

[72] Inventor **Ward Benjamin Davis**  
 Glendale, Calif.  
 [21] Appl. No. **800,887**  
 [22] Filed **Feb. 20, 1969**  
 [45] Patented **Nov. 16, 1971**  
 [73] Assignee **Sterilizer Control Royalties (a Trust)**  
 Los Angeles, Calif.

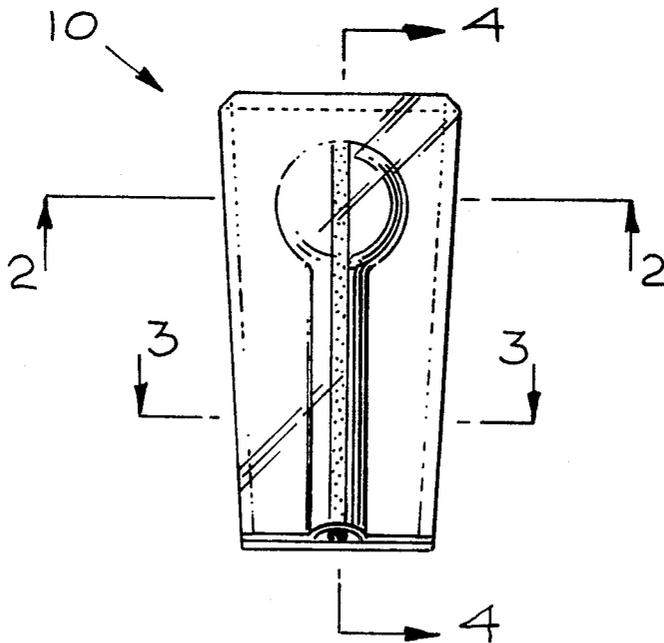
[56] **References Cited**  
**UNITED STATES PATENTS**  
 2,940,448 6/1960 Furlong, Jr. .... 23/259 UX  
 3,476,515 11/1969 Johnson et al. .... 23/253 X

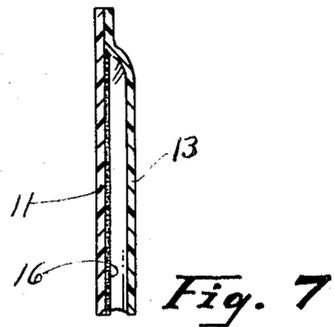
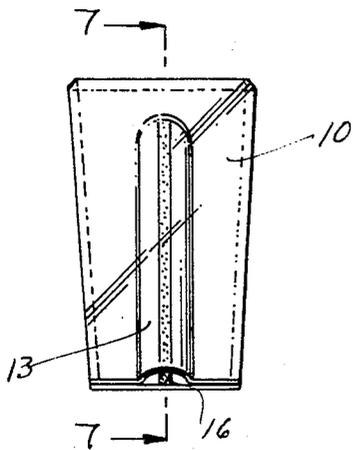
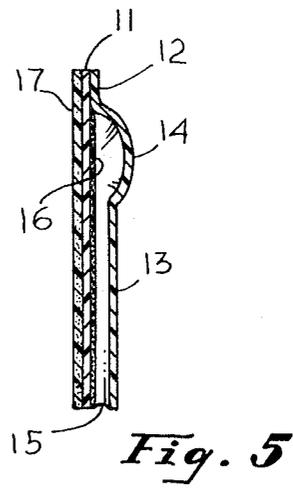
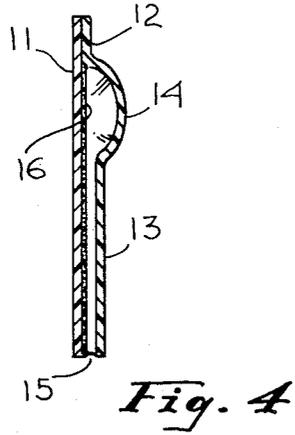
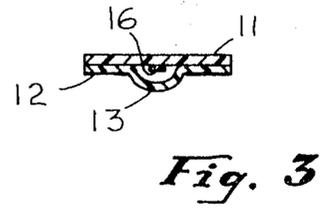
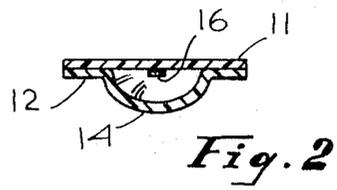
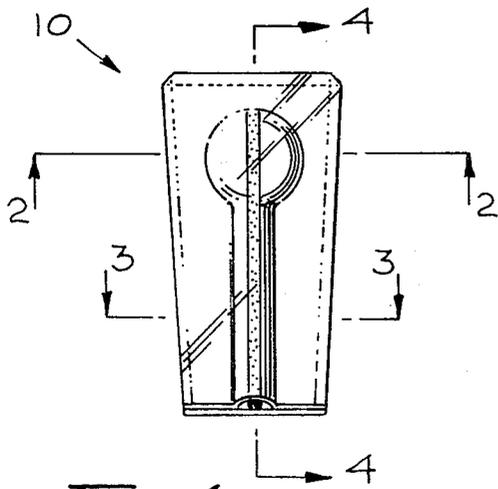
*Primary Examiner*—Morris O. Wolk  
*Assistant Examiner*—R. M. Reese  
*Attorney*—Miner L. Hartmann

[54] **DISPOSABLE COLORIMETRIC INDICATOR AND SAMPLING DEVICE FOR LIQUIDS**  
 6 Claims, 7 Drawing Figs.

[52] U.S. Cl. .... **23/253 TP,**  
 116/114, 128/2, 206/56  
 [51] Int. Cl. .... **B65d 83/00,**  
 G01n 31/22, G01n 33/18  
 [50] Field of Search ..... **23/253 TP,**  
 253, 259; 206/43, 56 A, 17.5; 128/2 R, 231, 132;  
 116/114.19, 114.20

**ABSTRACT:** A disposable colorimetric indicator and sampling device for liquids is formed by embossing a synthetic plastic sheet with a syringelike cavity and closing the cavity by adhering a plane synthetic plastic sheet over the cavity, the two sheets being either heat sealed or adhesively joined together on the margins around the cavity, the cavity having a tubular portion one end of which opens at the edge of the adhered sheets, and the other end of the cavity being enlarged to form a finger compressible enlargement. A coating of a colorimetric indicator composition, soluble in or reactive with the liquid to be tested, is provided, the liquid being drawn into the tubular cavity by first compressing the enlargement, and releasing the pressure to draw in a liquid sample to react with the colorimetric indicator coating.





INVENTOR  
WARD BENJAMIN DAVIS  
BY  
*Wm. L. Hartmann*  
ATTORNEY

DISPOSABLE COLORIMETRIC INDICATOR AND SAMPLING DEVICE FOR LIQUIDS

BACKGROUND OF THE INVENTION

This invention relates to a simple portable disposable indicator and sampling device by which a sample of an aqueous liquid may be withdrawn from a larger quantity, and tested colorimetrically either qualitatively or semiquantitatively for a selected constituent, for examples, for hydrogen ion concentration of a water solution, or for the presence of free chlorine in the water in a swimming pool, or for ascertaining the presence of other chemically detectable ingredients. The device includes not only chemical reagent for detection of the desired ingredient, but also the reaction vessel and the means for filling it with a liquid sample. At least one facet of the device adjacent the tubular cavity is transparent.

One object of the invention is to provide inexpensive formed plastic disposable indicators for making semiquantitative analyses of liquids. Another object is to provide means for withdrawing a sample of liquid in a formed syringelike device which also contains a colorimetric reagent. A further object is to provide a syringelike indicator device consisting of a plane plastic backing sheet adhered to an embossed plastic sheet, wherein the embossed figure is a tubular cavity with a closed compressible end portion and an opening at the edge of the device.

These and other objects are attained by my invention, which will be understood from the following description, reference being made to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an enlarged plan view of a preferred form of the indicator device;

FIG. 2 is a cross-sectional view taken on the line 2-2 of FIG. 1;

FIG. 3 is a cross-sectional view taken on the line 3-3 of FIG. 1;

FIG. 4 is a cross-sectional view taken on the line 4-4 of FIG. 1;

FIG. 5 is a cross-sectional view similar to FIG. 4 of an alternative form of my device;

FIG. 6 is a plan view of a second alternative form of my device; and

FIG. 7 is a cross-sectional view taken on the line 7-7 of FIG. 6.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to the drawings, particularly FIGS. 1 to 4, the indicator device 10 consists of a plane backing sheet 11 of elongated shape such as a trapezoid or rectangle, and an embossed sheeted front member 12, both of synthetic plastic composition, for example, polyvinyl chloride. At least the front sheet is deformable. The front sheet is preformed in the center portion longitudinally with a half-tubular cavity 13 terminating at the lower edge and a half-bulb cavity 14 connected to said tubular part near the upper edge of the front sheet. The front sheet 12 and the back sheet 11 are heat sealed, or alternatively adhesively joined together in the margins around the cavities so that a tubular portion terminating in a half- or part-bulb are formed, the tubular portion opening in the lower edge of the device at 15. Prior to the assembly of the parts, a stripe 16 of a

selector indicator composition is imprinted by flexographic printing, on the backing sheet 11 at a position coinciding with the subsequent position of the tube.

The indicator devices are manufactured in multiples from large sheets, and subsequently are die-cut into the final individual indicators. The back sheet is printed, flexographically, with properly spaced indicator stripes, and the front sheet is embossed or heat formed with a plurality of connected tube and bulb impressions, and the large sheets are surface joined in aligned superimposition.

As shown in FIG. 5, an opaque sheet 17 may be attached to the transparent backing sheet 11, or the backing sheet may be formed of a white plastic composition to provide a white comparison background for the indicator-produced color in the liquid within the tube.

In the alternative form shown in FIGS. 6 and 7, no enlargement or bulb is provided, and the upper portion of the tubular portion may be compressed and released in the same manner as in the preferred bulb type above described.

The preferred material for making the indicator device is sheeted polyvinyl chloride plastic, but other sheeted materials having similar properties may be used, for one example polystyrene. The sheet thickness may be varied, but in the range of 6 to 10 mils is satisfactory. The tube opening may be about one thirty-second to one-sixteenth inch by about one-quarter inch wide. The dimensions given are illustrative and are not critical.

The indicator stripe or coating is preferably printed at the proper location on the backing sheet by flexographic printing using flexographic-type ink. One such composition for use in detection of hydrogen ion concentration consisted of the following essential ingredients in the approximate proportions, which are not critical:

- Methanol 8 parts by weight
  - 2-ethoxyethanol 2 parts by weight
  - Phenol red dye 0.1 to 0.5 parts by weight
- I claim:

1. A disposable colorimetric indicator and sampling device for liquids, comprising a syringelike body formed with sheets of synthetic plastic, and having a tubular cavity with one end open, at least one face of said tubular cavity being transparent and a colorimetric indicator reagent combined in said cavity.

2. The device defined in claim 1 in which said body comprises plane backing sheet of plastic adhered to the plane margins around a figure embossed in a sheet of plastic, said figure consisting of a tubular cavity having an enlargement closing one end thereof, the open end of said tubular cavity being at one edge of said embossed sheet.

3. The device defined in claim 1 in which the said tubular cavity has a coating over at least part of its inside wall, said coating comprising an indicator reagent soluble in the liquid to be tested.

4. The device defined in claim 2 in which the said tubular cavity has a coating over at least part of its inside wall, said coating comprising an indicator reagent soluble in the liquid to be tested.

5. The device defined in claim 4 in which said partial coating on said tubular cavity wall is a stripe of flexographic ink comprising a colorimetric pH indicator.

6. The device claimed in claim 4 in which said partial coating on said tubular cavity wall is a stripe of flexographic ink comprising a free chlorine indicator.

\* \* \* \* \*