2011

PATENT ATTORNEYS

EXAMINATION

PAPER E

The New Zealand Law and Practice relating to Interpretation and Criticism of Patent Specifications

Regulation 158 (1) (e)

Duration: 4 hours (plus 10 minutes for reading)

When considering answers to the questions in this year's examinations, no account is to be taken of any provisions of the Patents Bill, the Trade Marks (International Treaties and Enforcement) Amendment Bill, or any other bill that may be before the New Zealand Parliament.

Instructions

Attempt all questions. The Patents Bill, the Trade Marks (International Treaties and Enforcement) Amendment Bill and the Regulatory Improvement Bill can be ignored.

The facts

Bill is an importer of performance road bikes and related gear. Bill believes that there's a real niche in the hydration market for a mass-hydration system that doesn't require the user to grab about for different bottles. He comes to you for advice about a hydration system for bicycles that he has developed. He explains that his system allows a cyclist to carry four bottles and to drink either from one bottle at a time or four bottles at once. When he arrives Bill has a thick sheaf of drawings and other documents from which he plucks a written description of his system and four patent documents located by his business partner **(D2, D3, D4** and **D5**). Bill explains that he developed his system in early 2010 while attending a consumer products show in Australia. He was inspired by the cycling accessories exhibited there, including one handle-bar mounted product that had two compartments, each with its own straw, but where both compartments could be drunk from simultaneously. After having a draftsperson prepare proper drawings, and spurning advice to manufacture in China, Bill contracted a number of local suppliers. Bill selected a local assembler to produce the system from parts sourced from those local suppliers. The system is shipped to Bill's warehouse already packaged for retail sale. Outside your office sits Bill's van full of product, ready for a sales trip calling on bike shops and cycle races around the country. Bill wants your advice before he hits the road this evening.

D1 Document A that describes his hydration system.

D2 NZ 123456 owned by Fluid Cycles Limited. NZ 123456 is a complete after provisional application filed 1 July 2010 which proceeded to grant in April 2011. The

provisional specification was filed on 2 July 2009. Bill has not provided you with a copy of that document.

D3 US 6,401,997

D4 US 5,301,858

D5 US 5,115,952

Questions

(1) Is NZ 123456 relevant to Bill's business and, if so, how? **(40 marks)**

(2) What (if anything) could Bill do to ameliorate any risks posed to his business by NZ 123456? **(40 marks)**

(3) What else would you tell Bill? **(20 marks)**

Document A – Bill's hydration system

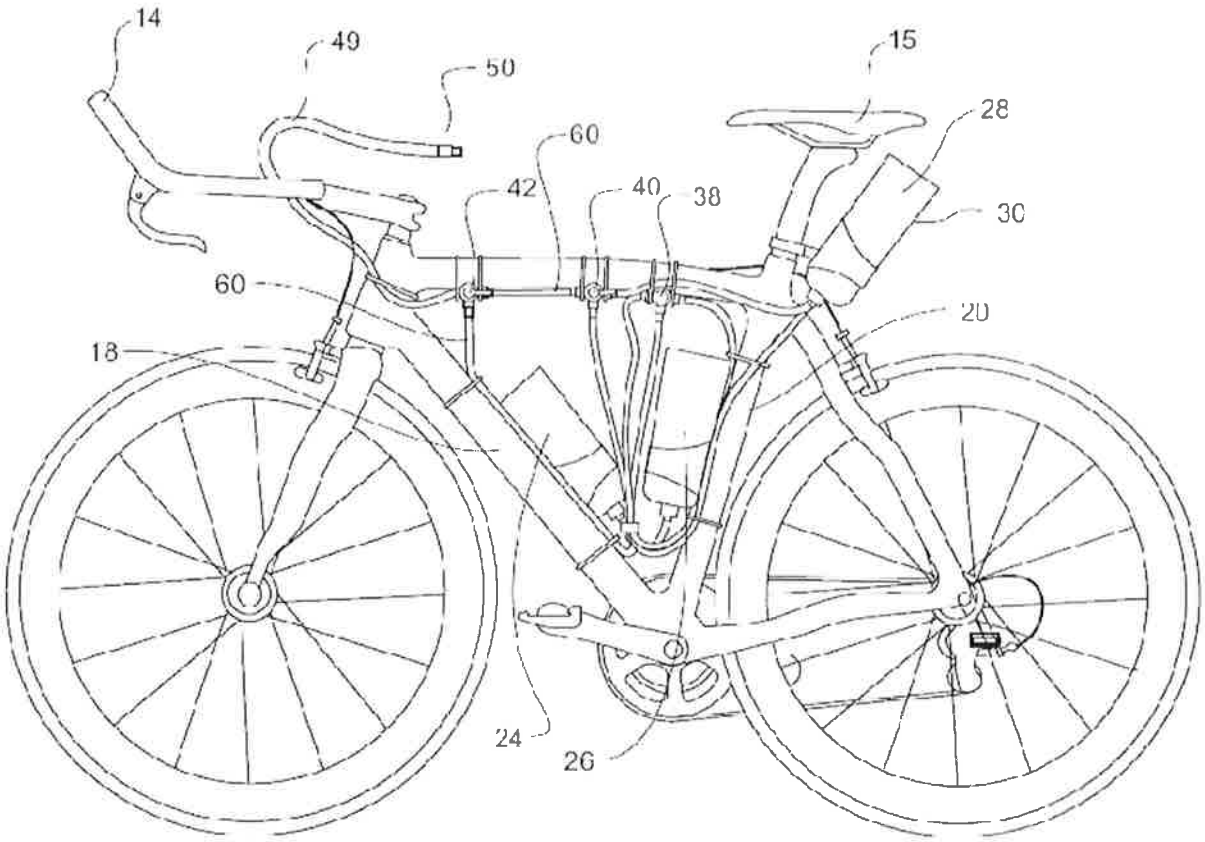

Figure 1

Fig 1: My hydration system can carry four bottles. Two bottom bottles (24 and 26) can be held on the bike frame on the down tube 18 and the seat tube 20. Two back bottles (28 and 30) can be held side-by-side in a holder behind the seat 15.

The bottles are connected by main three-way valve 42 that is connected with tubing (60) to bottom valve 38 ("bottom" as in the bottom bottles 24 and 26) and to back valve 40 ("back" as in the back bottles 28 and 30). Each valve (42, 38 and 40) has a lever that rotates 180 degrees through at least three positions to open or close the two inlet ports on each valve. The main valve 42 has an outlet tubing 49 where the business end is positioned above the handlebars 14 and terminates in a one-way valve, a push-pull valve or a bite-valve (50) that a cyclist operates with their mouth. When the lever of the main three-way valve 42 is rotated

to one of three positions, it opens, closes or partially opens/closes its inlet ports to allow fluid to flow from either the bottom bottles (24, 26) or the back bottles (28, 30) or both sets of bottles simultaneously.

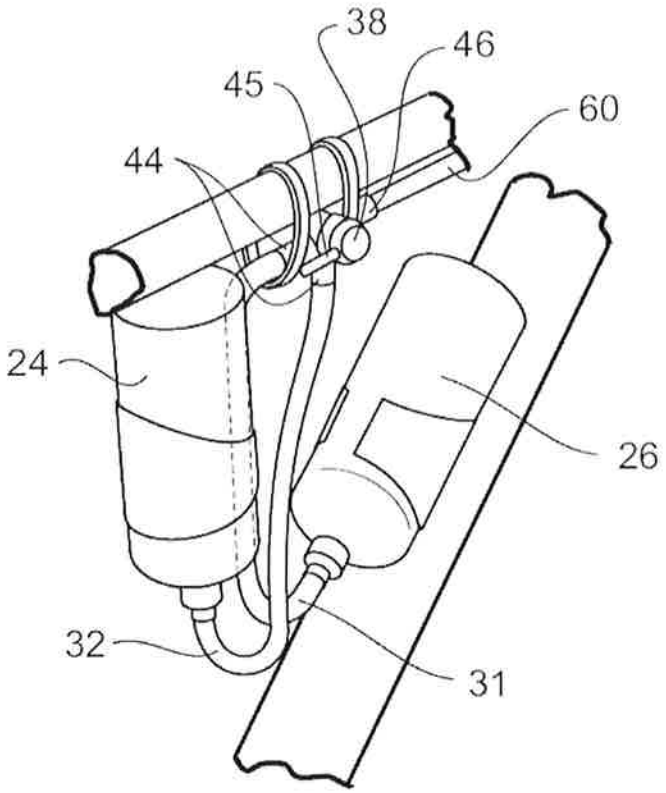

Figure 2

Fig 2: The bottom three-way valve 38 has two inlet ports 44 and one outlet port 46, and each inlet port is connected to one of the bottom bottles (24, 26) by inlet tubing (31 and 32). The bottom container valve 38 has a rotatable lever 45 that rotates 180 degrees around an axis. When the lever 45 of the bottom three-way valve 38 is rotated to one of three positions, it opens, closes or partially opens/closes the inlet ports 44 and outlet port 46 of the bottom valve 38 to allow fluid to flow from one or both bottom bottles. One of the tubes (60) from the main valve (42) connects to outlet port 46 of the bottom valve.

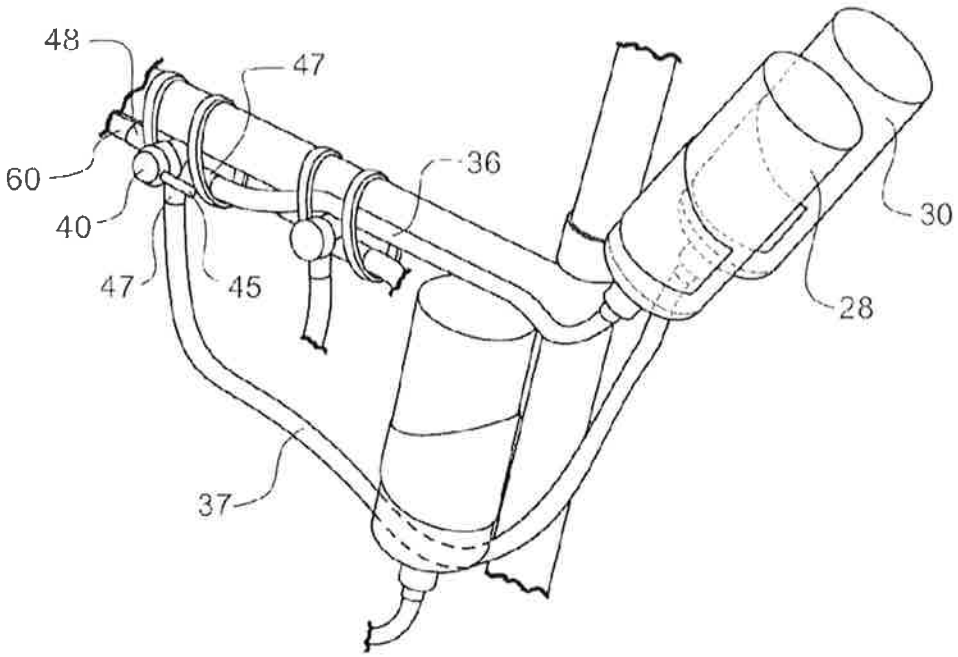

Figure 3

Fig 3: The back three-way valve 40 has two back container inlet ports 47 and one outlet port 48, and each inlet port is connected to the back bottles (28, 30) by inlet tubing (36 and 37). The back valve works in the same way as the bottom valve. One of the tubes (60) from the main valve (42) connects to outlet port 48 of the bottom valve.

After provisional

Number: **123456**

Dated: **1 July 2010**

PATENTS FORM No. 5

PATENTS ACT 1953

COMPLETE SPECIFICATION

DRINKING APPARATUS

We, **Fluid Cycles Limited**, a New Zealand company, having its registered office at 321 The Strand, Te Puke, New Zealand, hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

DRINKING APPARATUS

TECHNICAL FIELD OF THE INVENTION

This invention relates in general to drinking apparatus, and more particularly to an improved drinking apparatus that a user may drink from with little or no hand interaction.

BACKGROUND OF THE INVENTION

In many outdoor activities, it has been recognized that either participants or spectators often wish to have accessibility to some type of drinking apparatus. Typically, the type of activity involved, and the demands on the participant or spectator, dictate the specific needs and desires relating to the drinking apparatus. For example, in distance running or bicycling events, it is common for an athlete to carry some type of drinking reservoir so that periodically the athlete may take a drink. Indeed, in many lengthy competitive activities, it is imperative that the participant have access to fluid to replenish body fluids otherwise lost during the activity.

As a specific example, in distance bicycling events, it is common and well known in the art for each bicycle to be mounted with one or more drinking bottle cages, each capable of holding a drinking bottle somewhere along the frame of the bicycle. When the cyclist becomes thirsty, he or she may reach down and withdraw the bottle from its respective cage, take a drink from the bottle, and return it to its cage. While this approach permits the cyclist access to a desirable fluid, it has numerous disadvantages. One disadvantage is the physical manipulation required for the cyclist to withdraw the bottle from its cage. In particular, often the bottle is mounted somewhere below the seat of the bicycle and, as a result, the cyclist is forced to bend in an uncomfortable and unsafe position to reach the bottle. Thus, in addition to providing discomfort to the cyclist, he or she is put in an awkward and unsafe position which could cause the bicycle to become unstable and fall. Still further, the drinking activity is distracting to the cyclist, which is therefore both unsafe and time consuming. Moreover, in withdrawing and replacing the bottle into its respective cage, the cyclist may drop the bottle along the path of travel, thereby forcing the cyclist either to expend valuable time in retrieving the bottle or continuing his or her travels with no further access to a drink. Still further, a dropped bottle poses a safety hazard to cyclists behind the rider who dropped his or her bottle. Indeed, many bicycle accidents have occurred where trailing riders ran over a dropped bottle, thereby causing them to lose their balance and fall to the ground.

One prior art bicycle drinking apparatus includes a water bottle having a flexible tube which extends from the bottle to a position proximate the cyclist's mouth. The tube is further wound through a reel-type device which allows the cyclist to extend the tube to his or her mouth for sucking fluid from the bottle and, thereafter, reeling the tube back to a retracted position such that it is no longer accessible to the cyclist's mouth. Thus, this system prevents the cyclist from having to withdraw and replace the fluid bottle into its cage each time the cyclist desires to take a drink.

While easing the burden of having to manipulate the bottle, however, this system includes several disadvantages. One disadvantage is that the cyclist is still required to conduct detailed physical manipulations to withdraw and retract the drinking tube each time a drink is taken. As a result, again the concentration of the cyclist is taken off the immediate challenge of operating the bicycle and placed instead on the task of taking a drink. Again, therefore, valuable time and safety is compromised at the expense of providing a drink to the cyclist.

Yet another and, perhaps, more significant disadvantage with the system is the amount of suction demanded in order to bring fluid to the operator's mouth. Specifically, each time an operator of the system wishes to take a drink, he or she must apply a sufficient amount of suction to draw fluid from the bottle, through the entire length of the tube, to the mouth of the operator. As a result, it should be appreciated that a great deal of suction strength is likely exhausted each time a drink is taken. Naturally, over a repeated number of drinks, this activity could exhaust the cyclist. Indeed, during an aerobic exercise activity, such as a lengthy race under extreme conditions, this additional need to repeatedly apply suction to the tube could be dangerously tiring and could interfere with the normal breathing activity of the cyclist.

Another prior art approach to some of the above-referenced problems has been to provide a pressurized fluid bottle having a tube extending toward the user's mouth. A valve is disposed at the end of the pressurized tube so that the operator may actuate the valve with his or her teeth. More specifically, when the operator wishes to take a drink, he or she bites onto the valve, thereby permitting the pressurized water to pass through the valve and into the operator's mouth. While this system avoids the suction problems associated with the first system described above, it is necessarily mechanically complex. In addition, its complexity requires that the ultimate device be relatively expensive and, therefore, its cost may be prohibitive to casual bicycle riders or joggers. An additional drawback of this system may

arise from a failure in the pressurization mechanism. Specifically, if this pressurization system should fail, the system is rendered useless to the operator and, therefore, the operator is left with no fluid to drink. Thus, if the system is being used in a long-distance bicycle race or the like, its failure could be critical as it may leave the operator with no fluid for the duration of the race.

It is therefore an object of the present invention to provide a drinking apparatus which is capable of storing a desired amount of fluid, and providing an operator access to the fluid when desired.

It is a further object of the present invention to provide a drinking apparatus which provides access to the fluid stored within the drinking apparatus with little or no hand manipulation required by the user.

It is yet another object of the present invention to provide a drinking apparatus which provides access to the fluid stored within the drinking apparatus while requiring a minimal amount of suction.

It is yet another object of the present invention to provide a minimal amount of complexity to the system, thereby reducing the possibility of system failure and cost.

Still further objects and advantages of the present invention will be apparent to those of ordinary skill in the art having reference to the following specification together with its drawings.

SUMMARY OF THE INVENTION

In accordance with the present invention, an improved drinking apparatus is provided which substantially reduces the disadvantages and problems associated with prior drinking apparatus, and seeks to further the objects set forth above.

The present invention includes an apparatus for drinking a liquid stored in a bottle. Specifically, the apparatus includes a tube for drawing liquid in a first direction from the bottle toward a point external from the bottle in response to suction at that point. In addition, the apparatus includes means communicating with the tube for preventing the fluid from moving in a second direction opposite the first direction. The means communicating with the tube permits the fluid to move in the first direction in response to suction.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention, and the advantages thereof, reference is now made to the following description taken in conjunction with the accompanying drawings, in which:

FIG. 1 illustrates a perspective view of the preferred drinking apparatus of the present invention; and

FIG. 2 illustrates a perspective view of an alternative embodiment of the preferred drinking apparatus mounted on a bicycle.

DETAILED DESCRIPTION OF THE INVENTION

The preferred embodiment of the present invention and its advantages are best understood by referring to FIGS. 1-2 of the drawings, like numerals being used for like and corresponding parts of the various drawings.

FIG. 1 illustrates a perspective view of a drinking apparatus 10 in accordance with the present invention. Apparatus 10 includes a container 12 which, in the preferred embodiment, is a common fluid bottle as is known in the art. Typically, container 12 is constructed of a rigid, transparent or translucent plastic material and, therefore, the fluid 14 stored within container 12 is generally visible to the user of apparatus 10. A lid 16 is removably attached to container 12 in one of many techniques known in the art. For example, lid 16 may be threadably attached to container 12. As a result, a user of apparatus 10 may unscrew lid 16 counterclockwise from container 12 to refill fluid 14 within container 12. Once container 12 is filled with fluid, lid 16 is screwed in a clockwise fashion until it is again secured to container 12.

A flexible tube 18 is disposed within container 12 to provide access to fluid 14. Specifically, tube 18 has an aperture 20 at one end in order to draw fluid 14 upward through tube 18. In the preferred embodiment, tube 18 passes through an aperture vertically disposed through lid 16 so that fluid may be drawn upward and out of bottle 12. In an alternative embodiment, tube 18 may be broken down into two different tubes, one tube being internal to bottle 12 and the other being external to bottle 12. In this alternative embodiment, lid 16 would include an outlet for coupling the interior and exterior tubes replacing tube 12.

Although not shown, bottle 12 preferably also includes some type of inlet air flow device. As known in the art, it is typically necessary to allow air to flow inward to bottle 12 as fluid 14 is withdrawn from bottle 12. The inlet air flow device may simply be a hole near, or in, lid 16. As a more complex structure, a separate poppet valve may be included in bottle 12 for allowing an inlet of air. Still other strategies may be chosen by a person having skill in the art in order to ensure that air may enter bottle 12 as fluid 14 is withdrawn.

A flow control device 26 is connected to a second end of tube 18. Specifically, flow control device 26 includes an inlet 28 over which the second end of tube 18 is disposed. Further, flow device 26 includes an outlet 30. In the preferred embodiment, flow control device 26 is an automatic valve-type device which permits air and fluid to flow one way through the device, but not in the opposite direction. Such a device is commercially available from aquarium shops as it is used in common aquarium pump configurations.

One end of exterior tube 32 is disposed over outlet 30 of flow control device 26. The other end of exterior tube 32 has an aperture 34 which is readily accessible to a user of drinking apparatus 10. As described in greater detail below, a user may drink from apparatus 10 by applying suction at aperture 34 in order to draw fluid 14 upward through tubes 18 and 32.

The use of drinking apparatus 10 is generally as follows. A user of apparatus 10 first disposes a desirable fluid 14 within container 12. Thus, for purposes of typical outdoor exercise, the user may choose to place water within container 12. As stated above, in the preferred embodiment, lid 16 may be removed from container 12 by unscrewing it, and thereafter, pouring fluid 14 within container 12. Next, lid 16 is screwed back on to container 12 to enclose fluid 14 within container 12. Finally, tube 18 is disposed through the aperture within lid 16 such that it rests in the bottom of bottle 12.

With the remainder of the apparatus in place as shown in FIG. 1, a user may drink fluid 14 by applying suction at aperture 34. In particular, by applying suction to aperture 34, fluid 14 is first drawn upward through tube 18. As suction continues, this same fluid continues through a unidirectional limiter 36 disposed within flow control device 26. As a result, as fluid is drawn upward toward unidirectional flow limiter 36, it cannot return downward and back toward container 12. Indeed, it should be appreciated that the inclusion of flow control device 26 prevents downward movement o f air within either tube 18 or tube 32. As a result, once liquid has started upward in either tube, it cannot move downward toward bottle 12. Thus, even if an operator discontinues suction, the fluid in either tube will remain at its current level within

the respective tube rather than retreating into bottle 12. Moreover, if the operator continues to apply suction, the fluid exits aperture 34 into the operator's mouth. Thereafter, once the operator discontinues any further suction, then provided exterior tube 32 is in a somewhat vertical direction, the fluid remains at a point 38 just short of aperture 34.

Having explained the operation of apparatus 10, it should be noted that flow control device 26, while preferably disposed between tubes 18 and 32, may be placed anywhere between the point of entry of the fluid (i.e., aperture 20) and the point of exit of the fluid (i.e., aperture 34). Thus, flow control device 26 may be disposed within bottle 12, or constructed integrally within lid 16. Still further, second exterior tube 32 could be eliminated entirely, and a user could simply apply suction at outlet 30 to drink from bottle 12.

In view of the above, it should be appreciated that the inclusion of flow control device 26 requires a user of apparatus 10 to apply sufficient suction to aperture 34 only once in order to draw fluid the entire distance from container 12 to aperture 34. After this initial suction is applied, the fluid remains at a point 38 very near aperture 34, rather than returning downwardly through tubes 32 and 18 into container 12. As a result, apparatus 10 provides a significant advantage in that a user may draw the liquid upward in this fashion prior to engaging in any heavy exercise. For example, if apparatus 10 were used in the context of a bicycle race, the cyclist may suck the fluid 14 upward to point 38 prior to commencing the race. Thus, upon beginning the race, each time the user drinks fluid, he or she only applies sufficient suction to draw the fluid upward from its resting point 38 to aperture 34. Accordingly, a minimal amount of suction is necessary on behalf of the user, thereby easing their burden while still providing him or her the ability to drink during the bicycle race.

One other consideration arises from the use of apparatus 10. Particularly, it may be appreciated that, after initial suction, a certain amount of fluid will rest in tube 32. If the outdoor temperature is extreme, the fluid temperature within tube 32 may increase. For some athletes, this is irrelevant because they desire to have access to fluid, irrespective of its warmth. For others, the fluid in container 12 may be cooled or frozen prior to using the apparatus and, hence, any warming effect will be minimized. As yet another alternative, tube 32, as well as tube 18 and even container 12 may be insulated from the ambient temperature. One way of providing this insulation is to select an exterior colored coating which will reflect sunlight. Yet another insulating technique is to provide an insulative wrap around the tubing

and/or bottle. Still another alternative is to increase the thickness of the walls of the tubing and/or bottle to minimize the effects of ambient temperature.

FIG. 2 illustrates a perspective view of the preferred drinking apparatus of the present invention mounted on a bicycle 40. Bicycle 40 is constructed according to any of different embodiments known in the cycling art. As a result, bicycle 40 includes a pair of wheels 42 and 44. In addition, bicycle 40 includes a frame having a crossbar 46, a front stabilizer bar 48, a rear stabilizer bar 50 and a steering column 52. Steering column 52 communicates with a steering shaft 54 which is further connected to a handlebar 56. Bicycle 40 further includes a seat 58 which rests upon a vertical stabilizer bar 60. Typically, vertical stabilizer bar 60, rear stabilizer bar 50 and crossbar 46 are all welded together or joined together in order to provide support for seat 58.

In connection with the present invention, bicycle 40 includes a bottle-mounting apparatus 62 mounted to vertical stabilizer bar 60. Bottle-mounting apparatus 62 may comprise a metallic strapping member bolted to vertical stabilizer bar 60. Various alternative mounting apparatus, such as a bottle cage or a flexible strap member, could be used in place of the rigid member illustrated in FIG. 2. In any case, bottle-mounting apparatus 62 supports a pair of bottles 64 and 66 disposed immediately adjacent vertical stabilizer bar 60. Further, different types of bottle-mounting apparatus could be chosen to mount bottles 64 and 66 individually at different locations along the frame of bicycle 40. For example, one bottle may remain affixed to vertical stabilizer bar 60 while another is mounted on front stabilizer bar 48.

Each of bottles 64 and 66 are identical to bottle 12 illustrated in FIG. 1 above and, therefore, include the respective parts described above in connection FIG. 1. In addition, each of bottles 64 and 66 contains a fluid, such as fluid 14 discussed in connection with FIG. 1. Bottles 64 and 66 each communicate with a first exterior tube 68 and 70, respectively. In the preferred embodiment, however, exterior tubes 68 and 70 are joined at their outlet ends through a T-member 72. T-member 72 is constructed in accordance with principles known in the art and provides a device which allows fluid to flow from either branch of the T-member to an outlet. Moreover, the outlet of T-member 72 is directed toward a flow control device 74, which is identical to flow control device 26 discussed in connection with FIG. 1. Accordingly, it should be appreciated that fluid may be drawn from either bottle 64 or 66, either individually or at the same time, through their respective exterior tubes and into flow control device 74.

A single second exterior tube 76 is connected to the outlet of flow control device 74, and is attached via a strapping apparatus 78 to the frame of bicycle 40. Strapping apparatus 78 may be any type of known device for attaching single exterior tube 76 along a bicycle frame. Apparatus 78, however, should be adjusted to prevent any excessive force which could pinch off and close the flow of liquid through exterior tube 76. Thus, strapping apparatus 78 could be a plastic tie or some type of metallic strapping member for holding exterior tube 76 in place.

After passing through strapping apparatus 78, exterior tube 76 is preferably permitted to dangle when not used. When the cyclist mounts bicycle 40, however, an attaching device (not shown) placed at a point 84 near aperture 82 may be used to attach aperture 82 near the cyclist's mouth. In the preferred embodiment, this attaching device is a safety pin-like device which permits an operator of bicycle 40 to physically attach exterior tube 76 to his or her shirt. As an alternative, a hook and loop fastener, such as VELCRO.TM., may be used as the attaching device. In either case, tube 76 is attached to the shirt of the operator so that he or she may have access to aperture 82 for drinking by easily bending toward aperture 82, without having to remove his or her hands from handlebar 56. Further, even if the cyclist's hands are moved from handlebar 56, the movement is minimal in comparison to those prior art bicycle water bottle configurations which require the cyclist to reach downward to physically withdraw the bottle from its cage.

As an alternative, tube 76 may be constructed of a less flexible material, and may be mounted near handlebar 56 such that it extends upward toward the cyclist. In this manner, the cyclist need only lean forward toward handlebar 56 to have access to the end of the tube and, hence, to take a drink.

From the above, therefore, it should be appreciated that the present invention provides an improved drinking apparatus for use in any activity wherein a person desires to easily have access to a drink with minimal or no interruption of his or her activities. Although not necessarily limited, the present invention has particular advantage in connection with cycling because the operator is not disturbed from his concentration and balanced position. Further, while the present invention has been described in detail, it should be understood that various substitutions, alterations and modifications may be made to the above-description without departing from the spirit and scope of the invention as defined by the following claims.

WHAT WE CLAIM IS

1. An apparatus for drinking a liquid stored in a bottle, comprising:

a tube for drawing liquid in a first direction from said bottle toward a point external from said bottle in response to suction at said point; and

means external from said bottle for communicating with said tube for preventing said liquid from moving in a second direction opposite said first direction, wherein said means permits liquid to move in said first direction in response to said suction.

2. The apparatus for drinking of claim 1 wherein said means for preventing said liquid from moving in said second direction comprises a one-way valve which permits said liquid to flow through said valve with no manual interaction with said valve.

3. The apparatus for drinking of claim 1 wherein said tube comprises a first end for suction by a person to draw liquid in said first direction, and further comprising means for attaching said first end of said tube to a location proximate a person's mouth.

4. The apparatus for drinking of claim 3 wherein said means for attaching comprises a clip member.

5. The apparatus for drinking of claim 3 wherein said means for attaching comprises hook and fastener means.

6. The apparatus for drinking of claim 1 wherein said tube comprises a first tube, and further comprising a second tube having a first end connected to said means for preventing said liquid from moving in a second direction and a second end communicating with said bottle.

7. The apparatus of claim 1 and further comprising means associated with said bottle for permitting air to flow inward to said bottle as said liquid moves in said first direction.

8. The apparatus of claim 7 wherein said means for permitting air to flow inward comprises an aperture formed within said bottle.

9. The apparatus of claim 1 wherein said tube is insulated so that the temperature of said liquid is not substantially affected by ambient temperature external to said tube.

10. An apparatus for drinking a liquid, comprising:

a container for storing said liquid;

a tube for drawing said liquid in a first direction from said container toward a point external from said container in response to suction at said point; and

means external from said bottle for communicating with said tube for preventing said liquid from moving in a second direction opposite said first direction, wherein said means permits liquid to move in said first direction in response to said suction.

11. The apparatus for drinking of claim l0 wherein said means for preventing said liquid from moving in said second direction comprises a one-way valve which permits said liquid to flow through said valve with no manual interaction with said valve.

12. The apparatus for drinking of claim 10 wherein said tube comprises a first end for receiving said suction to draw liquid in said first direction, and further comprising means for attaching said first end of said tube to a location proximate a person's mouth.

13. The apparatus for drinking of claim 10 wherein said tube comprises a first tube, and further comprising a second tube having a first end connected to said means for preventing said fluid from moving in a second direction and a second end communicating with said bottle, wherein said first and second tubes are insulated so that the temperature of said liquid is not substantially affected by ambient temperature external to said first and second tubes.

14. An apparatus for drinking a liquid, comprising:

a main tube for drawing said liquid in a first direction toward a mouth of a person applying a suction force;

means external from said bottle for communicating with said main tube for preventing said liquid from moving in a second direction opposite said first direction, wherein said means permits said liquid to move in said first direction in response to said suction force;

a split member having an outlet communicating with said main tube, and having a plurality of inlets, wherein each of said inlets communicates with a respective bottle tube; and

a plurality of bottles for storing said liquid, wherein each of said plurality of bottle tubes communicates with a respective one of said plurality of bottles, and such that said suction force applied to said main tube causes said liquid to be drawn from each of said plurality of bottle tubes through said split member and to said main tube.

15. The apparatus for drinking of claim 14 wherein said means for preventing said liquid from moving in said second direction comprises a one-way valve which permits said liquid to flow through said valve with no manual interaction with said valve.

16. The apparatus for drinking of claim 14 wherein said main tube comprises a first end for suction by a person to draw liquid in said first direction, and further comprising means for positioning said first end of said main tube to a location proximate a person's mouth.

17. The apparatus for drinking of claim 16 wherein said plurality of bottles are affixed to a bicycle, and wherein said means for positioning said first end of said tube to a location proximate a person's mouth comprises attaching means for attaching said first end of said tube to a shirt of a rider of said bicycle.

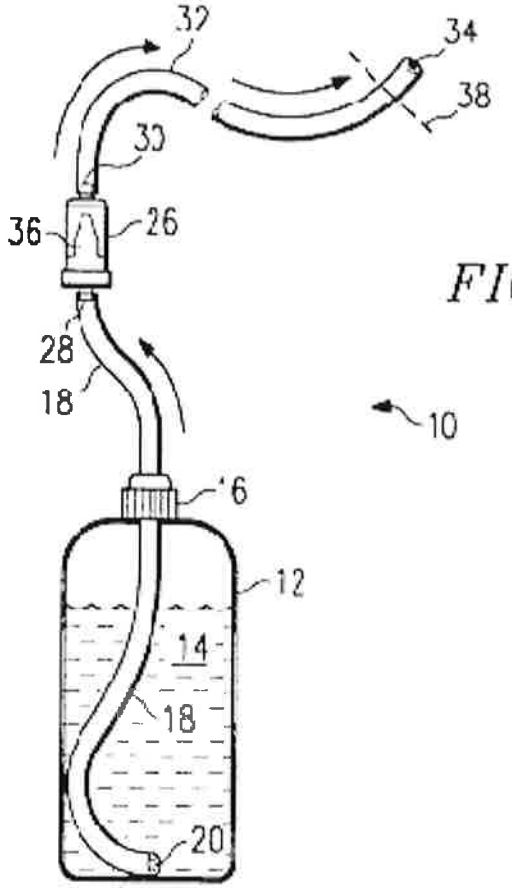
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FIG. 1

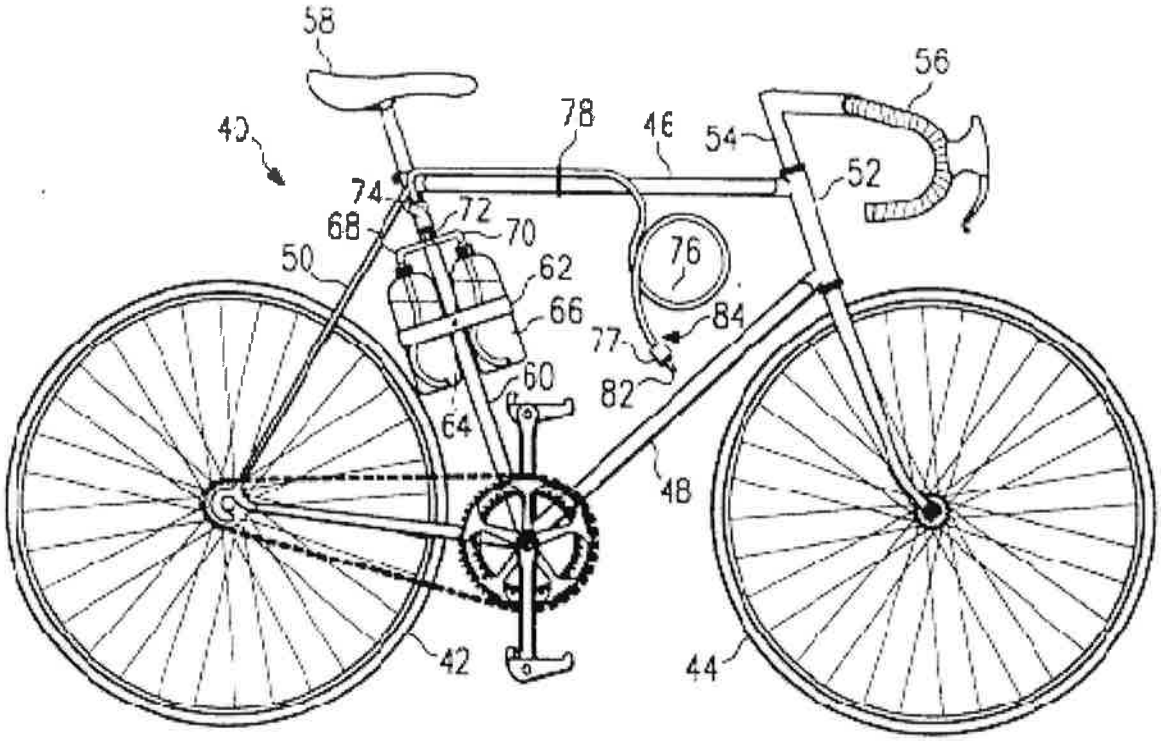
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FIG. 2

US006401997B1

(12) **United States Patent**
Smerdon, Jr.

(10) **Patent No.: US 6,401,997 B1**
(45) **Date of Patent: Jun. 11, 2002**

(54) **BICYCLE-MOUNTED LIQUID STORAGE AND DELIVERY SYSTEM AND SUPPORT BRACKET**

(76) Inventor: **E. Thomas Smerdon, Jr.**, 4001 Newhall Rd., Columbus, OH (US) 43220

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/390,451**

(22) Filed: **Sep. 7, 1999**

Related U.S. Application Data

(60) Provisional application No. 60/099,802, filed on Sep. 10, 1998.

(51) **Int. Cl.**[7] **B62J 11/00**
(52) **U.S. Cl.** **224/414**; 224/426; 224/442
(58) **Field of Search** 224/414, 425, 224/426, 442; 220/739, 740

(56) **References Cited**

U.S. PATENT DOCUMENTS

596,998 A	*	1/1898	Hawkins et al.	224/414 X
4,095,812 A		6/1978	Rowe	
4,274,566 A		6/1981	Rowe	
4,386,721 A	*	6/1983	Shimano	224/414 X
4,441,638 A	*	4/1984	Shimano	224/414
4,911,339 A		3/1990	Cushing	
5,024,358 A	*	6/1991	Reichert et al.	224/414 X
5,060,833 A		10/1991	Edison et al.	
5,085,349 A		2/1992	Fawcett	
5,115,952 A		5/1992	Jenkins	
5,158,218 A	*	10/1992	Wery	222/610
5,215,231 A	*	6/1993	Paczonay	222/610
5,301,858 A		4/1994	Hollander	
5,301,860 A		4/1994	Paczonay	
5,326,124 A		7/1994	Allemang	
5,358,142 A	*	10/1994	Holmes	222/610 X
5,607,087 A		3/1997	Wery et al.	
5,645,404 A		7/1997	Zelenak	
5,680,958 A	*	10/1997	Mann et al.	220/739
5,755,368 A		5/1998	Bekkedahl	
5,788,134 A	*	8/1998	Matic, Jr.	224/414
6,073,796 A	*	6/2000	Mogil	220/592.17

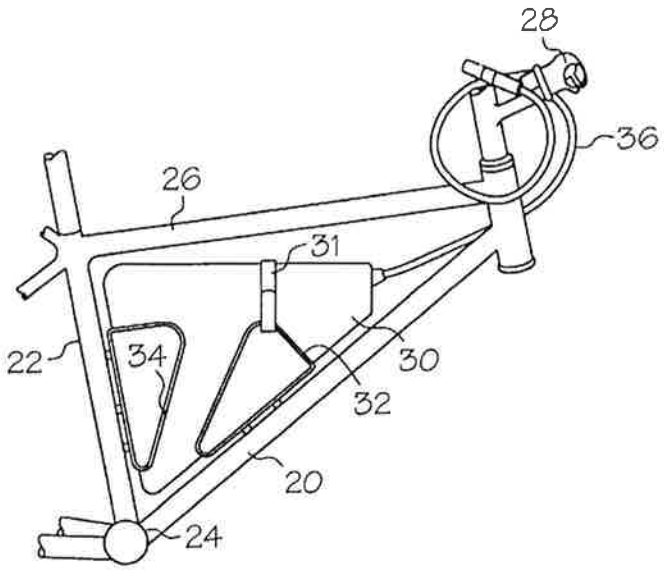
* cited by examiner

Primary Examiner—Stephen K. Cronin

(57) **ABSTRACT**

The present invention discloses a fluid storage and delivery system for bicyclists. In the preferred embodiment, the fluid is contained in a collapsible fluid container adapted to be removably inserted within the sides of a first support bracket mounted to the bicycle down tube frame member and a second support bracket mounted to the seat tube frame member. A conduit for delivering liquid to a cyclist extends from an inlet end within the fluid container to an outlet end accessible to the cyclist and may include a check valve at its inlet end. The conduit may also include a disconnection means to allow the conduit to be disconnected at the outlet side of the fluid container. Preferably the disconnection means is a quick disconnect tube connector with a flow shut-off capability oriented at the inlet side of the connection, so as to provide a seal against leakage from the fluid container when the connectors are disconnected. The support brackets have sides defining an open space between the sides and a central mounting plate to which the sides are attached, with the mounting plate having a series of apertures along its length and adapted for fastening the mounting plate to the threaded openings customarily used for mounting water bottle cages to bicycle seat and down tube frame members. A molded container adapted to be held within the sides of the support bracket is also disclosed.

21 Claims, 5 Drawing Sheets



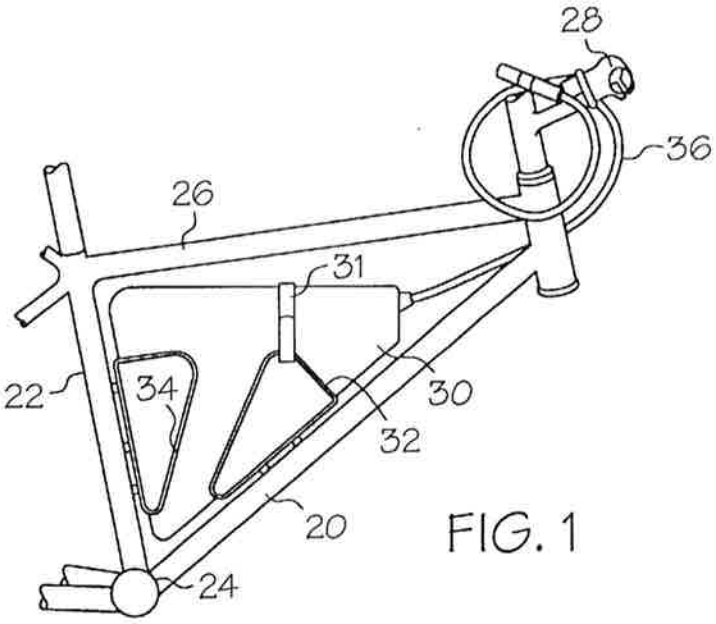

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FIG. 1

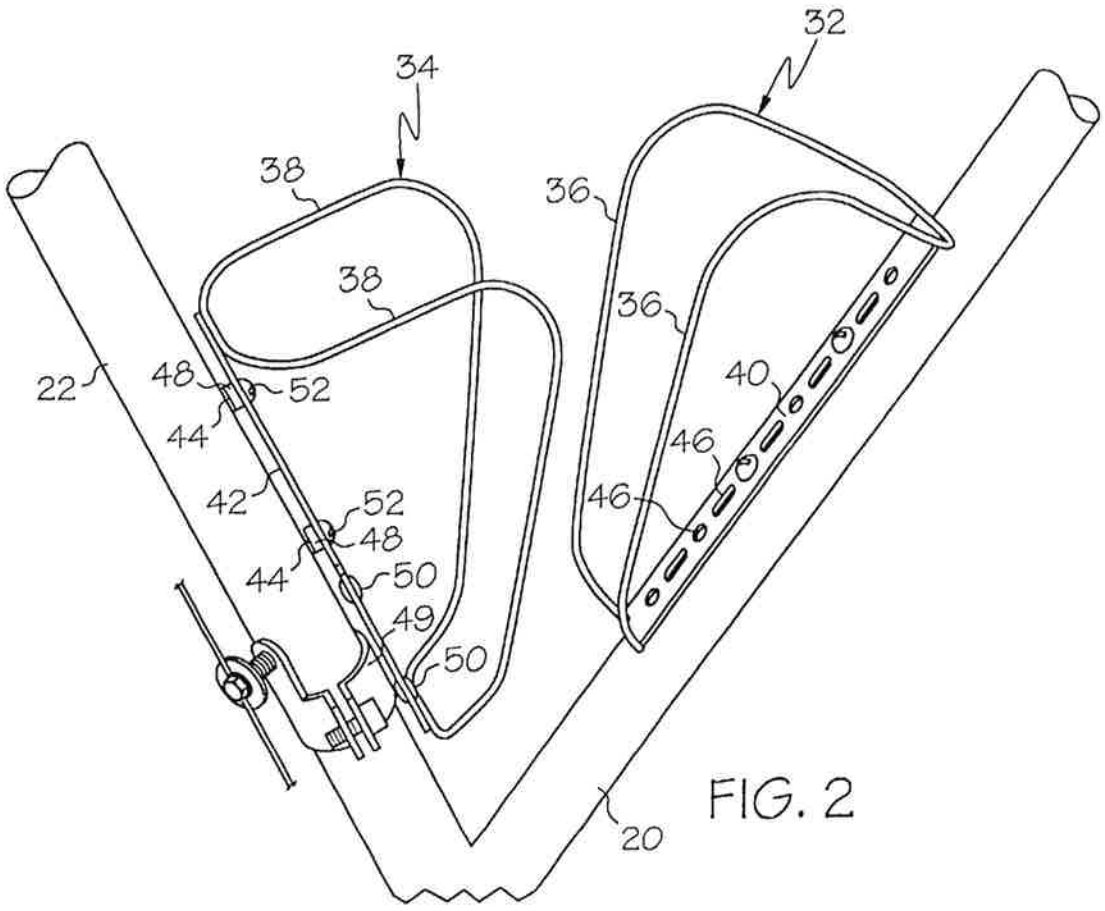
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FIG. 2

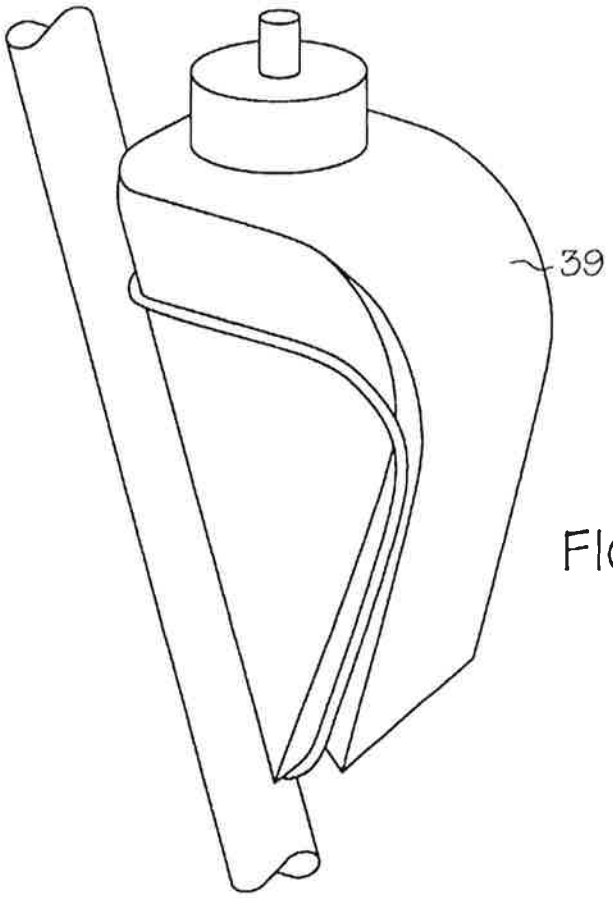

FIG. 3

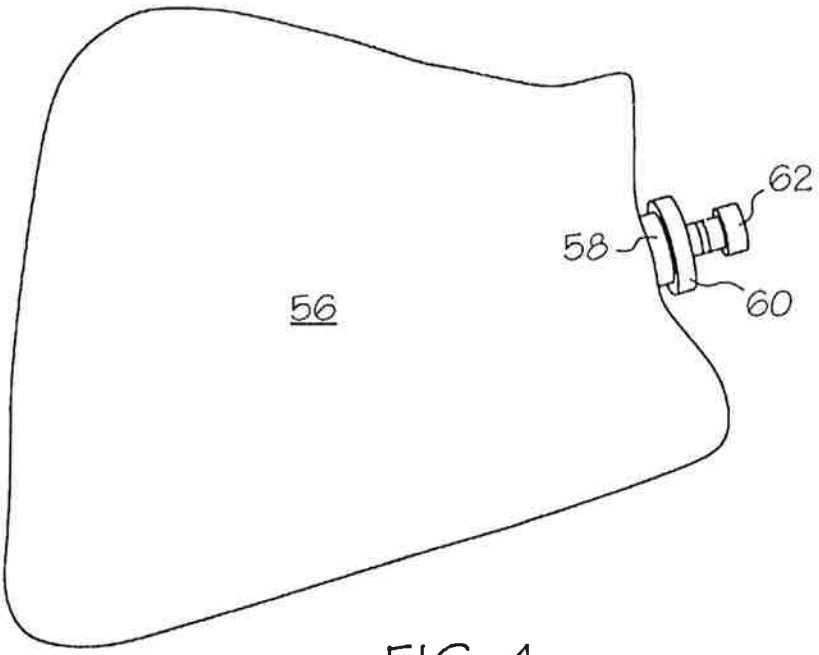

FIG. 4

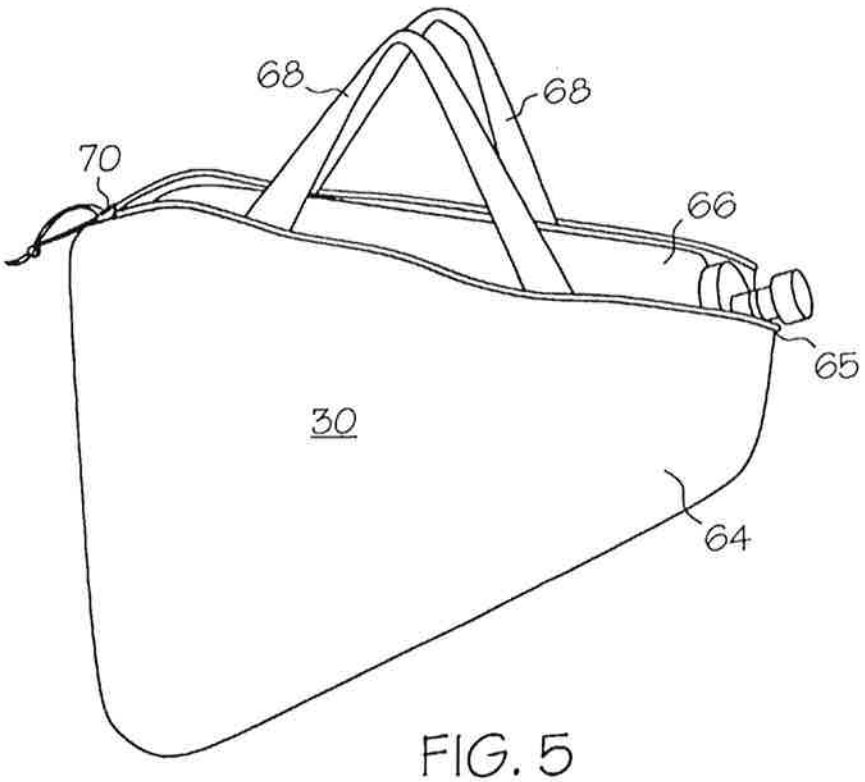

FIG. 5

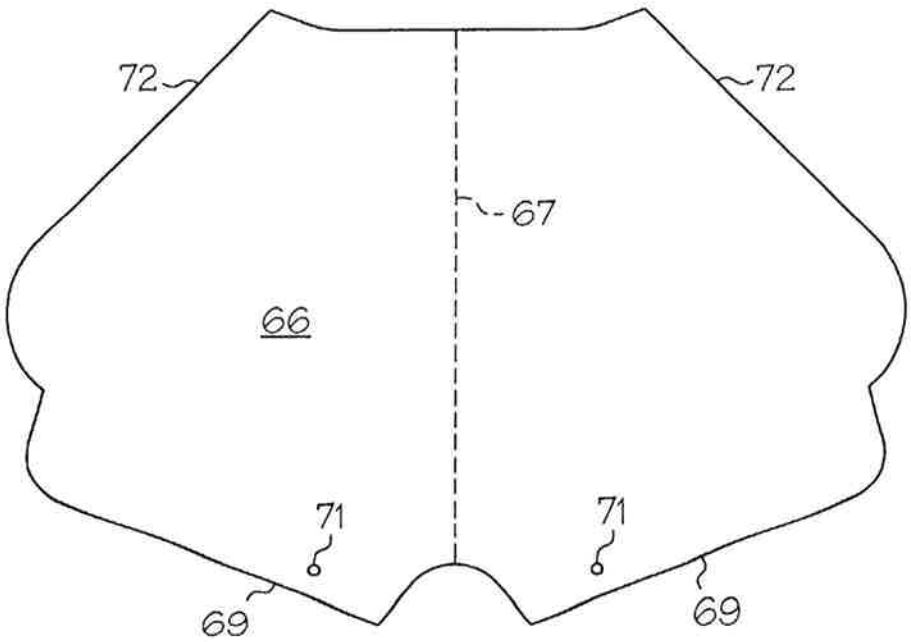

FIG. 6

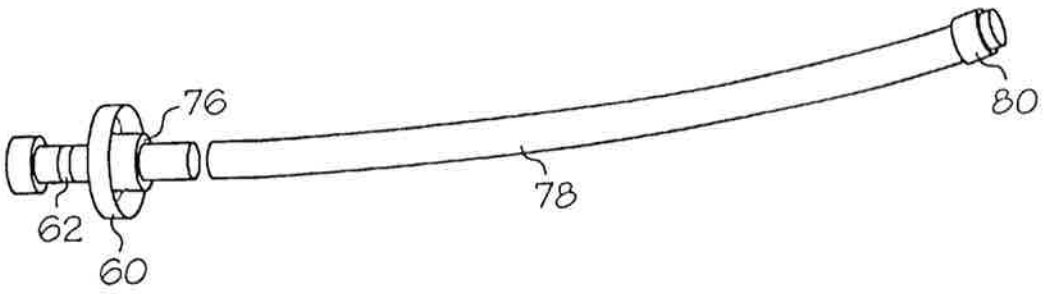

FIG. 7

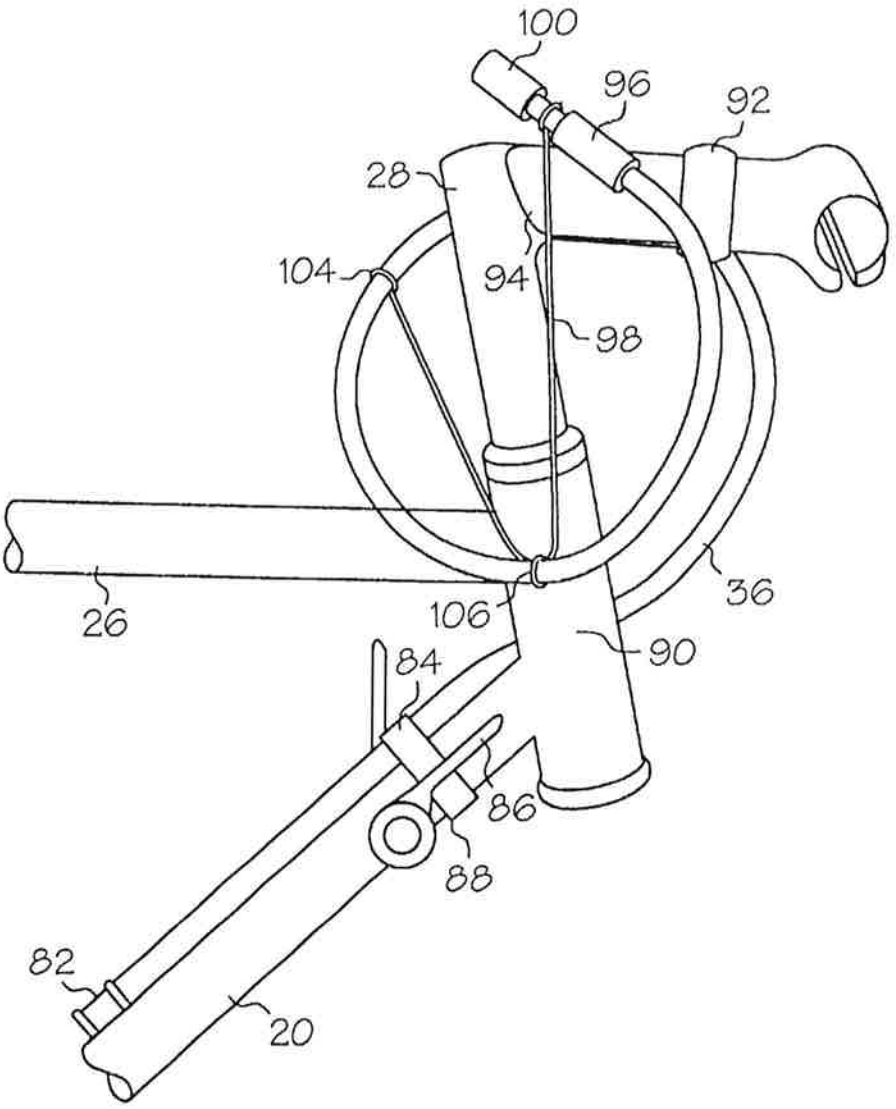

FIG. 8

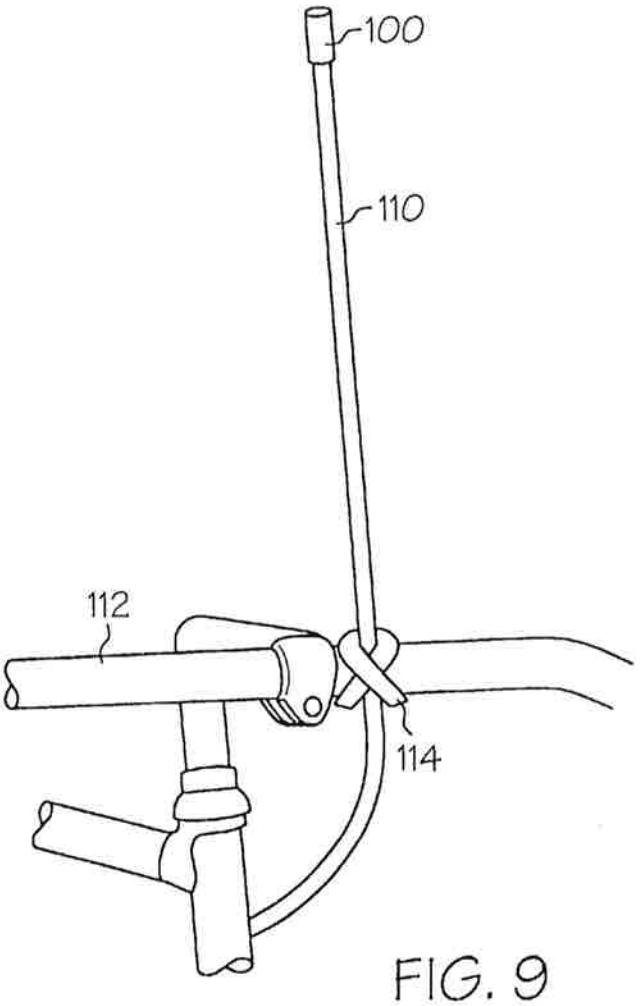

FIG. 9

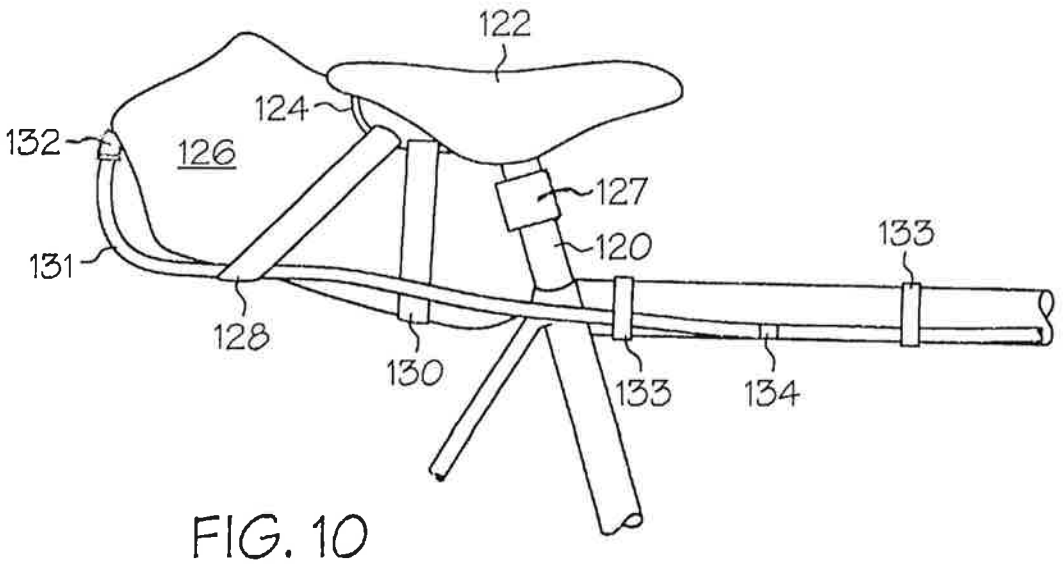

FIG. 10

BICYCLE-MOUNTED LIQUID STORAGE AND DELIVERY SYSTEM AND SUPPORT BRACKET

PRIOR APPLICATION

This application is a continuation in part of U.S. application Ser. No. 60/099,802, filed Sep. 10, 1998.

FIELD OF THE INVENTION

The present invention is in the field of bicycles and bicycling. The present invention relates to a fluid container system for bicyclists, and more specifically to an apparatus for carrying liquid in a container mounted to a bicycle and from which liquid may be dispensed to the cyclist through a beverage tube.

BACKGROUND OF THE INVENTION

In bicycling, it has been the practice of cyclists to carry water or other beverages to quench thirst and rehydrate the body, especially during long rides or racing events. For cyclists, the traditional method of hydration has been to drink from water bottles that are held in cages attached to the bicycle frame. For hot weather or long distance cycling, two water bottles are typically carried, one in a cage attached to the bicycle down tube and the other in a cage attached to the seat tube. A principal shortcoming of traditional water bottles is that they lack sufficient liquid capacity to provide adequate hydration over an extended period, which means the cyclist must find a place to stop to refill or curtail the ride. Another drawback is the need for the cyclist to reach down to remove and replace the bottle, which can compromise control of the bicycle and presents the risk of dropping the bottle. This is a particular concern in group riding situations and when riding over rough terrain, such as trail riding on a mountain bike. In addition, many mountain bikes in the smaller frame sizes have very short seat tubes, and as a result lack sufficient clearance to permit the convenient removal and replacement of a second water bottle attached to the seat tube.

Prior art reveals a variety of attempts to eliminate the need for a cyclist to reach down and remove and replace a water bottle in order to drink while riding. A number of these have utilized straw-like drinking tubes that extend from a bottle mounted to the bicycle. For example, U.S. Pat. No. 4,095,812 to Rowe (1978) shows a drinking straw that extends into a bottle mounted on the bicycle frame. The straw is retractably stored on a spring-loaded reel or, alternatively, is coiled inside a container mounted to the bicycle. Another embodiment shows a telescoping straw that collapses into an elongated housing. U.S. Pat. No. 4,274,566 to Rowe (1981) discloses an improved reel mechanism for retracting the drinking tube. The drinking tube connects with a liquid supply tube that extends into a bottle mounted separately from the reel mechanism. The supply tube incorporates a check valve at the submerged end which prevents water from flowing back into the bottle.

The reel mechanisms described in the Rowe '812 and '566 patents are cumbersome and require that the rider maintain a firm hold on the tube during drinking to prevent it from retracting. The alternative telescoping tube and coiled tube embodiments in Rowe '812 are also inconvenient, because the former requires the rider to lean over to drink from a fixed position rigid tube and the latter requires the rider to carefully feed the coiled tubing back into the storage canister after drinking.

U.S. Pat. No. 5,024,358 to Reichert et. al (1991) shows a narrow bottle that snaps onto the top and down tubes of the bicycle frame. A drinking tube extends upward from the bottle and can be snapped into a holder attached to the handlebar for the purpose of positioning the tube in front of the rider. The mounting location of the bottle described in Reichert '358 occupies the space just above where down tube mounted derailleur shifters are typically located. This bottle placement would interfere with the operation of such shifters and would prevent the rider from operating the front and rear derailleur shifters with the same hand. In addition, the bottle's shape renders it unsuitable for bicycles that have downwardly and rearwardly sloping top tubes, such as mountain bikes.

U.S. Pat. No. 5,115,952 to Jenkins (1992) shows a liquid container with a tube that clamps to the handlebar and extends upward to a location in front of the rider's face. Like Reichert '358, the Jenkins '952 system requires the rider to lean forward to drink from a tube in a fixed position in front of the rider's face. The rider must also draw the column of liquid through the length of the tube each time a sip is desired.

U.S. Pat. No. 5,788,134 to Matic, Jr. (1998) discloses a rigid, triangularshaped liquid container that attaches to the down tube and seat tube frame members by means of a C-shaped clasp that connects to the seat tube and hook and loop fastening straps that attach to the down tube. A hose extends from the rigid container to the area of the handlebar and a hose holder clip grips the hose at its outlet end and removably attaches to the handlebar. The hose holder preferably has a handle to enable the rider to detach the hose from the handlebar for drinking. This also has the shortcoming of requiring the rider to draw liquid through the length of tubing each time a drink is required. It also employs a rigid container, which is not well-suited to accommodate differences in bicycle frame geometry.

U.S. Pat. No. 5,301,858 to Hollander (1994) shows a bottle with a two-section drinking tube. The tube sections are connected by means of an oversleeve that permits the bottle to be removed from the bike and used as a hand-held or body-mounted sport bottle. Mounting clips are used to attach the upper drinking tube section to the bicycle frame or handlebar stem. In the preferred embodiment, the upper drinking tube section is provided with a spring sleeve that extends the tube toward the rider's face when the tube is removed from the mounting clip. In another embodiment, the upper drinking tube is made of memory flex tubing that returns to a tightly coiled shape after extension during drinking. The Hollander '858 embodiments share several of the shortcomings of the other prior art systems, including a reliance on a single frame-mounted water bottle. The bottle used in the Hollander combination water bottle system is similar to the ubiquitous sport bottles commonly used in cycling, and has the same problem of limited capacity that is typical of such bottles.

Other inventions for supplying liquid to bicyclists via a drinking tube have involved a means to force liquid from a bottle mounted to the bicycle through a drinking tube without the need for suction by the rider. U.S. Pat. No. 4,911,339 to Cushing (1990) shows a cylindrical container that is pressurized by forcing air into the container through a bellows device attached to bottom of the container. Flexible tubing extends from the container to a valve and nozzle mounted to the handlebars. U.S. Pat. Nos. 5,215,231 (1993) and 5,301,860 (1994) to Paczonay disclose a water bottle holder with a compressor arm that can be actuated by the cyclist. The bottle walls are compressed to force liquid

through a supply tube, and a check valve prevents the back flow of liquid. U.S. Pat. No. 5,326,124 to Allemang (1994) shows an apparatus for pumping liquid from a standard water bottle through a supply tube to the rider. U.S. Pat. No. 5,607,087 to Wery, et. al (1997) shows a water bottle that is pressurized by use of a pressurizing system such as a bicycle pump. Liquid flows through a tube connected at the lower end of the bottle to a valve at the other end of the tube. U.S. Pat. No. 5,645,404 to Zelenak (1997) shows a bicycle-mounted fluid reservoir with an electronic pump system. U.S. Pat. No. 5,755,368 to Bekkedahl (1998) discloses a bicycle water bottle that is filled with a carbonated beverage. The carbonation of the liquid pressurizes the bottle.

U.S. Pat. No. 5,358,142 to Holmes (1994) shows a mouth-pressurized drinking bag for cyclists. This system is comprised of a collapsible bladder for receiving liquid and an elastic enclosure that surrounds the bladder. The user pressurizes the bladder by blowing air into it through a drinking tube, which causes the bladder to expand against the elastic enclosure, and then clamping the tube. In the preferred embodiment, the bag is attached to the bicycle top tube and seat tube by hook-and-loop straps. An alternative embodiment shows the bag mounted to a carrying rack located over the rear wheel. The drinking tube is shown as extending upward from the handlebar to an area below the rider's face, but the patent does not show or claim a means for securing the drinking tube in the area of the handlebar and handlebar stem. One problem with Holmes '142 is that the liquid capacity of the bag depends on the strength and interior dimension of the elastic enclosure. This is because the bladder cannot practicably be filled beyond the point where the outward pressure from the weight of the liquid against the elastic is exceeded by the pressure of the elastic against the bladder. In addition, the dimensions of the bladder must be greater than those of the elastic enclosure, in order for the bladder to be able to expand the elastic enclosure when the bladder is pressurized. Another drawback to this system in its frame-mounted embodiment is that there is no means of restraining the sides of the bag. As the bag is pressurized, it will expand outward like a balloon. The expansion of the bag will cause the rider's legs to rub against the sides of the bag, thus interfering with the rider's pedaling motion.

U.S. Pat. No. 5,060,833 to Edison, et. al (1991) shows a collapsible water bag that is carried in a backpack. A flexible drinking tube runs from the lower end of the bag to a mouthpiece with valve device. The valve is opened by compressing the mouthpiece between the teeth. U.S. Pat. No. 5,085,349 to Fawcett (1992) also discloses a bite valve for use in connection with a backpack hydration system. For cycling, a basic shortcoming of a backpack hydration system is that the rider's back and shoulders must support the weight of the liquid, as opposed to the bicycle frame. This can lead to increased back, neck and shoulder fatigue and general discomfort, especially over longer distances and in hot weather. The drinking tube can also be a nuisance, because it passes over the rider's back and hangs down in front of the rider. Some cyclists also find the mouthpiece valves objectionable, due to the restricted flow through such valves and the fact that the user must maintain pressure on the mouthpiece during drinking. However, despite the obvious ergonomic shortcomings of backpack hydration systems, such systems have become quite popular, especially among mountain bikers. Today, backpack systems are the only widely available water bottle alternative that offers hands-free drinking and significantly increased liquid storage capacity.

The present invention has a number of objects and advantages. One goal is to provide a significantly larger liquid capacity than is available with water bottle systems. Another is to provide a secure means for mounting a large capacity fluid container in the inter-frame area of the bicycle, providing a comfortable alternative to backpack hydration systems. It is also a goal of the present invention to provide a system that prevents lateral movement of the fluid container during riding and has an aerodynamic profile that does not interfere with the normal pedaling motion. Another object of the frame-mounted embodiment is to place the weight of the liquid low on. the bicycle, thereby lowering the bicycle/rider center of gravity and improving stability. Still another goal of the frame-mounted embodiment is to provide an. elegant means for mounting the beverage container to the bicycle frame that permits the use of the system on a wide variety of bicycles and frame geometries;

The present invention also offers the benefit of hands-free drinking through a beverage tube and provides a secure and convenient method of attaching the outlet end of the beverage tube to the bicycle handlebar stem, while permitting the tube to be easily detached for drinking. The present invention also provides an alternative semi-rigid tube that may be positioned so that the outlet end is in front of the rider's mouth, suitable for time trialists who want to be able to drink without moving from an aerodynamic tucked position on the bike. Additionally, a check valve means is provided to prevent liquid from flowing back into the container from the beverage tube, thereby eliminating the common problem of prior art systems of requiring the rider to draw the a column of liquid from the container to the outlet end of the tube each time a drink is desired.

Another benefit of the preferred embodiment of the present invention is that the fluid container can be quickly disconnected from the drinking tube in a manner that seals the container against leakage, so that the container can be removed from the bike for convenient refilling. Moreover, the container of the preferred embodiment is made from a flexible polymeric film so that it collapses around the liquid as the container is drained, eliminating the need for a vacuum relief means and minimizing sloshing of the liquid. The insulated covering of the fluid container keeps the container contents cooler for a longer time than non-insulated bottles.

Yet another object of the present invention is to provide a support bracket that attaches to the threaded water bottle mounts commonly found on the down tube and seat tube of road and mountain bicycles marketed to the adult cycling enthusiast and that may be used to support article carriers in the open space above the bicycle bottom bracket junction of those tubes. A further object is to provide a molded fluid container for use in combination with the support bracket.

Still another object is to provide a saddle-mounted hydration system suitable for bicycles that lack a conventional frame geometry and also well suited for time trialists and triathletes who place a premium on light weight, aerodynamics, and the ability to drink without having to move from an aerodynamic position to remove a water bottle from its cage holder.

SUMMARY OF THE INVENTION

The present invention discloses a fluid storage and delivery for cyclists. In one embodiment, the fluid is contained in a fluid container enclosed within an insulative cover and supported within brackets mounted to the bicycle down tube and seat tube frame members. The fluid container is pref-

erably made from flexible film material, so that it will collapse around the liquid as the liquid is consumed. The insulative cover preferably comprises an outer bag with a zipper closure along the top and a removable foam insulation insert that is adapted to conform to the angle of the bottom bracket junction of the down tube and seat tube. A conduit, which is preferably comprised of flexible beverage tubing, extends from an inlet end within the fluid container to an outlet end within easy reach of the rider. A check valve means is located at the inlet end of the conduit and oriented to prevent the backflow of liquid into the container. In the preferred embodiment, the conduit is capable of being disconnected at the fluid container, to permit the container to be removed conveniently from the bike for refilling.

The beverage tubing is secured to the handlebar stem by a hook and loop fastening means, which permits the beverage tube to be easily removed from the handlebar stem during riding and raised to the rider's mouth for drinking, including hands-free drinking if desired. An elastic cord can be attached to the beverage tube to help maintain the tube's looped configuration and prevent the tube from swinging against the front wheel if the tube is accidentally dropped. Alternatively, a semi-rigid beverage tube may be used to position the outlet end of the tube in front of the rider's mouth while riding.

The support brackets have sides and an open space between the sides, so that the insulative cover with the fluid container inside may be placed into the support brackets and held within the sides of the sides of the bracket. The fluid container is thus is supported in a location between the seat tube and down tube frame members and above the bottom bracket junction of such frame members.

The present invention also discloses a support bracket for holding articles within the inter-frame area between down tube and seat tube. The support bracket has a central mounting plate with a series of apertures along its length adapted for fastening the bracket to the threaded openings for mounting water bottle cages. The design of the mounting plate allows the support bracket to be positioned at a desired height above the bottom bracket. The sides of the support bracket are formed from a single length of wire or metal tubing and are welded to the mounting plate so that the area above the mounting plate is open. When mounted on the bicycle, the uppermost sides of the bracket describe a U-shape, with the bottom of the U being welded in a perpendicular orientation to the mounting plate. The present invention also shows a molded container adapted to be held within the sides of the support bracket.

Finally, the present invention includes a saddle-mounted fluid container and insulative cover, well suited for bikes that lack a traditional frame geometry, but that have a seat post and a saddle with rails beneath the saddle. The insulative cover is preferably secured to the seat post and saddle rails by hook and loop fastening straps. As with the frame-mounted system, a conduit extends from within the container to the handlebar area of the bicycle. The conduit is preferably capable of being disconnected at the fluid container, and an alternative semi-rigid beverage tube is also disclosed.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side view of the invention mounted on a mountain bicycle frame.

FIG. **2** is a perspective view of the support brackets of the preferred embodiment attached to the down tube and seat tube frame members of a bicycle.

FIG. **3** is a perspective view of an molded bottle held within the preferred support bracket.

FIG. **4** is a side view of the fluid container and screw closure of the frame-mounted embodiment of the present invention.

FIG. **5** is a perspective view of the outer bag component of the preferred insulative cover, zipped open with carrying handles.

FIG. **6** shows a cutting pattern and fold line for the foam insulation insert of the preferred insulative cover.

FIG. **7** shows the section of conduit that is detachably connected to a tube connector at the inside of the fluid container closure and extends to an inlet end with a check valve.

FIG. **8** shows a side perspective view of the preferred means of securing the conduit to the bicycle down tube and handlebar stem.

FIG. **9** shows an alternative semi-rigid conduit attached to the handlebar of a bicycle by means of a hook and loop fastening strap.

FIG. **10** is a side perspective view of the insulative cover and conduit of the saddle-mounted embodiment attached to the saddle rails and seat post of a bicycle.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In accordance with the foregoing summary of the invention, the following presents a detailed description of the preferred embodiments of the invention.

FIG. **1** shows a side view of the frame-mounted fluid storage and delivery system on a mountain bike frame. An insulative cover **30** enclosing a fluid container is placed within a support bracket **32** attached to the bicycle down tube frame member **20** and a support bracket **34** attached to the seat tube frame member **22**. A conduit **36** preferably extends from a fluid outlet opening upwardly along the down tube to attachment points on the handlebar stem **28**. As illustrated in FIG. **1**, the fluid container is preferably supported just above the bottom bracket junction **24** of the down tube and seat tube. This lowers the center of gravity of the bicycle and thus improves stability compared to prior art systems that place the weight high on the bike or on the rider's back.

FIG. **2** shows a perspective view of the support brackets **32, 34** of the preferred embodiment attached to their respective frame members. The sides **36, 38** of the support brackets are affixed to a respective central mounting plate **40, 42**. The support brackets preferably describe a U-shape at their upper ends and taper downward and inward toward the bicycle bottom bracket. In the preferred embodiment, the distance between the outer sides of the U-shape at the top of the bracket is approximately 3 inches, tapering to a distance of approximately 2 inches between the outer sides at the lower end of the support bracket. These dimensions provide an aerodynamic profile and have been shown to provide ample clearance between the sides of the insulative cover and a cyclist's legs while pedaling. However, narrower or wider dimensions may be preferred where aerodynamics or storage capacity are overriding considerations.

The design of the support bracket, as shown in FIG. **2**, allows the system to be used on the great majority of adult bicycles. Most bicycles marketed to adult cycling enthusiasts, including bikes intended for road and off-road use, have two sets of threaded openings **44** (often referred to as water bottle cage bosses) in the inter-frame side of the seat

tube and the down tube for the purpose of mounting conventional water bottle cages. The distance between the centers of these threaded bosses is typically within the range of 63 to 66 millimeters. However, their location on the down and seat tubes in relation to the bottom bracket will vary considerably from bike to bike. For example, on mountain bikes the seat tube bosses will often be located low on the tube, near the bottom bracket, because the rearward and downward slope of the top tube **26** (as shown in FIG. **1**) limits the clearance available for removing and replacing a water bottle mounted to the seat tube. On road bikes, the location of the seat tube bosses is generally higher than on mountain bikes. The location of the threaded down tube openings in relation to the bottom bracket will also vary depending on the manufacturer's design preferences.

As shown in FIG. **1**, the support brackets are typically positioned on the seat and down tubes so that the uppermost points on the brackets are roughly level, but the relative orientation of the brackets will vary depending on frame geometry and the size of the brackets. Generally, it is preferable first to mount the seat tube support bracket so that the lower end of the bracket is roughly 2 to 3 inches above the top surface of the bottom bracket shell joining the down tube and seat tube, and then to mount the down tube holder. As shown in FIG. **1**, a securement strap **31** may be used to prevent the insulative cover and fluid container from bouncing in the support brackets over rough terrain or from sliding out when the bike is placed on its side. Preferably, this strap has a section of hook fastening material affixed at each end of the length of loop fastener material so that the hook and loop sides are all on the same surface of the strap. The strap is fastened to one side of the down tube support bracket, passed over the insulative cover, and fastened to the other side of the support bracket.

The support brackets of the preferred embodiment can accommodate a wide variation in the location of the threaded openings, while still permitting the brackets to be positioned as described above, because the holes **46** in the bracket's central mounting plate provide a number of possible attachment points. The support brackets can be mounted anywhere along the range from where the lower boss meets to lowermost mounting hole to where the upper boss meets the uppermost mounting hole. The mounting plate is also designed so that one round hole and one obround hole are used in attaching the support bracket, which accommodates typical bike-to-bike variations in the spacing between the bosses. Preferably, a round hole is at each end of the mounting plate.

Small spacer washers **48** are preferably used to provide the necessary clearance for the front derailleur mounting band on those bikes that have clamp-on front derailleurs. In addition, small rubber bumpers **50** are preferably inserted into round openings in the central mounting plate, in order to prevent the mounting plate from bending and contacting the frame tubes. On bikes that have water bottle bosses that extend only minimally above the surface of the frame tubes, the spacer washers can also be used to raise the attachment surface to approximately the same height as the protective bumpers, so that the edge of the mounting plate is parallel to the surface of the tube after being attached. The brackets can be fastened to the water bottle bosses by means of pan-head stainless steel screws **52** or other suitable threaded fasteners.

In the preferred embodiment, the central mounting plate is stamped from stainless steel sheet and deburred. This is an economical method for high volume production, but other materials and manufacturing methods will also work. The gauge of the steel can vary depending on the strength and weight characteristics that are desired, but **14** gauge has been shown to provide a good balance of torsional stiffness and light weight for most applications. In the preferred embodiment, the sides **36**, **38** of the support bracket are formed from a single length of stainless steel wire, so that the middle section of the wire resembles a U-shape with the mid-point being approximately at the bottom center of the U-shape. The remaining wire is angled symmetrically downward and slightly inward from the top of each side of the U-shape to a point just before each end, at which point each end section bends symmetrically inward so that the ends abut one another in perpendicular alignment with the bottom of the U-shape. The bottom of the U-shape is welded to the top surface of one end of the mounting plate and the abutted ends of the bracket sides are welded to the top surface of the other end of the mounting plate, using conventional welding methods.

The preferred support bracket may also be used to hold a container **39** that has been molded into a shape that allows the container to be inserted into the space between the sides of the support bracket and retained by the sides of the bracket, as shown in FIG. **3**.

A full-hard spring temper stainless steel is especially preferred for the bracket sides, because it allows the use of relatively small diameter wire, in the range of 0.120" to 0.140" for a general purpose support bracket, but other materials and diameters will also work and may be preferred for special applications. The use of stainless steel for the mounting plate and bracket sides also enables the support bracket to be electropolished as a final step, which gives the bracket an attractive bright finish and an elegant appearance on the bike.

Because of the variations in the angle formed by the bottom bracket junction of the seat tube and down tube, a rigid fluid container, such as a molded plastic bottle, will not always fit flush against the entire length of both central mounting brackets. A rigid container would also require some type of vacuum relief means, and the liquid contents would be susceptible to sloshing during riding. In addition, a rigid container would be difficult to use with small-size mountain bikes, because the container could not be bent or folded to allow it to be inserted into the support brackets at the necessary angle to clear the top tube. A collapsible beverage container, such as one made from a flexible polymeric film material, a overcomes these problems, and is therefore preferred for the fluid container of the present invention. The container's flexibility enables it to conform to a variety of dimensions and to be inserted into support brackets mounted on small-size mountain bikes. A vacuum relief means is not required, because the container's sides will simply collapse around the remaining liquid as the container is emptied, which also minimizes any sloshing of the liquid. In this regard, it is helpful, after filling the fluid container, to evacuate the remaining air in the container by squeezing the liquid toward the filling port and then closing the container.

FIG. **4** shows a side view of the fluid container **56** of the preferred embodiment. This general shape has been shown to work well in the present invention. As the container expands when filled, the slightly curved sides will straighten and conform to the interior of an insulative cover when the container and cover combination are placed in the support brackets. However, it can be appreciated that many different variations on the basic shape disclosed in FIG. **4** will also work, because of the ability of a flexible container to conform to the shape of a supporting structure.

As with all of the components that come into contact with the beverage liquid, the fluid container should be made from a material that complies with applicable FDA regulations for direct food contact. The material should have good flexibility and strength and should be able to withstand liquid temperatures up to boiling without deforming. Ideally, the opacity of the film should allow the user to view the level of the liquid inside, which helps the user to gauge the amount of liquid being placed in the bladder and to avoid overfilling. A material that has been shown to be well-suited for this application is polyethylene film, and in particular, film composed of metallocene-catalyzed polyethylene, which exhibits excel lent strength and flexibility characteristics. The gauge of film that is used will depend on the film's physical properties and the desired balance of strength, flexibility, weight, and other factors, but a gauge in the range of 6 to 8 mils has been shown to work well in this application for certain types of metallocene-based polyethylene films. The use of polyethylene film as the container material also permits a threaded fill port **58** to be molded from a polyethylene resin that will give the fill port sufficient rigidity for tightening a screw closure while allowing the fill port to be sealed to the film using conventional methods. It can of course be appreciated that a number of other types of film, such as vinyl and polyurethane film and laminated polyethylene film, and a variety of film gauges could also be used in the fluid container.

In the preferred embodiment of the fluid container, shown in FIG. **4**, a flanged, threaded fill port **58** is first sealed onto a single piece of film, and then the film is the folded over and the edges are sealed. This results in the fill port being located at the upper forward edge of the fluid container when mounted on the bike, which enables the conduit to extend from the interior of the container toward the handlebar stem in a relatively straight line parallel with the down tube. This configuration also positions the screw closure **60** above the liquid level during the majority of time the system is in use, which helps to prevent leakage caused by an improperly tightened closure.

Because the preferred fluid container is collapsible, the sides will expand outward when the container is filled. If the sides are not restrained in the support brackets, the filled container would tend to sag as the sides bulge outward around the sides of the preferred support bracket structure. Therefore, it is important that the sides of the container be supported in the support brackets or that the container be suspended from the support brackets to prevent sagging. In the preferred embodiment, the fluid container is supported in the brackets by an insulative cover comprised of an outer bag **64** and a foam insulation insert **66**, as shown in FIG. **5**. The insulation insert should be of a sufficient density to provide a fairly rigid shell for the fluid container when it is placed in the support brackets. The thickness of the insulation insert can vary depending on the type of material used and the desired balance of weight, rigidity, insulating properties, and available fluid container capacity. A combination that has been shown to work well in this application is a polyolefin closed cell foam with a density in the range of 4 to 6 pounds per cubic foot and a thickness of approximately ⅛ inch. It can of course be appreciated that closed cell foam is not the only possible light weight insulation material that can support the sides of the filled fluid container. For example, an air cell insulation material, which is available in different thicknesses and often has a foil backing on at least one side, has also been shown to work.

As shown in FIG. **6**, the insulation insert is preferably die cut from a roll or sheet of the foam or other insulation material in the desired thickness. The insulation insert is folded so that fold line **67** runs along the down tube frame member, and the back edges **69** are overlapped. The foam insert should rest flush against the entire length of both the down tube and seat tube central mounting plates when the insert is lightly pushed into the support brackets. If the fit is not flush against both mounting plates, the amount of overlap at the top of the back edge of the foam insert can be increased or decreased as necessary to achieve a good fit. This adjustment will typically be required to accommodate significant variations in the angle formed by the junction of the seat tube and down tube. A nylon panel fastener is preferably used to secure the lower portion of the rear edge together by fastening it through holes **71**.

The outer bag of the preferred insulative cover, shown in FIG. **5**, provides a means for housing the foam insert and carrying the fluid container when off the bike. Handles **68** can be sewn on the inside of the bag to enable the user to fill the container and carry it to the bike with the preferred closure means, a zipper **70**, open. The cyclist can then place bag in the support brackets, fold over the top edges **72** of the foam insert (shown in FIG. **6**), tuck in the handles, and zip the bag closed. In the preferred embodiment, the zipper closes from rear to front, and a small opening remains at the front **65** of the bag when the zipper is closed, so as to provide a passageway for the conduit. Having the handles on the inside of the closed bag also gives the bag a clean and aerodynamic appearance on the bike. The pattern for the outer bag is slightly larger than the dimensions of the empty fluid container, so as to accommodate the foam insert, but the bag shape is similar to that of the fluid container. The bag material would typically be a fabric such as is commonly used in backpacks and sports bags. The weight of the fabric used will depend on the desired balance of durability and light weight. A 200 denier coated nylon has been shown to work in a bag application where light weight is a primary objective, but a number of different fabrics will work, as can be appreciated. The bag fabric is much more supple and conformable than the foam insulation and therefore does not require any means of adjustment to accommodate differing frame geometries, as is the case for the insulation insert.

When fitted with a threaded fill port, the fluid container is preferably closed with a closure assembly as shown in FIG. **7**. This assembly includes a screw cap **60** that has a round hole punched or molded in the center. In the preferred embodiment, the diameter of this hole is just large enough to permit the hose barb end of a female quick disconnect coupling **62** to pass through the hole to the hose barb shoulder. Preferably, the female connector on the fluid container side includes a shut-off feature that provides a seal against leakage when the male and female connectors are disconnected. The quick connect couplings from Colder Products Company are well suited for this application. The hose barb is inserted through the hole in the screw closure and into a flanged tube connector **76**. The flange of the tube connector seats against the inside of the cap and functions as a gasket to provide a leak-proof seal when the cap is tightened. The tube connector should comply with the applicable FDA requirements for food contact, and it should be made from a material with sufficient resilience to allow the flange to compress slightly when the cap is tightened.

A section of flexible tubing **78**, as shown in FIG. **7**, is inserted over the tube connector. This section of the conduit should be long enough to extend from the tube connector to a point just above the lower end of the beverage container. The tubing **78** can easily be removed from the tube connector **76** to drain and rinse this tube after use. Preferably, an

elastomeric beverage grade tubing, such as silicone tubing, is used for this section of the conduit that is inside the fluid container. The use of a tubing material with a high amount of elasticity, such as silicone, facilitates the easy attachment and removal of the tube **78** from the tube connector, because the tubing is simply stretched over the tube connector. This also ensures a secure attachment of the tube connector. The elasticity of silicone also permits a cartridge check valve **80** to be inserted into one end of tube **78** without the need for an additional connector means, by simply stretching the tubing over the outside of the cartridge. The model no. 150 cartridge check valve with FDA compliant o-rings from Smart Products Incorporated works well in this application.

The assembly shown in FIG. **7** illustrates only one possible configuration. It can be appreciated that the same functionality can be achieved by the use of different combinations of parts and attachment methods. For example, the flanged tube connector could be lengthened so as to function also as the section of conduit, and the check valve could be removably connected to the end of the lengthened tube connector by means, for example, of a short section of elastomeric tubing into which the check valve has been inserted. Other configurations can also be imagined consistent with the teachings of the invention.

An hose barbed male tube connector **82**, shown in FIG. **8**, allows the outlet section of the conduit to be easily and quickly connected to, and disconnected from, the female quick connect coupling located at the outlet side of the screw closure. If desired, the conduit can be attached to the down tube by means of a hook and loop fastening strap **84**. The Velcro®) One Wrap® strap, which has a hook fastener surface on one side and a loop fastener surface on the other side, has been shown to work well for this purpose. The One Wrap® strap is first attached to the beverage tube and then fastened around the down tube. The use of a One Wrap® or other hook and loop fastening strap allows the beverage tube to be easily removed from the down tube and avoids the need for a special attachment clip that would have to be mounted to the down tube. This strap is preferably fastened around the down tube at a point just above the traditional location of down tube mounted derailleur shifters **86** located on the down tube of most adult bicycles. For road cyclists that use traditional down tube mounted derailleur shifters, a small section of adhesive-backed hook or loop fastener material may be adhered at a location on the underside **88** of the down tube to prevent the fastening strap and conduit from sliding around the down tube and possibly interfering with the operation of the shifters.

FIG. **8** shows a means of attaching a flexible beverage conduit **36** to the handlebar stem **28**. The beverage tube passes beside the bicycle steering column **90** and loops upward beside the handlebar stem to a first point of attachment. The loop then curves downward across the top tube **26**, and then upward where the outlet end is attached on the opposite side of the handlebar stem from the first point of attachment. The conduit is preferably attached at the first point of attachment by means of a hook and loop fastening strap **92**. The Velcro® One Wrap® strap has been shown to work well for this purpose. This means of attachment allows the beverage tube to be quickly and easily removed from the bicycle. In the preferred embodiment, the loop fastener side of the One Wrap®) strap passes over to the forward edge of a handlebar stem-mounted length of hook fastener **94**, described below, thereby securing the strap to the handlebar stem.

FIG. **8** also shows the preferred hook and loop fastening arrangement for the outlet end of the beverage tube. A section of hook fastener material **94** is adhered to the side of the handlebar stem where the beverage tube passes beside the stem. A length of loop fastener material **96** is adhered around the circumference of the end of the beverage tube. It is preferable to overlap the ends of the loop section slightly, so that the adhesive bonds to the loop material as well as to the surface of the beverage tube, thus ensuring a more peel-resistant attachment. The hook fastener that is adhered to the handlebar stem should have sufficient width and length to provide a generous attachment surface for the beverage tube. A width of 1 inch and a length of 2.25 inches works well. The loop fastener that is adhered to the beverage tube should also be at least 1 inch wide. The hook and loop fasteners should have a pressure sensitive adhesive backing that will maintain good adhesion in wet and warm conditions. Examples of hook and loop fasteners that have been shown to work well in this application are the 3M Scotchmate™ SJ3526 and SJ3527 industrial fasteners.

When a drink is desired, the rider can simply pull the end of the tube away from the loop fastener and raise the tube to his or her mouth to drink. When finished, the rider simply lowers the end of the tube and presses the beverage tube loop fastener **96** against the handlebar stem hook fastener **94** to secure the tube. This provides a convenient and dependable method of securing the end of the tube to the handlebar stem. However, if riding conditions warrant, an even stronger securement of the beverage tube to the handlebar stem can be obtained by passing the loop side of the fastening strap **92** across the tube and fastening it to the handlebar stem hook fastener **94**.

FIG. **8** shows an elastic cord **98** that is attached to the outlet end of the beverage tube of the preferred embodiment at a point just below a push-pull valve **100** and at two other locations along the beverage tube. The purpose of the cord is to maintain the looped configuration of the cord if it is accidentally dropped by the rider, and thereby prevent the end of the beverage tube from swinging against the front wheel of the bicycle. Preferably, one end of the elastic cord is attached at a location approximately where the tube passes behind the handlebar stem, and the middle attachment point is approximately midway between the two outer attachment points. The elastic cord can be attached at the outlet end by sliding a small loop in one end of the cord over the valve. The other end of the elastic cord can be attached to the beverage tube by means of a small cable tie **104**, which is inserted through a small loop in the end of the elastic cord and then fastened around the beverage tube. A second cable tie **106** secures the middle of the elastic cord to the beverage tube. The elasticity and diameter of the cord should permit the coiled beverage tube to be easily straightened with by the rider for drinking, but prevent the tube from straightening when it is dropped. Elastic cord with a diameter of approximately 1/16" and elasticity in the range of 100–150% has been shown to work well in this application.

The preferred valve **100** is inserted into the end of the preferred beverage tube and is operated by means of pushing or pulling a cap that slides over the end of a rigid tube inserted into the beverage tube. The valve can be operated by the rider with one hand by sliding the cap into an open or closed position with the thumb, or it can be opened by pulling on the back edge of the cap with the teeth. If desired, an elastomeric sleeve can be stretched over the valve cap to provide a softer surface for the rider's teeth and lips. This sleeve would typically be silicone tubing or another suitable elastomeric tubing that has been cut to approximately the same length as the valve cap.

Although a valve is not necessary to prevent liquid from draining from the tube during riding, because the outlet end

will generally be the highest point of the system, when riding over rough roads some liquid may splash from the end of the tube if it is not closed. While such splashing will typically result in only minimal liquid loss, it may be a nuisance to the rider. However, some riders may prefer a valveless mouthpiece, which can be accomplished, for example, by removing the valve cap.

FIG. **9** shows an alternative semi-rigid conduit **110** for supplying liquids to riders who prefer to drink from a fixed-position tube. This conduit preferably is comprised of a beverage grade polyolefin tubing, such as polyethylene tubing, and is removably secured to the bicycle handlebar **112** or to an"aerobar" handlebar extension by means of a hook and loop fastening strap. The use of such a Velcro® One Wrap®) strap, for example, allows the rider to adjust the upward angle of the tube by changing the location at which the strap is secured to the tube. A valve **100** may also be used in connection with the semi-rigid conduit.

Finally, FIG. **10** shows a saddle-mounted embodiment of the present invention, suitable for bicycles with a seat post **120** and a conventional saddle **122** with rails **124** beneath the saddle that attach to the seat post. An insulative cover **126** encloses a fluid container that, like the frame-mounted system, has a conduit extending from within the fluid container to a location within reach of the cyclist. The insulative cover is preferably secured to the seat post by hook and loop strap **127** and the rails on each side of the saddle by means of hook and loop fastener straps **128**, **130**. In the preferred embodiment, a male elbow connector **130** connects the conduit **131** to a female quick disconnect connector located at the outlet side of the fluid container. The conduit is preferably secured to the top tube frame member **26** by hook and loop straps **133** and attaches to the handlebar stem or handlebar in the manner described for the frame-mounted fluid container. A check valve means located at the inlet end of the conduit may also be employed to prevent liquid from flowing back down the tube. However, a check valve is not as critical in the saddle-mounted version because the fluid container is positioned at a much higher level relative to the outlet end of the conduit. An additional disconnection means **134** may be provided to allow a section of semi-rigid conduit to be removably connected to a section of the flexible conduit extending from the fluid container. Preferably, such additional disconnection means is a simple sleeve connector adapted to be inserted into the ends of the conduit.

While the present invention has been described with respect to specific embodiments, it is to be understood that other modifications and changes may be made to the disclosed embodiments without departing from the spirit and scope of the invention as defined by the following claims.

I claim:

1. A support bracket for holding articles within the inter-frame area above the bottom bracket junction of a bicycle down tube frame member and seat tube frame member, said support bracket comprising, in combination:

(A) Bracket sides comprised of a single length of wire or metal tubular material having two ends and a mid-point halfway between the ends, and formed so that the middle section of said wire or tubular material roughly defines a U-shape with the mid-point being approximately at the bottom center of the U-shape, and further formed so that the remainder of said length of wire or tubular material angles symmetrically downward and slightly inward from the top of each side of the U-shape to a point just before each end, at which point each end section angles symmetrically inward so that the ends abut one another in perpendicular alignment with the mid-point and the bottom of the U-shape;

(B) A central mounting plate comprised of a material compatible for welding to said holding means and having a top and bottom surface and two sides running lengthwise and two sides running width wise and defining the ends of said mounting plate, with said mounting plate having a series of apertures formed along its length and adapted for fastening said mounting plate to the threaded openings customarily used for attaching water bottle cages to bicycle down tube and seat tube frame members;

wherein said bracket sides and said mounting plate by joined together by welding the bottom of the U-shape of said bracket sides to the top surface of one end of the mounting plate and welding the abutted ends of said bracket sides to the top surface of the other end of said mounting plate.

2. The support bracket of claim **1**, wherein the apertures in said mounting plate are a series of alternating round a obround openings formed along the lengthwise center of said mounting plate, with the obround openings oriented so that their lengthwise dimension is parallel to the lengthwise sides of said mounting plate, and the centers of said openings being an equal distance apart and spaced so that each round and obround opening may be used in combination with a counterpart obround and round opening, respectively, to fasten said mounting plate to said threaded openings.

3. The support bracket claim **1**, wherein said bracket sides are formed from spring temper stainless steel wire and said mounting plate is stamped from stainless steel sheet material.

4. The support bracket of claim **1**, additionally comprising a molded container adapted to be removably inserted into the bracket sides so that said molded container is held in place by said bracket sides.

5. A liquid storage and delivery system for mounting on a bicycle having a down tube frame member and a seat tube frame member that are joined at an angle to one another at a bottom bracket junction, said system comprising:

(A) A first support bracket having sides defining an open space between said sides and having a central mounting plate to which the sides of said support bracket are attached, with said mounting plate having a series of apertures along its length adapted for fastening said mounting plate to the threaded openings customarily used for mounting water bottle cages to the bicycle down tube frame member;

(B) A second support bracket having sides defining an open space between said sides and having a central mounting plate to which the sides of said support bracket are attached, with said mounting plate having a series of apertures along its length adapted for fastening said mounting plate to the threaded openings customarily used for mounting water bottle cages to the bicycle seat tube frame member,

(C) A fluid container adapted to be removably inserted within the sides of said first and second support brackets and having an opening adapted to permit the passage of liquid through a liquid delivery conduit;

(D) A conduit for delivering liquid to a cyclist extending from within said fluid container, through said opening, and to an attachment location at the bicycle handlebar or handlebar stem.

6. The liquid storage and delivery system of claim **5**, wherein the sides of said support brackets extend a progres-

sively greater distance away from their respective frame members as the sides extend upward from their lowermost point when said support brackets are mounted on their respective frame members.

7. The liquid storage and delivery system of claim **5**, wherein said first and second support brackets are interchangeable.

8. The liquid storage and delivery system of claim **5**, further including a securement strap adapted to fasten to one side of a support bracket and extend over said fluid container and fasten to the other side of said support bracket.

9. The liquid storage and delivery system of claim **5**, wherein said liquid delivery conduit is comprised of semi-rigid beverage tubing that is adjustably secured to the handlebar or to a handlebar extension by means of a hook and loop fastening strap.

10. The liquid storage and delivery system of claim **5**, further including the combination of a flexible outer bag provided with a closing fastener and adapted to enclose said fluid container and an insulative material adapted to be removably inserted into said bag and to adjustably conform to the angle formed by the junction of the bicycle seat tube and down tube frame members.

11. The liquid storage and delivery system of claim **10**, wherein said insulative material Is a single piece of closed cell foam insulation.

12. The liquid storage and delivery system of claim **5**, wherein said liquid delivery conduit is removably attached to the handlebar stem by means of hook and loop fasteners.

13. The liquid storage and delivery system of claim **12**, wherein said liquid delivery conduit extends from the fluid container to a point roughly below the handlebar, where said conduit then extends in a looped configuration upwardly and rearwardly to a first point of attachment on one side of the handlebar stem, then downwardly and across a bicycle top tube frame member, and then upwardly to a second point of removable attachment on the other side of the handlebar stem.

14. The liquid storage and delivery system of claim **13**, further including an elastic cord that is attached to said liquid delivery conduit at a first location approximately where said conduit crosses behind the handlebar stem, at a second location just below the outlet end of the conduit, and at a third location approximately halfway between the first and second locations.

15. The liquid storage and delivery system of claim **5**, wherein said fluid container includes a threaded fill port sealed by means of a screw closure, with the opening In said fluid container being comprised of a hole formed in the middle of the screw closure.

16. The liquid storage and delivery system of claim **15**, wherein said fluid container is comprised of a flexible polymeric film material.

17. The liquid storage and delivery system of claim **15**, wherein said liquid delivery conduit includes a disconnection means at the outlet side of said screw closure.

18. The liquid storage and delivery system of claim **17**, wherein said disconnection means is comprised of a female quick disconnect tube connector with a flow shut-off capability and a male connector, with said female connector being oriented on the inlet side of the connection so as to provide a seal against leakage from said fluid container when said connectors are disconnected.

19. The liquid storage and delivery system of claim **17**, wherein said liquid delivery conduit further includes a disconnection means at the inlet side of said screw closure.

20. The liquid storage and delivery system of claim **19**, wherein the section of said liquid delivery conduit extending from the inlet end of said conduit to the disconnection means at the inlet side of said screw closure is comprised of flexible beverage tubing.

21. The fluid container of claim **20**, further including a check valve means located at the inlet end of said flexible beverage tubing and oriented to prevent the backflow of liquid into the fluid container.

* * * * *

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United States Patent [19]

Hollander

[11] Patent Number: 5,301,858

[45] Date of Patent: Apr. 12, 1994

[54] **COMBINATION WATER BOTTLE**

[76] Inventor: **Douglas S. Hollander**, 12 East 86th St. #704, New York, N.Y. 10028

[21] Appl. No.: **856,760**

[22] Filed: **Mar. 24, 1992**

[51] **Int. Cl.**[5] **A45F 3/18; B62J 11/00**

[52] **U.S. Cl.** ..... **224/148**; 224/32 R; 224/39

[58] **Field of Search** ..... 224/32 R, 35, 36, 39, 224/148, 157; 215/1 A, 1 C, 2, 6, 229; 220/4.27

[56] **References Cited**

U.S. PATENT DOCUMENTS

D. 316,389	4/1991	Wood .	
581,767	5/1897	Powers .	
880,082	2/1908	Kendrick	215/6
4,090,650	5/1978	Gotta .	
4,095,812	6/1978	Rowe	224/32 R
4,139,130	2/1979	Glusker et al.	224/148
4,274,566	6/1981	Rowe .	
4,607,755	8/1986	Andreozzi	224/148 X
4,815,635	3/1989	Porter .	
4,883,205	11/1989	Saelens .	
4,911,339	3/1990	Cushing .	
5,024,358	6/1991	Reichert et al.	224/32 R
5,048,705	9/1991	Lynd et al.	215/229
5,060,833	10/1991	Edison et al.	215/1 A
5,062,591	11/1991	Runkel	224/32 R
5,115,952	5/1992	Jenkins	224/35
5,119,978	6/1992	Kalamaras et al.	224/32 R

FOREIGN PATENT DOCUMENTS

2150814	7/1985	United Kingdom .
0006724	5/1990	United Kingdom .

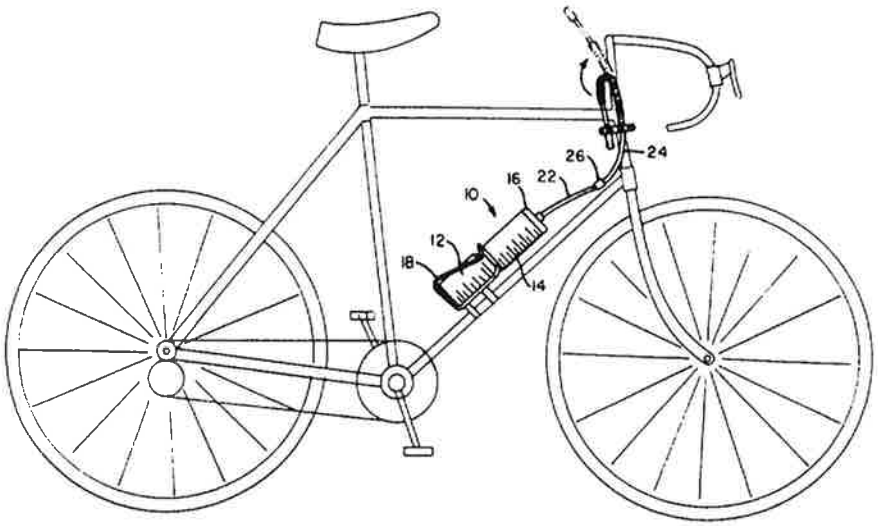
Primary Examiner—Renee S. Luebke

Attorney, Agent, or Firm—Kevin M. O'Brien; Ruffin B. Cordell

[57] **ABSTRACT**

A recreational water bottle system which includes a primary vessel for holding liquids, a watertight cap having a bottle tube extending therethrough into the primary vessel, a drinking tube for delivering liquids to a user, and an oversleeve adapter disposed between the bottle tube and the drinking tube for passing liquids and for selectively holding the bottle tube and the drinking tube in structural alignment. The system is adapted to be selectively mounted onto the frame of a bicycle or onto the body of an athlete, or used as a hand held sport bottle.

18 Claims, 7 Drawing Sheets



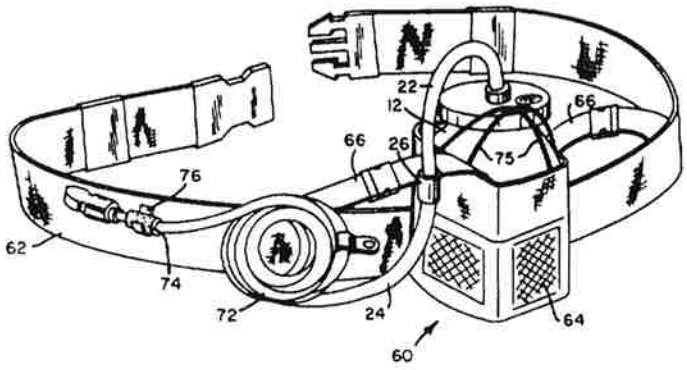


FIG. 1

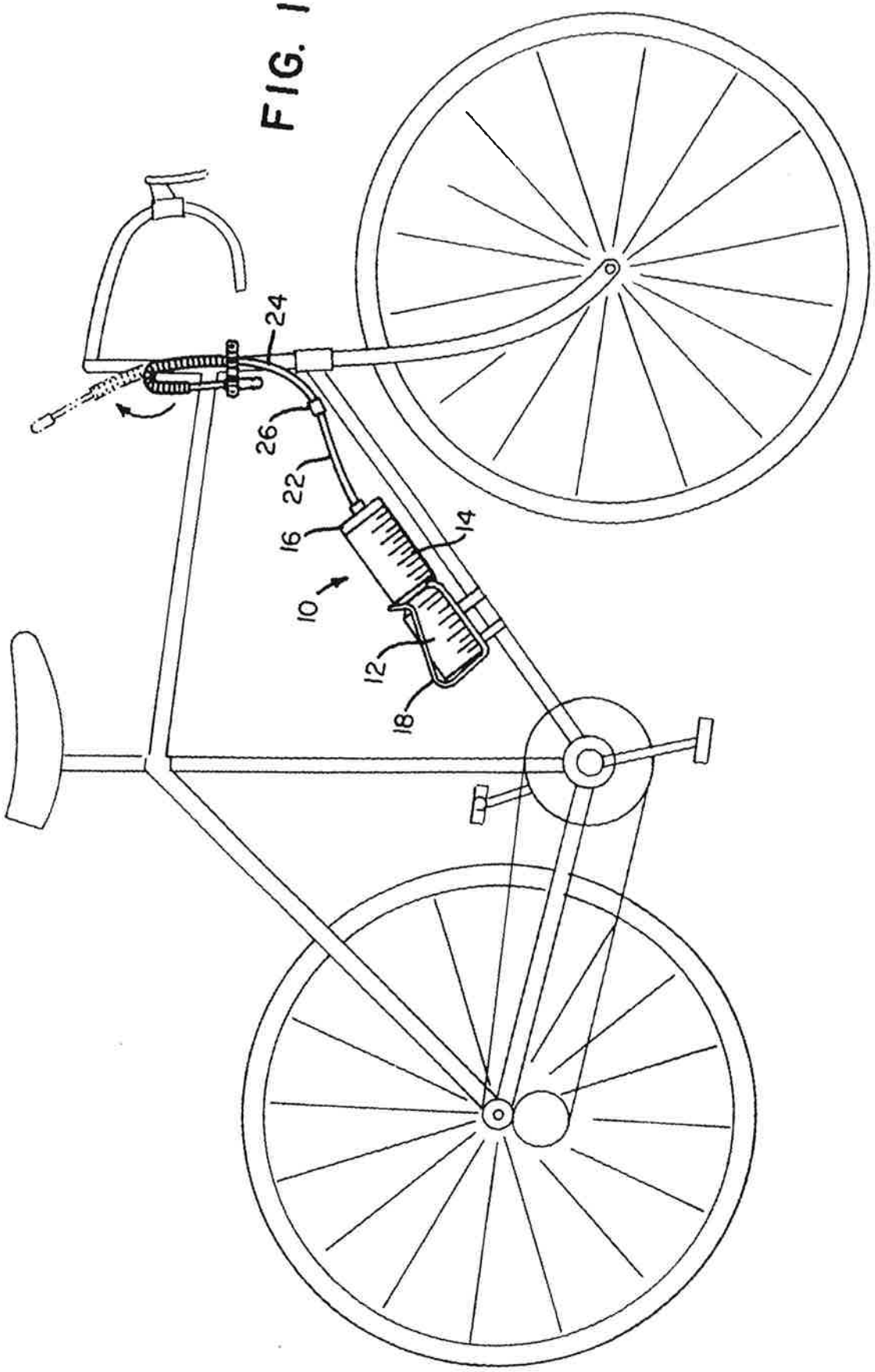


FIG. 2

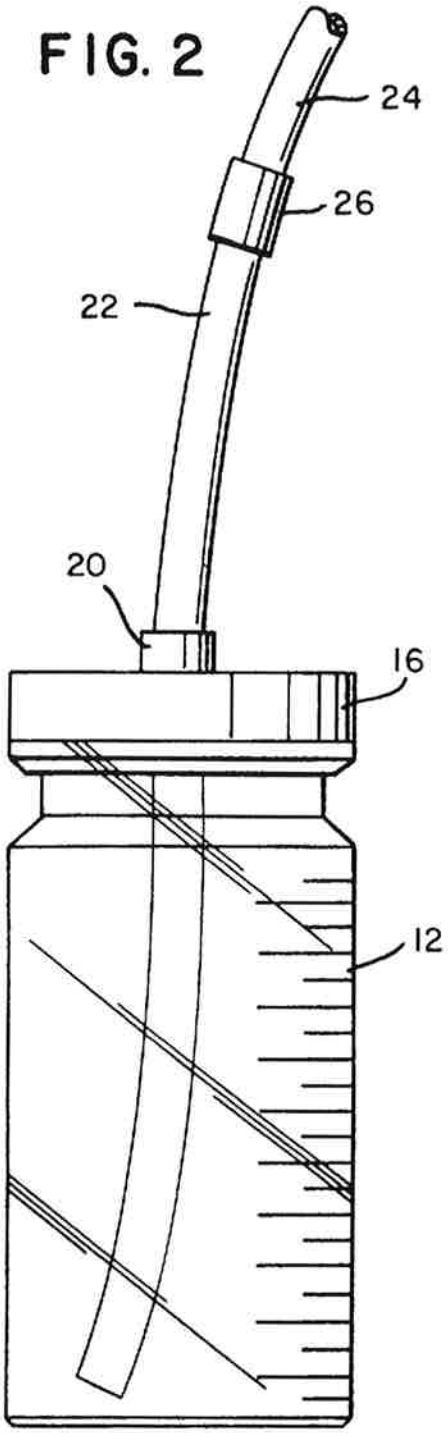


FIG. 3

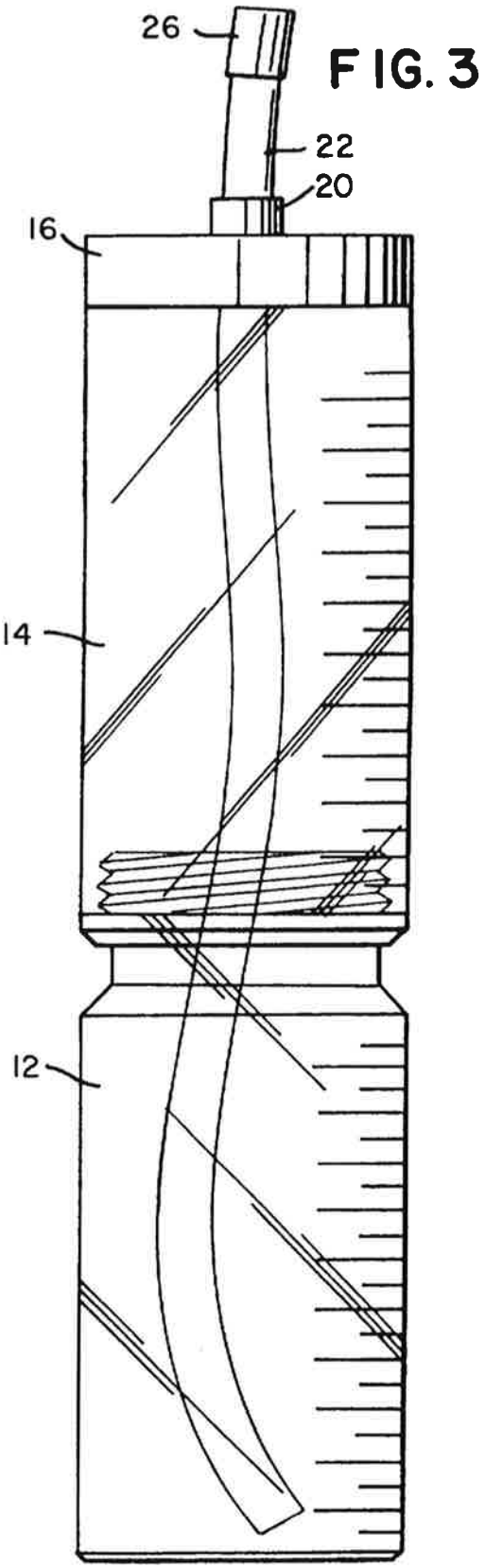
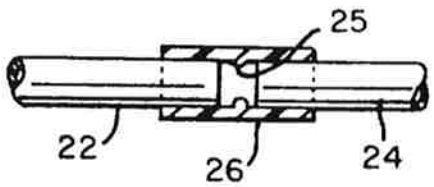


FIG. 4



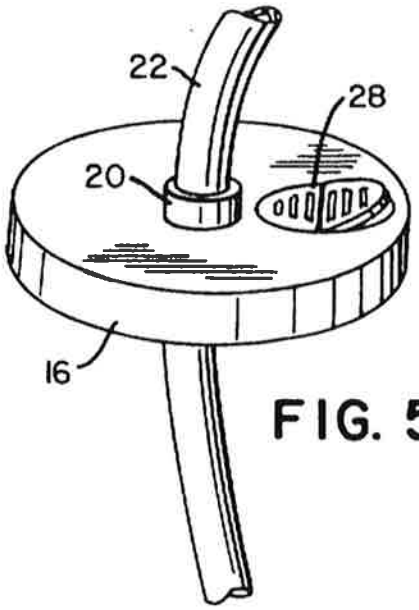


FIG. 5

FIG. 6a

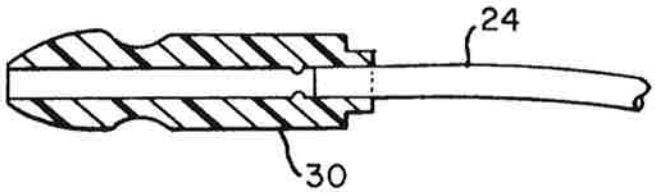


FIG. 6b

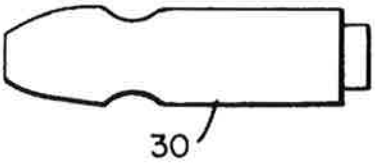


FIG. 6c

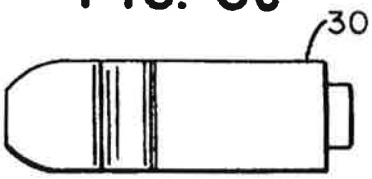


FIG. 6e

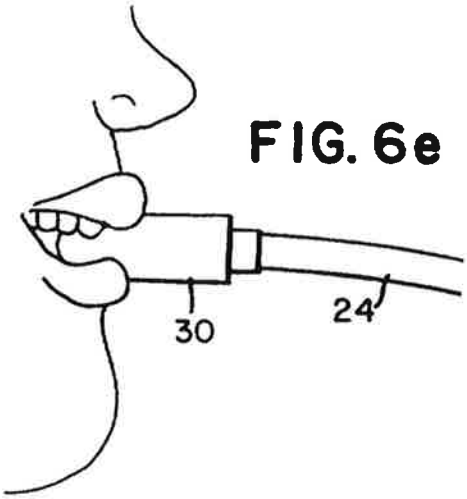
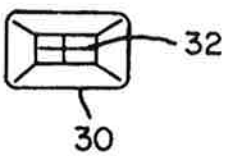


FIG. 6d



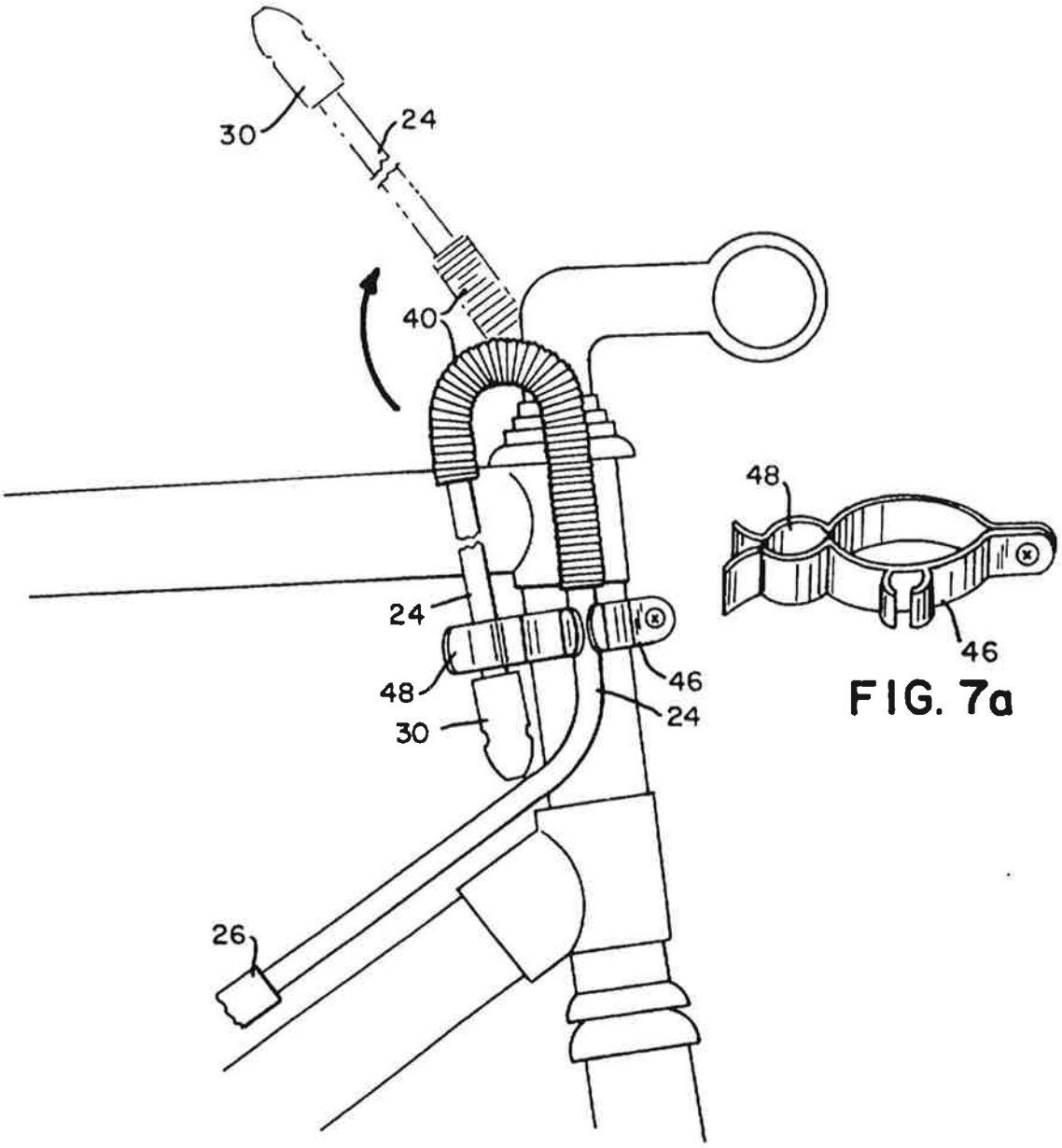


FIG. 7

FIG. 7a

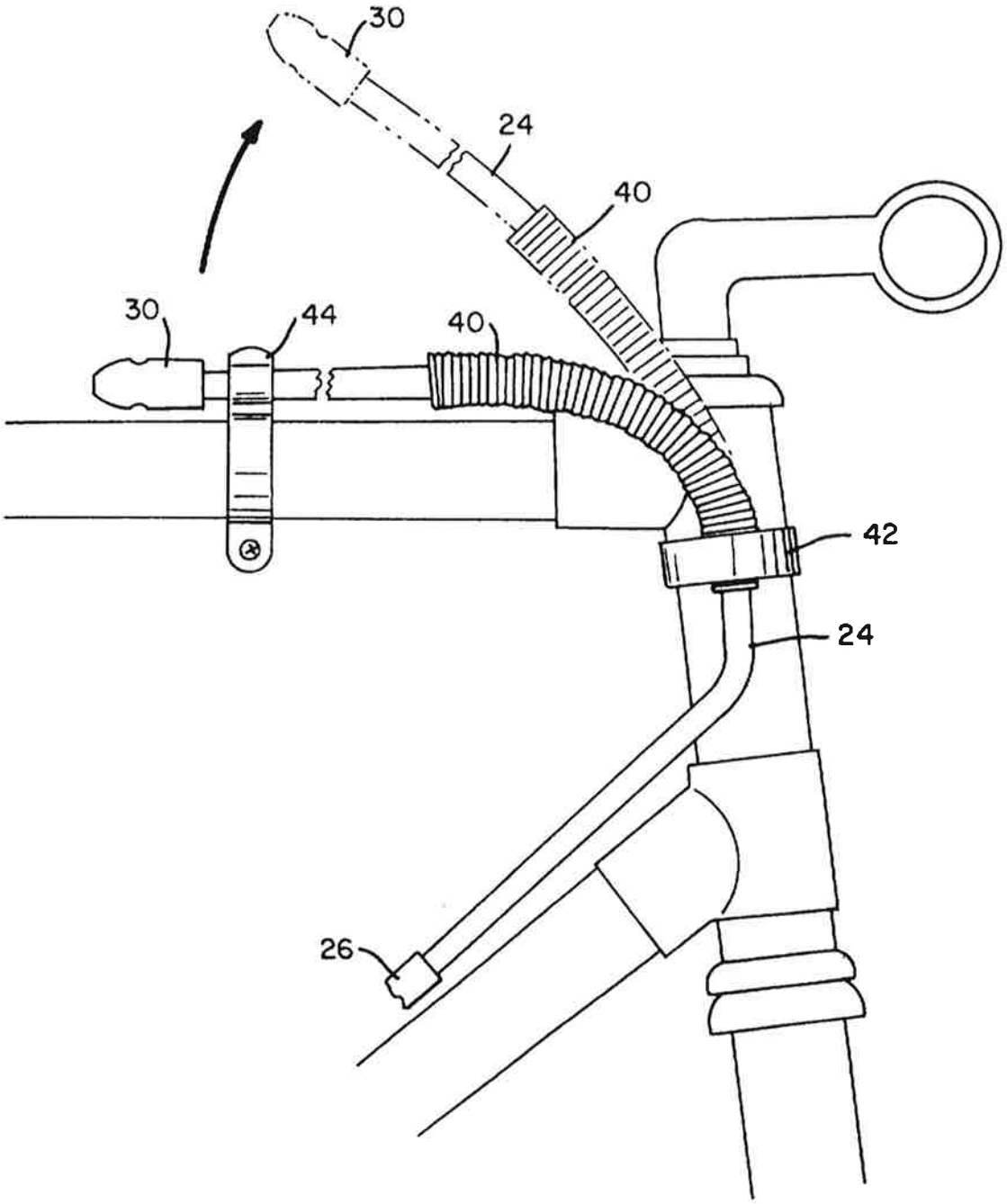
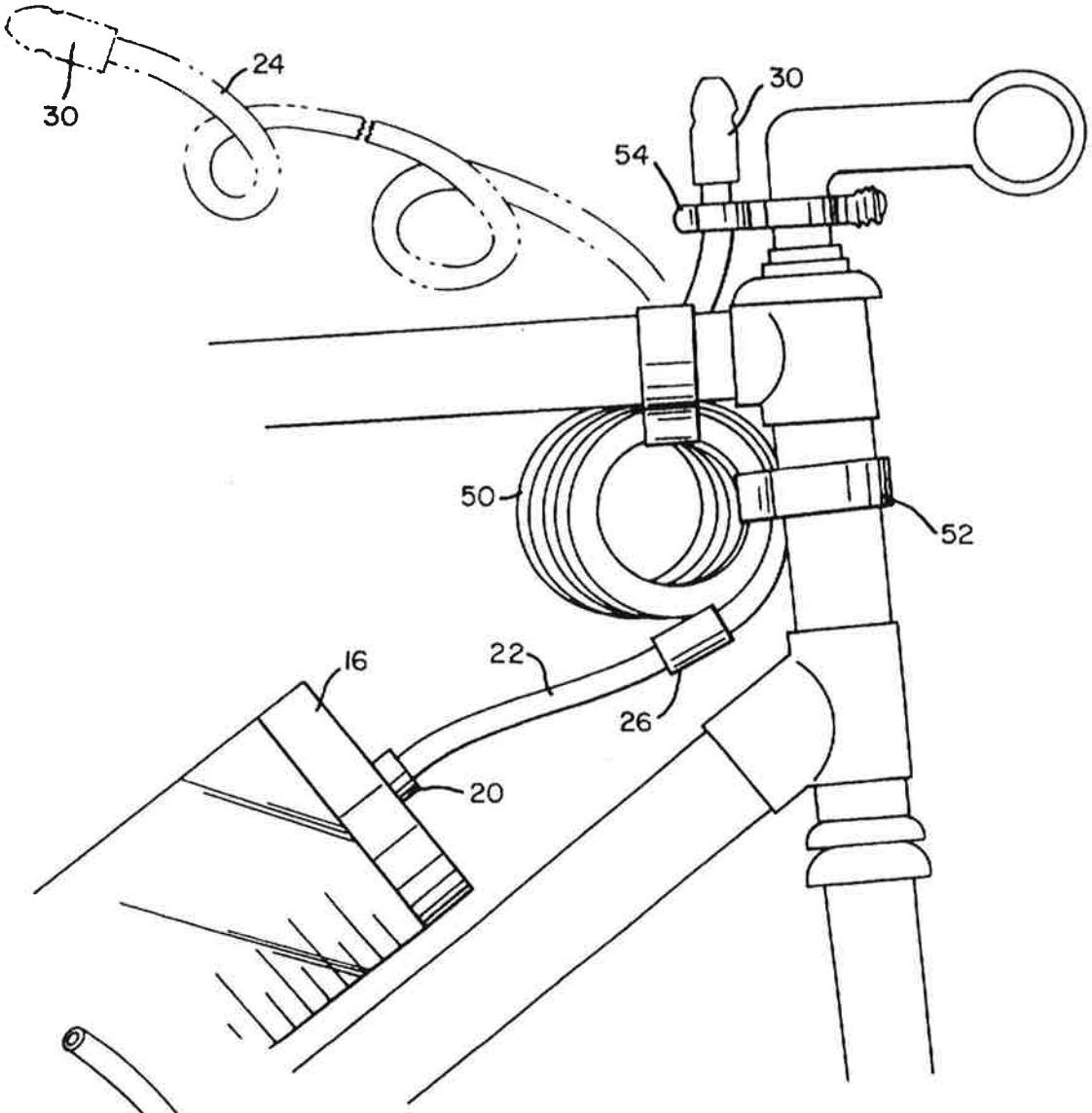


FIG. 8

FIG. 9



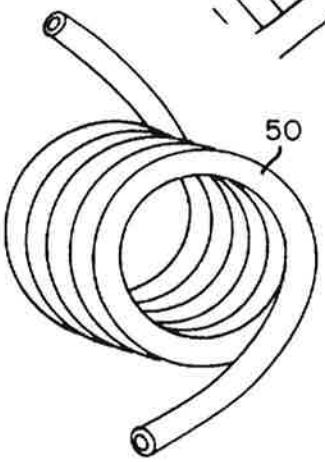


FIG. 9a

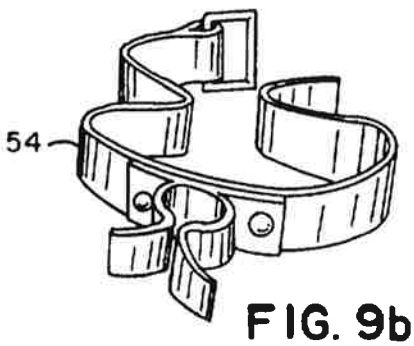
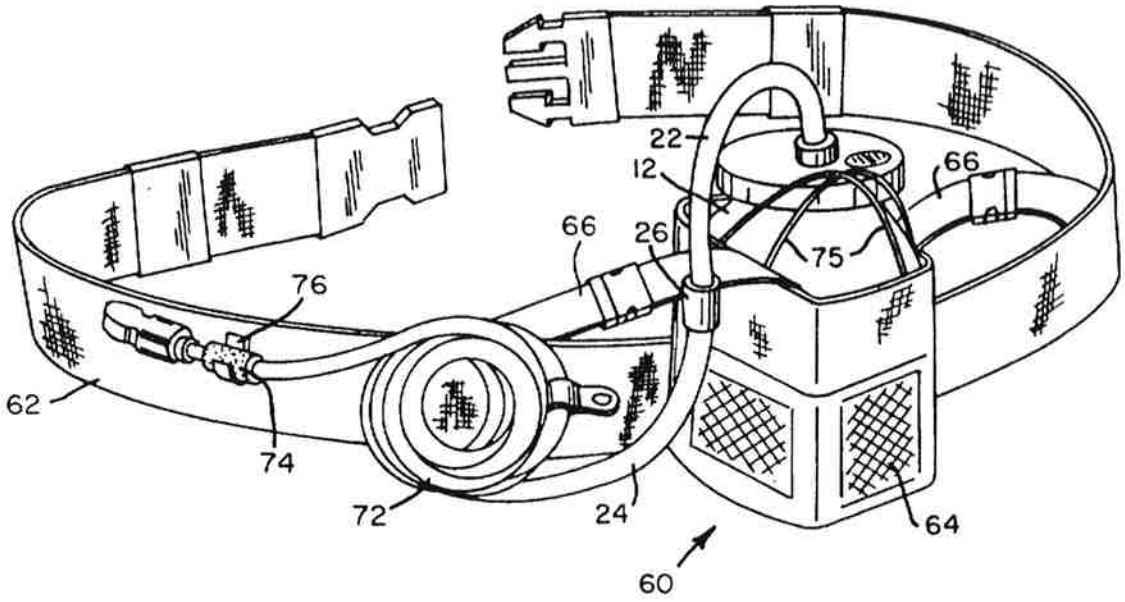


FIG. 9b

FIG. 10



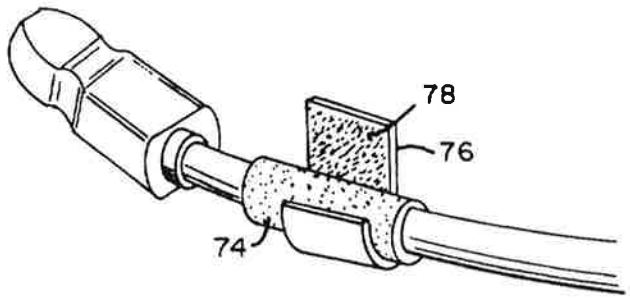


FIG. 10a

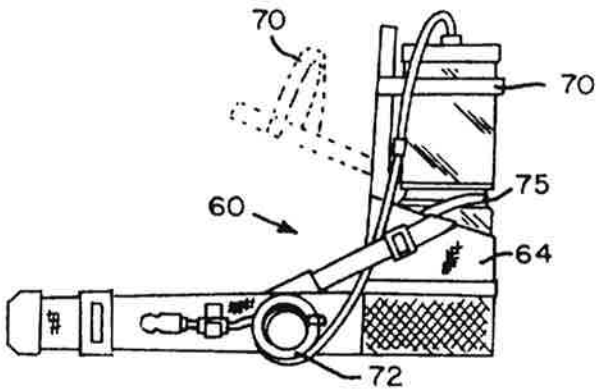


FIG. 10b

COMBINATION WATER BOTTLE

BACKGROUND OF THE INVENTION

The present invention relates to a bottle for carrying liquids during periods of exercise including the riding of a bicycle and jogging or running. The invention is more specifically suited to a combination device which accommodates an athlete engaged in both bicycling and running during the same exercise period.

In the last ten years, the popularity of bicycling, running and other forms of multi-sport exercise has grown significantly. In addition, the popularity of triathlons, duathlons, cross-training, and other combined forms of exercise has increased considerably. In the case of triathlons, athletes engage in swimming, cycling, and running in consecutive segments of a single timed competition. In duathlons, also called biathlons, athletes compete in a series of running, cycling, and running events in a single timed competition. In both training and competition, these athletes must be able to transfer from running to cycling to running again quickly and efficiently.

FIELD OF THE INVENTION

Several persons in the past have attempted to address the need for a versatile water bottle for use in physical exercise. A U.S. Pat. No. to Saelens, et al., 4,883,205, discloses the basic configuration of a water bottle for use while riding a bicycle. The system consists of a bottle compartment for holding liquids together with a mounting rack which allows the bottle to be mounted on the frame of a bicycle for use while engaged in exercise. However, because the bottle must be removed from its mounting prior to use, drinking is a difficult and sometimes hazardous procedure. Bottle extraction requires the rider to be distracted from riding the bicycle and direct his attention down to the bicycle frame where the water bottle is typically mounted. The disengagement of the water bottle is an awkward and clumsy procedure which may further distract the rider. The rider must shift his or her weight downward while twisting to reach the bottle, reducing the stability of the rider/bicycle system. All of these distractions may lead the cyclist to an accident or may diminish his overall performance if engaged in racing competition. In addition, the distraction and difficulties attendant using a bottle mounted onto the frame will lead the rider to drink less frequently and may thereby diminish his overall physical performance due to sub-optimal hydration.

Two U.S. Pat. Nos. to Rowe, 4,095,812 and 4,274,566, attempt to address the difficulties associated with using a water bottle during exercise which must be removed from its storage frame prior to use. In Rowe '812, there is disclosed a water bottle which is provided with an extendable tube which may be positioned to allow the rider to drink without removing the bottle from its mounting on a bicycle frame. The extendable tube is shown in several embodiments including a simple coil structure, a telescoping straw apparatus, and a spring-mounted tube reel. In Rowe '566, there is disclosed an elaborate dual pulley mechanism whereby the drinking tube is retracted back into a bulky housing. In each of these cases, the rider is provided with the facility of drinking without removing the bottle from its frame. However, the embodiments set forth by Rowe to store the drinking tube when not in use and maintain it in a desired position are not satisfactory. In addition,

none of the disclosures of Rowe suggest a mechanism whereby the bottle may be used for exercise applications not involving a bicycle.

An early attempt to satisfy some of the inadequacies in the prior art was set forth by Powers in U.S. Pat. No. 581,767. In Powers, there is disclosed a bicycle drinking tank which includes an elongated drinking tube mounted on a hinge. The tube may be swung in and out of position as desired by the rider and is held in position by frictional engagement. Again, there is no provision in the Powers device for utilization of this apparatus in physical activity other than bicycle riding. In fact, the Powers device is ill suited for removal from a bicycle in any case.

A variation on this theme is set forth in the U.S. Pat. No. to Reichert 5,024,358. The Reichert device sets forth an elongated water container mounted to the bicycle frame which is provided with an extended drinking tube. The drinking tube is mounted over the bridge of the handlebars to hold it in position in front of the rider. Again, the Reichert device makes no facility for use of the water bottle away from its bicycle frame mounting.

A further variation on this theme is set forth in U.S. Pat. No. 4,911,339 to Cushing. The Cushing device consists of a frame-mounted water bottle and elongated tube which includes a bellows to compress the air and liquid within the bottle cavity. Liquid is thereby forced up the tube to the rider upon operation of a hand valve.

Several attempts have been made to produce a water bottle suitable for use while engaged in running, jogging or other exercise on foot. The patent to Gotta, U.S. Pat. No. 4,090,650, discloses a man-portable water device which mounts on the belt of a user. An elongated straw is provided which allows the user to drink without removing the canteen from its belt-mounted position. The straw is pushed back down into the canteen when not in use to avoid interfering with the activities of the user. The bottle disclosed in Gotta is limited strictly to man-portable applications and is adapted to fit snugly around the waist of the user.

A similar device is disclosed in Glusker, U.S. Pat. No. 4,139,130. In Glusker there is disclosed a canteen belt wherein the water-containing compartment is extended around the waist of the user. An elongated straw is provided with an attachment to hold it in place when not in use. The user may drink without removing the container from his waist. The canteen is an integral part of the belt to be worn around the waist of the user and is not provided with further mounting structure.

A further belt-supported bottle device is described in the patent to Shurnik, U.S. Pat. No. 4,852,781. This device includes an elaborate intake vent to avoid spillage. Again, no provision is made for use of the device away from its belt mount position.

As will be understood, the recreational water bottle of this invention overcomes many of the disadvantages of the prior art. The difficulties and limitations suggested in the proceeding are not intended to be exhaustive but rather among the many which may tend to reduce the effectiveness and user satisfaction with prior recreational water bottles and the like. Other noteworthy problems may also exist, however, those presented above should be sufficient to demonstrate that prior recreational water bottles appearing in the past will admit to worthwhile improvement.

SUMMARY OF THE INVENTION

In contrast to the prior art devices which have attempted to address the need for a combination running/cycling and improved water bottle, the present invention is particularly, although not exclusively, adapted for use by athletes engaged in exercise both on bicycle and on foot.

In the preferred embodiment, the present invention consists of an improved bicycle water bottle which includes unique mounting features, unique fitting features, and a unique delivery system to allow an athlete to obtain liquids while engaged in exercise. The present invention efficiently and safely delivers liquids to the rider in an unencumbered manner during physical activities. It is designed to alleviate the inherent hazards and pitfalls associated with drinking during exercise using prior art devices.

A primary advantage of the present invention is its adaptability to exercise both on and off a bicycle.

A further advantage of the present invention is its simple, yet elegant, design which complements bike frame structure while solving existing hydration problems.

A still further advantage of the present invention is its ability to work as a two-stage bottle which can be used with either single or double liquid capacity based on rider requirements.

An additional advantage of the present invention is its provision of a bottle vent structure which prevents the build-up of a vacuum within the bottle cavity during fluid extraction.

Another advantage of the present invention lies in its adaptability for use as a hand-held sport bottle.

A still further advantage of the present invention is that the bottle can be quickly installed on and detached from a bicycle to provide for exercise on and off the bicycle.

A still further advantage of the present invention is a body mounted position to provide for hands-free use while engaged in running, skating or other foot-bound exercise.

The present invention is preferably constructed of rugged, lightweight plastic and utilizes traditional plastic molding technology. The basic components are a water bottle structure coupled with an elongated drinking tube and unique adaptor assembly which facilitates installation and removal from the bicycle. A drinking tube is provided with a novel positioning mechanism which allows the rider to utilize the drinking tube position most well suited to his or her particular preference.

OBJECTS OF THE INVENTION

It is therefore a general object of the invention to provide a novel recreational water bottle or the like which will obviate or minimize the problems previously described with reference to the prior art.

It is a specific object of the invention to provide a novel recreational water bottle which will be adaptable to exercise both on and off of a bicycle.

It is another object of the invention to provide a novel recreational water bottle which may be advantageously used by athlete engaged in combination cycling/running exercise training sessions and competitive events.

It is still another object of the invention to provide a recreational water bottle which facilitates the taking of liquids by an athlete while riding a bicycle.

It is a still further object of the invention to provide a recreational water bottle with a drinking tube which may be positioned advantageously at the preference of a bicycle rider.

It is a still further object of the invention to provide a recreational water bottle which includes a two-stage water cavity to allow for increased storage capacity.

It is a related object of the invention to provide a recreational water bottle which includes an adapter facilitating the rapid removal, transition, and installation from a bicycle mounted position to a body mounted position during exercise.

It is a related object of the invention to provide a recreational water bottle which includes an adapter facilitating the rapid removal, transition, and installation from a body mounted position to a bicycle mounted position during exercise.

It is a further object of the invention to provide a recreational water bottle adapted for use as a hand-held sport bottle.

Other advantages and meritorious features of the present invention will be understood from the following description of the preferred embodiments, the appended claims, and the drawings, the brief description of which follows.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side view of the water bottle of the present invention showing its mounting position on a bicycle;.

FIG. **2** is a side view of the recreational water bottle of the present invention showing the details of its construction;

FIG. **3** is a side view of the recreational water bottle of the present invention showing the present invention in its expanded configuration;

FIG. **4** is a cross-sectional view of the adapter of the present invention;

FIG. **5** is a close-up view of the cap and vent structures of the present invention;

FIG. **6***a* is a side cross sectional view of the mouthpiece of the present invention.

FIG. **6***b* is a side view of the mouthpiece of the present invention.

FIG. **6***c* is a top plan view of the mouthpiece of the present invention.

FIG. **6***d* is a front view of the mouthpiece of the present invention.

FIG. **6***e* is a side view of the mouthpiece of the present invention when inserted within a user's mouth.

FIG. **7** is a close-up view of a first tube-positioning mechanism of the present invention;

FIG. **7A** is a mounting clip to attach the drinking tube to the bicycle frame.

FIG. **8** is a close-up view of a second tube-positioning mechanism of the present invention;

FIG. **9** is a close-up view of a third tube-positioning mechanism of the present invention;

FIG. **9***a* is a perspective view of the memory flex tubing of the present invention;

FIG. **9***b* is a perspective view of a mounting clip of the present invention;

FIG. **10** is a perspective view of the present invention when mounted in the running mode of operation with close up views of the extender structures and mouthpiece retention means.

FIG. **10***a* is a perspective view of the hook and pile fastener and J hook of the present invention; and

FIG. 10*b* is a side view of the body mounted carrier of the present invention showing the extension strap.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIGS. 1 and 2, the recreational water bottle system 10 of the present invention is shown to include a primary water bottle 12. In the basic system configuration, the primary water bottle 12 is the only liquid-carrying vessel provided. As may be seen more clearly in FIG. 3, an alternative system in its extended mode utilizes an extension sleeve 14 to produce a two-compartment water-carrying vessel. Situated at the upper end of extension sleeve 14 in FIG. 3 is threaded cap 16. As may be seen in FIGS. 2 and 3, threaded cap 16 is adapted to fit onto the upper end of primary vessel 12 or alternatively onto the upper end of extension sleeve 14. The interrelationship between extension sleeve 14 and primary vessel 12 is accomplished by screwing the lower end of extension sleeve 14 onto the upper threads of primary vessel 12. Both primary vessel 12 and extension sleeve 14 are provided with volumetric markings on the side thereof to allow an athlete to monitor his liquid consumption during exercise. Primary vessel 12 is mounted to the bicycle through mounting cage 18. Mounting cage 18 is a conventional quick release design.

In the center of threaded cap 16 there is provided a watertight flange 20 as shown in FIG. 5. Watertight flange 20 is adapted to receive bottle tube 22 in a close frictional fit. Tube 22 extends into the bottom of primary vessel 12 to allow for the extraction of fluids from the container. If extension sleeve 14 is in use, bottle tube 22 extends through both extension sleeve 14 and primary vessel 12. Watertight flange 20 prevents liquid from escaping from the bottle cavity while in use. Threaded cap 16 includes a closable rocker vent 28 which permits air to enter the bottle cavity to avoid the buildup of a vacuum during drinking.

At the upper end of bottle tube 22 there is provided an adapter oversleeve 26. Above oversleeve 26 is another length of tubing designated as drinking tube 24. Drinking tube 24 may be sized according to the preference of the user. Oversleeve 26 is constructed of high strength plastic or rubber and consists of two female flange portions with a communicating passage therebetween as shown in FIG. 4. The inner diameter of oversleeve 26 is matched to the outer diameter of bottle tube 22 and upper drinking tube 24. Tubes 24 and 22 are inserted until they abut against tube stop 25. The flange portions of oversleeve 26 are adapted to receive the respective ends of bottle tube 22 and upper drinking tube 24 in a firm frictional fit. When assembled as described, oversleeve 26 creates an airtight link between bottle tube 22 and upper drinking tube 24, allowing the user to draw liquids up through the system.

In use, oversleeve 26 permits transfer of bottle system 10 between running and cycling activities quickly and efficiently. By simply detaching the upper flange of oversleeve 26 from the lower end of drinking tube 24 and removing the bottle from mounting cage 18, the bottle system 10 is suitable for use in the body mounted mode of operation or as a hand-held sport bottle.

Upper drinking tube 24 is provided with an ergonomically designed mouthpiece 30 at its upper end. Mouthpiece 30 is of unique construction and is made of high strength molded plastic. By reference to FIG. 6*a*, it can be seen the mouthpiece 30 is bullet shaped in cross section. In overall configuration, mouthpiece 30 is a rounded rectangle and is provided with an annular depression 1–2 centimeters from its opening. This shape allows a user to grip the mouthpiece in his or her mouth, avoiding leakage and ensuring ease of use as shown in FIG. 6*e*. The tip of mouthpiece 30 is provided with one-way valve 32. One-way valve 32 retains fluid in the whole of the system, including upper drinking tube 24 after the first use. This permits further use without re-priming the system, facilitating the overall function of the device.

Upper drinking tube 24 may take several configurations. First, in a preferred embodiment, upper drinking tube 24 may be mounted on the forward vertical bar of the bicycle as shown in FIG. 7. In this configuration, upper drinking tube 24 is provided with a spring sleeve 40 several centimeters from the upper end of the tube. Spring sleeve 40 is biased with its relaxed position in its fully extended state. Alternatively, memory flex tubing may be used to bias drinking tube 24 in its extended state. Spring sleeve 40 extends upper drinking tube 24 into a vertical position unless restrained. Spring sleeve 40 and drinking tube 24 are mounted to the bicycle frame at the vertical forward bicycle tube as shown in FIG. 7 through a mounting clip 46. Spring sleeve 40 is disposed around upper drinking tube 24. When it is desired to store upper drinking tube 24 and mouthpiece 30 out of the way, the assembly is bent downward over the frame of the bicycle as shown in FIG. 7 to engage molded clip 48 which receives upper drinking tube 24 in a firm frictional fit.

A second embodiment of upper drinking tube 24 is shown in FIG. 8. Here, mounting clip 46 is replaced by clips 42 and 44. Mounting clip 42 is attached to the front vertical bar of the bicycle and includes a receptacle for the portion of the drinking tube just below spring sleeve 40. Clip 44 includes a frictional clip which is adapted to receive the portion of upper drinking tube 24 just below mouthpiece 30 as shown in FIG. 8.

A third embodiment of upper drinking tube 24 is shown in FIG. 9. In this embodiment, upper drinking tube 24 is made of memory flex tubing 50. Memory flex tubing 50 returns to a tightly coiled shape after extension without the aid of external springs or mechanisms. The first loop of memory flex tubing 50 closest to oversleeve 26 is attached to the bicycle frame using clip 52. The portion of upper drinking tube 24 just below mouthpiece 30 is received in clip 54 which is mounted to the handle bar stem of the bicycle as shown in FIG. 9. In use, the rider will remove the mouthpiece and tubing from clip 54 and extend memory flex tubing to his or her mouth. After drinking, the mouthpiece and tubing are replaced into clip 54. Because memory flex tubing 50 recoils into its same tight shape, upper drinking tube 24 is stored neatly and compactly against the bicycle frame.

The bicycle mounted configuration constitutes a first mode of the present invention. A second mode of the present invention is shown in FIG. 10. This embodiment is known as the body mounted mode. Because of the unique structure of the oversleeve of the present invention, the recreational water bottle system 10 is adapted to be used both on and off of a bicycle. In the bicycle mode, the device is used as described above. In the body-mounted mode, the drinking tube 24 is disconnected from oversleeve 26, and the water bottle 12 is removed from cage 18. The bottle 12 is then installed into a body mounted carrier 60 as will be described.

As may be seen in FIG. 10, body mounted carrier 60 includes a quick release, adjustable nylon belt 62 which is provided with a bottle compartment 64. Stabilization straps 66 are provided to prevent movement of the water bottle 12 during exercise to avoid discomfort from jarring movement of bottle 12. Bottle compartment 64 is adapted to receive primary vessel 12, however, bottle compartment 64 is also provided with extension strap 70 to securely receive extension sleeve 14 if desired as shown in FIG. 10*b*. Carrier 60 also includes two elastic retention straps 75 which firmly hold bottle 12 in place when placed into bottle compartment 64.

Upper drinking tube 24 in the body mounted mode is most advantageously constructed of memory flex tubing 72, much in the manner of the embodiment of FIG. 9. The loop of tubing closest to oversleeve 26 is attached to belt 62. The portion of upper drinking tube 24 just below mouthpiece 30 is provided with a pile wrapping 74 for a hook and pile fastener, for example, Velcro ®. As shown in FIG. 10*a*, belt 62 is further provided with a "j" hook clip 76 which is provided with the hook portion 78 of a hook and pile fastener on the interior facing thereof. The "j" hook 76 thus securely receives the mouthpiece and tubing by engaging pile 74.

In use, the mouthpiece 30 is removed from "j" hook 76 and memory flex tubing 72 is extended to the mouth of the user. After drinking, mouthpiece 30 is replaced within "j" hook 76 to again securely engage the hook and pile fastener 74, 78.

In use, a rider seeking to transfer water bottle 12 from the bicycle mounted mode to the body mounted mode will simply disconnect bicycle upper drinking tube 24 from oversleeve 26 and remove bottle 12 from cage 18. After inserting bottle 12 into holder 64, body mount upper drinking tube 24 is inserted into oversleeve 26. This transition requires only moments and may be easily accomplished in reverse order to effect the transition from body mounted mode to bicycle mounted mode. Thus, the present invention is uniquely adapted to transitions between cycling and running during a single exercise period.

A third mode of operation of the present invention is achieved by detaching bottle 12 from upper drinking tube 24 to form a hand-held sport bottle in the form shown in FIG. 3. During pre-exercise warm-up and post-exercise cooling periods, it is desirable to have access to a source of hydration. By detaching oversleeve 26 from upper drinking tube 24, the user may use bottle 12 advantageously as a hand-held sport bottle and then replace the bottle 12 into either of the bicycle mounted mode or the body mounted mode of FIG. 10 for further use in recreation or exercise.

SUMMARY OF THE PRIMARY ADVANTAGES

In use, the recreational water bottle system of the present invention provides a novel and advantageous alternative to existing water bottle systems. The uniquely adaptable structures of the present invention allow a user to transfer from bicycle to foot bound exercise, and vice versa, without requiring an additional water bottle system. Total liquid consumption may be closely monitored during the course of exercise. Only a single source of hydration is required for the combined activity reducing preparation time. The bottle of the present invention may also be used as a hand-held sport bottle. The unique structure of the present invention supports a rapid transition between hand-held position and a bicycle or body mounted position. The components of the present invention are ergonomically designed taking into account physiological factors in choosing shape and placement of each part. The overall system is one which provides liquid to the athlete without distraction or disruption of exercise. This is especially important when engaged in multi-sport training, competition, or while negotiating hazardous urban roadways. The user need not employ his hands while drinking, and further, he need not take his eyes off of the track or road. Balance and concentration are not disrupted, enhancing overall performance.

The unique structures of the present invention offer for the first time a true "cross training" sport bottle. Those engaged in combination forms of exercise can use a single water bottle as a source of effective, safe hydration while running and cycling during a single exercise period. This added versatility is especially significant for triathletes and duathletes who must train alone over long distances. The recreational water bottle of the present invention transfers easily from bicycle to body mount and then back to bicycle again, if desired, with only a simple adapter manipulation. In many forms of exercise, total liquid consumption must be closely monitored. In the present invention, such liquid consumption is readily apparent given that a single water bottle transfers between exercise activities.

It should be appreciated that there has been disclosed in accordance with the present invention, the preferred embodiment of an improved recreational water bottle system. It is evident that many alternatives, common modifications, and variations would be apparent to one of ordinary skill in the art in light of the description set forth herein. Accordingly, the present invention is intended to embrace all such alternatives, modifications, and variations that fall within the spirit and broad scope of the following appended claims.

I claim:

1. A recreational water bottle system comprising:
- a primary vessel for holding liquids having a watertight cap;
- a bottle tube extending through said cap into said primary vessel;
- a first drinking tube for delivering liquids to a user;
- a second drinking tube for delivering liquids to a user;
- an oversleeve disposed between said bottle tube and either of said first drinking tube or said second drinking tube for passing liquids between said bottle tube and either of said first drinking tube or said second drinking tube and for selectively holding said bottle tube and either of said first drinking tube or said second drinking tube in structural alignment;
- wherein said oversleeve is selectively removable from at least one of said bottle tube or said first or second drinking tubes; and
- said oversleeve engages at least one of said bottle tube or one of said first or second drinking tubes in a frictional fit engagement.

2. The recreational water bottle system of claim 1 further comprising:
- a mouthpiece including a one-way valve.

3. The recreational water bottle system of claim 1 wherein said cap includes a closable vent.

4. The recreational water bottle system of claim 1 further comprising:
- means for attaching said primary vessel to a user's body; and

means for attaching one of said drinking tubes to a user's body.

5. The recreational water bottle system of claim 4 wherein said means for attaching said primary vessel comprises:

a bottle compartment having an upper and lower end;

a belt connected to said bottle compartment at its lower end; and

stabilization straps connected to said belt and to the upper end of said bottle compartment for reducing bottle movement.

6. The recreational water bottle system of claim 1 further comprising:

means for attaching said primary vessel to a bicycle frame; and

means for attaching one of said drinking tubes to a bicycle frame.

7. The recreational water bottle system of claim 6 further comprising a spring sleeve disposed around one of said drinking tubes, and said means for attaching one of said drinking tubes comprises a mounting clip attached to one of said drinking tubes or said spring sleeve.

8. The recreational water bottle system of claim 6 wherein one of said drinking tubes comprises memory flex tubing.

9. A recreational water bottle system comprising:

a primary vessel for holding liquids having a male threaded open end;

an extension sleeve having a female threaded lower end adapted to engage said open end of said primary vessel, and a male threaded upper end;

a watertight cap having a female threaded opening adapted to engage either of said primary vessel open end or said upper end of said extension sleeve;

said watertight cap further comprising a closable vent;

a bottle tube extending through said watertight cap into said extension sleeve and said primary vessel;

a drinking tube for delivering liquids to a user;

an oversleeve disposed between said bottle tube and said drinking tube for passing liquids between said bottle tube and said drinking tube and for holding said bottle tube and said drinking tube in structural alignment;

wherein said oversleeve engages said bottle tube in frictional fit engagement and is selectively removable therefrom;

means for attaching said primary vessel to the frame of a bicycle;

means for attaching said drinking tube to the frame of a bicycle;

said means for attaching said drinking tube comprising a mounting clip attached to said bicycle frame; and

a mouthpiece including a one-way valve.

10. A recreational water bottle system comprising:

a primary vessel for holding liquids;

a watertight cap having a female threaded opening adapted to engage said primary vessel;

a bottle tube extending through said watertight cap into said primary vessel;

first and second drinking tubes for delivering liquids to a user;

an oversleeve disposed between said bottle tube and one of said first or second drinking tubes for passing liquids between said bottle tube and one of said first or second drinking tubes and for selectively holding said bottle tube and one of said first or second drinking tubes in structural alignment through frictional engagement;

bicycle mounted receiving means attached to a bicycle frame for selectively receiving said primary vessel; means for attaching said first drinking tube to said bicycle frame;

body mounted receiving means attached to a user's body for selectively receiving said primary vessel; and

means for attaching said second drinking tube to said user's body.

11. The recreational water bottle system of claim 10 further comprising

means for selectively detaching said bottle tube from said oversleeve to permit the bottle to be used as a hand held sport bottle.

12. A recreational water bottle system comprising:

a primary vessel for holding liquids having a male threaded open end;

an extension sleeve having a female threaded lower end adapted to engage said open end of said primary vessel, and a male threaded upper end;

a watertight cap having a female threaded opening adapted to engage either of said primary vessel open end or said upper end of said extension sleeve;

a first drinking tube for delivering liquids to a user;

a second drinking tube for delivering liquids to a user;

a bottle tube extending through said cap into said extension sleeve and said primary vessel;

an oversleeve for communicating liquids between said bottle tube and one of said first or second drinking tubes;

means for selectively attaching said primary vessel to the frame of a bicycle;

means for selectively attaching said first drinking tube to the frame of a bicycle;

means for selectively attaching said primary vessel to the body of a user; and

means for attaching said second drinking tube to the body of a user.

13. The recreational water bottle system of claim 12 further comprising:

a spring sleeve disposed around said first drinking tube; and said means for attaching said first drinking tube comprising a mounting clip attached to said drinking tube or said spring sleeve.

14. The recreational water bottle system of claim 12 wherein one of said drinking tubes comprises memory flex tubing.

15. The recreational water bottle system of claim 12 further comprising:

a mouthpiece including a one-way valve.

16. The recreational water bottle system of claim 12 wherein said cap includes a closable vent.

17. The recreational water bottle system of claim 12 wherein said means for selectively attaching said primary vessel to the body of a user comprises:

a bottle compartment having an upper and lower end;

a belt connected to said bottle compartment at its lower end; and

stabilization straps connected to said belt and to the upper end of said bottle compartment for reducing bottle movement.

18. The recreational water bottle system of claim 12 wherein said means for selectively attaching said primary vessel to the frame of a bicycle comprises a quick release mounting cage.

* * * * *

US005115952A

United States Patent [19]

Jenkins

[11] Patent Number: 5,115,952

[45] Date of Patent: May 26, 1992

[54] DEVICE FOR PROVIDING LIQUID FLUID FOR CYCLISTS

[76] Inventor: **John D. Jenkins**, 5101 236th St., S.W., Mountain Lake Terrace, Wash. 93043

[21] Appl. No.: **557,794**

[22] Filed: **Jul. 26, 1990**

[51] **Int. Cl.**[5] **B62J 7/00**; B62J 7/06

[52] **U.S. Cl.** ..... **224/32 R**; 224/35; 224/36

[58] **Field of Search** ..... 224/32 R, 35, 36, 37, 224/39, 41, 148; 222/129, 145, 142.6, 144.5, 130, 135, 610; 24/30.5 P

[56] **References Cited**

U.S. PATENT DOCUMENTS

581,767	5/1897	Powers	224/148
3,206,074	9/1965	Hoffmann	222/130
3,572,660	3/1971	Mahon et al.	261/78
4,095,812	6/1978	Rowe	280/289 R
4,274,566	6/1981	Rowe	224/35
4,477,950	10/1984	Cisek et al.	24/30.5 P
4,629,098	12/1986	Eger	222/175
4,883,205	11/1989	Saelens et al.	224/32 R
4,911,339	3/1990	Cushing	222/610

FOREIGN PATENT DOCUMENTS

0003058	12/1895	United Kingdom	224/37
0013193	6/1898	United Kingdom	224/36

Primary Examiner—Ernest G. Cusick
Assistant Examiner—David J. Walczak
Attorney, Agent, or Firm—William F. Frank

[57] **ABSTRACT**

The present invention comprises a container clamped to a forward bicycle frame member and containing at least one liquid replacer, a container cap having one tube inserted therein and extending interiorly of the container to the bottom thereof. The one tube is positioned within said cap so that the tube interior end is positioned within the container to maximize the intake of the liquid positioned within the container. The tube extends from the container to and through a clamp on the bicycle handlebars. The tube terminates above the handlebars in a mouthpiece which aids in drawing the at least one liquid from the container by the cyclist. In a multiple compartment container a multipler way valve connects the tubes within the container to the single tube extending from the container to the mouthpiece.

13 Claims, 3 Drawing Sheets

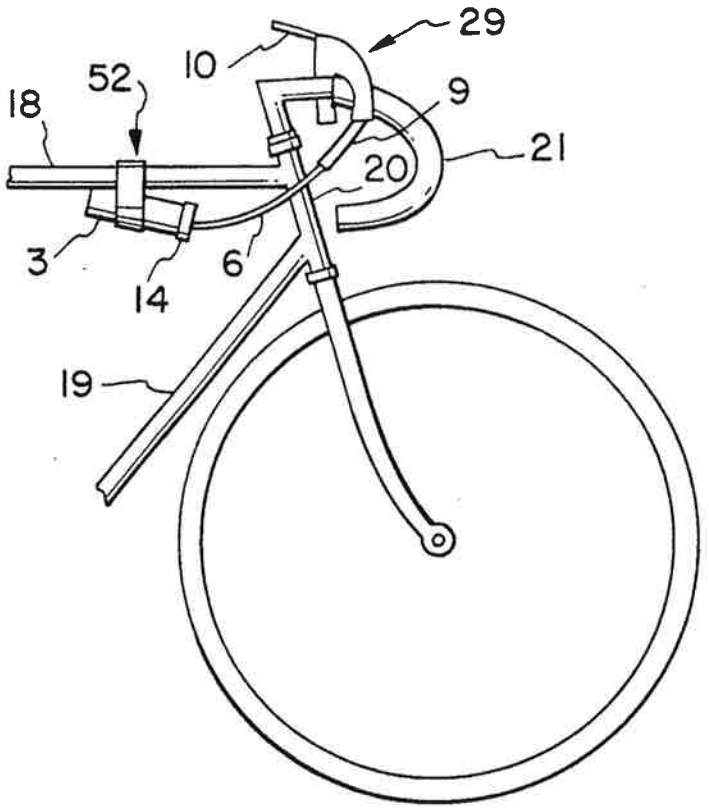
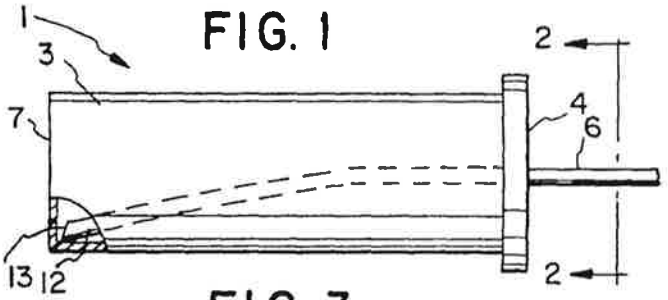


FIG. 1



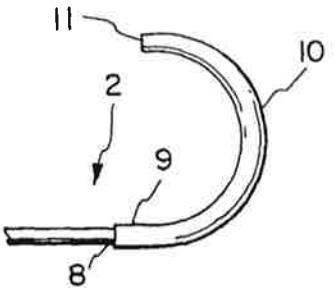


FIG. 2

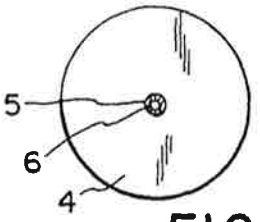


FIG. 3

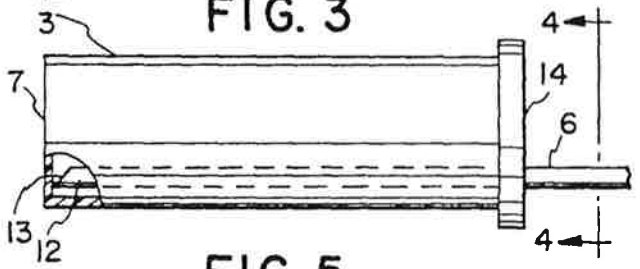


FIG. 4

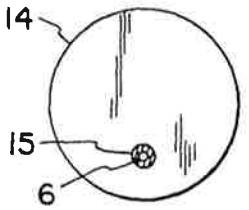


FIG. 5

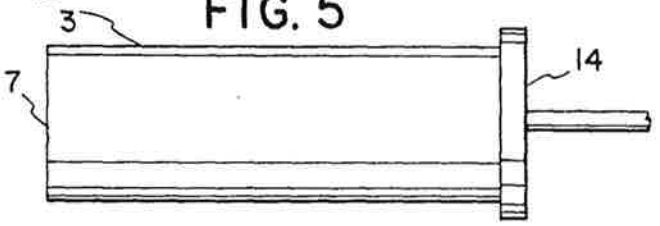


FIG. 6

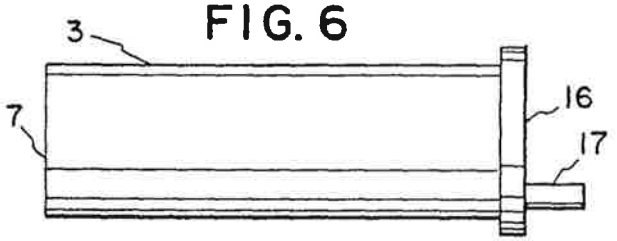


FIG. 7

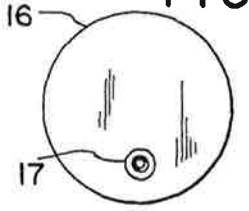


FIG. 8

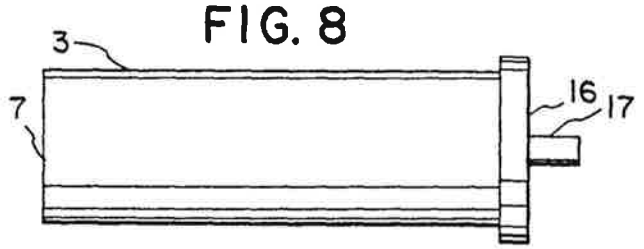


FIG. 12

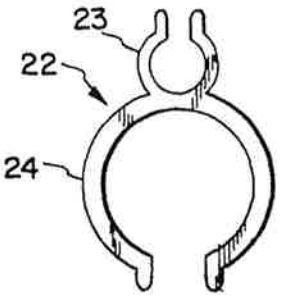


FIG. 21

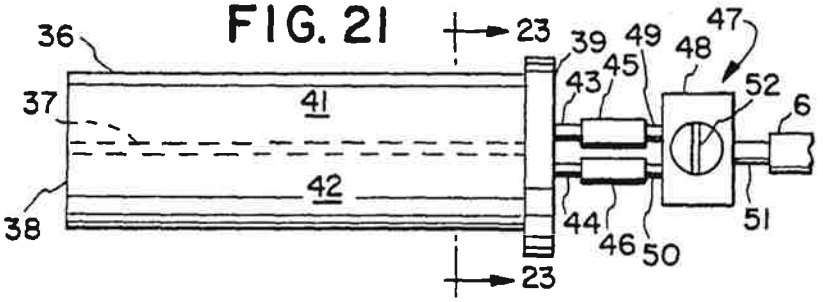


FIG. 13

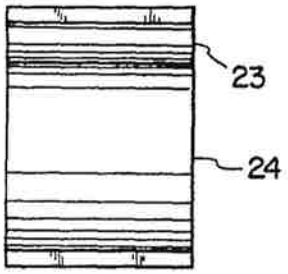


FIG. 9

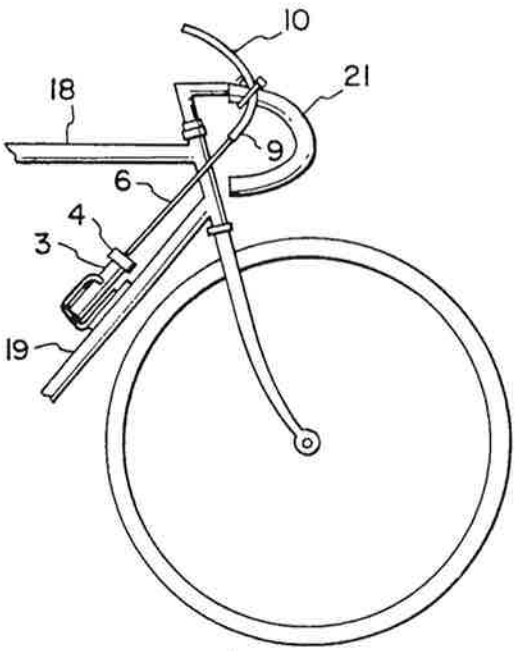


FIG. 10

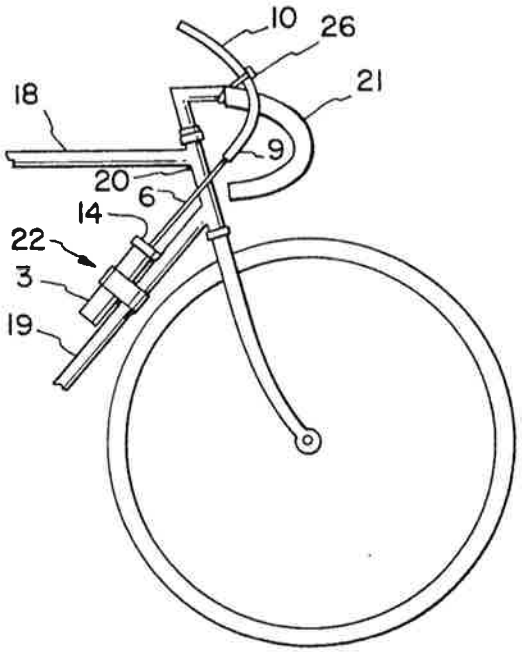


FIG. 11

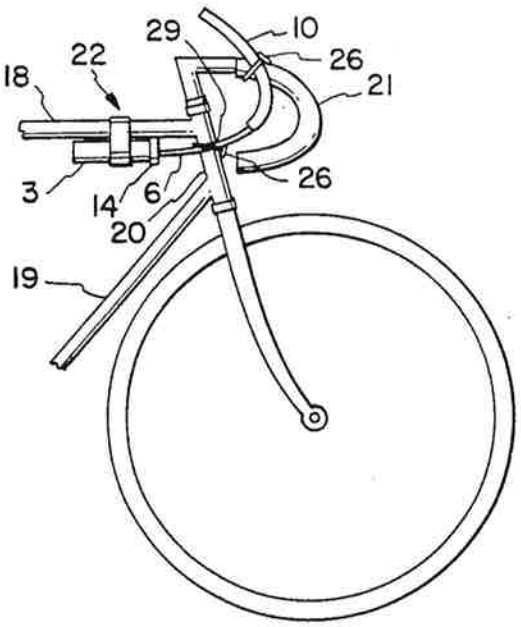


FIG. 27

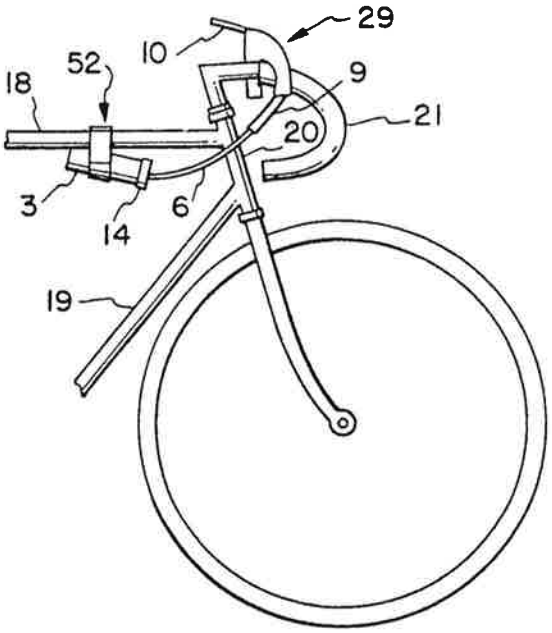


FIG. 24

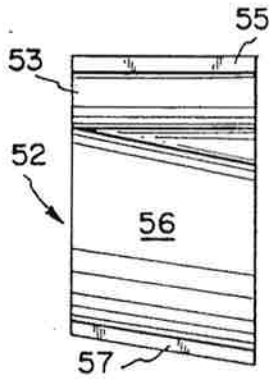


FIG. 26

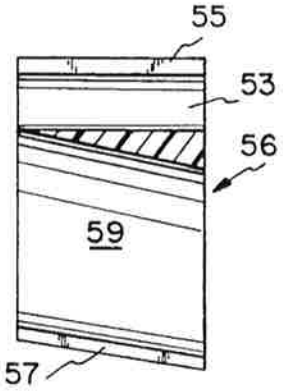


FIG. 25

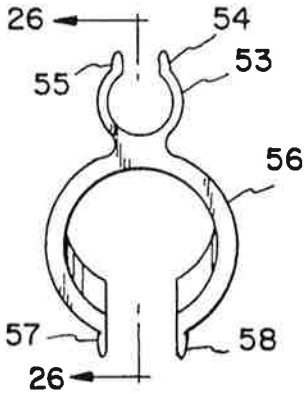


FIG. 15

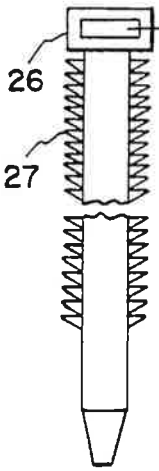


FIG. 16

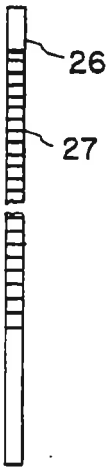


FIG. 17

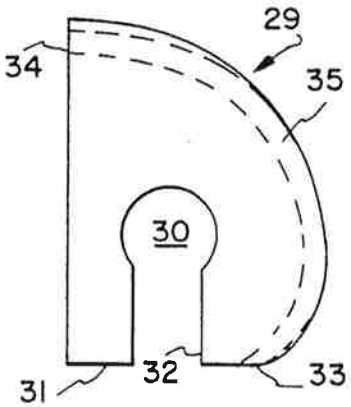


FIG. 19

FIG. 18

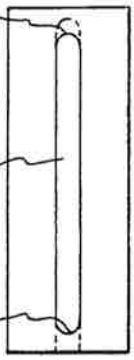


FIG. 20

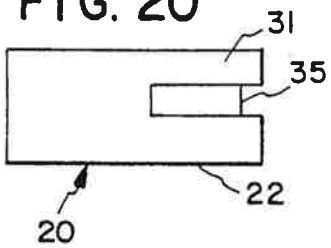


FIG. 22

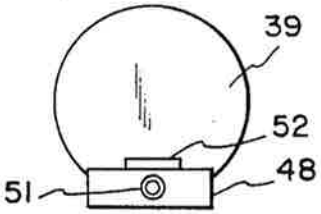


FIG. 14

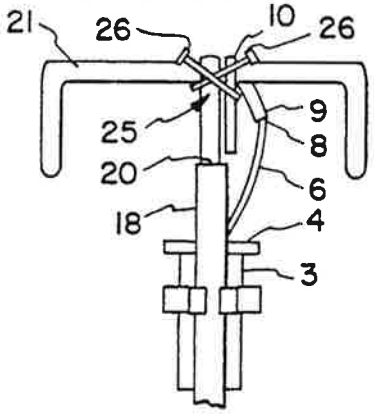
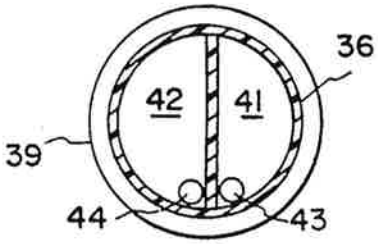


FIG. 23



DEVICE FOR PROVIDING LIQUID FLUID FOR CYCLISTS

FIELD OF INVENTION

The present invention is in the general field of nutrition. More specifically, the invention provides a novel stem for supplying liquids to cyclists.

BACKGROUND OF THE INVENTION

For those who compete in such races as cycling and long distance running, the provision of liquids is not only important during the course but also presents problems in the provisions of liquids to compensate for the body liquids dispensed by the runners and cyclists during their races. The conventional systems for both categories of athletes is to provide cups of liquids at stations along the race course which are grasped and taken by the competitors. For the distance runners, the liquid supply is a open end cup which is quickly taken and cast aside. For cyclists, the problem is different. The cyclists attempt to maintain their speed by minimizing the slowing effect resulting from raising the upper torso to drink from the open end cup as do runners.

To minimize the effect on speed from raising the upper torso, various devices to replace the use of the open end cup have been developed.

The obvious initial improvement in providing the source of liquid replenishment was a plastic bottle clipped to the diagonal frame of a bicycle leading from the pedal hub to the handlebar hub. The bottle obviously had a cap for refilling and a nipple or outlet on the cap from which the cyclist could draw in the liquid. The bottle was held on the frame by a clip having one portion attached to the frame and an opposite portion with resilient arms or means which held the bottle by friction on the shape of the holder. U.S. Pat. Nos. 4,441,638, 4,345,704 and 4,366,922 are excellent examples of the prior art. The bottle supply technique in the prior art yet required the cyclist to raise his torso. None of the art referred to included a tube leading into the bottle and terminating in the cap to permit the cyclist to siphon the liquid into his mouth while yet in a modified crouch position.

U.S. Pat. No. 4,274,566 appears to be the only known art at this time which attempts to overcome the aforesaid shortcomings of the bottle/nipple art. This patent shows a supply bottle mounted on the bicycle frame bar between the pedal hub and the seat. A tube leads from the bottle to a rectangular box mounted on the bar between the seat and the handlebar hub. Inside the box the tube passes forward to a fixed pulley in the front end of the box, loops therearound and passes to the rear of the box where it passes around another pulley which is mounted in the box for slidable movement forward and return to the rear by biasing means connecting the rear of the box and the rear of the frame mounting the other pulley. To use this device, the cyclist grasps the end of the tube extending from the forward end of the box and pulls the tube forward. This motion pulls the rear mounted pulley forward to extend the tube. The cyclist holds the tube in this extended position by grasping the end with his teeth and then siphons the liquid in the bottle through the thus extended tube into his mouth. Once the tube end is in the cyclist's mouth he can resume his racing position. This patent requires the cyclist to momentarily lift one hand from the handlebars, pull the tube out from the box, grasp it with his teeth using the jaw muscles and then siphon the liquid. The distance the liquid must travel both vertically and horizontally plus the cumbersomeness of the device has not made it a popular item of use among cyclists.

SUMMARY OF THE PRESENT INVENTION

The present invention comprises a container clamped to a forward bicycle frame member and containing at least one liquid replacer, a container cap having one tue inserted therein and extending interiorly of the container to the bottom thereof. The one tube is positioned within said cap so that the tube interior end is positioned within the container to maximize the intake of the liquid positioned within the container. The tube extends from the container to and through a clamp on the bicycle handlebars. The tube terminates above the handlebars in a mouthpiece which aids in drawing the at least one liquid from the container by the cyclist. In a multiple compartment container a multiple way valve connects the tubes within the container to the single tube extending from the container to the mouthpiece.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustratively shown in the accompanying drawings.

FIG. **1** is a front elevation view of the basic embodiment of the present invention, the rear, top and bottom views being a mirror image.

FIG. **2** is an end elevation view of FIG. **1**, along the plane **2—2** in FIG. **1**.

FIG. **3** is a front elevation view of another embodiment of the present invention, the rear view being identical.

FIG. **4** is an end elevation view of FIG. **3** along plane **4—4** in FIG. **3**.

FIG. **5** is a top plan view of FIG. **3**, the bottom view being a mirror image.

FIG. **6** is a front elevation view of a third embodiment of the present invention, the rear view being a mirror image.

FIG. **7** is a right end view in elevation of FIG. **6**.

FIG. **8** is a top plan view of FIG. **6**.

FIG. **9** is a front elevation view of a container of the present invention mounted on a bicycle, using a conventional wire holder bolted to the frame member, the rear view being identical.

FIG. **10** is a front elevation view of FIG. **3** mounted on a bicycle using a new container holder of the present invention.

FIG. **11** is a front elevation view of an alternate mounting of the liquid container of the present invention.

FIG. **12** is an elevation of one end of an embodiment of the new liquid container hanger of the present invention, the opposite end view being a mirror image.

FIG. **13** is a side elevation view of FIG. **12**.

FIG. **14** is a top plan view of the securing of the exhaust portion of the liquid supply line of the present invention to the handlebars of a bicycle.

FIG. **15** is a top plan view of a strap used in FIG. **14**.

FIG. **16** is a side elevation view of FIG. **15**.

FIG. **17** is a front elevation view of a liquid supply line support bracket of the present invention, the rear view being a mirror image.

FIG. **18** is a right end elevation view of FIG. **17**.

FIG. **19** is a left end elevation view of FIG. **17**.

FIG. **20** is a top plan view of FIG. **17**.

FIG. 21 is a top plan view of another embodiment of the liquid container of the present invention, the bottom plan view being a mirror image.

FIG. 22 is a right end view in elevation of FIG. 21.

FIG. 23 is a cross-section view along plane 23—23 in FIG. 21.

FIG. 24 is a side elevation view of another embodiment of the hanger of the present invention for a liquid container.

FIG. 25 is a right end view of FIG. 24.

FIG. 26 is a cross-sectional view of FIG. 24 along plane 26—26.

FIG. 27 is an elevation view of the present invention using any of the containers of the present invention with the support brackets of FIG. 17 and container hanger of FIG. 24.

DETAILED DESCRIPTION OF THE INVENTION

With reference to FIGS. 1 and 2, this embodiment comprises a liquid source 1 and a supply line 2. The liquid source 1 comprises a cylindrical container 3 of a conventional type and a cap 4 which may be secured to container 3 by threads or a bayonet type connector. Cap 4 has a center opening into which a portion of the supply line 2 is inserted in frictionally sealing contact. Supply line 2 comprises two portions, intake portion 6 extending from the bottom 7 of container 3, through cap 4 to a juncture 8 where it is inserted into end 9 of exhaust portion 10 which terminates in end 11. Intake portion 6 of supply line 2 is flexible plastic tubing of conventional type. Exhaust portion 10 is a rigid plastic tubing formed into the arcuate shape shown. End 11 of portion 10 is uncovered for two reasons. The first and most important is that the cyclist needs only to place end 11 in this mouth and draw the liquid up through the supply line 2. The second reason is that as the bicycle moves forward through the ambient air, the air passing over the open end 11 may create a partial vacuum at end 11, which, if it occurs, could draw some of the liquid replenishment in container 3 up into intake portion 6 outside the cap 4. As will be noted in the breakaway portion of container 3 the innermost end 12 of portion 6 terminates in a diagonal cut 13. Diagonal cut 13 prevents the end portion 12 of portion 6 from sealing itself against the interior surface of end 7 of container 3 which would prevent flow of liquid replenishment from container 3.

Referring now to FIGS. 3, 4 and 5, in this second embodiment the difference between these FIGS. and FIGS. 1 and 2 is the cap 14 secured to container 3 as described with reference to FIGS. 1 and 2. Cap 14 differs from cap 4 in that intake portion 6 passes through an opening 15 in the peripheral portion of cap 14, opening 15 being so positioned in cap 14 that intake portion 6 lies along the interior wall of container 3. Other than this distinction the remaining description set forth above with reference to FIGS. 1 and 2 is identical.

With reference to FIGS. 6–8, in this third embodiment, the difference between these latter FIGS. and FIGS. 3–5 is the cap 16 which is secured to container 3 as previously described. The opening in cap 16 is formed by an outwardly extending nipple 17 over which the end of intake portion 6 is placed. This embodiment eliminates the segment of intake portion 6 which extends within container 3 as previously described. FIGS. 6–8 provide for an entirely new positioning of container 3 as will be subsequently described.

FIGS. 9 and 10 show the positioning of the embodiments in FIGS. 1–5 on a bicycle frame. The components of the bicycle frame are well known and require no additional identification. As seen, container 3 of both embodiments is identically positioned on the bicycle frame. The following description, in the interest of brevity, is equally applicable to both FIGS. 9 and 10.

FIGS. 9–16 show the mounting of the embodiments of FIGS. 1, 3 and 6 on the various frame elements of a bicycle. These are identified as the horizontal frame 18 extending from the seat post hub to the handlebar post/-front wheel fork hub 20; the diagonal frame 19 extending from the pedal hub to hub 20 and the handlebars 21 positioned in hub 20. A container retaining means 22 comprises an integrally formed omega shaped frame clamp 23 and an omega shaped container clamp 24, the retaining means being formed from a resilient metal or thermoplastic material. The diameter of clamp 23 may vary in accordance with the diameter of the bicycle frame element. The exhaust portion 10 rests on the handlebars and can be secured thereto by an X-crossing of plastics ties 26, an example 25 of which is seen in FIG. 14 or well known plain plastic strips. Tie 26 has an advantage in that though sawtooth tab 27 can be pulled through slot 28 in tie 26 until the desired tightening of exhaust portion 10 to handlebar 21 is achieved. The tab 27 can be compressed laterally to release the sawtooth from contact with the outer edges of slot 28 and pushed back through slot 28 to release and remove exhaust portion 10 from contact with the handlebar 21. In some instances to provide greater stability to exhaust portion 10, intake portion 6 is secured to hub 20 by a circumferential wrapping 29 of a tie 26 about hub 20 as shown in FIG. 11. FIGS. 9 and 10 show container clamping means 22 positioned on frame 19. FIG. 11 shows clamping means positioned on frame 18. The position shown in FIG. 11 is preferable because container 3 is in a horizontal position and as such the liquid replenisher does not have to be siphoned along a vertical vector, this being particularly true when the embodiment of FIGS. 3 and 6 are used.

FIGS. 17–20 show a novel mounting bracket 29 for the exhaust portion 10. As seen in FIG. 17, the bracket is basically of a quadrant shape with an omega shaped opening 30 with opposing arms 31 and 32 on its lower edge. Opening 30 is fitted over one of the handlebars at the vicinity of the handlebar post in a frictional retaining fit. FIGS. 18–20 discloses an opening 33 on its lower edge and an opening 34 on its upper edge and a groove 35 interconnecting the two openings. The exhaust portion 10 is inserted into opening 33, inserted into groove 35 and extended toward the cyclist through opening 34. The bracket can be rotated about a handlebar to accommodate the cyclist so that he need only move his head to the end 11 of exhaust portion 10 to begin to draw in the liquid replenisher.

FIGS. 21–23 illustrate a novel liquid replenishment container 36. Container 36 is of conventional outer shape as in FIGS. 1–8. However, it differs from those containers 3 in that the interior of container 36 is divided in half by a wall 37 extending from the end 38 to the container opening (not visible). Container 36 is closed by a cap 39 having a peripheral opening therein (not visible) centrally positioned in relationship to each half 41, 42 of container 36 as was shown and described with reference to FIGS. 6–8. Each opening in cap 39 has a nipple 43, 44 extending outwardly therefrom as described with reference to FIGS. 6–8. From each

nipple 43, 44 there extends a short tubing 45, 46 which terminates in a valve means 47. Valve means 47 comprises a valve body 48 having two nipples 49, 50 extending rearwardly toward cap 39 to receive tubing 45, 46 respectively. The forward side of valve body 48 has a nipple 57 to which an intake portion 6 is connected and which leads to exhaust portion 10. Valve body 48 contains a valve 52 which can be selectively positioned to provide access to tubing 45 or to 46 or to prevent access to either. Because of the dual compartment of container 36 cap 39 is connected to container 36 by a bayonet type junction (not visible but well known in the connector art) to insure the contents of container 36 can be properly discharged.

FIGS. 24–26 illustrate a second novel support 52 for the container shown and described with reference to FIGS. 1–8 and 21–23. This support provides that the containers 3 and 36 will be inclined downwardly toward handlebar/front fork hub, thus insuring that all liquid will flow to the respective cap openings to be drawn from the containers. Additionally, the downward inclination of the container will insure that the liquid(s) in the respective containers will enter into the intake portion 6 up to a level commensurate with the level of the liquid(s) in the container. Support 52 comprises an omega shaped bracket 53 having lips 54 and 55 to be clamped onto the horizontal bar connecting the seat post hub with the handlebar/front fork hub. Depending from bracket 53 is another omega shaped bracket 56 having lips 57 and 58. It will be seen that the opening 59 in bracket 56 is inclined downwardly.

FIG. 27 shows the present invention installed on a bicycle frame in a preferred position.

Such modifications as may occur to those of skill in the art are considered to be within the scope of the present invention as described therein and set forth in the appended claims.

What is claimed is:

1. A body liquid replenishment system for cyclists mounted on said cyclists' cycle comprising container means for said liquid replenishment mounted on said cycle, means to supply said liquid to a cyclist operatively connected to said container means and extending outwardly therefrom and directed toward said cyclist's face, means of securely position said container means on a frame member of a bicycle and means to secure one end portion of said supply means on said bicycle handlebars in proximity to a cyclist's head when said cyclist is in a racing position so that a cyclist can draw or suck said liquid replenishment from said container through said supply means, said supply means other end being connected to an end of said container, said container positioning means comprising a pair of clamping elements integrally formed in a back to back relationship of a resilient material, each clamping element having an omega shape, one of said omega shapes having an internal diameter minimally less than said frame member diameter to insure a frictionally secure fit with said frame member, said other omega shape having a diameter minimally less than said container means exterior diameter to insure a frictionally secure fit with said container means, said container omega shape clamping element having a longitudinal axis which is inclined downwardly and forwardly with reference to said bicycle frame member clamping element and a longitudinal axis thereof so that when said container is mounted on said frame said supply means is connected to the lowest part of said container means.

2. The system according to claim 1 wherein said container means comprises a cylindrical bottle having a closed end and an open end and cap means for said bottle, said cap means having means thereon to receive said liquid supply means other end portion to permit withdrawal of a liquid within said container.

3. The system according to claim 2 wherein said means to receive said supply means other end comprises a central opening on said cap means to engage said supply means other end portion in a frictional and sealing relationship.

4. The system according to claim 2 wherein said means to receive said supply means other end portion comprises an opening on the periphery of said cap means to engage said supply means other end in a frictional and sealing relationship.

5. The system according to claim 2 wherein said means to receive said supply means other end portion comprises an opening on the periphery of said cap means and an integrally formed nipple encompassing said opening and extending outwardly from said cap means outer surface to engage said supply means other end in a frictional and sealing relationship to maximize withdrawal of said replenishment.

6. The system according to claim 2 wherein said liquid supply means comprises plastic tubing, said one end portion being formed of a rigid tubing configured into an arcuate shape, one ned of said shape being positioned above said handlebars in proximity to said cyclist's head to give access to said liquid to said cyclists, the opposite end of said shape being joined to one end of a flexible member of said tubing, the opposite end of said flexible member being in contact with said cap means to permit withdrawal of a liquid replenishment in said container.

7. The system according to claim 6 wherein said opposite end of said flexible member passes through said cap means and terminates within said container at said container closed end, said flexible member opposite end terminal end having a diagonally cut terminus.

8. The system according to claim 6 wherein said opposite end of said flexible member is fitted upon a nipple extending outwardly from said cap means.

9. The system according to claim 1 wherein said securing means comprises a pair of clamping elements integrally formed in a back to back relationship of a resilient material, each clamping element having an omega shape, one of said clamp's omega shape diameter being minimally less than said frame member diameter to insure a frictionally secure fit with said frame member, said other clamp's omega shape diameter being minimally less than said container means exterior diameter to insure a frictionally secure fit with said container means, said clamping elements omega axes being parallel to each other in spaced apart vertical planes.

10. The system according to claim 1 wherein said means to secure said one end portion of said supply means on said bicycle handlebars comprises a pair of flexible plastic straps having buckle means on one end of each strap, said straps securing said one end portion to said handlebars in a X-shaped crossing of said straps about said handlebars and securing each strap within its respective buckle.

11. The system according to claim 9 wherein each strap is formed with a plurality of angular teeth along each strap longitudinal length.

12. The system according to claim 1 wherein said securing means comprises a bracket of thermoplastic

resilient material having parallel spaced apart flat side surfaces, lower side portions of said bracket having a transversely formed omega shaped opening therethrough to frictionally and securely engage one of said handlebars, one end of said bracket having a flat surface with an opening on an upper portion and an identical opening on a lower surface to receive and hold said one end portion of said supply means, said bracket opposite end having an arcuate shape interconnecting top and bottom surfaces of said bracket, said opposite end having a groove therein interconnecting said top and bottom openings to receive said one end portion of said supply means.

13. The system according to claim **1** wherein said container means comprises a cylindrical bottle divided interiorly into two equal compartments and a cap means having a pair of peripheral positioned outwardly extending nipples integrally formed thereon, each nipple communicating respectively with one of said compartments, said cap means further having valve means with separate connections to each nipple for selective intake from said container compartments and an outlet from said valve means for connection to said liquid supply means.

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