March 1, 1966 P. H. KNOTT 3,237,340

TOY "BLOOD SAMPLING" SYRINGE SIMULATOR

Filed Oct. 30, 1963 2 Sheets-Sheet 1

FIG. 1

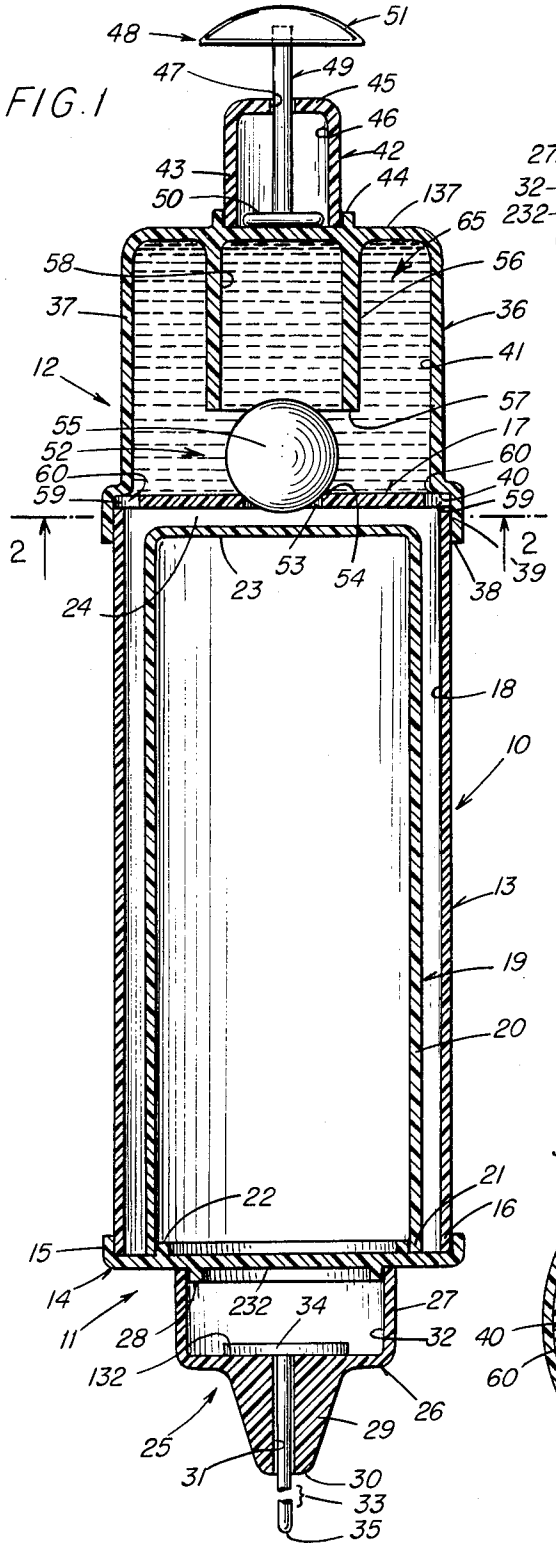


FIG. 3

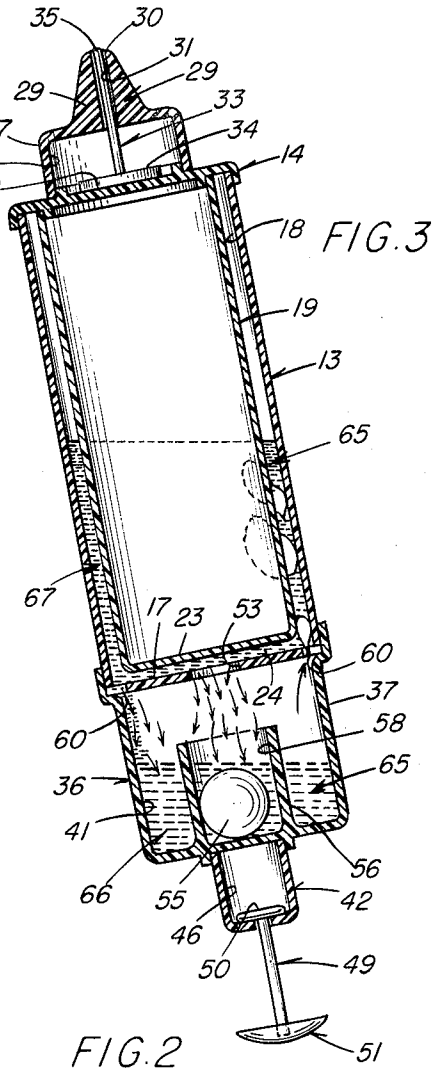
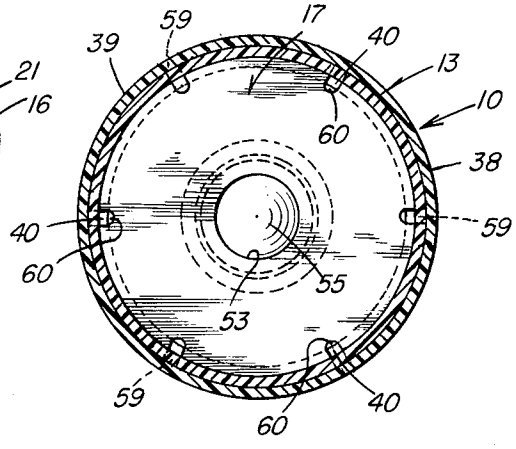


FIG. 2



March 1, 1966 P. H. KNOTT 3,237,340

TOY "BLOOD SAMPLING" SYRINGE SIMULATOR

Filed Oct. 30, 1963 2 Sheets-Sheet 2

FIG. 4

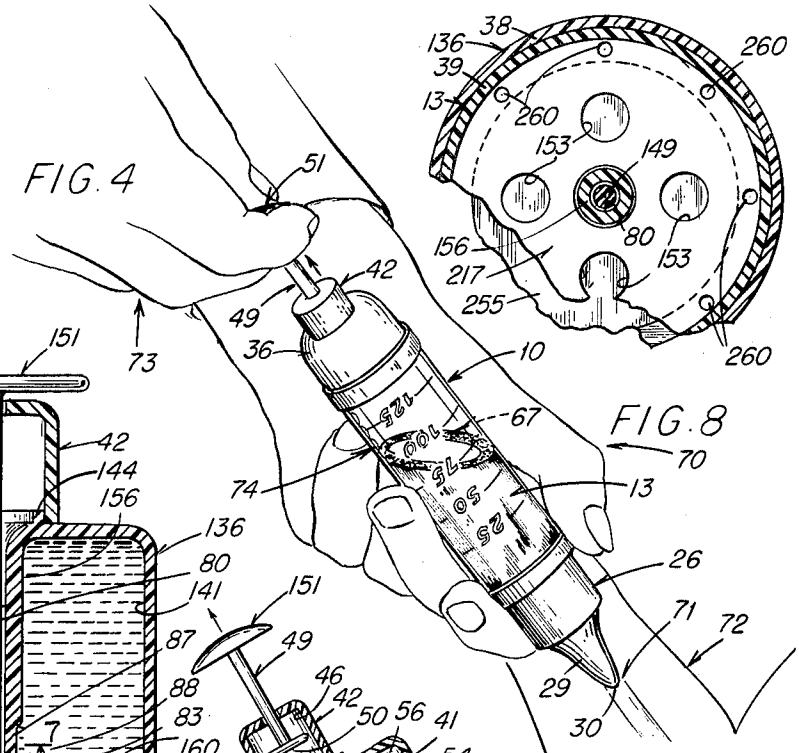


FIG. 8

FIG. 6

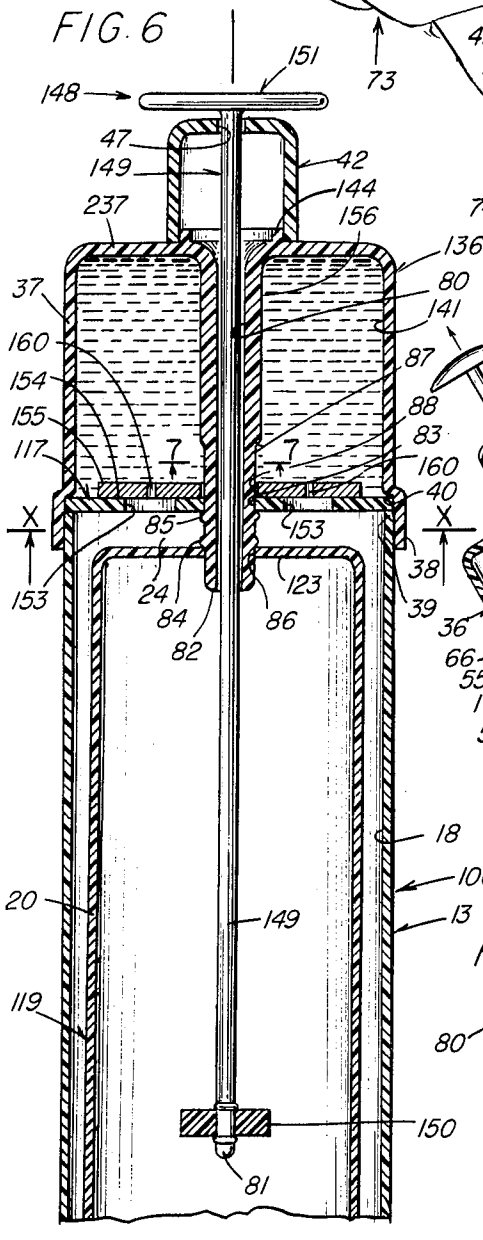


FIG. 7

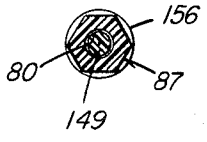


FIG. 5

United States Patent Office

3,237,340

Patented Mar. 1, 1966

3,237,340

TOY "BLOOD SAMPLING" SYRINGE SIMULATOR

Philip H. Knott, New York, N.Y.
(202 South St., Apt. A2, Sausalito, Calif.)

Filed Oct. 30, 1963, Ser. No. 320,068
6 Claims. (Cl. 46—1)

The present invention relates to amusement devices and, more particularly, to one employable as a simulator of a medical syringe capable of taking a sample of blood from an animal body, such as that of a person.

A general object of the invention is to provide such a simulator which looks much like a common type of hypodermic syringe capable of being operated to draw into a barrel chamber thereof by means of piston-created suction a sample of blood through a hollow needle or cannula subcutaneously inserted into the flesh of an animal, particularly a person, to communication with a vein, and which convincingly appears to be drawing such a blood sample when properly manipulated in a simple manner without actually doing so and without causing pain.

Medical hypodermic syringes of conventional type which may be employed to draw off a sample of blood from an animal body may include an elongated tubular barrel fitted at one end with a head structure to which is attached an opaque needle hub carrying a hollow hypodermic needle having a sharpened tip for thrust into flesh to communicate the bore of the needle with a vein. Such tubular barrel is usually made of light-transmitting or transparent material for "see through," such as glass or suitable plastic. The barrel is fitted with a reciprocative piston assembly having a piston head reciprocatively mounted in the tubular barrel to define between it and the head structure a collective chamber. The piston assembly includes a piston stem which extends out through the back end of the barrel and suitable guide structure mounted on the back end of the latter effectively closing off the back end of the barrel and guiding reciprocation of the stem with the end of the stem projecting therebeyond and carrying a hand-engageable knob for reciprocation or retraction of the stem and the piston head therewith. The guide structure which closes off the back end of the barrel is, in many embodiments, opaque, being constructed of metal, and frequently carries coaxially with the outer end thereof a guide sleeve through which the piston stem is slidably mounted. Conventionally, such a syringe is employed to take a sample of a person's blood by first thrusting the piston assembly forward to advance the piston in the barrel chamber to the head structure for expelling the air therefrom. Then the tip of the hypodermic needle is thrust into a person's flesh to communicate its bore with one of his veins. Upon retraction of the piston assembly by grasp of the knob on the end of the stem and pulling it back the piston head is caused to be retracted in the barrel chamber, creating suction therein to draw in a sample of blood for subsequent analysis.

A more specific object of the present invention is to provide the present amusement device or toy in a form simulating such a syringe device in which is housed in a concealed chamber thereof a quantity of colored liquid simulating blood and which upon release will trickle into a light-transmitting or "see-through" tubular shell thereof that simulates a syringe barrel with the observable pooling therein simulating suction collection of blood in the tubular chamber.

Another object of the present invention is to provide embodiments of this amusement device, each of which may, prior to the release of a blood simulating liquid for hidden slow flow or trickle into the "see through" or transparent collecting or receiving shell chamber, be manipulated in a simple but effective manner to convince an observer that a needle simulating element thereof is being thrust into a "patient's" flesh without this actually occurring.

A further object is to so equip embodiments of the device as to permit the piston assembly simulator thereof to be slowly retracted by a hand of the operator during the trickle transfer of the blood simulating liquid for observed progressive collection or pooling artfully to deceive an observer or the "patient" into believing that this retractive action causes the progressive collection in the manner of the usual suction withdrawal performed by a real blood sampling syringe.

A still further object of the invention is to provide structural embodiments of the present amusement device which may be readily and economically constructed and which permit effective use and operation thereof as toys by children in the play of medical treatment games or as amusement devices by adults in playing practical jokes on others.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combinations of elements, and arrangement of parts, which will be exemplified in the constructions hereinafter set forth, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which:

FIG. 1 is an axial section, to enlarged scale and with some parts broken away and others shown in side elevation, of an embodiment of the toy "blood sampling" device of the present invention, showing the device readied for the intended deceptive use;

FIG. 2 is a transverse sectional view taken substantially on line 2—2 of FIG. 1;

FIG. 3 is a sectional view similar to FIG. 1, but to smaller scale, of the device illustrated in FIGS. 1 and 2, showing it in inverted position to effect recycling spill of the colored liquid from the receiving chamber back into the hidden supply chamber to constitute the readied condition depicted in FIG. 1;

FIG. 4 is a perspective view of the device of FIG. 1, illustrating employment and operation thereof in deceptively persuading an observer that a blood sample is being withdrawn from a "patient's" arm by an operator of the device with the use of the latter;

FIG. 5 is a sectional view similar to FIG. 3, but with some parts shown in side elevation and others broken away, depicting the upright position of the device as it is employed for the purpose illustrated in FIG. 4;

FIG. 6 is an axial section of an upper portion of a modified form of the device illustrated in FIGS. 1 to 5 incl., with common parts broken away;

FIG. 7 is a sectional view taken substantially on line 7—7 of FIG. 6; and

FIG. 8 is a transverse sectional view, with parts broken away, taken on a line substantially in the position of line X—X in FIG. 6, of a further modified form of the device.

Referring to the drawings, in which like numerals identify similar parts throughout, and particularly with reference to FIGS. 1 to 5 incl. thereof, it will be seen that an embodiment of the "blood sampling" toy or amusement device of the present invention may include a syringe barrel simulating tubular structure 10 carrying on one end (its distal end) a transverse head structure

11 and on its other end (its proximal end) a back end structure 12.

The barrel simulating tubular structure 10 includes a cylindrical sleeve or shell 13 of suitable light-transmitting or transparent material, which may be formed of substantially rigid and water clear transparent plastic, e.g., polystyrene, a vinyl compound, etc., or glass and the like; or from a slightly cloudy or milky "see through" material, such as polyethylene and like plastic, etc. The front or distal end of the tubular shell 13 is fitted with the transverse head structure 11 in the form of a closing disk 14, which may have a cylindrical edge flange 15 telescoped over the front edge 16 of the shell and anchored thereto in a substantially fluid-tight joint, such as by cement. The back or proximal end of the tubular shell 13 is substantially closed off by a transverse partition plate or disk 17, so as to define between it and the head plate 14 within the shell an internal receiving chamber 18. In order to reduce the capacity of the receiving chamber 18 the barrel simulating structure 10 may include an elongated space-filling insert 19 preferably coaxially mounted within the tubular shell 13. For this purpose insert 19 may consist of an inverted elongated cup provided with a cylindrical sidewall 20 terminating in an annular lip 21 suitably anchored in a fluid-tight manner to the head plate 14, such as by being telescoped over a cylindrical flange 22 carried by the inner face of the latter and cemented thereto, if necessary. The inverted insert cup 19 is closed at its top end by a transverse wall 23, which may be integral with its sidewall 20, spaced inward or downward from the transverse partition plate 17 to define therebetween an intervening transverse flow space 24. Thus, the major portion of the receiving chamber 18 is defined between the tubular shell 13 and the cylindrical sidewall 20 of the inverted insert cup 19 as an annular intervening space of reduced capacity. In order that the presence of the inverted insert cup 19 will generally go unobserved in casual inspection of the device and may hide trickle transfer of the blood simulating liquid from the concealed supply chamber into the receiving chamber 18 this cup may be formed or molded from "see through" material which may be slightly clouded, such as polyethylene or the like, that may be employed in the production of the tubular shell 13, or the latter may be of substantially water-clear transparency with the insert cup being slightly milky in appearance.

Means 25 for simulating a hypodermic needle and its support is centrally mounted to and projects downwardly from the transverse head plate 14. It may be in the form of an opaque housing 26 simulating a needle hub and its mount, and thus may include a cylindrical sidewall 27 telescoped over a cylindrical flange 28 carried by the head plate 14 and suitably anchored thereto, such as by cementing. The needle hub simulator 26 includes a front or bottom end closure provided with a tapered or frusto-conical boss 29 terminating in a tip end 30 and provided with an axially extending passage 31 communicated to an interior chamber 32 defined within the cylindrical sidewall 27. The housing 26 and its boss 29 may be molded as a unitary structure from suitable plastic material carrying an opaquing pigment and it may have substantial rigidity. An elongated element or pin 33 is slidably and loosely mounted in the coaxial passage 31 to serve as hypodermic needle simulator. Pin 33 carries an enlarged head 34 loosely confined within the hub chamber 32 for free axial movement between the back face 132 of the frusto-conical body 29 and the front or bottom face 232 of the head plate 14.

In the upright position of the device as illustrated in FIG. 1, with the needle simulator 33 depending, the tip end 35 of the latter extends out an appreciable distance beyond the tip end 30 of the frusto-conical body 29 by virtue of force of gravity acting thereon. It may be biased by a light compression spring confined between back face 132 and pin head 34 within chamber 32 for this purpose. When the tip end 35 of the needle simulator pin 33 is pressed against a relatively immobile surface and the remainder of the device is lowered or pushed forward, the needle pin is caused to be retracted in the passage 31 until the stop head 34 thereof abuts the outer face 232 of the head plate 14, and as will be seen from FIG. 3. In such relative positions of the parts the tip end of the needle pin 33 may be substantially flush with the tip end 30 of the frusto-conical needle hub simulator 29 so that there is no projecting end to endanger a child or other person.

The back or proximal end of the tubular shell 13 is fitted with the back end structure 12 which may be in the form of an inverted cup-shaped cap 36 formed of suitable opaque material, and for this purpose may be molded from suitable rigid plastic containing opaquing pigment. The inverted cap 36 may include a cylindrical sidewall 37 terminating in a stepped lip 38 telescoped about the annular back edge 39 of shell 13 and suitably anchored thereto in a fluid-tight joint, such as by cementing. The stepped lip 38 provides an internal annular shoulder 40 which rests upon the circumferential zone of the partition disk 17, so that the latter is clamped between the back edge of the tubular shell 13 and this shoulder. The inverted cap 36 includes an outer or upper transverse closing end wall 137 to define with its cylindrical sidewall 37 and the partition plate 17 an internal supply chamber 41. The back end structure 12 also includes a housing 42, which may be in the form of an inverted hollow cup of similar opaque material having a cylindrical sidewall 43 telescoped within a cylindrical flange 44 carried by the end wall 137 of the inverted cap 36 and suitably anchored thereto, such as by cementing. The inverted cup 42 has a transverse top end wall 45, and it, the cylindrical cup sidewall 43 and the cap end wall 137 together define an internal chamber 46 with which a central hole 47 in the cup end wall 45 communicates. The inverted cup 42 may simulate a syringe piston stem guide sleeve.

A piston structure simulator 48 is provided which may be in the form of an elongated rod 49 slidably mounted through the hole 47 in the top end 45 of the inverted cup 42, with its bottom end carrying a stop enlargement 50 loosely mounted in the chamber 46 for axial slide between the cup end wall 45 and the cap end wall 137. The piston stem rod 49 carries on its top end an enlargement or knob 51 beyond the guide sleeve simulator 42 and is designed to be engaged by an operator's fingers for retraction of the piston stem rod.

Within the hidden chamber 41 of the inverted cap 36, is housed a fast or rapid flow one way valve structure 52. As will be seen from FIGS. 1 to 3 and 5, the valve structure 52 includes a relatively large circular hole 53, serving as a valve port and terminating in a circular top edge 54 which serves as a valve seat. A valve ball 55 of appreciable weight, which may be a steel ball, is of larger diameter than the circular valve seat 54, so that it will rest or nest partially therein and plug the rapid flow passage 53 in the upright position of the device 10, as is illustrated in FIG. 1. The top wall 137 of the inverted cap 36 has depending therefrom a cylindrical flange 56 having an I.D. greater than the O.D. of the ball 55, so as to be easily slidable therein to serve as a valve ball cage coaxially arranged within the hidden chamber 41. The annular space between the bottom edge 57 of the depending cage flange 56 and the valve seat 54 is of a dimension less than the diameter of the valve ball 55, so as to assure that the valve ball will always be captive opposite or within the interior space 58 of the cage. The valve structure 52 permits rapid return flow from the receiving chamber 18 back to the supply chamber 41 in an inverted position of the device, as will be explained later. It will readily occur to one that such valve ball cage structure may be widely

varied to serve a similar purpose, and that variations thereof may be supported from the sidewall 37 of the inverted cup 36 or extend upwardly from the partition plate 17.

The partition plate 17 is provided with a plurality of trickle passages. Such trickle passages may be provided as a plurality of circumferentially-spaced notches 59 in the circular edge of the partition plate 17, as will be understood from FIGS. 1 and 2. The edge zone of the partition plate 17 is clamped between the top edge 39 of the outer shell 13 and the annular shoulder 40 within the mouth of the inverted cap 36 when the anchoring flange 38 of the latter is telescoped down over this shell. The notches 59 extend radially inward from the circumferential edge of the partition plate 17 to a circle having a diameter less than the internal diameter of the inverted cap sidewall 37, so that their inner portions will be uncovered there to define adjacent the inverted cap sidewall trickle passages 60 of small transverse area or pinhole size to permit slow liquid flow or trickle therethrough. It will be seen from FIG. 2 that the notches 59, which define the trickle passages 60, may be six in number, located about 60° apart, but they may be greater or fewer in number, and a pair thereof located on diametrically opposite sides will serve their intended purposes, as will appear hereinafter.

Within the "blood sampling" syringe simulator of FIGS. 1 to 5 incl. is confined a quantity of blood simulating liquid 65, in either the supply chamber 41 or annular receiving chamber 18 or partially in both. This liquid 65 may be of known composition consisting of a suitable liquid vehicle carrying in suspension a red tinting pigment with the mixture having an appearance similar to that of fresh red blood. Space in the device which is unoccupied by the blood simulating liquid 65 is filled with air or other gaseous medium.

In operation of the toy "blood sampling" syringe simulator of FIGS. 1 to 5 incl., let it be assumed that one child is to act the part of a "patient" and another child is to act the part of a "nurse" or "doctor" as the operator who is to take a sample of the blood of the "patient" for analysis. In the event that the quantity of blood simulating liquid 65 is initially housed in the annular receiving chamber 18, so that in order to carry out the action it must be first transferred to the hidden chamber 41. The operator will, while unobserved, invert the device as is indicated in FIG. 3, preferably to an oblique, canted or tilted position, so that the valve ball 55 drops by gravity action down into the captive cage 56, thereby opening up the valve port 53. The blood simulating liquid 65 rapidly flows through the head space 24 and spills through the valve port 53 into the supply chamber 41, there to collect in a pool 66 with simultaneous depletion of the pool 67 thereof in the receiving chamber 18. Air in the supply chamber 41 will simultaneously pass upward through one or more trickle passages 60 that are at higher elevation to replace the blood simulating liquid 65 flowing down through the rapid flow valve port 53, and a minor downward flow may occur at trickle passages 60 which are at lower elevation, all as is illustrated in FIG. 3. When substantially all of the blood simulating liquid 65 is collected in the supply chamber 41, including the interior space 58 of the valve ball cage 56, the device will be quickly turned up to the upright position illustrated in FIG. 1. As a consequence, the valve ball 55 drops down to snug engagement within the circular valve seat 54 to close the valve port 53, and if the transverse partition 177 is substantially horizontal there will be practically no flow through any of the small trickle passages 60 since the head of liquid on all of the trickle passages will be substantially equal. The operator is then ready to create the illusion of taking a sample of the "patient's" blood in observed manipulation thereof.

The operator may then employ the readied device of FIG. 1 to simulate the taking of a sample of blood of a "patient" by holding it in one hand, such as in the manner indicated at 70 in FIG. 4, and pressing the tip end 35 of the needle pin 33 against an area 71 of the skin of the "patient's" arm, illustrated at 72. This causes the needle pin 33 to retract up into the hub passage 31 against its gravity or spring biasing, as will be understood from FIG. 5. It will be noted from FIGS. 4 and 5 that the device will be held by the operator in an oblique or canted position which not only simulates the normal position that a nurse or doctor may hold a blood sampling syringe in taking a blood sample, but also is a natural position for one to hold it for effecting the simulating action. At the same time, the operator grasps with the fingers of his other hand, a portion of which is illustrated at 73 in FIG. 4, the piston stem simulating rod 49 and its pull knob 51. As he pulls up thereon to retract the piston stem simulator 49, which he may do slowly to simulate the retraction of the piston assembly of a conventional hypodermic syringe, the blood simulating liquid 65 within the inverted cap chamber 41 will trickle down through one or more trickle passages 60 at lower elevation, due to the canting of the device 10, with simultaneous countercurrent hidden transfer of air from the receiving chamber 18 up through one or more of the trickle passages at higher elevation, as is illustrated in FIG. 5 by the bubble at 74. It is to be understood that the slow retraction of the piston stem simulator 49 has nothing to do with this slow trickle transfer of the blood simulating liquid 65 down from the supply chamber 41 into the receiving chamber 18 so as to progressively pool in the latter as is indicated at 67, but is merely employed to enhance the illusory effect. This trickle transfer occurs at 74, which is remote from the "patient's" eyes and thus will be practically hidden from his view particularly when the intervening insert cup 19 is of slightly cloudy appearance. Since the capacities of the supply chamber 41 and the annular receiving chamber 18 may be substantially equal in preferred embodiments of the device of the present invention the trickling blood simulating liquid 65 will eventually empty from the supply chamber by unobserved slow trickle through lowermost trickle passage or passages 60 progressively to collect in a pool 67 in the observable annular receiving chamber 18 until the latter is eventually substantially filled thereby. The "patient" probably will be astonished at the apparent amount of the blood simulating liquid which has collected in the barrel shell 13, which seems to fill the entire shell, and mystified by the source of this liquid which he may think is blood. The illusion is enhanced by the fact that when then the operator withdraws the device from contact of its needle hub nose 30 with the "patient's" skin area 71, force of gravity causes the needle pin 33 slowly to slide out of the hub passage 31 with maintenance of contact of the needle tip 35 with the skin, thereby creating the illusion that the needle is being slowly withdrawn from the patient's flesh and without any attendant pain.

It will be noted from FIG. 5 that in the position of appreciable tilt or cant of the device illustrated therein to attain the described illusory effect and operation, the valve ball 55 remains securely in its seated position effectively to close the rapid flow port or passage 53. This will be apparent from the fact that the force of gravity acting at the center of mass of the valve ball 55, indicated by the vertical arrow 75, is inward of the circular valve seat 54 on the low side. Thus considerable canting or tilting of the device in its illusory operation is possible, for obtainment of the trickle transfer of the blood simulating liquid 65 from the top supply chamber 41 down into the annular receiving chamber 18.

In the embodiment of FIGS. 6 and 7 a different type of one way rapid flow valve is illustrated, together with modified means to permit a piston stem simulator to be extended so that it may be retracted a greater distance for more realistic action throughout the trickle transfer of the blood simulating liquid 65 from the concealed supply chamber 41 down into the observable annular receiving

chamber 18. In this form the distal end of the barrel structure 100 may be similar to the head structure 11 and needle simulating assembly 25 of the embodiment of FIGS. 1 to 5 incl., or varied within the scope of the invention as one may wish. The inverted opaque cap 136 has a similar cylindrical sidewall 37 terminating in a depending stepped lip 38 telescoped down over the top end 39 of transparent tubular shell 13 and fixed thereto, so as to clamp between the top end of this shell and the annular shoulder or land 40 of the inverted cap transverse partition plate 117. The inverted cap 136 supports on its transverse top end 237 cup-shaped guide sleeve 42 with the bottom edge of the latter telescoped about upstanding flange 144 to which it is affixed. The inverted opaque cap 136 has a central sleeve 156 depending from its top end wall 237, with the former provided with an axial bore 80 extending up through this top end wall to communicate with the interior of the guide sleeve simulator 42 and aligned with the hole 47 in the top end of the latter. Elongated piston stem rod 149 extends down through the guide sleeve hole 47 and the sleeve bore 80 for location of its bottom end 81 within the interior of the filler shell 119. The bottom end 81 of the piston stem rod 149 carries suitable stop means, such as an enlargement or disk 150, to be pulled back to abutment with the inner end 82 of the sleeve 156 for limiting retractive action of the stem when pull is applied thereto by means of the enlarged finger-engaging knob 151. Thus this piston simulating sub-assembly 148 will permit appreciable retractive travel of the piston stem rod 149 for slow observable movement throughout the period of time that the blood simulating liquid will trickle down from the hidden supply chamber 141 to the observable annular receiving chamber 18.

In the FIGS. 6 and 7 embodiment the transverse partition plate 117 may be made of semirigid plastic, such as polyethylene, having some elasticity so that the material thereof which defines the edge of a central hole 83 therein may be stretched over annular stop and flow blocking ribs 84 and 85 in the assembly of parts, or the inverted cup 136 may be made of such semirigid plastic having a fair degree of elasticity so that its integral depending sleeve 156 or its annular ribs may be contracted during such assembly operation. The bottom end section of the depending sleeve 156 snugly fits within a central hole 86 in the transverse top end 123 of the filler shell or inverted cup 119 to form a fluid-tight joint thereat which, if desired, may be supplemented by or have substituted therefor an effective cement joint.

The depending sleeve 156 of the inverted cap 136 has an intermediate section 87 which may be longitudinally ribbed or polygonal in cross-section, as will be seen from FIG. 7, so that a central complementary-shaped hole 88 in a circular flat valve plate 155 may slidably receive this sleeve section 87 and with the latter preventing relative rotation. The valve plate 155 will be sufficiently heavy as to permit ready slide back and forth on the sleeve section 87 in the inversion and return end-for-end rotation of the device of FIG. 6. For this purpose, the valve plate 155 may be made from metal of a fairly high specific gravity relative to the plastic material employed in construction of the other parts.

The transverse partition plate 117 may be provided with a plurality of, e.g., four, relatively large rapid flow holes or valve ports 153 which may be equally spaced and are to be securely closed by the valve plate 155 in the upright position of the device, as is illustrated in FIG. 6. Since the same areas of the bottom face of the valve plate 155 will remain opposed to the flow passages or ports 153 by virtue of the non-rotary mount of the slidable valve plate on the sleeve section 87 and thus with respect to the partition plate 117, each of these four circular areas may be provided with a small pinhole 160 to form a trickle passage.

In operation of the embodiment of FIGS. 6 and 7 with the hidden supply chamber 141 containing a quantity of blood simulating liquid (not shown therein so as to avoid confusion in the structural illustration) force of gravity and the weight of the liquid head imposed upon the valve plate 155 will cause it to be snugly engaged with the top surface 154 of the transverse partition plate 117, so as securely to close the rapid flow passages 153 in the latter. There will be substantially no leakage through the pinhole trickle passages 160 due to the surface tension of the liquid and the size of these pinholes, and particularly since in a true upright position such pinholes will be located at the same elevation so that the same hydraulic head will be imposed thereon. When the device of FIG. 6 is tilted or canted from the exact upright position shown therein, such as in the manner proposed in FIG. 5, one or more of the trickle passages 160 will be located at an elevation lower than such trickle passages on the diametrically opposite side of the depending sleeve 156, or the longitudinal axis of the device, so that there will be a greater hydraulic head on the lower trickle passages than on the higher ones. Consequently, the blood simulating liquid will slowly trickle down from the hidden supply chamber 141 through the lowermost trickle passage or passages 160 into the head space 24 of the annular receiving chamber 18 and thence into the latter for progressive collection in the manner illustrated in FIG. 5 and previously described. When the embodiment of the device illustrated in FIGS. 6 and 7 is inverted the valve plate 155 slides back along the shaped section 87 of the sleeve 156 away from the transverse partition plate 117 to open the valve ports or rapid flow passages 153, thereby permitting rapid return flow of the liquid from the annular chamber 18 back into the supply chamber 141 for recycling use.

Variation of the FIGS. 6 and 7 embodiment is illustrated in FIG. 8, which is a transverse section taken on a line substantially in the position of "X"—"X" of FIG. 6. It will be seen therefrom that the transverse partition plate 217 may have its annular marginal zone provided with a plurality of circumferentially-spaced pinholes 260 which may be in the near vicinity of the top end 39 of the outer shell 13 and the inner cylindrical sidewall of the inverted cap 136, to serve as the trickle passages. With the trickle passages being provided as pinholes 260 in the uncovered portion of the marginal edge zone of the transverse partition plate 217 the plate valve 255 need not be provided with such small passages within the valve port closing areas, such as those illustrated at 160 in FIG. 6.

While it is preferred that embodiments of the present invention be equipped with retractive hypodermic needle simulators and piston stem simulators to enhance the illusory manipulations thereof, some such devices may, within the scope of the invention, be equipped with these simulators fixedly mounted to the barrel structures. With such simplified embodiments it is not too difficult to persuade an observer that the tip of the fixed needle element is being subcutaneously inserted and that suction-creating retractive pull is being applied to the exposed fixed piston stem and knob.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A toy "blood sampling" device for simulating the

action of a blood sampling suction syringe comprising, in combination,

(a) an elongated tubular light-transmitting shell constituting the outer sidewalls of a gas-filled chamber for receiving a quantity of colored liquid simulating blood which may be observed therethrough,

(b) transverse head means closing off the bottom end of said shell and receiving chamber,

(c) means simulating a hypodermic needle centrally supported by and projecting from said transverse head means,

(d) an inverted hollow cap connected to the top end of said shell in a fluid-tight manner and having a closed transverse top end with said cap defining therewithin a supply chamber,

(e) transverse partition means segregating the shell receiving chamber from the cap supply chamber with the latter containing an appreciable quantity of the blood simulating liquid,

(f) means defining flow passages past said partition means for transfer of the liquid down from the shell receiving chamber into the cap supply chamber in an inverted position of the device with the cap lowermost and for trickle of the liquid down from the cap supply chamber into the shell receiving chamber in an upright position of the device with the cap uppermost, and

(g) means mounted on the top end of said inverted cap simulating the manually engageable end of a syringe piston stem.

2. The toy "blood sampling" device as defined in claim **1** in which said hypodermic needle simulating means includes an opaque housing simulating a needle hub, and an elongated element simulating a needle projecting from and retractably mounted in said hub housing with stop means on said needle simulator limiting slide thereof out of said housing whereby when the tip of said needle simulator is pressed against a person's skin this element is retracted harmlessly into said hub housing to simulate subcutaneous insertion.

3. The toy "blood sampling" device as defined in claim **1** in which said piston stem simulating means includes an opaque housing simulating a syringe piston stem guide sleeve, an elongated rod slidably mounted through the top end of said housing simulating a retractable piston stem with stop means on the latter limiting slidable pull-out thereof relative to said guide sleeve housing, and a hand-engageable knob carried by said retractable stem beyond said guide sleeve.

4. A toy "blood sampling" device for simulating the action of a blood sampling suction syring comprising, in combination,

(a) an elongated tubular light-transmitting shell through which colored liquid therein may be observed,

(b) an elongated space-filling insert in said tubular shell defining therewith an intervening annular gas-filled chamber for receiving a quantity of colored liquid simulating blood,

(c) cross-head structure mounted to one end of said tubular shell and closing off the annular chamber thereat,

(d) means carried by cross-head structure simulating the hub of a hypodermic needle,

(e) an elongated element simulating a hypodermic needle centrally supported by said hub simulating means,

(f) a hollow cup-shaped opaque cap having an open inner end anchored in an annular fluid-tight joint to the other end of said shell and having an outer transverse closed end,

(g) transverse partition means segregating the annular receiving chamber from the interior of said cap with the latter serving as a supply chamber containing an appreciable quantity of the blood simulating liquid,

(h) means defining a relatively large flow passage past said partition means for rapid transfer of the liquid from said annular receiving chamber to said supply chamber in said cap when the latter is lowermost,

(i) valve means substantially closing off said flow passage when said cap is uppermost and permitting rapid flow of the liquid through this passage when said cap is lowermost,

(j) means defining at least a pair of small passages past said partition means for slow trickle of the liquid down through one of these small passages from the supply chamber to the annular receiving chamber when said supply chamber cap is uppermost with said valved passage substantially closed and simultaneous countercurrent flow of gas up through the other small passage from the annular receiving chamber to the supply chamber, and

(k) means mounted on said outer transverse closed end of said cap simulating the manually engageable end of a retractable syringe piston stem.

5. The toy "blood sampling" device as defined in claim **4** in which the needle hub simulating means is in the form of a housing having a longitudinal passage therein terminating at its tip end, and said needle simulating element is an elongated rod slidably and loosely mounted in this passage for ready retraction thereinto and carrying stop means inward of said housing tip end to limit outward gravitational slide when the needle hub simulator is depending.

6. The toy "blood sampling" device as defined in claim **5** in which said syringe piston stem means includes a housing simulating a piston stem guide sleeve having a longitudinal passage therein terminating at its top end, and said stem is in the form of an elongated rod slidably mounted in this sleeve passage for ready retraction outwardly thereof, said stem carrying stop means inward of said sleeve housing top end to limit pull-out thereof, and a hand-engageable knob carried by the outer end of said stem rod beyond said guide sleeve.

References Cited by the Examiner

UNITED STATES PATENTS

2,886,316	5/1959	Ayala	46—1 X
3,071,888	1/1963	Knott	46—1

FOREIGN PATENTS

383,811	11/1932	Great Britain.

RICHARD C. PINKHAM, *Primary Examiner.*