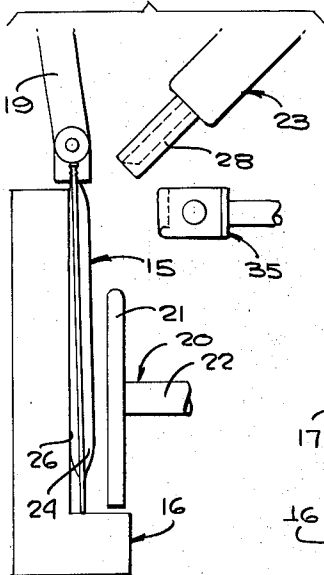


FIG. 2

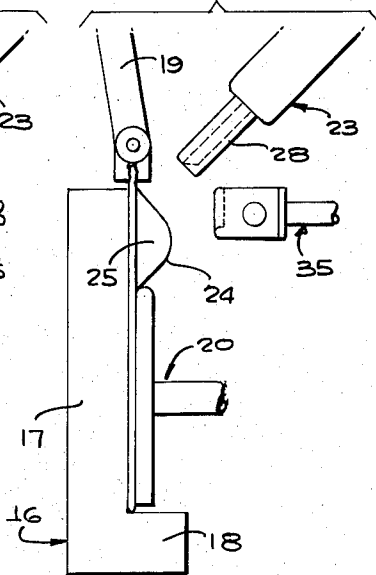


Fig.3

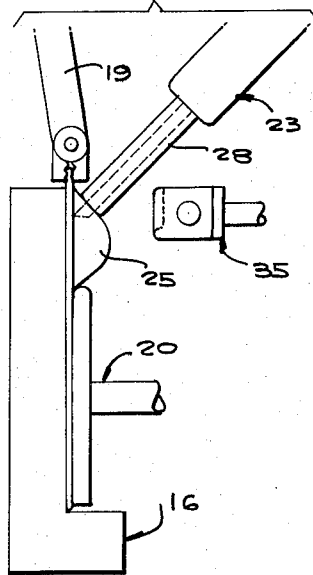


FIG. 4

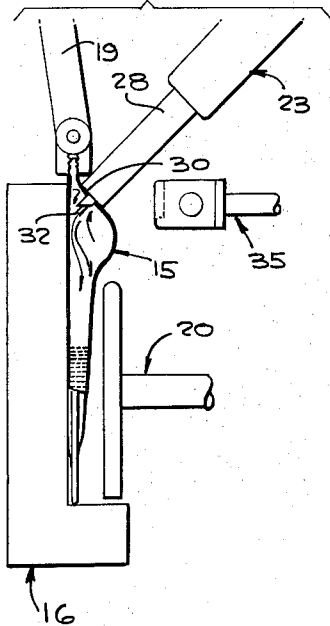


FIG.5

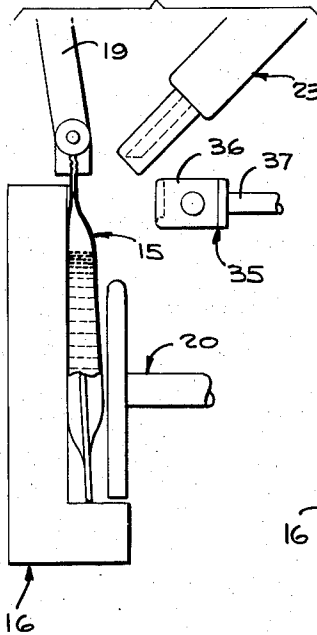
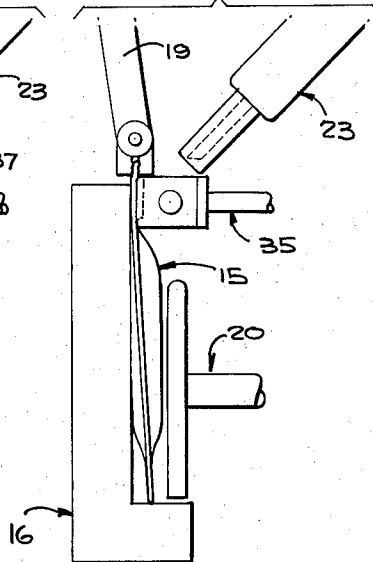


Fig. 6



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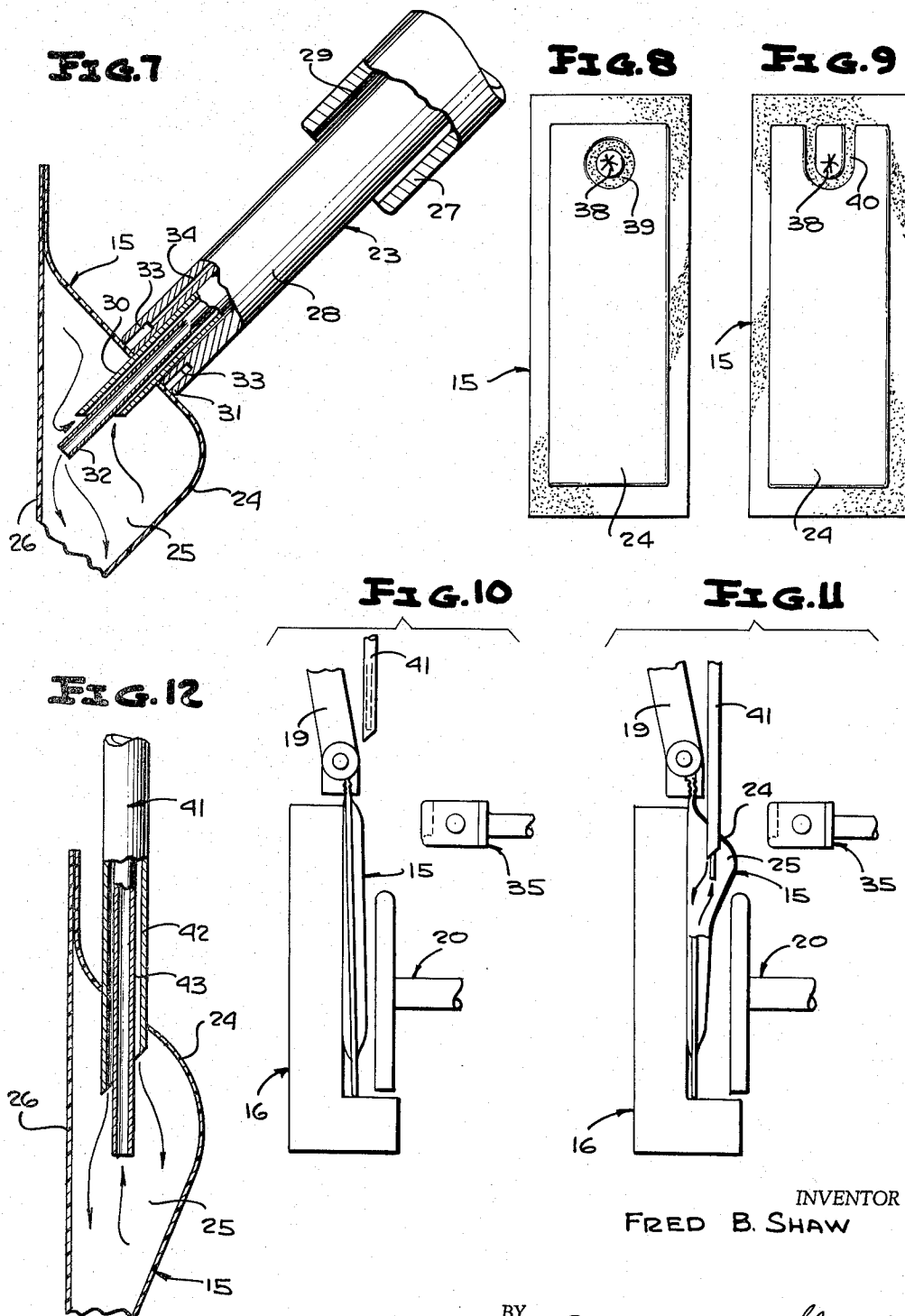
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MEANS FOR FILLING POUCHES

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2 Sheets-Sheet 2



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MEANS FOR FILLING POUCHES

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This invention relates to a method and to the means for filling pouches, which have been previously sealed, with a flowable material and especially relates to the method and to the means for preparing aseptic product filled pouches.

In the packaging of materials and especially foodstuffs which are subject to deterioration and decomposition upon standing, it has been found extremely desirable to be able to package such material in a flexible pouch in such a manner that it could be subsequently stored at room temperature for an unlimited duration of time without subsequent spoilage. The invention is specifically useful for the packaging of food products in flexible pouches; however, the invention is not limited thereto, as products such as whole blood, petroleum jelly in a flowable state, finely divided flowable silica gel and high purity chemicals and solutions thereof may be packaged according to the present invention with success equal to that encountered in the packaging of food products.

The present invention, therefore, has particular utility not only with liquids in the most restricted sense but also with materials which are flowable under the specific conditions of the invention such as fluid solutions, emulsions, suspensions and other flowable mixtures which might include the foregoing with gaseous entrainments as minor constituents.

It is known in the aseptic packaging of solids and semi-solids, which are not readily flowable, to package these materials under make-and-fill conditions and then subject the ultimate packages to a sterilization process so as to obtain the necessary storage life. Product packaging under make-and-fill conditions is available with existing commercial equipment, such as utilized in the packaging of products in metal cans. The use of such equipment in packaging readily flowable products is, however, undesirable as it is well known that make-and-fill equipment and methods are primarily useful when packaging solid or semi-solid products, but that the well known inadequacies of make and fill machines for flowable products makes this procedure questionable in the case of such fluid materials. It should also be realized that it would be expensive to produce a flexible filled pouch which would withstand the sterilization processes after such pouch has been filled. Normally the packaged product is subjected to sterilizing conditions in a retort or autoclave.

By sterilizing the pouches prior to their filling, various economies may be achieved and greater varieties of material may be utilized. For example, lighter gage structures of retort processible pouches can be successfully exposed to retorting when the pouches do not carry any filling. Further, pouch structures totally incapable of withstanding the thermal stresses of retorting may be pre-sterilized by gas sterilization, as with ethylene oxide; or by radiation sterilization, as by an electron beam or gamma radiation.

It is therefore an object of the present invention to prepare aseptic, product filled pouches by aseptically introducing a sterile fill into a sterile pouch.

It is also an object of this invention to prepare aseptic, product filled pouches by inflating a portion of a sealed, sterile pouch, thereafter puncturing one wall of the pouch at said inflated portion by a needle-like filler member, filling the pouch with a sterile flowable material and finally

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ally sealing off from the rest of the pouch, an area immediately surrounding the puncture formed by the needle-like filler member.

It is another object of this invention to provide a method for preparing aseptic, product filled pouches in which a pre-sterilized pouch having a small amount of gas therein is squeezed together so as to inflate a small portion thereof, a needle-like filler member is inserted through one wall of the pouch in said inflated area and utilized to fill the pouch with sterile flowable material.

It is still another object of this invention to provide a method of preparing aseptic, product filled pouches in which an already sterile and completely sealed pouch having a small amount of gas therein is squeezed together along major portions thereof so as to inflate a minor portion thereof and to present a ballooned or bulged portion for ease in puncture with a needle-like filler member, filling the pouch with a sterile flowable material, withdrawing the needle-like filler member and sealing off an area immediately surrounding the puncture caused by the needle-like filler member from the rest of the pouch.

It is a further object of this invention to provide a method of preparing aseptic, product filled pouches in which an already sterile and completely sealed pouch having a small amount of gas therein is squeezed together along major portions thereof so as to inflate a minor portion thereof so as to present a ballooned or bulged portion for ease in puncture with a needle-like filler member, filling the pouch with a sterile flowable material, withdrawing the needle-like filler member, and entirely sealing an area of the pouch surrounding the puncture so as to prevent the contamination of the material in the pouch.

It is still a further object of this invention to provide a method for preparing aseptic, product filled pouches in which a portion of a sterile, sealed pouch is inflated so as to present a more readily puncturable wall surface to a needle-like filler member, puncturing the wall with the needle-like filler member and filling the interior of the pouch while securely holding a portion of the wall surrounding the puncture to the needle-like filler member by suction, withdrawing the needle-like filler member and sealing the pouch in an area surrounding the puncture.

Another object of this invention is to provide a method for preparing aseptic, product filled pouches in which a portion of a sterile, sealed pouch is inflated so as to present a more readily puncturable wall surface to a needle-like filler member, puncturing the wall with the needle-like filler member, filling the interior of the pouch, sealing the area surrounding the puncture and then withdrawing the needle-like filler member.

Still another object of this invention is to provide an apparatus for preparing aseptic, product filled pouches comprising a support for at least one entirely sealed and sterile pouch, means for holding the pouch in a fillable position, means for inflating a minor portion of the pouch, means for puncturing one wall of the pouch and filling the pouch with a sterile flowable material there-through, and means for sealing an area of the pouch surrounding the puncture.

Yet another object of the present invention is to provide an apparatus for preparing aseptic, product filled pouches wherein there is provided a needle-like filler member comprising means for holding the filler member against a wall of the pouch and means insertable through the wall of the pouch including a filling duct and an air vent.

With the above, and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description and the several views illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a partial and somewhat diagrammatic end view of the herein presented means for preparing aseptic, product filled pouches in which the relationship of the various elements is clearly presented.

FIGURE 2 is a view of the apparatus similar to FIGURE 1, but showing the presser plate in pressing engagement against the bottom portions of the pouch and causing an inflation of the top portion of the pouch.

FIGURE 3 is a view of the apparatus similar to the previous figures, but showing the needle-like filler member in puncture engagement with one wall of the pouch.

FIGURE 4 is a view of the apparatus similar to FIGURES 1 through 3, but with portions of the pouch broken away for clarity and shows the pouch being filled with a sterile flowable material.

FIGURE 5 is a view of the apparatus similar to that shown by FIGURE 4, the needle-like filler member having been removed from the wall of the pouch and the pouch filled with the sterile flowable material.

FIGURE 6 is a view of the apparatus similar to the showing in FIGURES 1 through 3, and in particular illustrates the sealing member in engagement with the pouch and surrounding the puncture formed by the needle-like filler member.

FIGURE 7 is a partial sectional view on a much larger scale and shows the details of one embodiment of the needle-like filler member.

FIGURE 8 is a plan view of one embodiment of an aseptic product filled pouch of the present invention.

FIGURE 9 is a plan view of another embodiment of an aseptic product filled pouch of this invention similar to the showing of FIGURE 8.

FIGURE 10 is a partial and somewhat diagrammatic end view of the apparatus for preparing aseptic product filled pouches similar to the apparatus illustrated by FIGURES 1 through 3 of the drawings, but presents another embodiment thereof.

FIGURE 11 is an end view of the apparatus for filling pouches with aseptic flowable materials similar to FIGURE 10, with parts of the pouch being broken away for clarity and showing the needle-like filler member in puncture engagement with one wall of the pouch.

FIGURE 12 is a partial sectional view on a much larger scale showing the details of the needle-like filler member of the embodiment shown in FIGURE 11 of the drawings.

Referring to the drawings, and, in particular, to FIGURES 1 through 7 thereof, there is shown therein one embodiment of the present invention. In FIGURE 1, the first stage of the operation is shown wherein a pouch 15 is placed upon a support member 16 in position to be filled. The pouch is normally composed of thin walled plastic material which is either entirely sealed on all four sides thereof as illustrated in FIGURES 8 and 9 of the drawings, or completely sealed on certain sides thereof within one or more of the other sides being a fold. The support may be of any general type and is herein shown as constituting a vertical element 17 and a supporting horizontal element 18. A jaw-type holder 19 is positioned to clamp the upper portion of the pouch and to aid in retaining the pouch in general parallel relationship to the vertical portion 17 of the support 16. A presser plate 20 having a head 21 and a reciprocable piston 22 is positioned adjacent to the lower portions of the pouch 15 and is reciprocable normal to the position of the pouch 15 so as to press the lower portions of the pouch together and expand the gases contained therein to the opposite or upper end of the pouch as shown in FIGURE 2.

The forcing of the gases contained within the lower portion of the pouch upwardly into the upper portion inflates the upper portion and facilitates the ease in which the needle-like filler member, generally designated 23, may be inserted through the forward wall 24 of the inflated portion 25 of the pouch 15, it being obvious that without

such inflation, it would be, indeed, difficult to puncture one of the walls, e.g., wall 24, without puncturing the other wall 26, as most clearly shown in FIGURE 7.

It should also be explained at this time that the inflation of the pouch may be carried out by other means, such as the application of heat by infrared lamps upon the pouch to cause an expansion of the gases contained therein.

As most clearly shown in FIGURE 3 of the drawings, the needle-like filler member 23 is brought into engagement with the wall 24 of the inflated portion 25 so as to puncture the wall 24 and to be in position to introduce a flowable fill material, particularly aseptic fill, into the interior of the pouch 15. The details of the needle-like filler member 23 may be had from observation of FIGURE 7 of the drawings in particular wherein the needle-like filler member 23, preferably of the hypodermic type, is shown as having an upper barrel portion 27 into which a holder 28 is inserted by means of a collar 29. The holder 28 is generally of cylindrical shape and is in receipt of a hollow needle 30 which is operable from a position extending past the forward butt portion 31 of the holder 28 to a position of hiding within the confines of the holder 28. A hollow tube is further reciprocable within and spaced from the hollow needle 30 and forms a filling duct 32 through which a flowable material contained in the upper portions of the needle-like filler member 23 may be transported therefrom into the interior of the pouch 15.

The hollow space separating the wall of the filling duct 32 from the wall of the hollow needle 30 forms a vent for the gases contained within the pouch 15 to escape during the replacement thereof by the flowable material introduced through the filling duct 32. The forward butt portion 31 of the holder 28 is further provided with an annular recess 33 which is, in turn, connected to a pipe 34 for operation with a vacuum source (not shown) for producing a vacuum in the annular recess 33 so that the forward butt portion 31 of the needle-like filler member 23 may be held securely against the forward wall 24 of the inflated portion 25 of the pouch 15 by the vacuum within the recess 33.

It should be noted that the needle-like filler member 23 as shown in FIGURE 7 of the drawings is positioned against the upper surface of the distended or inflated portion 25 of the pouch 15 and that the suction applied through the annular recess 33 aids in retaining this previously-mentioned distended or inflated condition of the pouch 15. The vacuum pull exerted through the annular recess 33 further assists in the entry of the hollow needle 30 through the wall 24 of the pouch.

Turning for the moment back to the operational sequence of the process as shown by FIGURES 1 through 6 of the drawings, there is therein shown in FIGURE 4 thereof the withdrawal of the presser plate 20 upon the filling of the pouch 15. As clearly shown, sterile flowable material enters the pouch through the filling duct 32 and the gases forced therefrom are vented through the space formed by the hollow needle 30 and the filling duct 32. When the pouch is filled with the flowable material to the desired level, the needle-like filler member 23 is withdrawn to its original position as shown in FIGURE 5 of the drawings so as to clear the line of reciprocation of a sealing member 35.

The sealing member 35 may be of conventional design and consists primarily of a heated sealing head 36 mounted upon a reciprocable plunger 37 for movement into contact and away from the upper edge of the filled pouch. The sealing member 35 is then moved into position against the pouch so as to clamp the walls 24 and 26 thereof against the vertical portion 17 of the support 16 and to heat seal an area surrounding a puncture 38 made by the needle-like tube 30 of the filler member 23 completely off from the rest of the pouch.

Referring to FIGURES 8 and 9 of the drawings, there is therein shown two types of sealing designs that may be

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applied to the walls 24 and 26, respectively, of the filled pouch 15 so as to seal the puncture 38 (represented by the criss-cross lines) completely off from the rest of the pouch. A circular sealing area 39 is shown in FIGURE 8 to seal off the puncture from the rest of the pouch while a U-shaped sealing area 40 is sealed together and co-operates with a portion of the edge seal of the pouch to completely separate the puncture 38 from the rest of the pouch shown in FIGURE 9. This is, of course, necessary to retain the aseptic qualities carefully imparted to the sealed pouch, as it is believed obvious that if the area surrounding the puncture were not sealed off from the rest of the pouch, atmospheric gases containing impurities could seep in through the puncture and thus contaminate the fill located within the main body of the pouch. The seal area also prevents the fill, if remaining in a flowable condition within the pouch 15, from leaking out through the puncture 38.

In some cases, upon the withdrawal of the filler member 23 from the wall 24 in the area of the puncture 38, small deposits of the fill are located within the area bounded by the sealing area 39 or 40. Upon extended periods of storage these minute quantities of fill located within the area bounded by the sealing area 39 or 40 may be adversely affected, such as by decomposition, upon contact with the atmospheric gases and thus present an unsightly and undesirable appearance or odor to the package as a whole. To avoid, it is desirable to completely seal the area bounded by the sealing area 39 or 40 dependent on the particular design of the sealing area as shown by either FIGURE 8 or FIGURE 9. It, of course, should be understood that the circular and U-shaped sealed areas as shown in FIGURES 8 and 9, respectively, are illustrative only and that designs limited only to the imagination and considerations to be hereinafter presented may be utilized to seal off the punctured area from the rest of the pouch.

A further embodiment of the present invention is illustrated in FIGURES 10 through 12 of the drawings, where a modified needle-like filler member 41 is shown. The member 41 is adapted to puncture the inflated portion 25 of the pouch 15 as shown most clearly by FIGURE 11 and FIGURE 12 upon a larger scale. The construction of the needle-like filler member 41 is best shown in FIGURE 12 wherein an outer pointed filling duct 42 is provided with a reciprocable inner concentric tube 43 which serves as a vent for the gases which are replaced by the flowable material entering the pouch through the filling duct 42. Of course, it is obvious that the positions of the vent and filling duct may be reversed; that is to say, the filling duct 42 could become the vent and the vent 43 could become the filling duct.

The filler member 41 moves in line with the pouch 15 and punctures the inflated portion 25 thereof proximal to the top sealed portion of walls 24 and 26. With this modification the puncture 38 formed by the point of the filling duct 42 may be completely sealed off from the rest of the pouch while the filler member 41 is still in penetrating contact with the interior of the pouch 15. It is, of course, obvious that in utilizing such a procedure that it would be necessary to utilize the U-shaped area 40 as shown in FIGURE 9 or a like modification thereof.

With either of the modifications as hereinabove disclosed, many pouches may be filled at one time in contrast to the one shown and illustrated in the drawings. With such an arrangement it is also contemplated that the separately sealed pouches each may have a sealed edge in common which, during the filling operation, could be perforated so as to assist in the separation of one sealed pouch from the other. Of course, in the case of filling a single pouch, a single filler member is employed, but whenever groups of joined pouches are to be filled, multiple filler members would be employed so that the whole group of pouches would be filled and sealed simultaneously.

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It is further contemplated that in those cases where desired, a sterile ray lamp could be mounted in such a position so as to impinge upon the pointed head of the filler member so as to minimize the possibility of a chance bacteria being introduced inside of the pouch 15 upon puncture of the inflated portion 25.

The filler member 23 or 41 could also be operated as follows. Upon the filling of the pouch 15 to the desired level a nonoxygen containing gas, such as nitrogen, could be introduced through the filling duct so as to sweep out any remaining portions of the atmospheric gas that might be contained within the filled pouch. It is also contemplated that steam could be introduced in the same manner so as to sweep out any remaining undesirable gases. It is pointed out at this time that such a purging operation could be carried out simultaneously with the filling by incorporating means such as a third concentric tube (not shown) within the filler member 23 or 41.

As has been above explained, it is thus possible by utilizing the equipment set forth above in the manner contemplated to fill previously sterilized pouches with sterilized material under sterile conditions so as to obtain an aseptic product filled pouch which will not become contaminated or decomposed when subjected to long periods of storage.

While preferred structural details and methods are disclosed herein, it is to be understood that variations both in structure and method, e.g., (by utilizing compartmented pouches with a different fill introduced into each compartment) may be provided without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. Apparatus for preparing aseptic product-filled pouches comprising means for supporting at least one sterile-sealed pouch, a pressure applicator member adjacent to the pouch for inflating a portion thereof with the gases contained therein without breaking the seal of said pouch, a filler member having a needle-like end for puncturing a wall of said pouch, said filler member having means for introducing an aseptic flowable material into the interior of said pouch and a means for removing the gases contained therein and a sealing means for sealing off an area surrounding the puncture in the wall of the pouch.

2. Apparatus for preparing aseptic product-filled pouches comprising means for supporting at least one sterile-sealed pouch, means for inflating a portion of said pouch without breaking the seal comprising a pressure applicator member adapted to squeeze a major portion of said pouch together to inflate a minor portion, a filler member having a needle-like end for puncturing a wall of said pouch, said filler member having means for introducing an aseptic flowable material into the interior of said pouch and means for removing gases contained therein and sealing means for sealing off an area surrounding said puncture in the wall of said pouch.

3. Apparatus for preparing aseptic product-filled pouches comprising means for supporting at least one sterile-sealed pouch, a pressure applicator member adjacent to the pouch for inflating a minor portion thereof without breaking the seal, a hypodermic-filler member having means for introducing aseptic flowable material into the interior of said pouch and means for simultaneously removing gases contained therein and sealing means positioned generally normal to said pouch for reciprocation into sealing contact with an area surrounding the point where said hypodermic-filler member punctures the pouch wall.

4. The apparatus of claim 3 further characterized in that the filler member is disposed in a position generally normal to the position of the sealing means.

5. Apparatus for preparing aseptic product-filled pouches comprising means for supporting at least one sterile-sealed pouch, means for inflating a portion of said

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pouch without breaking the seal of the pouch, a filler member for aseptically introducing a flowable fill material into the interior of a sealed pouch comprising a holder having a generally hollow interior and a butt portion engageable with a wall of a sealed pouch, a pointed hollow needle disposed within the generally hollow interior of the holder and projectable to a position extending past said butt portion, a hollow duct disposed within and spaced from said hollow needle and projectable to a position extending past the point of said hollow needle, a recess disposed in said butt portion, said recess being connected to a vacuum source, and sealing means positioned generally normal to said pouch for reciprocation into sealing contact with an area surrounding the point where said filler member punctures the pouch wall.

6. A filler member for aseptically introducing a flowable fill material into the interior of a sealed pouch comprising a holder having a generally hollow interior and a butt portion engageable with a wall of a sealed pouch, a pointed hollow needle disposed within the generally hollow interior of the holder and projectable to a posi-

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tion extending past said butt portion, a hollow duct disposed within and spaced from said hollow needle and projectable to a position extending past the point of said hollow needle, and a recess disposed in said butt portion, said recess being connected to a vacuum source.

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