United States Patent [19]

Holbrook

[11] **3,727,788**

[45] **Apr. 17, 1973**

[54] **FLUID CONTAINER STRUCTURE HAVING MUTUALLY COOPERABLE PORT CONNECTIONS**

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

[21] Appl. No.: **96,341**

[52] **U.S. Cl.** .....**220/44 R,** 128/214 R, 285/181, 285/213, 215/79

[51] **Int. Cl.** **B65d 51/16**

[58] **Field of Search**.....285/293, 187, 292, 285/417, 23; 128/214 R, 214 B; 220/44 R; 215/79

[56] **References Cited**

UNITED STATES PATENTS

3,485,404	12/1969	Newton	215/79 X
2,557,495	6/1951	Bily	285/181 X
3,112,128	12/1963	Knapp	285/181 X
2,050,023	8/1936	Slayter	285/293

FOREIGN PATENTS OR APPLICATIONS

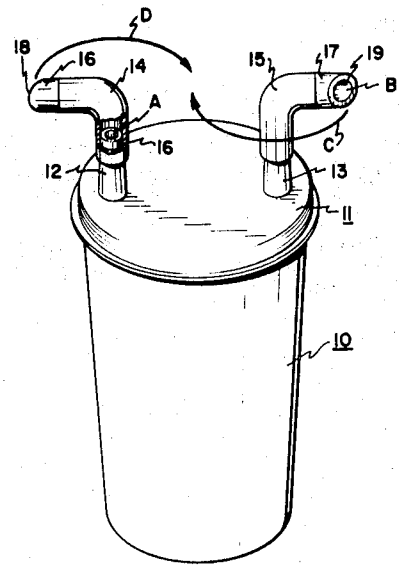
1,104,160	6/1955	France	220/94 R

Primary Examiner—George E. Lowrance
Attorney—M. Ralph Shaffer

[57] **ABSTRACT**

In a fluid container construction having a pair of ports, connector means for providing horizontal connection to such ports, and, additionally, for sealing the interior of the fluid container structure. This is facilitated, in a preferred form of the invention, by the connectors comprising elbows having cooperating, preferably tapered ends which can be placed in mutual proximity, with a junction cover being provided for sealing off or at least covering such ends at their point of mutual proximity. As the junction cover a collar is preferably provided, and which is slit to accomodate selective expansion and contraction of the collar, depending upon its position relative to the juncture of the two elbow connectors.

11 Claims, 9 Drawing Figures



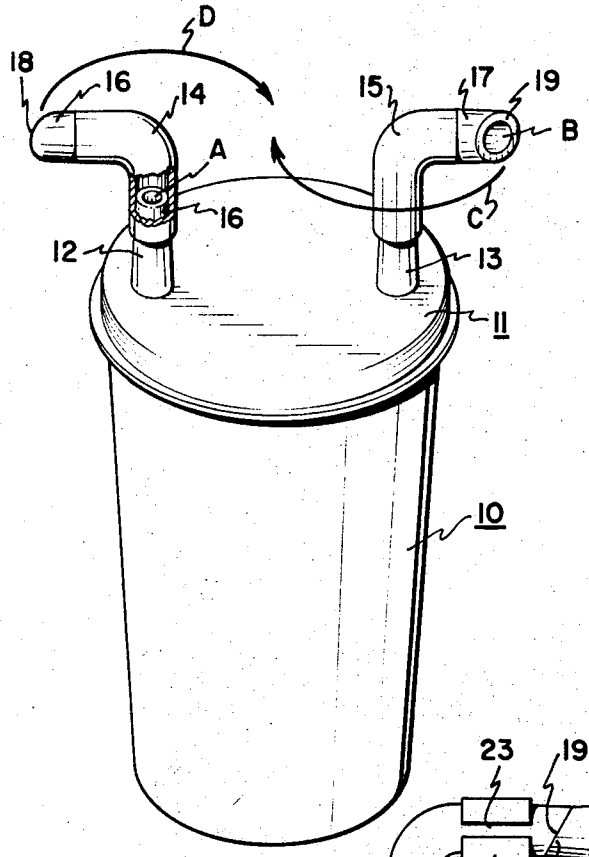


FIG. 1

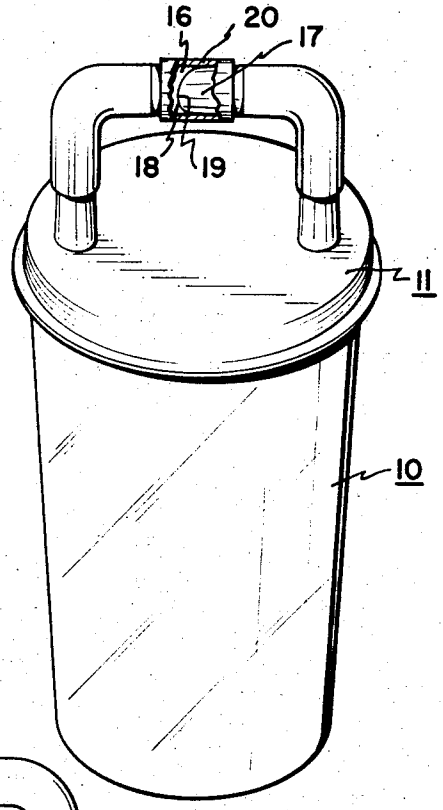


FIG. 2

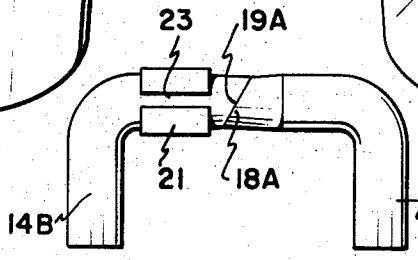


FIG. 4

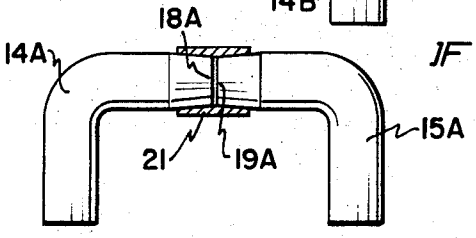


FIG. 3

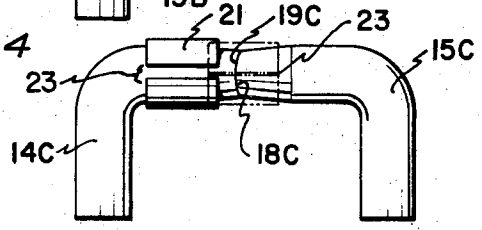


FIG. 5

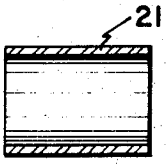


FIG. 7

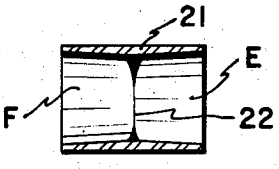


FIG. 8

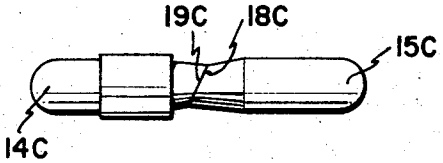


FIG. 6

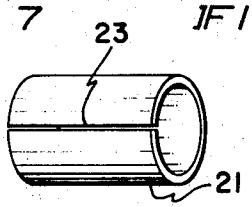


FIG. 9

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FLUID CONTAINER STRUCTURE HAVING MUTUALLY COOPERABLE PORT CONNECTIONS

The present invention relates to fluid containers and, more particularly, to a new and improved fluid container structure having essentially horizontal communication means wherein flexible conduit connections are facilitated. Additionally, the invention provides for rotatable connectors which can be opened to provide for exterior conduit connection and, alternatively, closed together such that the same may seal the interior of the fluid containers against contamination.

In a preferred form of the invention a collar may be provided which can be slipped easily over one of the elbows used, while such elbows are spread apart, and then returned centrally over the elbow juncture when the same are closed together. In this manner the interior of the container can be sealed off or isolated relative to external sources of the contamination.

In the past, fluid containers have been devised to have plural inlet ports. Some of these are used in hospitals wherein such ports form part of a lid and comprise an aspirated fluid inlet port and also a vacuum port to facilitate the drawing of fluid within the container. The lids of such containers are generally fabricated by means of a plastic mold which, by its nature, must generally include vertical, upstanding ports. This is to reduce the expense and complications of manufacture. Such vertical ports, however, provide solely for a vertical connection of tubing to the bottle. In such event the weight of tubing, where the same is flexible, will tend to collapse the tubing proximate its juncture with its ports, thereby pinching off the tubing and precluding proper conduit communication and flow.

In the present invention the connection means takes the form of elbows which can be turned outwardly to accomodate horizontally connecting tubing. Such elbows or connection means may be rotated by means of their tapered Leur fittings relative to the ports.

Additionally, another feature of the invention is to dimension the elbows and to configure the ends thereof such that the outwardly exending elbow ends may be turned inwardly to meet, or at least be disposed in proximity, such that the two ends may be sealed together so as to seal off the interior of the container from outside contaminants. Such a sealing means may be provided either by tape or, and preferably, a collar. The collar, where used, is preferably slit so that where the elbow ends are tapered, the collar may contract inwardly, to appropriately seal the same; this will not prevent the collar from being urged outwardly, away from the juncture, and thereby expanded, by virtue of inclusion of the slit, over the enlarged cross-section of a respective elbow at its interior region. Compressibility of the wall of the collar may preclude the necessity of slit inclusion.

Accordingly, a principal object of the present invention is to provide a new and approved fluid container structure.

An additional object of the invention is to provide a fluid container structure wherein the ports thereof are provided with turnable elbows.

An additional object is to provide elbows for upstanding ports in fluid containers.

An additional object is to provide a fluid container structure having a pair of connector means which can be turned together and sealed at their respective juncture, this to preserve the interal character of the fluid container structure.

An additional object is to rpovide in a fluid container structure a pair of elbows which are connected to ports of the structure, the elbows being configured to be rotationally displaced inwardly such that their outer ends join, or are at least disposed in close proximity.

A further object is to provide a fluid container structure having a pair of turnable elbows joining respective ports, the elbows being joinable together and being secured in such position by means of a removable means such as a collar.

The features of the present invention which are believed to be movel are set forth with particularly in the appended claims. The present invention both as to its organization and manner of operation, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with accompanying drawings in which:

FIG. 1 is a perspective view of a fluid container constructed in accordance with the principles of the present invention and showing the elbow connectors thereof as disposed in their outer or extended positions.

FIG. 2 is a view similar to FIG. 1, illustrating the elbows of FIG. 1 as having been rotationally displaced such that their ends meet, this for covering by a junction cover, also shown.

FIG. 3 is a view of alternate elbows that may be employed in the structure of FIGS. 1 and 2, such elbows being turned inwardly and being covered by a collar.

FIG. 4 is a front elevation of elbow structure similar to FIG. 3, with the collar being displaced to the left to reveal adjoining beveled surfaces of the elbows constituting a common juncture.

FIG. 5 is a front elevation similar to FIG. 4, but illustrates the use of a slit collar which can be moved either to the right or left (see the solid line configuration in FIG. 5) or move centrally (as shown in the dotted line configuration in FIG. 5) wherein the slit width contracts.

FIG. 6 is a top plan of the structure of FIG. 5, the dotted line configuration being omitted.

FIG. 7 is a vertical longitudinal section of a representative collar that can be used in practicing the invention.

FIG. 8 is a longitudinal vertical section of an collar alternate to that shown in FIG. 7, and wherein the interior is tapered in a manner such that the exterior tapers of adjoining elbows can be accommodated so that the same can be adequately sealed.

FIG. 9 is a perspective view of a representative collar of FIGS. 7 and 8, wherein a respective one is provided with a slit, allowing for the expansion of the collar where the same is moved away from its central position relative to of the elbow juncture; the slit narrows and the collar itself allowed to contract when the same is proximate the juncture of the tapered adjoining elbows, to thereby seal the same.

In FIG. 1 fluid container 10 is shown to include a lid 11 provided with upstanding ports 12 and 13. Ports 12 and 13 are preferably tapered as indicated and include respective apertures A for providing communication, such as fluid and vacuum communication, respectively, to the interior of fluid container 10.

Each of the 14 12 and 13 is provided with a respective elbow outwardly extending hereinafter referred to as simply the elbows so that 14 and 15. Each of the same is provided with a tapered seat 16, one being shown, which frictionally cooperates with a respective port 12, 13. The elbows 14 and 15 are provided with L-configured, communicating apertures B, respectively, and the outwardly positioned ends 16 and 17 are conically tapered about their peripheries and also cooperatively beveled at 18 and 19, that is, at their respective terminations or ends. In the embodiments shown in FIGS. 1 and 2 the beveled ends 18 and 19 mutually lie in a transverse vertical plane. These ends are so cut or beveled that they exactly fit together when the elbows are advanced in directions C and D, respectively, as shown in FIG. 1, so that the two ends 16 and 17 meet at their respective beveled surfaces 18 and 19. Thereafter, the ends may be secured together as by tape 20, as seen in FIG. 2. Thus, the elbows 14 and 15 serve not only to accommodate the securement of exterior tubing thereto, but also provide a closed conduit which can be sealed, thereby keeping the interior of the fluid container completely clean, that is, free of dust particles or other contaminants, to be ideally suited for hospital environments. Additionally, the generally flexible conduit used such fluid container can now be attached to the horizontal, outwardly extending ends 16 and 17 of the elbows so that there is less likelihood for the conduit to pinch off, as might otherwise be the case where the conduit tubing is simply attached directly to the respective ports 12 and 13.

FIG. 3 llustrates another embodiment of the invention wherein elbows 14A and 15A this time are provided with right-angle or square end surfaces 18A and 19A; in such event either tape 20, as shown in FIG. 2, or preferably a collar, as illustrated in one or more of the FIGS. 7, 8 and 9, may be emploed so that the two elbow ends may be sealed together in the manner heretofore described in connection with FIG. 2.

The sealing collar 21 in FIG. 3 is shown to be in a form similar to the cross-section of the collar shown in FIG. 8. It is noted that the interior of the collar, see FIG. 8, is tapered at both halves E and F to meet at a common interior juncture 22. The latter will be aligned with the area of contact or proximity of ends 18A and 19A in FIG. 3. Where the collar is of the configuration shown in FIG. 8, then the same should be resilient such that the center portion at 22 may be compressed outwardly as the collar is shifted either to the right or to the left upon the associated elbow away from its tapered end; or the collar should be cylindrical as shown at 21A in FIG. 7. In either event, the collar is preferably slit at 23 so that the same can expand outwardly as the collar is shifted either to the right or to the left relative to its central position as shown in FIG. 3.

In FIG. 4 the elbows 14B and 15B are shown to be each provided with proximate beveled ends 18A and 19A, with the collar 21 being illustrated as being shifted to the left. In the usual manner of practicing the invention, the collar is first installed, see FIG. 4, when the elbows are outwardly extended in the manner shown in FIG. 1. Thereafter, when the elbows are rotated in opposite directions 180° such so their beveled edges join, then the collar 21 will be shifted to the right, centrally, in a manner similar to the tape-configuration seen in FIG. 2, such that the juncture of the two ends is covered. This covered or sealing can be made very effective, especially where the collar is resilient and the slit 23 provided, see FIG. 9; in such event the expanded slit 23 in FIG. 4 will be allowed to contract to that shown in FIG. 9 when the collar 21 is centrally disposed over the cooperating ends of the elbows.

FIGS. 5 and 6 illustrate a further embodiment of the invention, similar to FIG. 2, wherein the elbows 14C and 15C are provided with slanted extremities 18C and 19C which cooperate along its vertical, transverse, bevel plane. In such event the collar 21 is provided with an expanded slit which contracts when the collar is centrally positioned directly over the two ends.

FIG. 6 is simply a top plan of the structure shown in FIG. 5. The dotted line configuration in FIG. 5 illustrates the manner in which the slit collapses when the collar is advanced over a central portion of the elbow combination across the central juncture.

Suitable grades of polyethylene plastic, by way of example, may be utilized in practicing the invention, as by way of fabrication of the fluid container lid with its associated parts and elbows. A soft plastic will be used for the collar if the same is to expand inwardly when the collar is centrally positioned over the elbow juncture. In the event that a "rigid" plastic is employed, rigid in the sense of being noncompressible as to wall section, then a slit as at 23 may be provided wherein the entire tubular collar can expand outwardly when urged either to the right or to the left of the central elbow juncture, thus enabling the collar to contract inwardly to tend to close the slit when the collar is so centrally disposed over the two adjoining ends of the elbows.

What is provided, therefore, is a new and improved conduit connector construction for fluid containers wherein elbows are provided the ports of such containers. The elbows provide two purposes. In the first place they permit a mounting of coduit such that the conduit, if flexible, is not likely to pinch. In the second place, the elbows are configured as mutual connecting means such that the elbow ends can be joined together, or at least held in close proximity, and covered, thereby retaining the clean and/or sterile condition within the container. Thus, it is seen that the supplier of the container can sterilize the same and seal the elbows thereof so as to preserve the interior sterile condition of the container until the time immediately prior to use at the hospital. At such time the sealing collar, of whatever form, is removed by a technician and the necessary tubular conduit to be usd installed over the elbows. Hence, possibilities of contamination are reduced to a minimum.

While particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects, and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

I claim:

1. A fluid container including, in combination, structure defining an enclosure provided with a pair of upstanding ports, and a pair of elbow connection means,

for receiving independent elongate conduits, respectively rotatably connected to said port means for communication therewith, said elbow connection means having respective outer ends constructed for selective, mutual, communicative proximity in mutual non-enveloping end-to-end facing disposition and also selective mutual removal, upon the pivotal displacement of at least one of said elbow means upon its port, whereby to facilitate external conduit connection thereto.

2. Structure according to claim 1 wherein each of said ports comprises an upstanding, tapered, port element, each of said connection means including tapered seat means for rotatably frictionally engaging respective ones of said port elements.

3. Stucture according to claim 1 wherein said outer ends of said connection means pair are beveled relative to a common plane, when said outer ends are disposed in communicative relationship, whereby to permit said outer ends to come together in peripheral end contact and to be easily separable from said contact.

4. Structure according to claim 1 wherein said securing means comprises a collar removably positioned over those portions of said outer ends of said connection.

5. Structure according to claim 4 wherein said collar is provided with a resilient, compressible wall.

6. Structure according to claim 4 wherein said collar is interiorly tapered in opposite directions, forming a medial thickened junction, said connector means having tapered ends configured to cooperate with the oppositely tapered interior of said collar.

7. A fluid container including, in combination, structure defining an enclosure provided with a pair of ports, and a pair of connection means, for receiving elongate conduits, respectively rotatably connected to said ports for commication therewith, said connection means having respective outer ends constructed for selective, mutual, communicative proximity, wherein said container is provided with means for temporarily securing said outer ends together, whereby to seal the interior of the same and, hence, said enclosure from exterior contaminants, wherein said securing means comprises a collar removably positioned over those portions of said outer ends of said connection, and wherein said collar includes a longitudinal wall slit, said outer ends having tapered portions, said wall slit enabling said collar to contract aginst said tapered portions of said outer ends when centrally disposed thereover and also permitting said collar to expand radilly outwardly when said collar is advanced inwardly along the respective connection means over which the same is mounted and away from said tapered portion thereof.

8. A fluid container including, in combination, structure defining an enclosure provided with a pair of ports, and a pair of connection means for receiving elongate conduits, respectively rotatably connected to said ports for communication therewith, said connection means having respective outer ends constructed for selective, mutual communicative proximity, wherein said container is provided with means for temporarily securing said outer ends together, whereby to seal the interior of the same and, hence, said enclosure from exterior contaminants, wherein said securing means comprises a collar removably positioned over those portions of said outer ends of said connection, and wherein said collar is longitudinally slit, whereby to accommodate expansion of said collar when the same is advanced toward one of said connection means away from its outer end and also to collapse upon said collar assuming a sealing disposition over adjacent outer ends of said pair of connection means.

9. A fluid container including, in combination, structure defining an enclosure provided with a pair of upstanding tapered ports, a pir of elbows having bevelled outer ends disposed in the same plane and tapered seats, frictionally and rotationally secured to pair of ports,respectively, said elbows with said ports being constructed and arranged whereby a rotational displacement of each of said elbows upon said ports in an appropriate degree will cause said elbows at said outer ends to advance together for mutual intercommunication at their respective outer ends.

10. Structure according to claim 9 wherein said elbows are provided with means for sealing adjacent ends of said elbows together in communicative relationship.

11. Structure according to claim 10 wherein said means comprises a collar removably secured over said adjacent ends of said elbows.

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