June 20, 1967 R. L. NEUHAUSER 3,326,695

SELF-ELEVATING EXTENSIBLE DRINKING STRAW

Filed Dec. 12, 1963 2 Sheets-Sheet 1

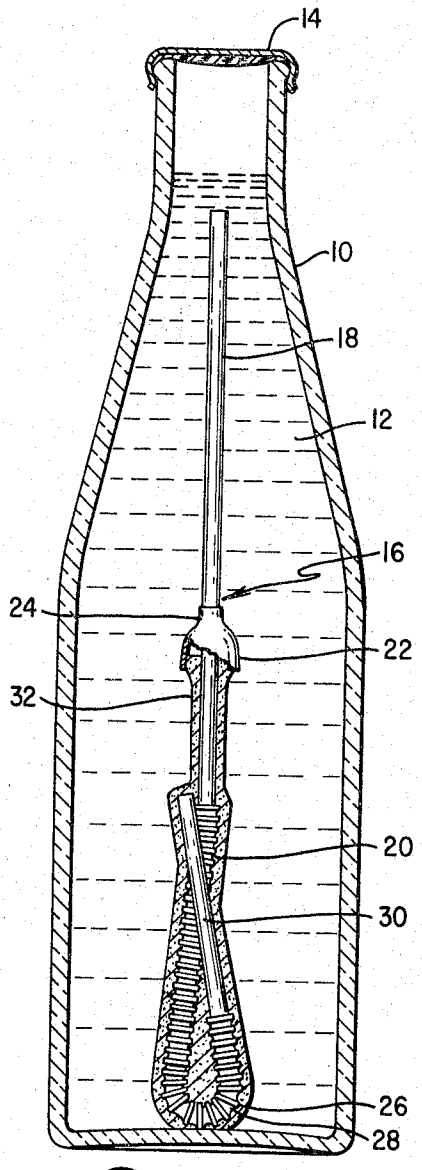

Fig. 1

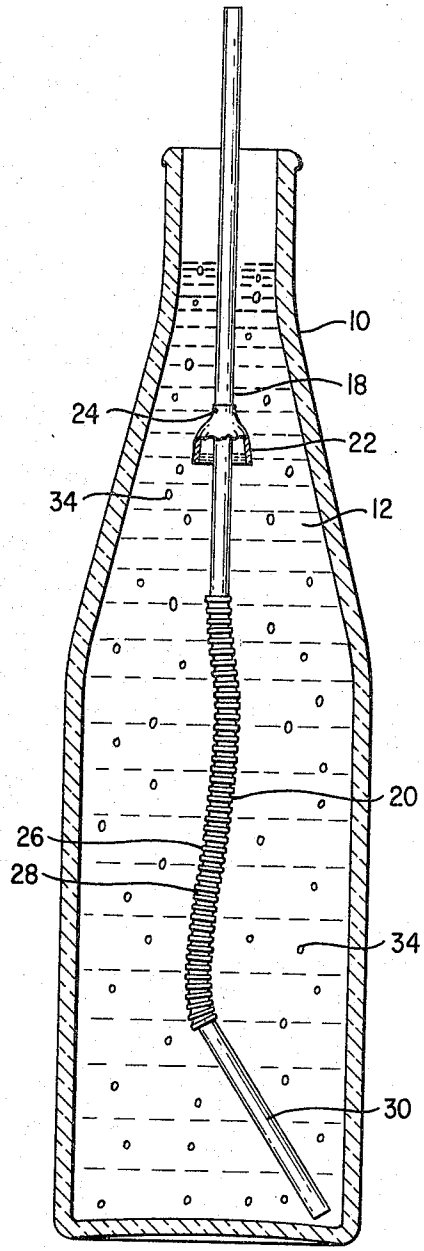

Fig. 2

INVENTOR.
ROY L. NEUHAUSER
BY Malcolm W. Fraser
ATTORNEY

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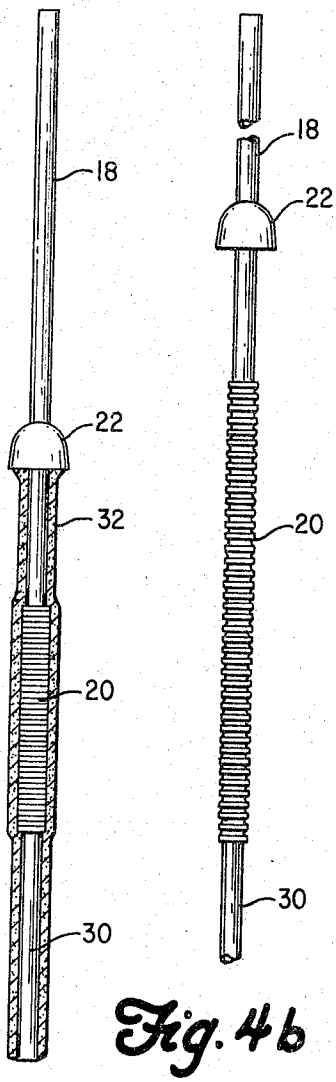

Fig. 4a

Fig. 4b

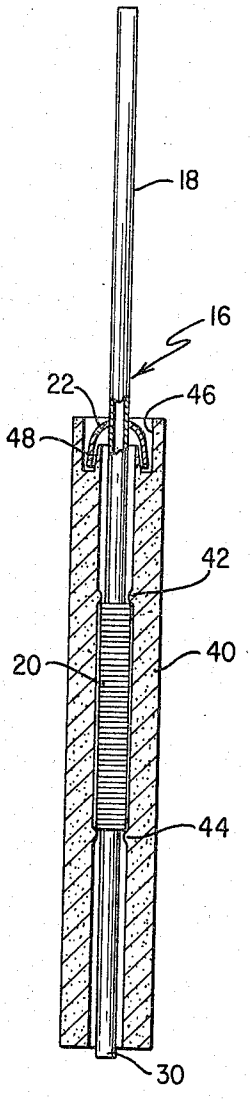

Fig. 5

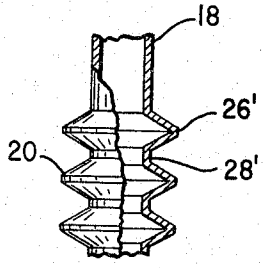

Fig. 3

INVENTOR.
ROY L. NEUHAUSER
BY Malcolm W. Fraser
ATTORNEY

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SELF-ELEVATING EXTENSIBLE DRINKING STRAW

Roy L. Neuhauser, 875 W. Cresta Drive, Tucson, Ariz. 85714

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2 Claims. (Cl. 99—138)

The present invention relates to an improved drinking straw, and more particularly to a self-contained and self-elevating extensible drinking straw for bottles containing carbonated beverages.

An object of the invention is to produce an extensible drinking straw which may be totally contained within a container of carbonated beverage, for example; and when the container is opened, the upper end portion of the straw will rise out of the container into a drinking or sipping position, while the opposite end remains immersed in the beverage and effectively maintains communication with the bottom portion of the container.

In a preferred embodiment, the invention may be defined as a drinking straw for use in an associated container for effervescent beverages which typically comprises an elongate hollow tubular member having a relatively rigid section and an extensible and contractible section, and means attached to the hollow tubular member extending radially outwardly therefrom for capturing a portion of the gases liberated from the beverage to thereby effectively raise one end of the drinking straw out of the associated container; while the other end remains immersed in the beverage adjacent the bottom of the container.

Other objects and advantages of the invention will become manifest from reading the following detailed description of the invention considered in the light of the attached drawings in which:

FIGURE 1 is a sectional view of the invention showing the drinking straw entirely within an associated closed container;

FIGURE 2 is a sectional view of the invention shown in FIGURE 1 after the container has been opened and the drinking straw has been caused to be raised to a drinking position;

FIGURE 3 is an enlarged fragmentary partial cut-away illustrating a modified form of the flexible portion of the drinking straw of the invention;

FIGURES 4*a* and 4*b* illustrate modified forms of the drinking straw illustrated in FIGURES 1 and 2; and

FIGURE 5 is a sectional view of a device of another form of the invention illustrated in FIGURE 4.

Referring to the drawings, there is illustrated in FIGURES 1 and 2 a container or bottle **10**, typically formed of glass, for containing a carbonated beverage **12** and having a top closure or cap **14**. A drinking straw **16**, embodying the novel features of the invention, is disposed within the beverage **12**.

The drinking straw **16** is typically formed of a helically wrapped paper-like material having a suitable resin or wax coating which is insoluble in the beverage **12**. The straw **16** includes an upper section **18** which is relatively rigid and a lower section **20** which is relatively flexible.

The upper section **18** of the straw **16** is provided with a radially outwardly extending element **22** which is typically of substantially bell-shaped cross-sectional configuration. The element **22** may be suitably formed of a material insoluble in the beverage **12**, such as for example, acrylic polyester, laminated paper, plastic or aluminum. The constricted end **24** of the element **20** conforms to the shape of the upper section **18** of the straw **16** and has an inside diameter to enable a snug engagement between it and the associated straw **16**. It will be clearly appreciated that the desired firm engagement between the element **22** and

the upper section **18** of the straw **16** may be readily achieved by the application of a suitable cement which when set is insoluble in the beverage **12**; or alternately by maintaining the relative inside dimensions of the constricted end **24** and the outside dimension of the upper section **18** such that a force or press fit may be achieved therebetween.

The lower section **20** of the drinking straw **16** is fabricated in a manner to render the same flexible and capable of being bent without collapsing the internal passageway. The lower flexible section **20** may typically consist of a series of ribs **26** and grooves **28** which may be formed in any of the well known manners at the time of manufacture of the straw or at a subsequent stage. The ribs **26** may have a relatively flat peripheral surface as illustrated in FIGURES 1 and 2, wherein the grooves **28** have a curved cross-sectional configuration. The ribs **26** and grooves **28** which constitute the flexible portion **20** of the straw may satisfactorily be of the general type illustrated in FIGURES 1 and 2, or could be formed in a helical manner. In this latter instance, the ribs **26** and grooves **28** would be formed as continuous spaced parallel elements helically formed from one end of the flexible portion to the other. The configuration of the flexible portion **20** of the straw is in effect similar to a bellows and effectively minimizes the tensile strain, as well as the compression strain, necessary to bend or compress the flexible portion **20** without rupturing or collapsing the straw **16**.

It has been found advantageous, in certain instances, to provide a rigid tip portion **30** on the lower terminal end of the drinking straw **16**. During the use of the drinking straw **16**, the free end of the tip portion **30** remains in close contact with the bottom of the container **10** thereby enabling the removal of all of the beverage **12** through the straw **16**. The length of the tip portion **30** of the straw is preferably slightly less than the inside diameter of the bottom of the container **10** to thereby prevent the tip portion **30** from being wedged in the container between diametrically opposed wall surfaces thereof and thus restrict or even possibly completely cut off the flow of the beverage through the straw.

In order to render the drinking straw assembly less buoyant and to facilitate the installation thereof in the associated carbonated beverage container **10**, the zone defined by the interior surface of the element **22** and the outer surface of the flexible portion **20** is covered and coated by a material **32** which is soluble in the beverage **12**. The soluble material **32** may typically be a sugar or the like and is to be used to more or less lock the flexible lower portion **20** and the lower tip portion **30** in a folded position as shown in FIGURE 1. Typically, the drinking straw assembly in its uncoated form is held in substantially the position shown in FIGURE 1 and immersed in a molten sugar bath and then withdrawn, allowing the substance **32** to harden thereby causing the assembly to retain the position as shown in FIGURE 1. This enables the entire assembly to be inserted into the bottle or container **10** through the reduced upper neck portion either before, during, or after it has been filled with the carbonated beverage **12**. The assembly of the straw and the soluble material **32** is of sufficient weight to cause the entire assembly to assume a position in contact with the interior bottom wall of the bottle **10**. In this position of rest, such as to be completely immersed within the beverage **12** the straw **16** will not interfere with the filling of the bottle **10** with the carbonated beverage **12**, or with the application of the top closure or cap **14**.

After the top closure or cap **14** is suitably secured to the top of the bottle **10**, the soluble material **32** will dissolve and go into the solution of the beverage **12** allowing

the flexible portion **20** and the lower tip portion **30** to unbend enabling the tip **30** to swing through an arc so that the open end thereof may make contact with the bottom of the bottle. The unflexing of the flexible portion **20** is accomplished due to the inherent "memory" of material comprising the straw. Normally, the straw **16** tends to assume a relatively straight configuration when no external forces are applied thereto. However, when it is flexed and then coated with the material **32**, the straw **16** will remain in the flexed condition until the external forces are removed by the dissolution of the soluble material **32**; whereupon, the flexible portion **20** attempts to straighten and return to its normal flexed condition.

It will be understood that when sugar is employed for the soluble material, the composition of the beverage **12** being inserted into the bottle **10** must be deficient in its sugar content equal to the actual amount of sugar cast upon the drinking straw.

An alternate method of causing the straw assembly **16** to assume the bent or flexed condition illustrated in FIGURE 1, the soluble material **32** such as sugar, may be injected into the interior of the straw and then the straw is held in the flexed position until the soluble material is set and then the assembly is inserted into the container **10** in the manner described above.

With reference to FIGURE 2, the drinking straw assembly **16** is shown in its drinking or sipping position after the top closure or cap **14** has been removed from the associated bottle **10**. After the cap **14** has been removed, the carbon dioxide content within the beverage **12** tends to go out of solution and escape from the beverage in the form of gas bubbles generally indicated by reference numeral **34**. As the effervescence of the beverage **12** continues, certain of the carbon dioxide bubbles are captured within the interior zone of the element **22** which tends to impart additional buoyancy to the drinking straw assembly to cause the same to rise in the bottle to the drinking position as illustrated in FIGURE 2. In addition to the elevating effect of the captured gas, the elevation of the drinking straw **16** in the container **10** is assisted by the forces tending to unflex and cause the flexible portion **20** to return to its normal unflexed condition. It will be clearly apparent that in this manner the invention provides an inexpensive and efficient means for providing the customer of the carbonated beverage with a sanitary drinking straw which automatically elevates to a drinking position when the container is opened.

As mentioned above, one of the typical methods for applying the soluble material **32** to the straw **16** is by casting the material upon the outer surface of the lower portion **20**. Since most of the carbonated beverages are flavored with natural flavors added from fruits, nuts, roots, herbs and bark and leaves of plants, sugar is a material readily suitable for use with the invention and is readily compatible with carbonated beverages presently known as soda, pop, and soft drinks and includes ginger ale, cola beverages and numerous other types, is easily handled, and may readily be cast onto the exterior surface of the assembly or injected into the hollow interior of the straw **16**, as discussed above.

With reference to FIGURE 3, there is shown an alternate configuration for the ridges and grooves explained with reference to FIGURES 1 and 2. More specifically, the flexible portion **20** of the straw assembly is comprised of a plurality of ridges **26'** and associated grooves **28'** which in cross-section more clearly are in the form of a conventional bellows-type arrangement.

Now referring to FIGURES *4a* and *4b*, there is shown another embodiment of the invention wherein identical structural elements of the drinking straw illustrated and described with reference to FIGURES 1 and 2 are referred to by like reference numerals. In these figures, the drinking straw assembly **16** includes a flexible section **20** fabricated in the same manner as in the foregoing embodiment illustrated in FIGURES 1 and 2, but at the time of encapsulation in the soluble material, the flexible section **20** is compressed axially instead of bending or folding and held in the compressed state for a period of time sufficient to allow the soluble material, such as sugar, to solidify and thereby hold the straw assembly in a reduced or decreased overall length condition. The overall length of the drinking straw assembly is then less than the interior dimension between the top and bottom walls of an associated container. The assembly may then be readily inserted in the container in the manner described hereinbefore covering the embodiment of the invention illustrated in FIGURES 1 and 2 Thereafter, the molten material **32** dissolves, allowing the flexible section **20** to return to its original uncompressed length, thus increasing the overall length of the drinking straw **16** and especially the length thereof below the element **22**. The straw assembly is then readily elevated after the uncapping of the container **12**, and the rigid bottom tip portion **30** will be in effective contact with the bottom of the container **10** while the upper end of the straw is in a drinking position outside of the top of the container.

Another embodiment of the invention is shown in FIGURE 5 wherein the flexible portion **20** of the drinking straw is held in a state of compression by a hollow encapsulating tube or cylinder **40** of a soluble material, such as sugar. The hollow cylinder **40** may be formed by the compression of granules of sugar in a manner similar to the ordinary sugar lump, or it may be cast in a mold from the molten state. The hollow cylinder **40** has on the inner surface thereof a pair of spaced apart annular inwardly extending rib-like projections **42** and **44** which act to retain the opposite end portions of the flexible portion **20** of the drinking straw assembly **16**. The annular projections **42** and **44** are so spaced that when the flexible portion **20** of the drinking straw **16** is in its somewhat fully compressed state as shown in FIGURE 5 and inserted within the cylinder **40**, that they prevent the flexible portion **20** from returning to its original uncompressed free length. The drinking straw **16**, due to its relatively flexible nature, can be inserted with sufficient mechanically applied force past the projection **42** and into proper inserted position at any time between the time the straw is manufactured and the time that it is to be inserted into an associated container. It will be noted that the free end of the lower rigid tip portion **30** extends below the lower surface of the cylinder **40** so that the tip **30** will not be closed off by the cylinder **40** after it has been inserted into a container. Such an arrangement allows the beverage within the container to pass upwardly through the drinking straw **16** at the time of its insertion into an associated container to prevent a buoyant action which might be caused by entrapped air and prevent any bobbing up and down of the assembly within the container. Further, the hollow cylinder **40** is provided with a well-like portion **46** having an upwardly extending truncated cone **48** coaxially located therein and adapted to militate against an overabundance of air or gas being retained within the interior of the zone defined by the element **22**.

It will be understood that the hollow cylinder **40** being formed of a soluble material is dissolved and goes into solution of an associated beverage and allows the flexible portion **20** of the drinking straw **16** to return to its normal elongate compressed condition in the same manner as described in condition with the description of FIGURES *4a* and *4b*.

Although the description has thus far referred to the straw as being formed of a paper-like material, it will be readily apparent that other materials such as plastic which have the same or similar "memory" characteristics may likewise be satisfactorily employed in carrying out the objectives of the invention.

According to the provisions of the patent statutes, I have explained the principle and mode of operation of my invention and have illustrated and described what I now consider to represent its best embodiments. How-

ever, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

What I claim is:

1. A drinking straw for use in containers for effervescent and carbonated beverages comprising an elongated hollow straw member having a relatively rigid top portion and a bottom portion, said straw member including an extensible and compressible portion between said top and bottom portions and close enough to said bottom portion to be immersed within the beverage, a beverage soluble coating material on said extensible and compressible portion maintaining said portion in a compressed condition, and a bell-shaped element attached to said top portion and close enough to said bottom portion to be normally immersed within the beverage, said bell-shaped element extending radially outwardly and downwardly from said top portion for capturing a portion of the gases liberated from the beverage to thereby effectively raise said straw member into a drinking position.

2. The invention defined in claim 1 wherein said beverage soluble material is a soluble sugar.

References Cited

UNITED STATES PATENTS

942,306	7/1909	Clarke	210—1
2,613,988	10/1952	Jarbeau	215—1
3,099,565	7/1963	Neuhauser	99—138

FOREIGN PATENTS

1,022,157	12/1952	France.
1,136,439	12/1956	France.
904,010	8/1962	Great Britain.

A. LOUIS MONACELL, *Primary Examiner.*

RAYMOND N. JONES, *Assistant Examiner.*