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CHEMICAL PACKAGE
Filed Dec. 26, 1967

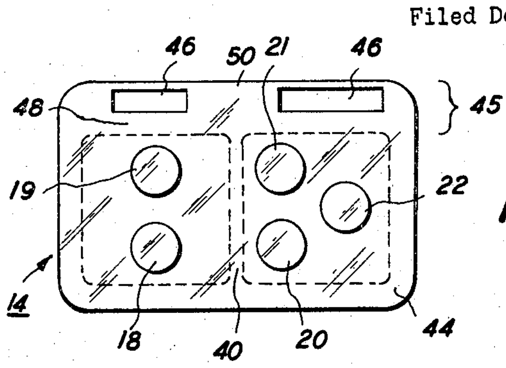

FIG. 2

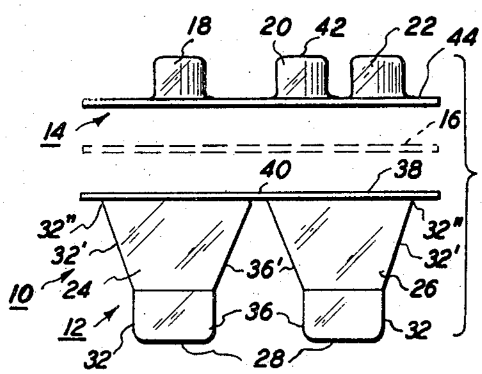

FIG. 1

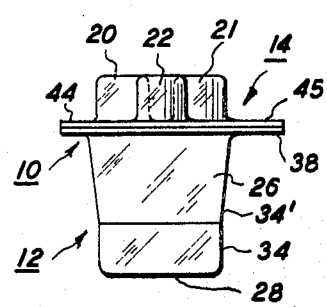

FIG. 3

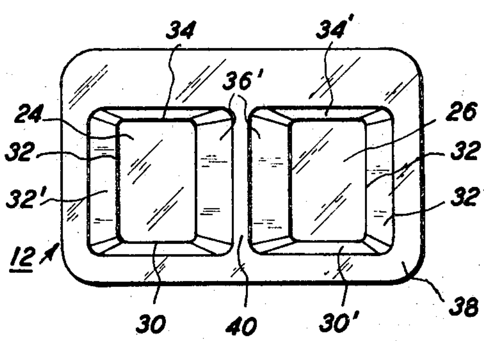

FIG. 4

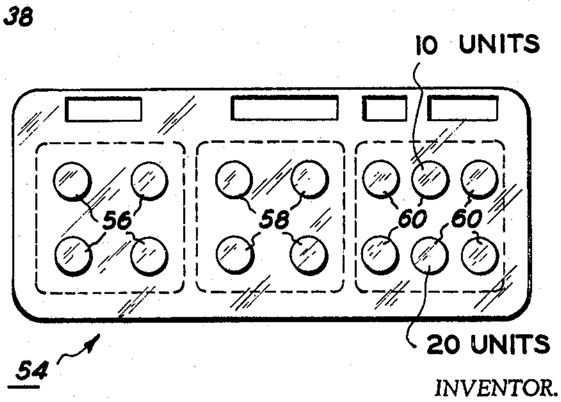

FIG. 5

INVENTOR.
DONALD A. HAMILTON
BY Joseph Hirsch
Ronald Zibelli
ATTORNEYS

United States Patent Office

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CHEMICAL PACKAGE

Donald Arthur Hamilton, Pasadena, Calif., assignor to Xerox Corporation, Rochester, N.Y., a corporation of New York

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ABSTRACT OF THE DISCLOSURE

Disposable reaction container comprising a lower section having at least two compartments for the admixing of materials added thereto, an upper section securely mounted on said lower section and having at least one reagent storage chamber in communication with each admixing compartment, one of said admixing compartments having at least one more storage chamber associated therewith than the other of said admixing compartments, and restraining means to prevent the premature movement of prepackaged reagents from said storage chambers.

This invention relates to automatic chemical analysis and, more particularly, to the automatic chemical analysis of body fluids, such as blood, urine, etc.

In co-pending application Ser. No. 602,025 filed Dec. 15, 1966, there is disclosed an automated chemical analytical system including a plurality of different disposable reaction containers, a magazine for the storage of the plurality of different reaction containers, a station for the addition of sample material to the reaction container, a mixing and incubation station wherein the reaction mixture is maintained in the disposable container for a period of time sufficient to culminate the chemical reaction, a detection station wherein the analytical data is obtained by monitoring one or more of the physical properties of the reaction mixture, a disposal station wherein the disposable reaction container is eliminated from the system, and means to transport the disposable reaction container from its storage area in the magazine through the system to the disposal station. The heart of the system is the disposable reaction container which, in its broad aspects, has at least one lower compartment for the admixing and reaction of reagents and sample, and an upper section having a plurality of reagent storage chambers in communication with each reaction compartment. At least one wall or end portion of the reaction compartment may be optically transparent so that upon completion of the desired chemical reaction the compartment can be utilized as a cuvette for optical analysis. Optionally, none of the walls need be optically transparent as a probe photometer such as the one disclosed in Gale 3,164,663, may be inserted into the reaction mixture and electromagnetic radiation from a source passed through a radiation conductor, the reaction mixture and back through the radiation conductor to a detection means, without the necessity of passing through the compartment walls.

In co-pending application Ser. No. 602,018 (also filed Dec. 15, 1966) there is disclosed a similar, though conceptually and structurally different, analytical apparatus and system. The disposable reaction container in this application has a flexible lower compartment, i.e. one having at least one flexible wall, so that during analysis a light source and a detection means pressed against the flexible wall or walls defining the lower cuvette(s) will cause the walls to yield a distance sufficient to define a fixed optical path between the light source and the detection means through the reaction mixture. The automatic analytical apparatus includes monitoring means including a light source and a means responsive to the variations in light

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transmittance caused by different concentrations of a known constituent in the reaction mixture. The light source and the responsive means are pressed against opposite sides of the reaction compartment or cuvette during analysis to define a fixed optical path through the reaction mixture. Thus, there is provided an automatic analytical apparatus having the optical path defining means built into a detection station. Production requirements for the disposable reaction container are less severe than when the fixed optical path is defined by the rigid walls of the reaction compartment. The reaction container can be mass produced and disposed of after use without significant cost.

In co-pending application Ser. No. 645,665, filed June 13, 1967, there is disclosed a disposable reaction container of improved design. Specifically, the lower section of the disposable reaction container comprises positioned walls adapted to channel the material added thereto to a portion of the lower compartment defined by a substantially rectangular volume. Optionally, a still lower compartment can be provided for the storage therein of a magnetic stirring bar so that thorough mixing of added materials can be achieved through use of urging means magnetically coupled to said magnetic stirring bar.

In co-pending applications Ser. Nos. 693,400, 693,401 and 693,629, filed concurrently herewith, there are disclosed disposable reaction containers having modified upper storage sections. In application Ser. No. 693,400, each storage section has a plurality of longitudinal ribs, either parallel to the outer chamber wall or reversely tapered as described therein, for securely holding a reagent tablet in place. In application Ser. No. 693,629, each storage chamber has a plurality of ribs or detents which encircle the storage chamber and section it into a plurality of storage zones. Each zone is adapted for the storage of at least one reagent tablet. Also, the storage chamber can be in the form of a truncated cone so that different storage zones can accommodate differently sized reagent tablets. In application Ser. No. 693,401, each storage chamber has at least one hollow finger therein, said hollow finger or fingers being adapted for the storage of donut-shaped reagent tablets thereon. Each of the containers as shown in the preceding applications had distinct advantages which made the use thereof more advantageous over the disposable containers as disclosed in the first three co-pending applications. For example, the previously provided restraining layer (e.g. layer **16** as shown in FIGURE 1 of Ser. No. 645,665) can be omitted. For a complete discussion of the advantages of each particular container, reference is made to the aforementioned co-pending applications. Portions of those applications which are necessary for a complete understanding or to complete the disclosure of the present invention are incorporated herein by reference.

Summary of the invention

Now, in accordance with the present invention, there is provided a further disposable reaction container for use with the aforementioned analytical apparatus and systems. The disposable reaction container comprises a lower section having at least two lower compartments for the admixing and reaction of reagents and sample material added thereto, and an upper storage section having reagent storage chambers in communication with each reaction compartment. In the design of the present invention, however, one reaction compartment has at least one more storage chamber associated therewith than has the other compartments. This is in contrast to prior designs wherein each reaction compartment had the same number of storage chambers associated therewith as other reaction compartments.

The additional storage chamber or chambers are utilized to store one or more standard solution-producing compositions (either in powder or tablet form), said solution being of known concentration. Upon proper processing of the standard material, the automatic analytical apparatus can be initially calibrated and, thereafter, the initial calibration can be verified during continuous or discontinuous operation of the apparatus. Any deviations which occur during operation can be automatically adjusted for and, thus, the system will remain in calibration without the necessity of passing distinct standard-holding reaction containers through the system.

The disposable reaction container of the present invention has special applicability to a low through-put analyzer, i.e. one which conducts on the order of 12 tests per hour. To calibrate the analyzer and thereafter continuously verify that the analyzer has remained in calibration (or to cause automatic compensation for deviations from calibration) would require so many individual standard-holding reaction containers to be passed through the analyzer as to make the device totally impractical. With the disposable container of the present invention, however, standardization and calibration or verification of the device can be accomplished simultaneously with each analysis.

Additionally, the disposable reaction container of the present invention offers the distinct advantage of being able to run a standard with each and every test being conducted. This is true whether the analytical apparatus be high-, medium-, or low-speed. This reduces the necessity of preparing and passing distinct verification standards through the analytical apparatus. Since the operator does not have to prepare such standards, the system is more operator insensitive and, therefore, more reliable.

With respect to the actual structure of the disposable reaction container, the upper storage section and the lower section can take on any of the forms previously described with respect to this type of container in any of the aforementioned co-pending applications. As previously indicated, it is the additional storage chamber or chambers associated with one reaction compartment which distinguishes the present invention from the inventions claimed in the aforementioned co-pending applications.

Any lower section having a plurality of distinct reaction compartments can be used. The preferred lower section, however, is the one disclosed in Ser. No. 645,665 (and subsequently filed co-pending applications) wherein the lower section of the disposable reaction container comprises positioned walls adapted to channel the material added thereto to a portion of the lower compartment defined by a substantially rectangular volume. At least two walls on opposite sides of each reaction compartment are inclined to the vertical whereby material added to the reaction compartment is caused to flow into the bottom portion thereof. The inclined walls terminate at a point intermediate the open top portion of the lower section and the bottom wall of the reaction compartment; the walls continuing in a plane perpendicular to a plane passing through the flange portion extending around the outer perimeter of the lower section to define a substantially rectangular volume having substantially rectangular and parallel sides, said volume adapted to use as a cuvette for optical analysis of the material held therein.

The walls of each reaction compartment can be transparent and rigid, the distance between one pair of opposite side walls defining a fixed optical path through the reaction mixture. This fixed optical path or fixed distance between the pair of opposite walls is equal, within tolerances, for each disposable reaction container representing a single chemical analysis whereby uniformity and reliability of analytical data and results can be achieved.

In a different embodiment, at least one pair of opposite walls are flexible so that a fixed optical path through the reaction mixture can be defined by pressing a light source against one wall and a detection means against the other wall. The walls yield a distance sufficient to define a fixed optical path between the light source and the detection means through the reaction mixture. Alternately, higher than atmospheric pressure means can be positioned over the upper storage section so that a relatively inert gas, such as nitrogen, can be admitted to the reaction compartment through holes made in the upper section during sample addition. The side walls will be bowed outwardly and can be made to press up against accurately positioned optical path defining means. This latter embodiment has the advantage of requiring no moving optical members and has less possibility of scratching the side walls which come in contact with the optical path defining members. Further, there is a greater assurance that the side walls forming the optical windows will be flat (as opposed to convex or concave) against the optical path defining members. Thus, in each embodiment, there is provided within each detection station means to define an optical path which will be maintained constant for each disposable reaction container representing like chemical testing units.

Optionally, a small circular compartment can be provided in the lower portion of each reaction compartment for the storage of a magnetic stirring bar which can be rotated during incubation, etc., by means magnetically coupled thereto to thoroughly mix the materials added to the reaction compartment. Or the magnetic stirring bar can be stored in its own compartment in the upper storage section and dispensed therefrom when it is needed to mix materials added to the lower reaction compartment.

Brief description of the drawings

The nature of the invention will be more easily understood when it is considered in conjunction with the accompanying drawings wherein:

FIGURE 1 is an exploded side view of an exemplary disposable reaction container of the present invention;

FIGURE 2 is a top view of the disposable container of FIGURE 1;

FIGURE 3 is an end view of the disposable container of FIGURE 1;

FIGURE 4 is a top view of the lower section of the disposable container of FIGURE 1; and

FIGURE 5 is a top view of an alternative embodiment disposable container of the present invention.

Referring to FIGURES 1–4, there is seen a disposable reaction container **10** having a lower section **12** and an upper section **14** having a plurality of reagent storage chambers **18, 19, 20, 21** and **22.** Lower section **12** has two separate lower compartments **24** and **26.** Each lower compartment has a bottom wall **28,** exterior side walls **30, 32,** and **34** and interior wall **36.** The wall portions of compartments **24** and **26** terminate in a horizontal flange **38** which encircles the outer perimeter of the two compartments and holds them together as a distinct unit. Bottom wall **28** is parallel with horizontal flange **38** with walls **30, 32 34** and **36** being perpendicular thereto, the five walls thus defining a rectangular volume having slightly rounded edges and corners. The rectangular volume does not extend all the way from bottom wall **28** to flange **38** but terminates intermediate these two elements. The lines of termination of the rectangular solid along each wall define a plane which is parallel to the plane of horizontal flange **38.** From this plane the walls diverge upwardly and outwardly as at **30′, 32′, 34′** and **36′** until they intersect with horizontal flange **38** to define a rectangular opening beneath the plurality of reagent storage chambers when upper section **14** is in position on flange **38.** As shown, walls **32′** terminate in a short leg **32″** just prior to its intersection with flange **38,** leg **32″** being perpendicular to flange **38.** If desired this leg can be omitted whereby walls **32'** will diverge upwardly and outwardly from the plane at the top of the rectangular volume until they intersect with flange **38**. The shape of the opening is not critical as long as it will not interfere with the introduction of sample and reagents into the lower compartment. The sloping walls channel all materials downward toward the bottom of the reaction compartment. Interior walls **36** extend to the plane of horizontal flange **38** and are connected to each other at line **40** thereby forming a distinct barrier between compartments **24** and **26**.

Resting on flange **38** and barrier line **40** is an upper storage section **14** which comprises a unitary member **42** having formed therein a plurality of reagent storage chambers **18, 19, 20, 21** and **22** in the form of "top-hats." If the reagents are stored in powder form, then it is necessary to provide a restraining layer **16** (shown in dotted lines) to prevent the premature deposition of the powder reagents into the reaction compartment. If the reagents are stored in tablet form then any of the embodiments disclosed in Ser. Nos. 693,400, 693,401 and 693,629 can be utilized. In any event, the application of force on the top of the chambers will cause inversion of the "top-hat" with the resultant deposition of the reagent material into the lower compartment.

Upper section **14** has a flange **44** which encircles the lower perimeter thereof. One side of flange **44** which extends the length of the disposable reaction container is slightly wider than the border which encircles the remainder of the upper storage section **14**. This wider portion is indicated at **45**. Flange **38** which encircles the upper perimeter of the lower section is also wider along this side. Thus, the rectangles with slightly rounded edges formed by flange **38** encircling the upper perimeter of lower section **12** and flange **44** encircling the lower perimeter of upper section **14** (and restraining layer **16** is such a layer utilized) are of equal size and dimension so that the two members can be suitably joined to provide a unitary disposable container. Preferably, each member is formed out of a plastic material which can be heat sealed to the other member to provide an exceptionally strong bond which cannot be broken under normal use. Flanges **38** and **44** are sufficiently wide along the wider portions **45** so that a code area **46** can be provided between inner bond **48** and outer bond **50**. Any suitable type of coding can be placed on this code area to indicate or record any information which desirably should be known during a chemical analysis, such as the actual test which has been pre-stored in the particular disposable reaction container, patient number, instructions for the associated automatic analytical apparatus and system, analytical results, etc. Typical codes include binary coding in the form of light and dark areas, magnetic coding, etc.

The number of storage chambers built in to the upper section will depend upon the number of reagents needed in the analytical test and their compatibility with each other. If two or more reagents are so compatible that they can be stored in contact with each other for extended periods of time then it is possible to store them in one chamber. Where the reagents are not compatible, it is necessary to provide a plurality of chambers. The number of additional chambers associated with the single reaction compartment will depend, among other things, upon the accuracy of calibration and verification desired; the number of points necessary to establish the calibration curve; if tablets are used, the amount of the standard which can be formulated into a tablet of appropriate size (that is, it may be necessary to provide two tablets of 10 units strength to achieve a 20 unit concentration and 4-ten unit tablets to get a 40 unit concentration, etc.). As shown in FIGURES 1–4, reaction compartment **26** has one additional storage chamber **22** associated therewith.

In operation, container **10** is taken from a supply magazine and passed to a sample addition station where the proper amount of sample diluted with distilled water is aliquoted into compartment **24**. This addition is accomplished by injecting the sample solution through a needle which has been inserted through upper section **14**. Preferably, this insertion is made at a point which will not cause undue rotation of the supported container. For example, with a container as shown in the figures, the insertion for each compartment can be made at a point approximately midway between the centers of storage chambers **18** and **19**. The sample-holding container is then passed to a reagent addition station where the application of a pushing force on each storage chamber causes the reagent stored therein to be emptied into the appropriate compartments. Reagent addition can be done in one operation or it can be done sequentially as is necessary to complete the analytical procedure. If done sequentially, the addition can be done during or after incubation. In essence, reagents can be added any time prior to final detection as determined by the particular analytical procedure utilized. Container **10** is passed to a mixing station where it is maintained for a time sufficient to ensure the dissolution of all solid materials in the liquid contained in the lower compartments. The container next passes to an incubation station where appropriate reaction conditions are imposed upon the materials within the container for a time sufficient to complete the desired reaction which is then measured at a detection station. It is not necessary that the mixing and incubation stations be separate and distinct as it is contemplated that these operations may be performed in a single station.

At a detection station, light of appropriate wavelength is passed from a light source through the reaction mixture to detection means situated on the opposite side of the reaction mixture from the light source. The amount of light transmitted (or, conversely, the amount of light absorbed) at the testing wavelength will be representative of the amount of the constituent under analysis in the test solution.

Preferably, the disposable container as shown in the drawings is used in conjunction with a double-beam detection mechanism. In one compartment there is provided a solution of the material being tested with the reagents which will bring the reaction mixture to the desired point for analysis. The other compartment (for example compartment **26**) will contain the standard solution in the presence of the reagents which will bring that mixture to the colorimetric point where it can be optically analyzed for calibration or verification of prior calibration. If being used in a verification mode, the detection mechanism will adjust for any deviations from the prior calibration which might occur during operation.

Light from the light source and light which has passed through the reaction mixture can be conducted to the disposable container and the detection means, respectively, through light conduits which are pressed against an opposite pair of rigid walls which comprise a portion of the lower compartment. In this embodiment, the optical path is defined by the distance between the opposite walls of the lower compartment against which the light conduits are pressed. Since it is preferred to maintain this optical path constant for all like analytical procedures, strict production requirements must be met in the production of disposable containers having rigid lower compartment walls.

An optical form of optical analysis is where a disposable reaction container having flexible reaction compartment walls has light source means and detection means pressed against opposite walls so that a fixed optical path will be defined between the light source and the detection means through the reaction mixture. Alternatively, higher than atmospheric pressure means can be positioned over the upper storage section so that a relatively inert gas can be admitted to the reaction compartment through the hole made in the upper section during sample addition. The flexible walls will be bowed outwardly and can be made to press up against accurately positioned optical path defining means. By providing a fixed optical path in this manner, it is easier to mass produce the disposable container as a certain critical feature, the optical path, has been eliminated as a strict production requirement. The optical path defining means is now built into the detection station and, as would be expected, significantly less detection stations will be produced than disposable containers. Since a fixed optical path is defined by the detection station and will be the same for each container passing therethrough, highly accurate and reliable data can be obtained with this system.

Referring to FIGURE 5, there is seen a further disposable reaction container of the present invention which differs from the disposable container of FIGURES 1–4 in that it has more reaction compartments and more storage chambers associated therewith. Only the top view of the disposable container is given, it being understood that the lower section is similar in detail to the lower section of FIGURES 1–4 except it has three lower compartments instead of two. Obviously, the geometry of the area circumscribed by the flange surrounding the upper perimeter of the lower section is also increased, as will the area circumscribed by the flange encircling the lower perimeter of the upper section (and the restraining layer **16** if one is provided). As shown, upper section **54** has four storage chambers **56** associated with the left-most reaction compartment, four storage chambers **58** associated with the middle reaction compartment and six storage chambers **60** associated with the right-most reaction compartment.

Compartments **56**, **58** and four of the compartments **60** are utilized to store the necessary reagents for conducting the particular analysis. Two of the compartments **60** are utilized to store standard solution-producing tablets for producing solutions of different concentration. For example, a tablet may be provided in one compartment which will produce upon dilution a ten unit standard solution. In the other compartment a tablet can be provided which will produce a 20 unit standard solution. By depositing both tablets a 30 unit solution can be obtained. Thus, by using two tablets singly and then in combination three calibration points can be obtained.

In operation, the disposable reaction container of FIGURE 5 will be used in a similar manner to the disposable container of FIGURES 1–4 except that it will be used in a triple-beam detection mechanism. In one of the two left-most compartments, there will be provided a solution of the material being tested with all the reagents which will bring the reaction mixture to the desired point for analysis. In the other compartment, there will be provided a solution of the material being tested in the absence of reagents. In certain instances, one or more reagents can be added to this latter solution, providing the reagents do not carry the reaction to completion or do not adversely affect, in any other way, the optical analysis. This latter solution is called a "critically incomplete blank" and will enable the analytical system to compensate for the effects of the sample and the reagents added thereto. The standard solution will be provided in the right-most compartment in the presence of the analytical reagents which will bring the reaction mixture to the colorimetric point for standardization of the detection mechanism or verification of a prior calibration. As previously indicated, the detection mechanism will be capable of detecting any deviations from prior calibration and compensating for such deviations so that the analytical system will always be in adjustment and, thus yield accurate and highly reliable analytical data. If one wishes to conduct an extremely precise analysis and take into consideration every possible influencing factor, additional lower compartments can be built into the disposable container for the introduction of such factors and the analysis thereof. Thus, adjustments can be made which will compensate for the effect which these materials have upon the particular analysis.

An additional and conceptually different analytical technique is also achievable with the disposable reaction container of the present invention. A critical amount of the constituent under analysis can be placed in the additional chamber associated with one reaction compartment. During analysis, the detection mechanism can compare the data obtained from the sample with this critical amount and if the sample data exceeds the critical amount sound a warning buzzer or make other appropriate notation which would indicate that the critical threshold value has been exceeded.

As previously indicated, a magnetic stirring bar may be disposed within the reaction compartment for thorough mixing of materials added thereto through magnetic coupling with properly positioned urging means. Optionally, a cylindrical recess can be provided below the bottom wall **28** of each lower compartment and in communication with each reaction compartment for the storage of such a magnetic stirring bar. The shape of the storage recess in not critical as long as the magnetic stirring bar can easily drop into the recess when the bar is not in use. Or, the stirring bar can be stored in the upper storage section and dispensed into the reaction compartment when needed to mix deposited materials. With the reaction mixture in the lower compartment, the disposable container is moved to a mixing station where an external magnetic field is applied, such as by a rotating magnetic bar. The rotation of the magnetic bar within the disposable container creates a vortex and by regulating the rotational speed of the magnetic stirring bar it is possible to thoroughly mix all the reagents with the sample as well as to clean the walls of the reaction compartment and the storage chambers of undissolved reagents. This insures that all reagents are present in the reaction mixture in proper amounts. Upon completion of the mixing operation, the stirring bar will settle into its storage recess out of the way of optical analysis which proceeds through the side walls forming the rectangular volume of each reaction compartment. An exemplary stirring bar comprises a small cylindrical section of stainless steel wire. Should the magnetic material have a deleterious effect on the assay, then the stirring bar should be entirely covered with a material which will not interfere in the analytical procedure, such as a complete coating of glass or inert plastic.

A more complete discussion of further modifications in the disposable container design, reagent storage techniques, the automatic analytical apparatus and system with which the disposable reaction containers of the present invention are to be utilized, etc., is given in co-pending applications Ser. Nos. 602,018; 602,025; 645,665; 693,400; 693,401 and 693,629. Reference is made thereto for said complete discussion. Portions of those applications which are necessary for completion or a complete understanding of the present invention are incorporated herein by reference.

While the invention has been described with reference to its preferred embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted for elements thereof without departing from the true spirit and scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to teaching of the invention without departing from its essential teachings.

What is claimed is:

1. A disposable reaction container comprising a lower section having at least two separate compartments for the admixing of materials added thereto, an upper section securely mounted on said lower section and having at least one storage chamber adjacent each of said compartments, one of said compartments having at least one more storage chamber associated therewith than the other of said compartments, and restraining means to prevent the premature movement of prepackaged reagents from said storage chambers.

2. The disposable reaction container of claim **1** wherein said lower section has two admixing compartments.

3. The disposable reaction container of claim 1 wherein said lower section has three admixing compartments.

4. The disposable reaction container of claim 1 wherein one admixing compartment has one additional storage chamber associated therewith.

5. The disposable reaction container of claim 1 wherein one admixing compartment has two additional storage chambers associated therewith.

6. The disposable reaction container of claim 1 wherein said restraining means comprises a shearable layer disposed adjacent the openings of said reagent storage chambers, said restraining layer being sufficiently strong so that it will shear only below a particular reagent storage chamber when application of force to the top portion of said storage chamber causes said storage chamber to be inverted and pushed through said restraining layer.

7. The disposable reaction container of claim 1 wherein said restraining means comprises at least one vertically disposed rib extending into each storage chamber and adapted to securely hold at least one reagent tablet in place therein.

8. The disposable reaction container of claim 7 wherein each storage chamber has a plurality of ribs therein.

9. The disposable reaction container of claim 7 wherein each storage chamber is substantially cylindrical and has three ribs disposed about the periphery thereof, said ribs being substantially equidistant from each other.

10. The disposable reaction container of claim 7 wherein each rib is provided with a reverse taper such that the tapered rib is closer to the center of the storage chamber at its boundary with the lower portion of the upper section than at its intersection with the top wall of the storage chamber.

11. The disposable reaction container of claim 1 wherein said restraining means comprises at least one rib encircling each storage chamber.

12. The disposable reaction container of claim 1 wherein said restraining means comprises a plurality of ribs encircling each storage chamber, said ribs adapted to define separate storage zones within each storage chamber wherein separate reagent tablets may be stored spaced from other tablets stored therein.

13. The disposable reaction container of claim 1 wherein said restraining means comprises a set of detents extending into each of said storage chambers.

14. The disposable reaction container of claim 1 wherein said restraining means comprises a plurality of sets of detents extending into each of said storage chambers, each set adapted to support a reagent tablet spaced from other reagent tablets stored therein.

15. The disposable reaction container of claim 1 wherein said restraining means comprises at least one hollow finger extending into said storage chamber from the top portion thereof and adapted for the storage of at least one reagent tablet thereon.

16. The disposable reaction container of claim 14 wherein each hollow finger has a plurality of ribs thereon, said ribs adapted to reduce the surface area contact between said hollow finger and a reagent tablet stored thereon.

17. The disposable reaction container of claim 15 wherein the lower portion of said hollow finger is tapered to form a guide to assist in the positioning of a reagent tablet thereon.

18. The disposable reaction container of claim 15 wherein each of said storage chambers is substantially cylindrical and has a concentric hollow finger therein.

19. The disposable reaction container of claim 1 wherein said upper section comprises a unitary plastic sheet which has been formed into said storage chambers and said restraining means.

20. The disposable reaction container of claim 1 wherein said upper section and said lower section are heat sealed together.

21. The disposable reaction container of claim 1 wherein at least one set of opposite walls defining a portion of each compartment is optically transparent so that upon completion of the desired chemical reaction each compartment can be utilized as a cuvette for optical analysis.

22. The disposable reaction container of claim 21 wherein each set of optically transparent opposite walls is parallel to the longitudinal axis of said container.

23. The disposable reaction container of claim 1 wherein the side walls of each admixing compartment are slightly flexible.

24. The disposable reaction container of claim 23 wherein said side walls are parallel to the longitudinal axis of said container.

25. The disposable reaction container of claim 1 wherein said upper section has a flange which encircles the lower perimeter of said upper section and surrounds the plurality of reagents storage chambers, said upper section flange being wider along one longitudinal portion and capable of having information stored thereon.

26. The disposable reaction container of claim 1 wherein said lower section has a flange which encircles the upper perimeter of said plurality of admixing compartments, the lower portion of each compartment comprising a bottom wall and parallel and perpendicular side walls which define a substantially rectangular volume, said rectangular volume terminating in a plane parallel to said flange, each of said parallel and perpendicular side walls diverging upwardly and outwardly from said plane substantially until each of said walls intersect with said flange.

27. An upper storage section for use with a disposable reaction container comprising a unitary plastic layer formed into a plurality of storage chambers, said storage chambers being divided into at least one group of "n" storage chambers and one group of at least "$n+1$" storage chambers, each group being adapted for positioning over an admixing compartment in the lower section of a disposable reaction container.

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MORRIS O. WOLK, Primary Examiner

R. E. SERWIN, Assistant Examiner

U.S. Cl. X.R.

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