

[54] **ASEPTIC SAMPLER FITTING**

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**UNITED STATES PATENTS**

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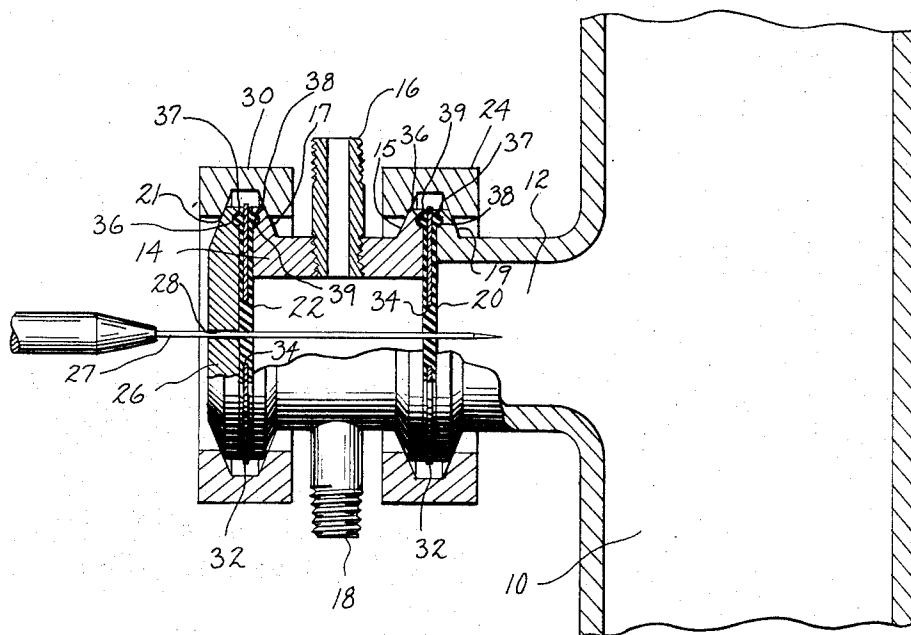
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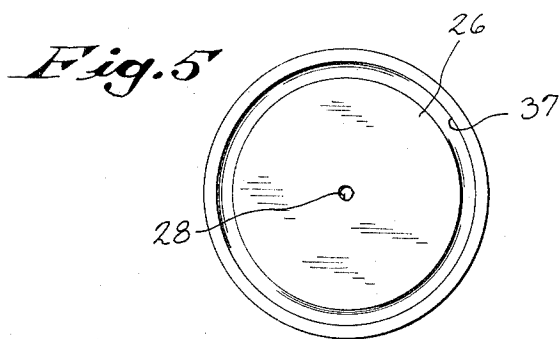
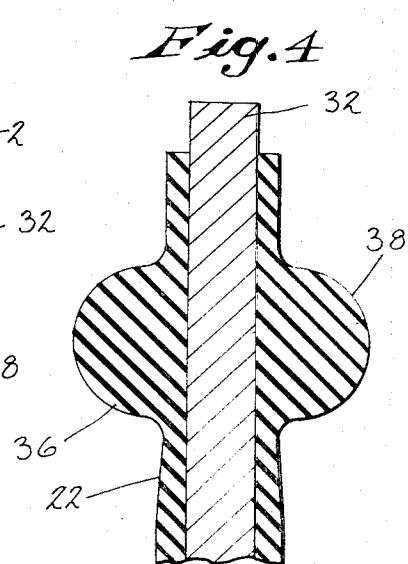
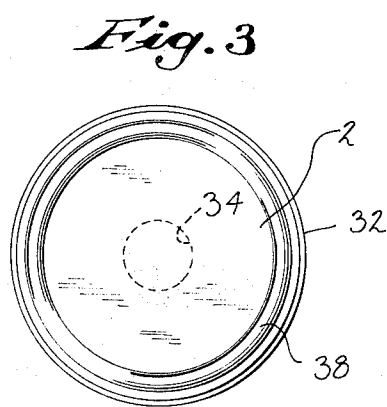
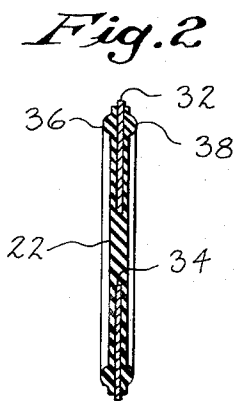
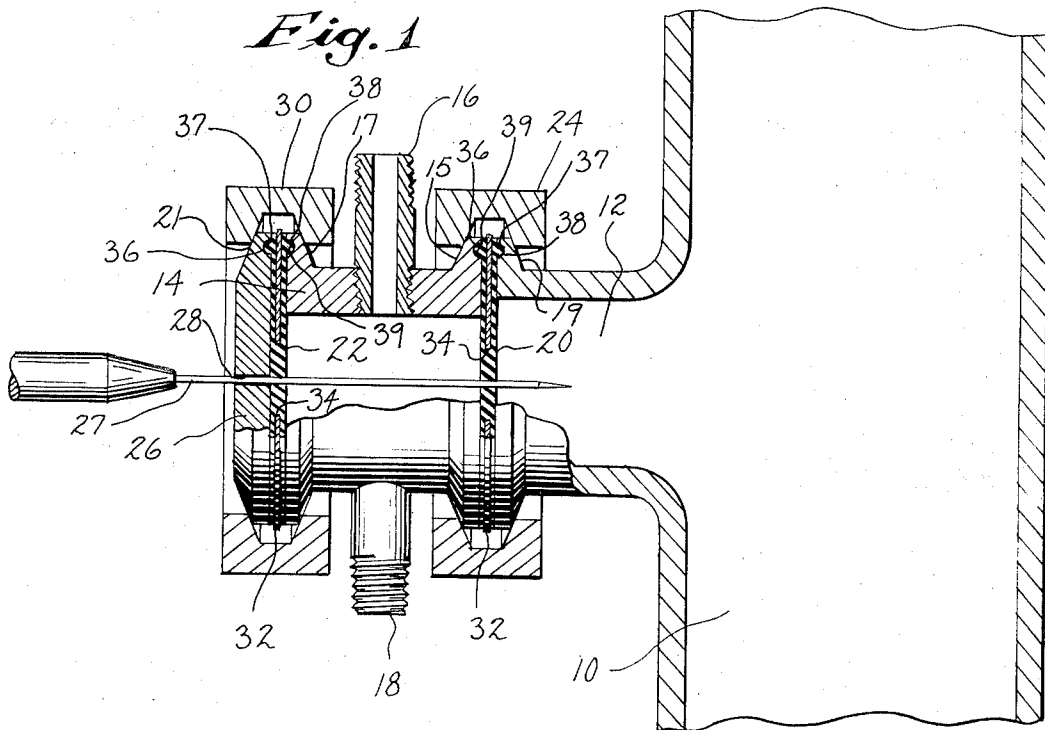
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**ABSTRACT**

An aseptic medium such as steam or the like is contained within a tubular body member between two opposing covers each of which has a self-closing pierceable portion. The tubular body member is adapted for attachment to a container or conduit for sampling the contents of the container or conduit with a sterile hypodermic needle. The contents of the container are sampled by inserting a sterile hypodermic needle through the pierceable portion of both covers into the material contained within the conduit or container, then withdrawing a sample through the needle, and finally removing the needle, whereupon the self-closing pierceable portions close and seal the body member again. The pierceable covers also serve as gaskets.

**16 Claims, 5 Drawing Figures**





## ASEPTIC SAMPLER FITTING

### BACKGROUND OF THE INVENTION

In the production of pharmaceuticals or of sterile food products of the type where the bacteria count must be maintained at a negligible level so that the product, when canned or packaged, will have a long shelf life, it has been the practice to take samples by means of probes to check the conditions in various parts of the processing system while the sterile food or pharmaceuticals were being prepared. The probes that have been employed in the past have been mainly hypodermic needles which are capable of sucking out a sample. It has been common practice in the past to attach a sampling disk made of a self-sealing pierceable material at the points in the system where samples are to be taken. A cotton wad that had been saturated in ethynol was mounted over the disk. The sample was taken by inserting a hypodermic needle first through the sterilized cotton wadding then through the pierceable disk into the material to be sampled. A sample was then withdrawn through the needle and the needle was subsequently withdrawn from the pierceable disk.

It has been found, however, that this type of a sampler fitting is objectionable in that it requires a removable cover to maintain the loose cotton wad in position and to keep it sterile and furthermore necessitates the renewing of the ethynol from time to time to maintain the sterile condition of the cotton. Accordingly, the principal object of this invention is to provide an aseptic sampler fitting which is more sterile than those heretofore known in the art and furthermore easier to utilize and more durable in use than those heretofore known in the art.

### SUMMARY OF THE INVENTION

In accordance with this invention, there is provided a tubular body member which is closed at two opposing ends by a first and second cover member both of which contain a self-closing pierceable portion through which a hypodermic needle can be inserted. A steam inlet and steam outlet is provided in the tubular body member for circulating steam or other aseptic medium there-through so that when the hypodermic needle is inserted through the self-sealing pierceable ends of the device it will be sterilized and maintained in a rigorously aseptic condition by means of the live steam or other aseptic medium. The tubular body member is adapted to be attached to a container or conduit in such a way that the contents of the container or conduit can be sampled by piercing the two covers with a hypodermic needle as described above.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal sectional view of one illustrative embodiment of the invention;

FIG. 2 is a cross-sectional view of one of the two covers in the embodiment of FIG. 1;

FIG. 3 is a plan view of the cover shown in FIG. 2;

FIG. 4 is an enlarged cross-sectional detail of the outer periphery of the cover shown in FIGS. 2 and 3; and

FIG. 5 is a plan view of a cap member which fits over the cover shown in FIGS. 2, 3, and 4.

### DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. 1, the aseptic sampler fitting of this

invention is adapted to be attached to a container or conduit containing a sterile material such as milk or a similar food which is being processed. The embodiment shown in FIG. 1 is shown as attached to a conduit T-fitting 10 by which the fitting may be attached at any desired position in a conduit line. It will be apparent to those skilled in the art, however, that the same mounting arrangement is also adaptable to containers or vessels having ports of the same diameter as the stem portion 12 of the T-fitting disclosed in FIG. 1.

The disclosed embodiment consists of a tubular body member 14 which has a steam inlet port 16 and a steam outlet port 18 communicating into the interior of the body member 14. The two opposing ends of the body member 14 are flanged and are closed by cover members 20 and 22, both of which include a self-sealing pierceable portion through which a hypodermic needle can be inserted as shown in the drawing. The body member 14 and the inner cover 20 are clamped onto the stem portion 12 of the T-fitting by means of a split ring clamp 24 which can be any suitable type of prior art clamp, such as the clamp of U.S. Pat. No. 3,563,571 which issued to Bruno H. Werra on Feb. 16, 1971, for "Aseptic Joints". The other self-sealing pierceable cover 22 is exteriorly accessible and is protected from contact with the outside environment by means of an outer cap member 26 which is shown in detail in FIG. 5. Cap member 26 has a central opening 28 through which the hypodermic needle can be inserted. The cap member 26, and the cover 22, are held in position against the flanged end of body member 14 by a second split ring clamp 30 which can be any suitable form of prior art clamp. The hole 28 in the cap 26 serves as a piloting hole for the needle to insure that it will pierce the pierceable portions of the covers 22 and 20. Because the hole 28 is small, on withdrawal of the needle 27 the material around the puncture in the cover 22 has no place to go but in a self-sealing direction to close the puncture hole.

In general terms, the two cover members 20 and 22 can be any suitable material which contains a self-sealing pierceable portion through which a hypodermic needle can be inserted and withdrawn repeatedly. It has been found, however, that the following materials are particularly adapted for use with this invention because of their self-sealing pierceable characteristics in combination with their ability to withstand steam heat: (1) ethylenepropyleneterpolymer, (2) fluorocarbon elastomers, and (3) butyl elastomers.

Also, although any suitable form of construction can be used for the two covers 20 and 22, it is a feature of the invention to use a central disk of stainless steel 32 which has an opening 34 in the central portion such as best shown in the cross-sectional drawing of FIG. 2. Referring to FIG. 2, the stainless steel central washer 32 is covered on both sides by the self-sealing pierceable material and a bead of the material is disposed in a ring around the periphery of the disk on both sides so as to constitute an O-ring and centering type of seal for the periphery of the cover. FIG. 4 shows an enlarged detail view of the peripheral seal area showing the two resilient sealing beads 36 and 38 which, taken together, act as an O-ring and centering means and seal the steam into the inner chamber of body member 14.

Although any suitable clamp means can be used to hold the cover members 20 and 22 against body member 14, it is a feature of the invention to taper the

flanges 15 and 17 of body member 14 and also to taper the matching flanges 19 and 21 of T-coupling 10 and cap member 26 respectively, and to use tapered clamps 24 and 30 which squeeze the flanges together when the clamps are tightened. It is also a feature of the invention to provide peripheral grooves 37 and 39 in the flanges 15, 17, 19, and 21 to match the resilient beads 36 and 38 so as to form a more secure seal within the center of body member 14. It will be appreciated by those skilled in the art that as clamps 24 and 30 are tightened, their tapered sides will squeeze the flanges 15, 17, 19, and 21 together and force the beads 36 and 38 very tightly into their matching grooves 37 and 39 to provide an excellent seal with a minimum of parts.

To take an aseptic sample with the sampler fitting of this invention, a hypodermic needle 27 is inserted through the central opening 28 of cap member 26 and through the central opening 34 of the two covers 20 and 22 so that the end of the hypodermic needle 27 is aseptized before it projects into the interior of the T-coupling 10. A sample is then withdrawn through the needle, and the needle is subsequently withdrawn from both of the covers 20 and 22, with the aseptic medium again acting on the needle to maintain its aseptic condition. The self-sealing portion of covers 20 and 22 prevents any leakage of steam or aseptic medium out of body member 14 by immediately sealing as soon as the needle is withdrawn.

From the foregoing description it will be apparent that this invention provides an aseptic sampler fitting which is more reliable in operation and sturdier in construction than those heretofore known in the art, and although this invention has been described in connection with one specific embodiment thereof, it should be understood that the invention is not limited to the disclosed embodiment since many modifications are possible in the disclosed structure without altering the fundamental principles of operation. For example, although steam has been used as an aseptic medium in the disclosed embodiment, it will be clear to those skilled in the art that any other suitable aseptic medium such as ethynol or the like could be employed in the place of steam. Also, although the disclosed embodiment utilizes an inlet and outlet port communicating into the hollow cavity of the body member for circulating the aseptic medium through the hollow cavity, it will be clear to those skilled in the art that the circulation of the aseptic medium may be omitted in some embodiments of the invention, which means that the inlet and outlet ports could be eliminated. Accordingly, it should be understood that this invention includes the above-noted modifications and all other modifications which fall within the scope of the following claims.

What we claim is:

1. In combination with a container having sterile material therein which is to be sampled, an aseptic sampler fitting connected to said container providing for sampling the contents without introducing bacteria, said fitting comprising a tubular member having two opposing ends, a first exteriorly accessible cover closing one of said ends and having a self-sealing pierceable portion, a second cover closing the other of said ends and having a self-sealing pierceable portion, an aseptic medium within said tubular member between said first and second covers, and means for attaching said tubular member to said container with said second cover adjacent to the contents of said container so that an aseptic

sample of the contents of said container may be obtained by piercing both of said pierceable portions of said covers with a hypodermic needle and withdrawing a sample of said contents through said hypodermic needle, the aseptic medium being so located and of such character as to aseptize the needle before it enters the container having the sterile material.

2. An aseptic sampler fitting as defined in claim 1 wherein the aseptic medium is steam and wherein the pierceable portion of said first and second covers is made of one of the following three materials: (1) ethylenepropyleneterpolymer, (2) fluorocarbon elastomer, (3) butyl elastomer.

3. An aseptic sampler fitting as defined in claim 1 and further comprising a steam inlet port attached to said tubular member and communicating with the interior thereof, and a steam outlet port attached to said tubular member and communicating into the interior thereof for circulating steam through the interior of said tubular member.

4. An aseptic sampler fitting as defined in claim 1 wherein said first and second covers each comprise a readily removable disk of relatively rigid material having an opening formed in the center thereof, said disk having a permanently affixed coating on at least one side which is composed of a self-sealing pierceable material at least covering said center opening.

5. An aseptic sampler fitting as claimed in claim 4 in which each disk has a permanently affixed coating on both sides, and said coating being formed to provide protruding circular beads on each side of the disk adjacent the periphery thereof to form sealing and locating beads, and there being means on the fitting and container for receiving said beads.

6. An aseptic sampler fitting as claimed in claim 5 in which there is means for removably clamping the disks in position on the fitting, and said fitting and container having grooves located to receive the beads of the disks.

7. An aseptic sampler fitting as claimed in claim 1 in which said container has a stem with an annular flange, in which said tubular member has inner and outer annular flanges, in which one cover is removably clamped between the inner annular flange of the tubular member and said annular flange of the stem, and in which the other cover member is removably clamped against the annular flange at the outer end of the tubular member.

8. An aseptic sampler fitting as claimed in claim 7 in which said other cover is removably clamped between a cap and said annular flange at the outer end of the tubular member, said cap having a central hole.

9. An aseptic sampler fitting for attachment to a container for sampling the contents of said container, said fitting comprising a tubular member having two opposed ends, a first exteriorly accessible cover comprising a disk of relatively rigid material having an opening in the central portion thereof coated on both sides with a self-sealing pierceable material at least covering the opening in the central portion of the disk, a second like cover closing the other of said ends and having a self-sealing pierceable portion, the self-sealing pierceable coating material on both sides of the disk including a protruding circular bead adjacent the periphery of said disk to form a sealing and locating bead on both sides of the disk, an aseptic medium within said tubular member between said first and second covers, and

means for attaching said tubular member to said container with said second cover adjacent to the contents of said container so that an aseptic sample of the contents may be obtained by piercing both of said pierceable portions of said covers with a hypodermic needle and withdrawing a sample of said contents through said hypodermic needle.

10. An aseptic sampler fitting as defined in claim 9 and further comprising means for attaching said tubular member and first and second covers to a conduit containing a fluid to be sampled.

11. An aseptic sampler fitting as defined in claim 9 wherein grooves are formed in said tubular member adjacent to said first and second covers for receiving said sealing beads around the periphery of said first and second covers.

12. An aseptic sampler fitting as defined in claim 11 wherein said opposing ends of said tubular member are flanged and wherein said grooves are formed in said flanges.

13. An aseptic sampler fitting as defined in claim 12

and further comprising a third flange adjacent to the outer periphery of one of said covers and a fourth flange adjacent to the outer periphery of the other of said covers, there being grooves formed in said third and fourth flanges for receiving said sealing beads around the periphery of said first and second covers.

14. An aseptic sampler fitting as defined in claim 13 and further comprising a first and a second clamp member for clamping said first and second covers onto the opposing ends of said tubular member.

15. An aseptic sampler fitting as defined in claim 14 wherein said first and second clamp members and all of said flanges are tapered so that tightening of the clamp members increases the sealing pressure on said sealing beads of said first and second covers.

16. An aseptic sampler fitting as defined in claim 14 in which there is a cap externally of said first cover maintained in position by said first clamp member, and in which said cap has a hole in alignment with the pierceable portions of said covers.

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