

March 10, 1970

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3,499,327

URINE COLLECTORS

Filed Jan. 22, 1968

2 Sheets-Sheet 1

FIG. 2

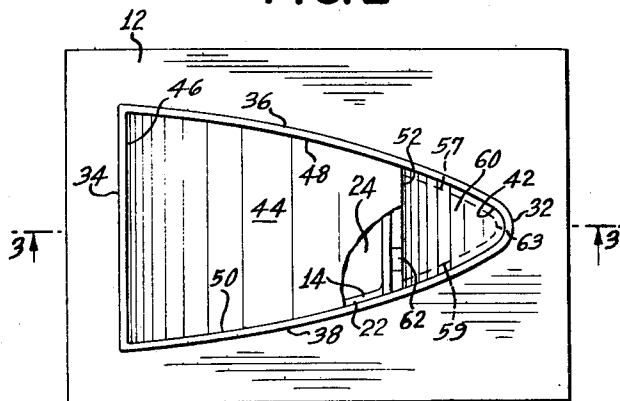


FIG. 1

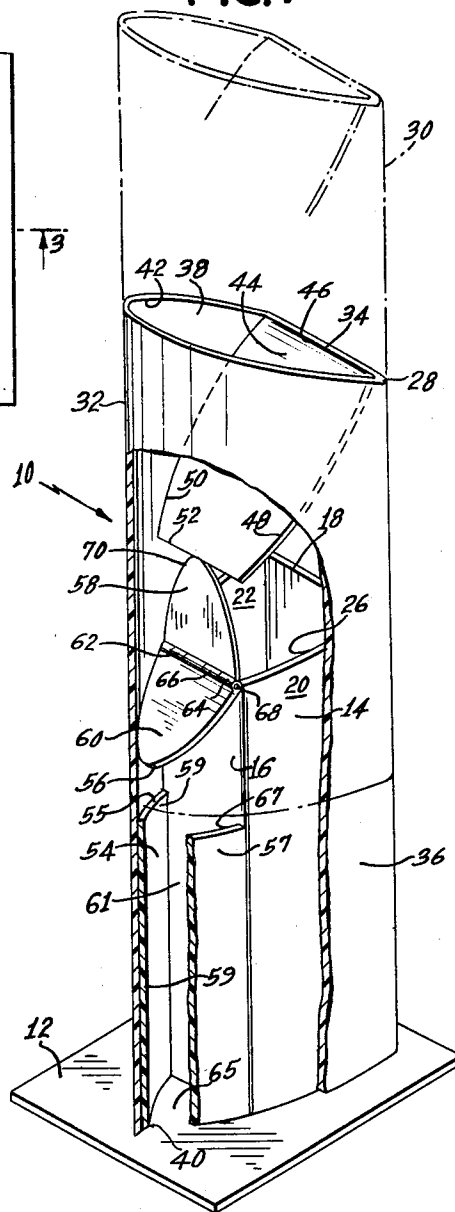
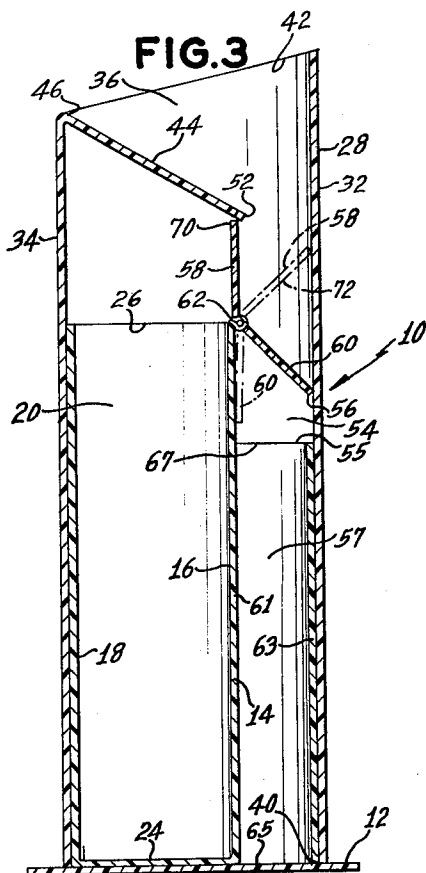


FIG. 3



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FIG. 4

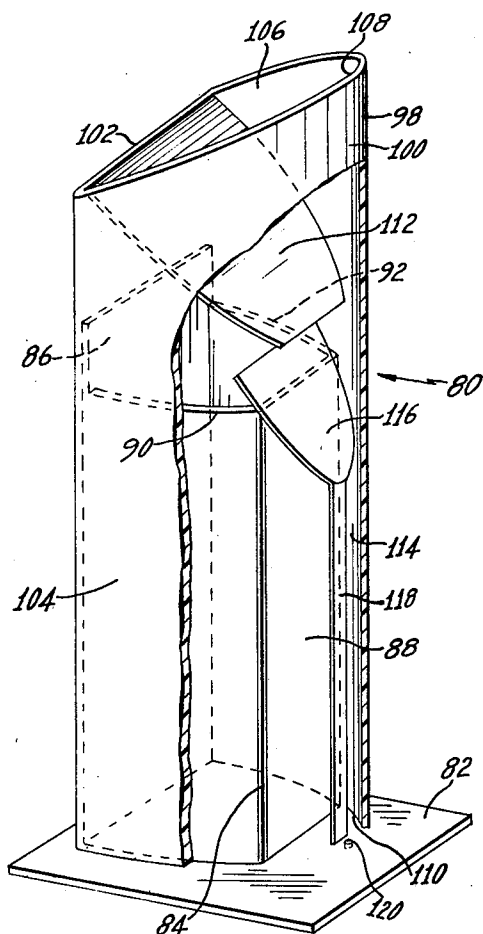


FIG. 5

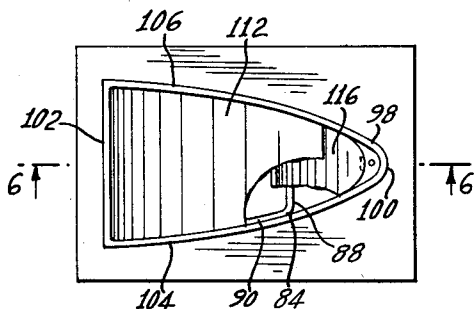
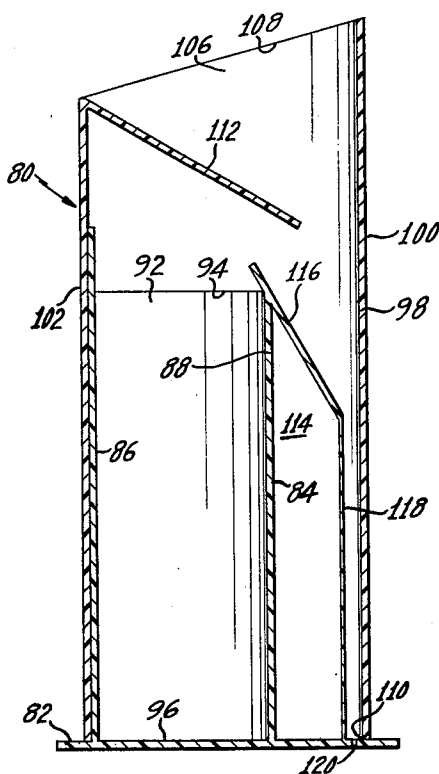


FIG. 6



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3,499,327

## URINE COLLECTORS

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17 Claims

### ABSTRACT OF THE DISCLOSURE

A urine collector for obtaining a urine sample other than the first portion of the urine stream emitted during normal urination comprising a urine sample receptacle and a compartment forming means disposed about the urine sample receptacle and forming a compartment exteriorly of the urine sample receptacle. The compartment has an open top for receiving the first portion of the urine stream thereinto and the urine sample receptacle has an opening adjacent the top portion thereof for the ingress of urine thereinto after the first portion of the urine stream has been deposited into the compartment. The collector further includes means for shielding the urine sample receptacle from initial direct entry of the first portion of the urine stream deposited into the urine collector. Additionally, in one aspect of the invention, the urine collector includes diversion means associated with the urine sample receptacle for diverting the mid-portion of the urine stream from the compartment into the urine sample receptacle, these means permitting the first portion of the urine stream deposited in the collector to pass into the compartment.

### BACKGROUND AND SUMMARY OF THE INVENTION

This invention relates to a urine collector, more particularly, the invention pertains to a sterile receptacle which is particularly useful in obtaining a "clean" or mid-portion sample of the urine produced during normal urination.

It is the present medical practice to obtain a urine sample from a patient in a glass bottle; the bottle being later capped and labeled. These bottles, however, have often proved to be awkward to fill, especially by females, without the danger of overflowing. Also the usual prior art urine sample bottles are inconvenient for carrying, for example to the doctor's office, because they are susceptible to breakage and leakage.

Often times, when urine samples are obtained by procedures and methods of the present practice and employing the available apparatus and devices, such as above set forth, the samples are contaminated, that is, they are not "clean" or mid-stream urine samples. These samples often contain surface skin and intraurethral contamination as from bacterial, blood cells, foreign bodies and other like agents which might interfere with studies, analysis and determinations thereof.

Therefore, it is a general object of this invention to provide apparatus for obtaining a "clean" or midstream urine sample from the urine produced during normal urination which sample is devoid of surface skin and intraurethral contamination.

It is another object of the present invention to provide an improved sterilizable, liquid sampling receptacle composed of a rigid unbreakable plastic material; which receptacle is not susceptible to breakage as in the case with the usual prior art glass bottles generally used for urine sampling.

Another object of the invention is to provide an improved plastic, liquid-sampling collector which is provided with an inner portion or receptacle and with a de-

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tachable tubular-shaped, funnel-like outer portion or sleeve; the outer portion serving as a convenient filling means for the collector, and also as a means for receiving and temporary holding any excess fluid which may overflow from the inner portion of the collector.

In the practice of this invention, means are provided to divert the first portion of the urine stream into an portion of the collector while the middle, or middle and last portions of the urine stream are diverted into an inner portion of the collector. It has been the practice of the prior art to direct all portions of the urine stream into a collector or the receptacle portion thereof, and not divert the first or contaminated portion of the urine stream into a separate compartment portion of the collector.

Accordingly, it is a further object of this invention to provide a valve or other means within the collector for diverting the first portion of the urine sample into an outer portion of the collector, while permitting the other portions of the urine sample to be collected and retained in an inner receptacle portion of the collector.

In general these objects are attained by providing a urine collector which is capable of obtaining a urine sample other than the first portion from the urine stream emitted during normal urination including a urine sample receptacle, a compartment forming means disposed about the urine sample receptacle and forming a compartment exteriorly of the urine sample receptacle, the compartment having an open top for receiving the first portion of the urine stream thereinto, and the urine sample receptacle having an opening adjacent the top portion thereof for the ingress of urine thereinto after the first portion of the urine stream has been deposited into the compartment.

### BRIEF DESCRIPTION OF THE DRAWINGS

The novel features which are believed to be characteristic of this invention are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a perspective view of a first embodiment of the urine collector of this invention;

FIG. 2 is a top plan view of the apparatus shown in FIG. 1;

FIG. 3 is a cross-sectional view of the apparatus taken along line 3—3 of FIG. 2;

FIG. 4 is a perspective view of a second embodiment of the urine collector of this invention;

FIG. 5 is a top plan view of the apparatus depicted in FIG. 4; and

FIG. 6 is a cross-sectional view of the apparatus taken along line 6—6 of FIG. 5.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings in detail now, and in particular to FIGS. 1, 2 and 3 thereof, the improved urine collector of this invention is seen to include a rectangular base member 12 of sufficient size to adequately maintain and support the remainder of the urine collector in an upright position; and to insure stability and balance of the device when the same is placed on a work surface such as a counter, bench, table, desk or the like. The entire device is made and fabricated from rigid, clear plastic material, but could be constructed from other like materials if so desired.

The collector includes an inner portion or receptacle 14 for receiving and retaining the middle portion, or

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what is known as the mid-stream portion, of the urine produced during normal urination, for use as a specimen or sample for later study and analysis. Receptacle 14 includes a front wall 16, a back wall 18 and side walls 20 and 22. Inner portion or container 14 further includes a closed and sealed bottom 24 and an open top 26 to provide for the entry of liquid into this portion 14. Receptacle 14 is securely attached to base member 12.

Urine collector 10 further includes an outer, detachable, tubular-shaped portion or sleeve 28, which fits over and around inner receptacle 14. Outer portion 28 is not secured or affixed to base member 12, and as such, is detachable from the remainder of the collector, including base member 12 and inner portion 14. Outer portion 28 is removed from the remainder of the urine collector 10 by lifting the same vertically upward therefrom, as indicated by the dashed-line configuration at reference numeral 30 in FIG. 1. Tubular-like sleeve 28 includes a front edge or wall 32, a back wall 34 and opposite side walls 36 and 38. Outer portion 28 further includes an open bottom 40 and an open top 42 to readily permit the influx of the stream of urine therein. Outer portion 28 fits snugly about inner portion 14, that is to say, that the back wall 34 and side walls 36 and 38 of the outer portion 28 fit closely adjacent the respective side walls 20 and 22 and back wall 18 of inner portion 14, such as to form an effective seal between the inner 14 and outer portion 28 along their side and back walls.

Outer portion 28 further includes a inclined baffle 44 which is positioned adjacent its upper, open end 42. The rear edge 46 of baffle 44 is connected to the upper edge of back wall 34 of the outer portion 28. Baffle 44 further includes side edges 48 and 50 which respectively conform to and are connected to the inside surfaces of side walls 36 and 38 of the outer portion 28. Member 44 is terminated by a front or leading edge 52 which extends over and beyond front wall 16 of inner portion 14, yet stops substantially short of front edge or wall 32 of outer portion 28. The purpose and function of member 44 is to direct the stream of urine entering collector 10 through its open top 42 into the compartment 54 (see in particular FIG. 3) formed by and between front wall 16 of inner portion 14 and outer portion 28.

The side 36 and 38, front 32 and back 34 walls of outer portion 28 are formed such that when this portion is firmly pressed against base member 12, the lower edges of these walls form an effective seal with the base member 12. In this manner compartment 54 between front wall 16 of inner portion 14 and outer portion 28 can be used as an effective reservoir or container for the urine introduced into the receptacle. Should it be desired, sealing means (not shown) can be provided between base member 12 and the lower edges of walls 36, 38, 32 and 34 of the outer portion 28 to insure that a seal is formed between the lower end of outer portion 28 and base member 12. Thus urine can be retained in compartment 54 until such time as outer portion 28 is raised above base member 12, as depicted at reference numeral 30 in FIG. 1, to drain the reservoir.

Collector 10 further includes a pivoted valve member 56 which is capable of diverting the stream of urine, entering the collector, from compartment 54 into inner receptacle 14. Valve member 56 includes an upper partition or door-like element 58 and a lower partition or door-like element 60 which are joined together at their inner edges adjacent line or pivot axis 62 and affixed to each other at an angle of approximately 130°. Valve member 56 includes hinge portions, as at reference numeral 64, along line 62 and hinge portions, as at 66, are connected to the upper edge of front wall 16 of inner portion 14, such that a hinge is formed along line or pivot axis 62. A hinge pin 68 joins the hinge portions 64 and 66 such that valve 56 is pivotal about the upper edge of front wall 16 on pivotal axis 62. Valve member 56 is biased, as by a spring (not shown) or other means,

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into its normal or natural position as depicted at reference numeral 70; but may be readily rotated or moved to its operative position, as depicted in the dashed-line configuration at reference numeral 72 in FIG. 3. If so desired valve member 56 can be made unitary with the upper edge of front wall 16 of inner receptacle 14. This is accomplished by providing a thin plastic, tab-type hinge which extends between and connects valve 56 to the upper edge of front wall 16 in lieu of the hinge portions 64 and 66 and hinge pin 68, as shown in FIGS. 1 and 3.

When using urine collector 10 of this invention the stream of urine is directed into the outer receptacle 28 through its open top 42 and onto inclined member 44. Inclined member 44 directs the incoming stream of urine towards and into reservoir section 54 between the front wall 16 of inner portion 14 and outer portion 28. The so directed stream of urine in falling into reservoir 54 will then contact partition 60 of valve member 56, in so doing its pressure or force and weight will operate and rotate valve member 56 from its normal position 70 into its rotated or operative position 72 (see FIG. 3), such that the remaining portion of the incoming stream of urine will be diverted and directed by means of partition 58 of valve member 56 into inner receptacle 14. The force and weight of the incoming stream of urine on partition 58 of valve 56 will maintain the valve in its rotated or operative position 72 until such incoming stream of urine is ceased. In this manner the first or contaminated portion of the urine stream is passed into reservoir section 54, while the mid-stream portion of the voided urine is collected and retained in the inner receptacle 14 for study and analysis at a later time. Should the volume of voided urine be such as to overflow inner container 14, the latter or last portions of the urine stream will merely overflow container 14 and collect within reservoir 54, from which those portions of the urine stream collected therein can be disposed of through a small opening (not shown) through base member 12 in the bottom of reservoir 54. These portions of the urine stream collecting in reservoir 54 can also be disposed of by the attendant or technician at a later, suitable time into a proper receptacle by merely raising outer portion 28, as shown in the dashed-line configuration of FIG. 1.

If so desired, compartment 54 can be provided with a liner, as at 55 in FIGS. 1, 2, and 3, to prevent urine which has been collected in this reservoir section 54 from leaking or escaping from the same upon the raising and/or removal of outer portion 28, with the possible consequence of the urine running over the hand of the attendant. Liner 55 includes two opposed side walls 57 and 59, a back wall 61 which is common with front wall 16 of inner portion 14, a front wall portion or edge 63, a bottom 65 which is a portion of base member 12 such that liner 55 is securely attached to base member 12, and an open top 67 to permit ready entry of the urine therein.

Thus a "clean stream" or mid-stream portion of the urine stream can be collected as a sample or specimen for analysis and cultural procedures at a later, convenient time; while the first portion of the voided urine, containing surface skin and intraurethral contamination, such as bacteria, blood cells, foreign bodies and other agents which might interfere with future studies and determinations, can be readily passed.

Referring to FIGS. 4, 5, and 6 now, the second embodiment of the urine collector 80 is depicted therein and includes a rectangular base member 82. Connected to base member 82 and sealed thereto in an integral manner is an upright, inner receptacle or portion 84 in which the "clean stream" or mid-stream portion of the urine is collected and retained for later analysis and study. Inner receptacle 84 includes a back wall 86, a front wall 88 and two side walls 90 and 92. This portion further includes an open top 94 and a closed bottom 96 which is a portion of base member 82.

Surrounding inner receptacle 84 is a second upright receptacle or container-like sleeve 98 which readily fits about receptacle 84 along its back and side walls. This outer portion 98 includes a front edge or wall portion 100, a back wall 102 and two side walls 104 and 106. Container-like sleeves 98 further includes an open top 108 and an open bottom 110. Back wall 102 and side walls 104 and 106 of outer portion 98 fit closely adjacent respective backwall 86 and side walls 90 and 92 of inner portion 84, such that the outer portion 98 snugly and telescopically fits about inner portion 84. The outer portion 98 is slidable vertically upward and downward over inner portion 84, and can be completely removed from base member 82 and inner portion 84 when so desired. The lower end of outer portion 98 adjacent its open bottom 110 is formed such that it will engage base member 82 and form an effective seal therewith. In this manner an effective reservoir section 114 may be formed between front wall 88 of inner portion 84 and outer portion 98. If desired, sealing means (not shown) may be provided between base member 82 and the lower edges of walls 100, 102, 104 and 106 of outer portion 98 to insure that a seal is formed between base member 82 and the lower end of outer portion 98.

Further included within the outer container-like portion 98 is an inclined baffle 112 used to direct the flow of the incoming stream of urine into the reservoir 114 formed by and between the front wall 88 of inner receptacle 84 and the sides 104 and 106 and front wall portion 100 of outer portion 98. Inclined baffle 112 is connected along its rearward edge to the top edge of back wall 102 and has its side edges attached to the sidewalls 104 and 106 of the outer portion 98. The forward edge of inclined member 112 projects over and beyond the front wall 88 of inner portion 84, but does not extend all the way to front wall portion 100 of the outer container-like portion 98.

Urine collector 80, of the embodiment of FIGS. 4-6, further includes an inclined shield or deflector 116 which is partially positioned in reservoir 114 to direct the stream of inflowing urine from inclined member 112 downwardly into reservoir 114, and to shield inner receptacle 84 to prevent the incoming stream of urine from entering or splashing thereinto. Deflector 116 is mounted adjacent its rearward edge to the top edge of front wall 88 of inner portion 84. The rearward edge of shield 116 extends over and rearwardly of front wall 88 of inner portion 84 and the sides of shield 116 generally conform to side walls 104 and 106 of outer portion 98. The forward end of shield 116 is connected to one end of and supported by a narrow rib member 118, the opposite end of which is attached to base member 82 adjacent the forward wall portion or edge 100 of outer portion 98.

As the urine stream enters outer portion 98 through its open top 108 the same is directed by means of inclined member 112 and deflector 116 into reservoir 114. As more urine is added to collector 80, reservoir section 114 begins to fill up and in time overflows into inner receptacle 84, such that the mid-stream or "clean stream" portion of the urine is collected and retained in inner portion 84. Rib member 118 and shield 116 act as an inhibitor to minimize turbulence within reservoir 114, such that the first or contaminated portion of the urine stream which is collected within reservoir 114 does not mix and co-mingle with "clean" or mid-stream portion of the urine stream collected which is within inner receptacle 84. If so desired, a small opening or passageway such as at 120, may be formed within base member 82 at the bottom of reservoir section 114 to permit the first or contaminated portion of the urine to exit collector 80 through the base member 82 into a proper receptacle which has been provided for this purpose. Opening or passageway 120 should be of a size such that the urine inflow into collector 80 is greater than the outflow leaving the collector through opening 120, in

order that the volume or urine within reservoir section 114 will rise to the top thereof and spill over into container 84 thereby a clean or mid-stream sample of urine can be collected and retained therein for later analysis and study. If an opening, such as 120, is not provided within base member 82, the technician or attendant can drain those portions of the urine which have been collected within reservoir 114 into a proper receptacle by merely raising outer portion 98 above base member 82. If desired, outer portion 98 can be completely removed and base member 82, inner portion 84 and the urine collected therein can be set aside and refrigerated for analysis and study at a later time.

In using either of the embodiments of the improved urine collector of this invention, the male directs his urinary stream into the open end 42 or 108 of the collector such that the urine is directed downwardly along inclined member 44 or 112. When the urine collector is used by a female, she will, while seated on a commode, press the top portion of outer portion 28 or 98 of the collector tightly around her urethral opening, to separate the labia and then urinate thereinto such that the urine stream flows downwardly along incline member 44 or 112. When voiding of the urine is complete the collector is put aside for later preparation, study and analysis by the technician or attendant.

While only certain preferred embodiments of this invention have been shown and described by way of illustration, many modifications will occur to those skilled in the art and it is, intended that all such modifications be covered within the true spirit and scope of this invention.

What is claimed as new and what it is desired to secure by Letters Patent of the United States is:

1. A unitary and portable, hand-held, urine collector for obtaining a sample other than the first portion from the urine stream emitted during normal urination comprising a urine sample receptacle, a compartment forming means disposed about said receptacle and forming a compartment exteriorly of and generally around said receptacle, said compartment being adapted and arranged to be held by one hand of the user for carrying about and positioning the same for receiving the urine stream thereinto, said compartment having an open top for receiving and collecting the first portion of the urine stream therein, said receptacle having an opening adjacent the top portion thereof for the ingress of a later emitted portion of urine thereinto after the first portion of the urine stream has been deposited into said compartment.

2. The urine collector as defined in claim 1 further comprising means for shielding said receptacle from initial direct entry of the first portion of the urine stream deposited into said collector.

3. The urine collector as defined in claim 1 further comprising a baffle associated with said compartment forming means disposed spacedly upwardly from said receptacle for directing the urine stream deposited thereon into said compartment.

4. The urine collector as defined in claim 1 further comprising diversion means associated with said receptacle for diverting the mid-portion of the urine stream from said compartment into said receptacle, said diversion means permitting the first portion of the urine stream to pass into said compartment.

5. The urine collector as defined in claim 1 further comprising turbulence inhibitors associated with said compartment, said turbulence inhibitors minimizing the mixing of the first portion of the emitted urine contained within said compartment and the mid-portion of the emitted urine which is deposited into said compartment and passes through said opening into said receptacle.

6. The urine collector as defined in claim 3 wherein said baffle is connected to said compartment forming means, said baffle extending inclinedly downwardly and inwardly of said compartment from a point closely adjacent

said open top of said compartment, said baffle extending over and shielding said receptacle to prevent direct entry of the urine stream thereinto.

7. The urine collector as defined in claim 4 wherein said diversion means includes a valve member positioned exteriorly of and connected to said receptacle closely adjacent said opening, said valve member being contacted by the first portion of the urine stream deposited in said collector to move from a position in which the first portion of the urine stream passes into said compartment to a position diverting later portions of the urine stream deposited in said collector through said opening into said receptacle.

8. The urine collector as defined in claim 7 wherein said valve member includes a pair of valve elements connected to each other at an angle, hinge means for hingedly attaching said pair of valve elements to said receptacle adjacent said opening, one of said valve elements being normally positioned in a generally upright position with the other of said valve elements normally extending inclinedly downwardly from said hinge means into said compartment, said valve member being pivotal into its operative position by the first portion of the urine stream deposited in said collector contacting said other valve element, said other valve element being positioned in a generally upright position closely adjacent a side of said receptacle after pivoting of said valve member with said one valve element extending inclinedly upwardly from said hinge means into said compartment, said one valve element after rotation of said valve member directing later portions of the urine stream deposited in said collector through said opening into said receptacle.

9. The urine collector as defined in claim 5 wherein said turbulence inhibitors include a first elongated generally upright member positioned within said compartment and having upper and lower end portions, a second elongated member being inclinedly positioned within said compartment and having upper and lower end portions, said upper end portion of said first member being connected to and supporting the lower end portion of said second member spacedly downwardly from said opening in said receptacle, said upper end portion of said second member being connected to said receptacle adjacent said receptacle adjacent said opening therein.

10. The urine collector as defined in claim 1 wherein said compartment forming means includes a base member and a sleeve, said sleeve having a lower end positionable juxtaposed with said base member to form said compartment interiorly of said base member and sleeve and exteriorly of said receptacle.

11. The urine collector as defined in claim 1 wherein said compartment forming means includes a base member and a sleeve, said receptacle including a bottom and side wall means extending upwardly therefrom, said sleeve having side wall means which are disposed outwardly of and slidably fitted about a portion of said receptacle side wall means, said sleeve side wall means and receptacle side wall means having opposing portions spaced apart, said sleeve having a lower end positionable juxtaposed

with said base member to form said compartment between said opposing portions and interiorly of said base member.

12. The urine collector as defined in claim 11 wherein said side wall means of said receptacle includes a plurality of side walls, said side wall means of said sleeve includes a plurality of side walls, two opposed said side walls of said sleeve being slidably fitted about two opposed said side walls of said receptacle.

13. The urine collector as defined in claim 11 wherein said sleeve further includes an upper open end, a baffle connected to said sleeve adjacent its said open upper end, said baffle extending inclinedly downwardly and inwardly of said sleeve from a point closely adjacent said open upper end, said baffle extending over and shielding said receptacle to prevent direct entry of the urine stream thereinto and to direct same into said compartment.

14. The urine collector as defined in claim 1 further comprising a passageway communicating at one end with said compartment adjacent its bottom and at its other end exteriorly of said collector whereby the urine stream portions deposited in said compartment may drain therefrom.

15. The urine collector as defined in claim 1 wherein said receptacle includes elongated side wall means and a bottom, said compartment forming means includes an elongated generally upright sleeve, said sleeve having a lower end adjacent said receptacle bottom and an upper end spaced above said receptacle, said sleeve having a portion thereof spaced laterally from said receptacle side wall means and forming said compartment.

16. The urine collector as defined in claim 15 further comprising a baffle attached inwardly of and to said sleeve adjacent its said upper end, said baffle shielding said receptacle from initial direct entry of the first portion of the urine stream deposited into said collector and directing the urine stream toward said compartment.

17. The urine collector as defined in claim 6 wherein said compartment forming means includes an elongated sleeve, said sleeve having a pair of opposite side wall portions, a front wall portion and a back wall portion, said baffle including a pair of opposite side edges, a front edge and a back edge, said baffle side edges being respectively connected to said sleeve side wall portions, said baffle back edge being connected to said sleeve back wall portion, and said baffle front edge being laterally spaced from said sleeve front wall portion and downwardly spaced from said baffle back edge and its connection with said sleeve back wall portion.

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U.S. Cl. X.R.

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