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[54] **BEDSIDE AND AMBULATORY PORTABLE DRAINAGE SYSTEM**
9 Claims, 17 Drawing Figs.
[52] U.S. Cl. **128/275,**
224/45, 248/95, 248/174, 248/227
[51] Int. Cl. **A61f 5/44**
[50] Field of Search. 248/95, 99,
174, 227, 300, 301; 224/45; 4/110; 128/275, 214,
295

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ABSTRACT: A bedside, ambulatory and portable system for the collection of human body fluids, including a calibrated transparent observation chamber for the immediate receipt and inspection of the fluid and its rate of flow, said chamber having a closable outlet and an upper overflow into a removable drainage collector provided with an openable and closable inlet, and calibrated for measurement of its contents, and means for supporting the assembly from a bed frame, together with a foldable stand for independently supporting the said assembly if desired.

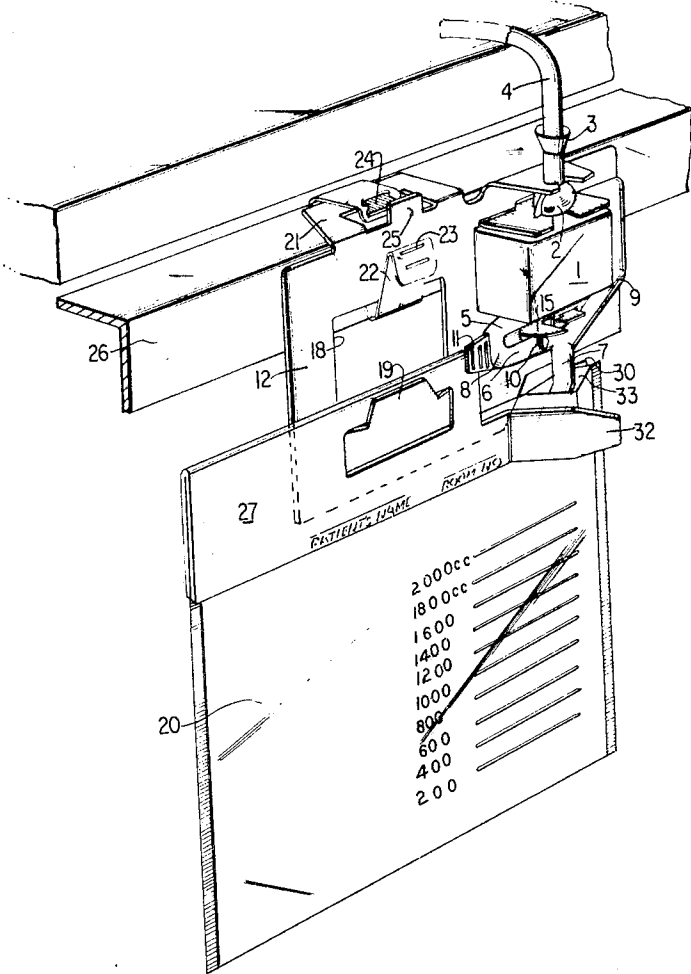
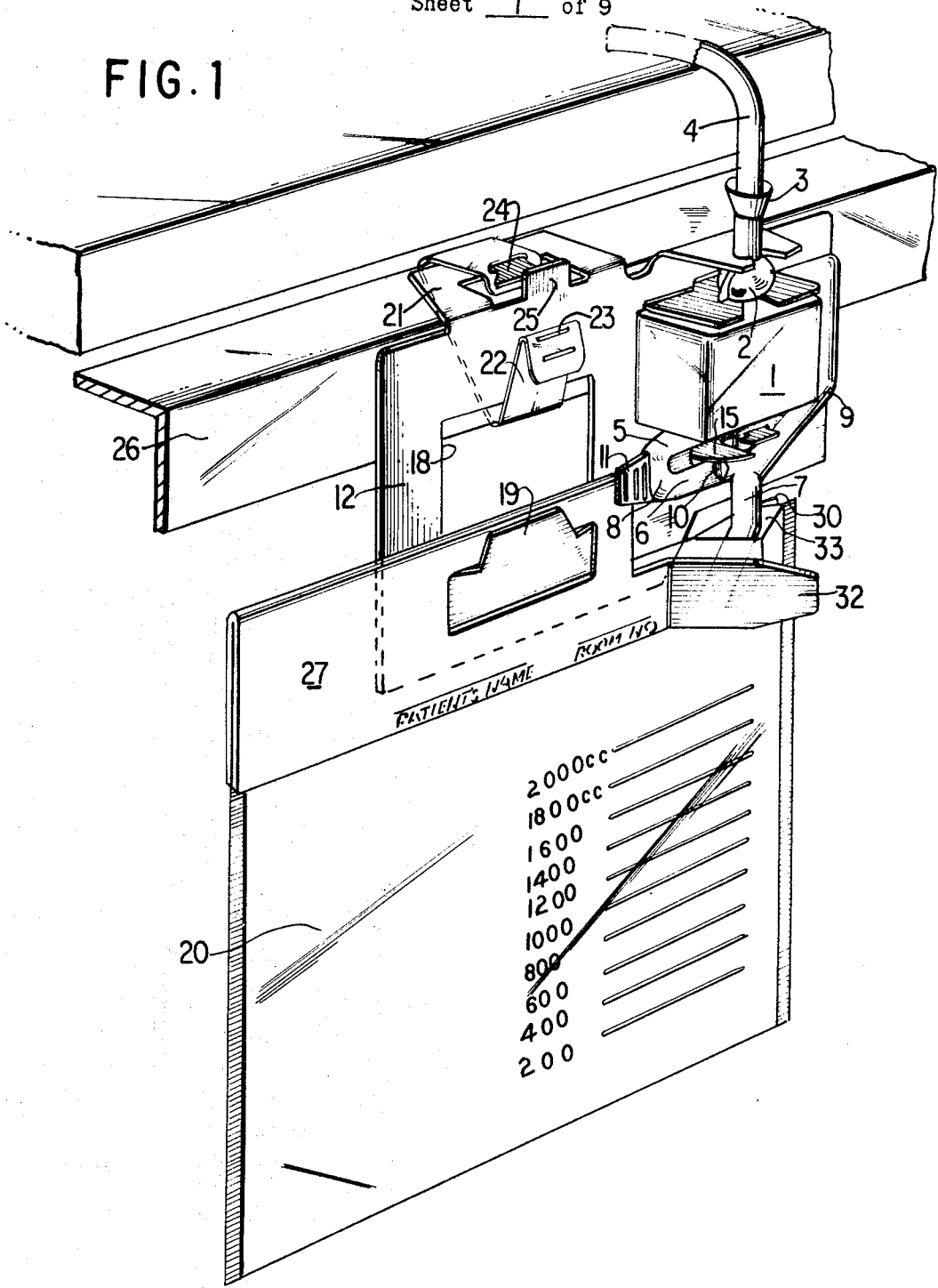


FIG. 1



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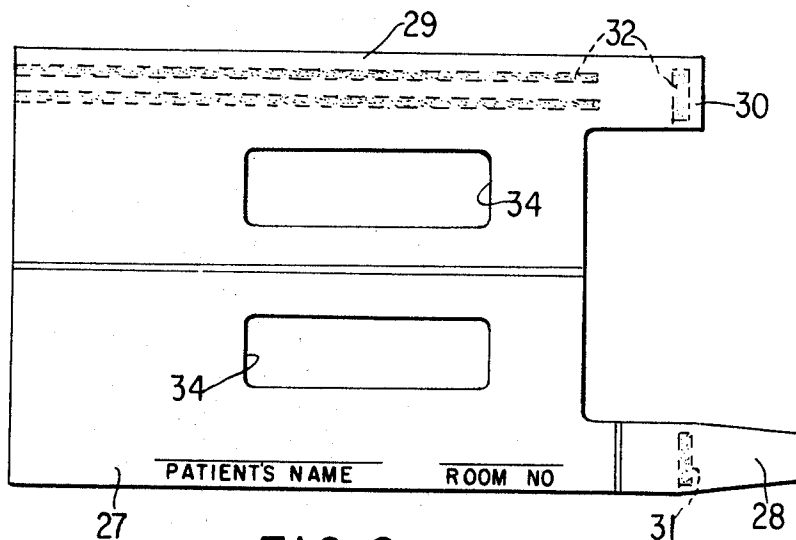


FIG. 2

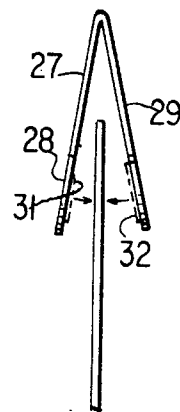


FIG. 4

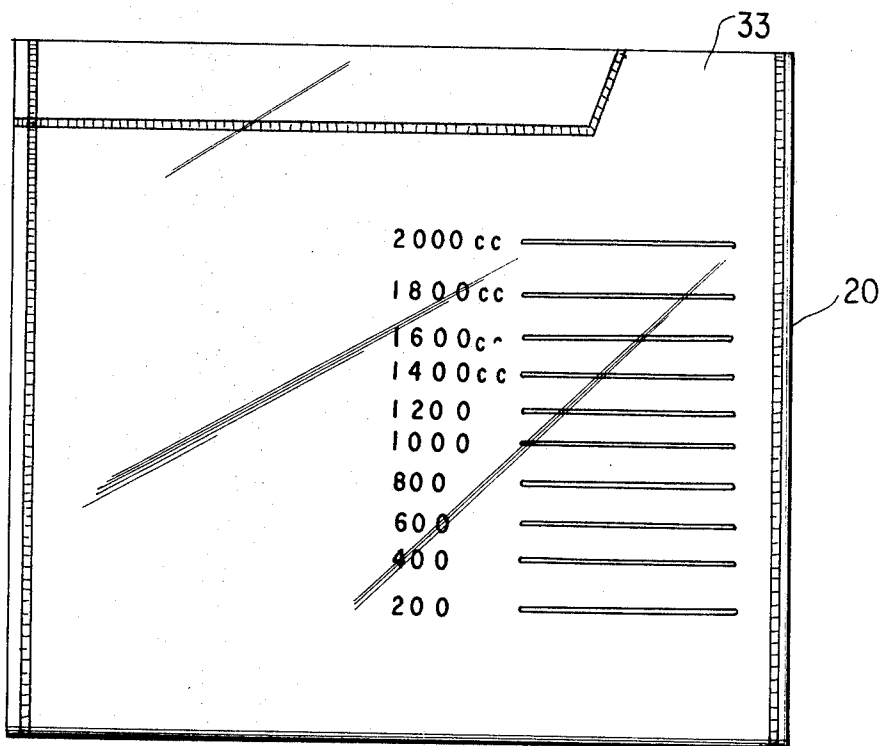


FIG. 3

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FIG. 6

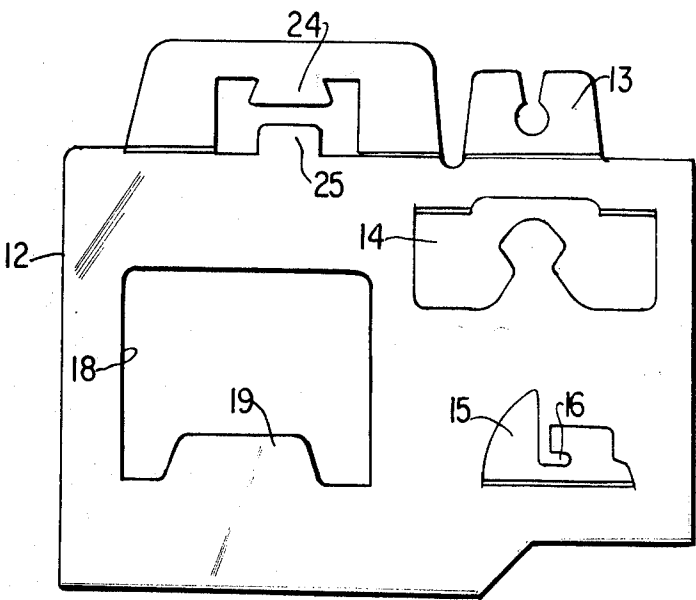


FIG. 7

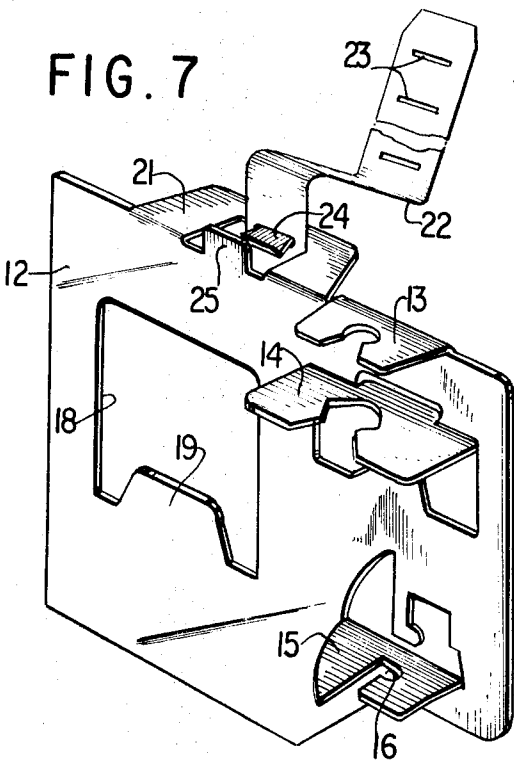
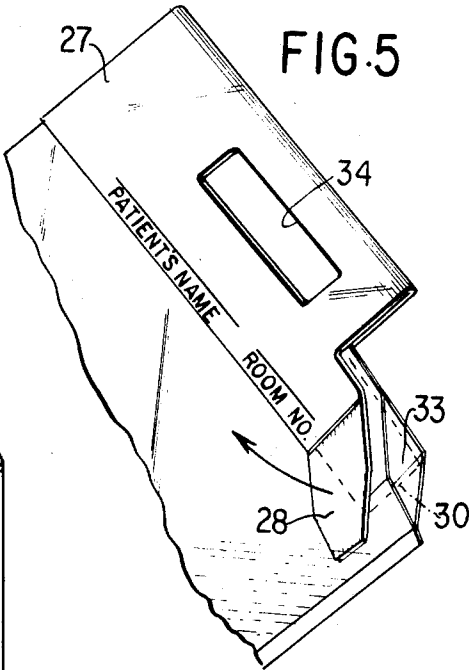


FIG. 5



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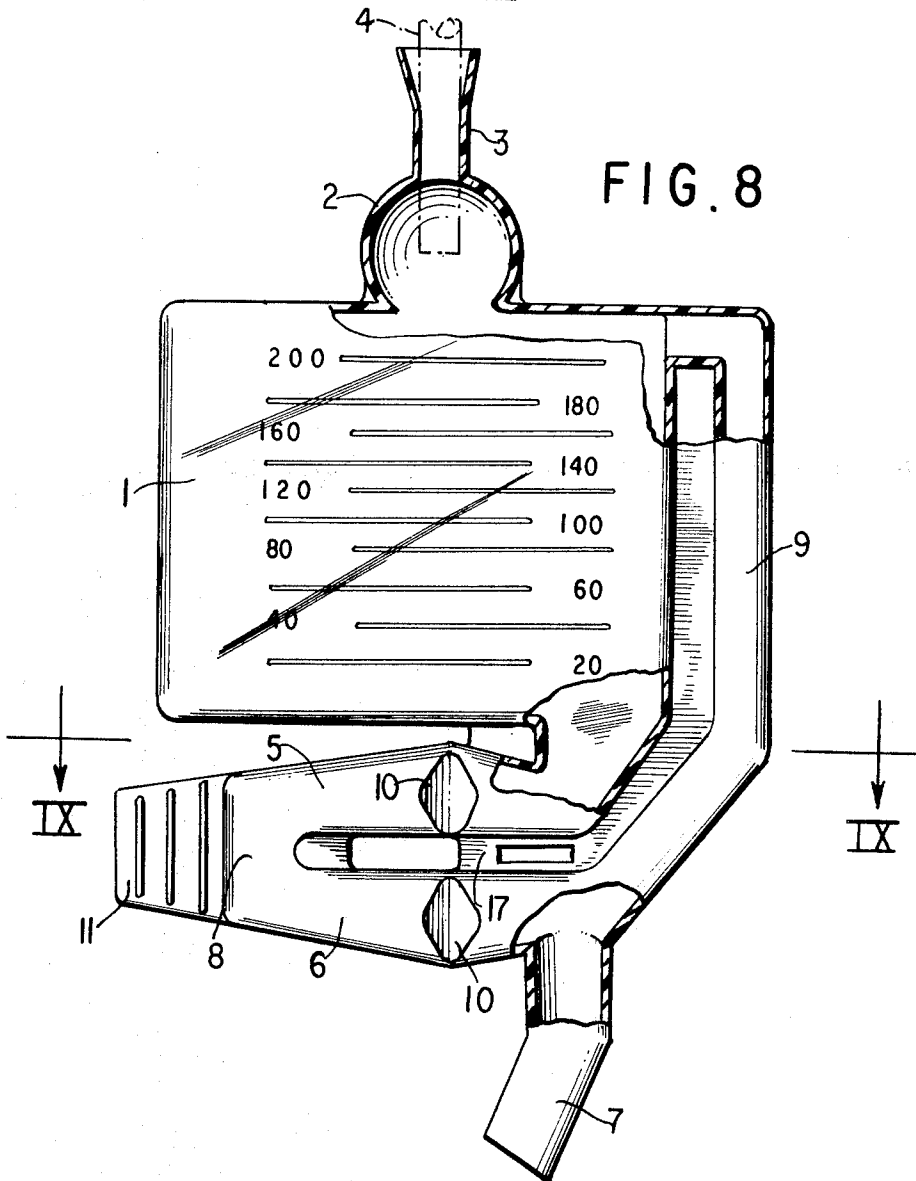
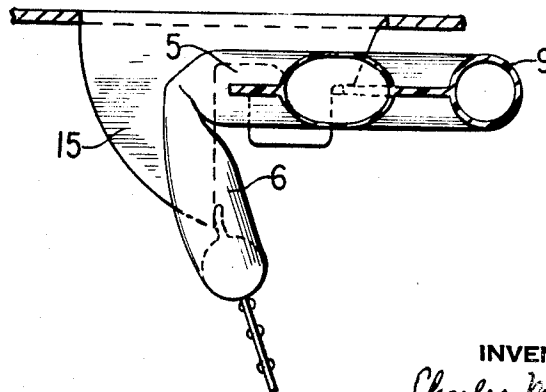


FIG. 9



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FIG. 12

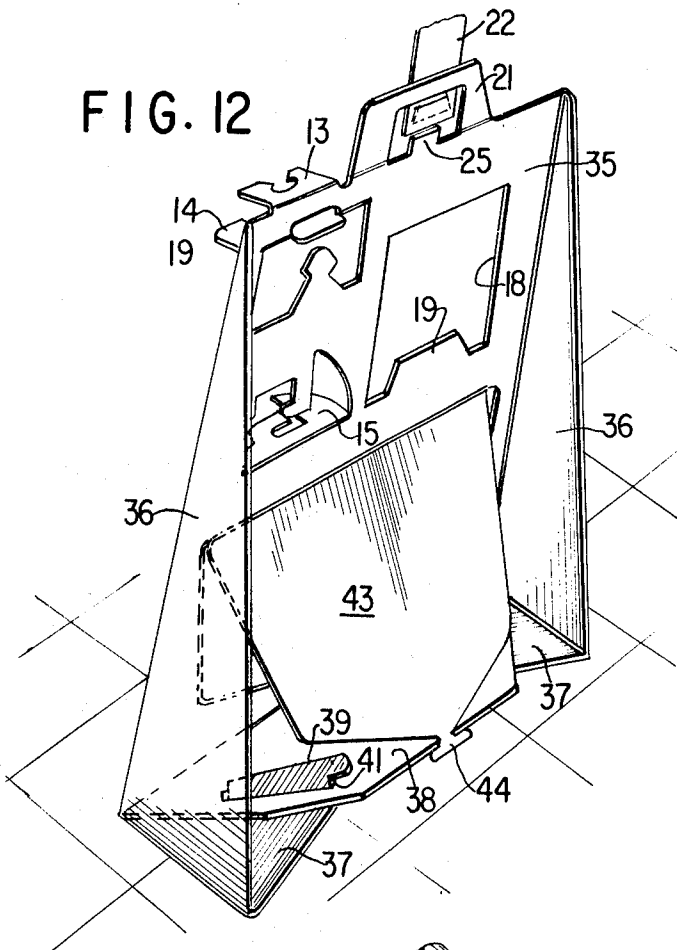


FIG. 13

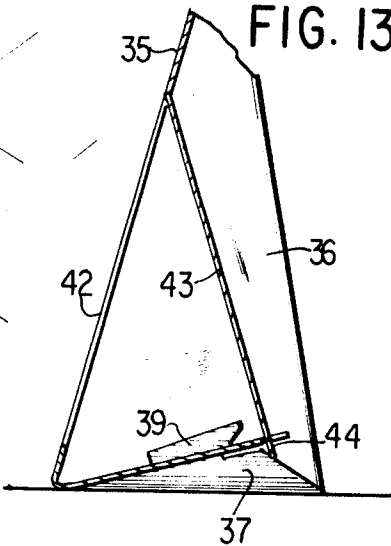
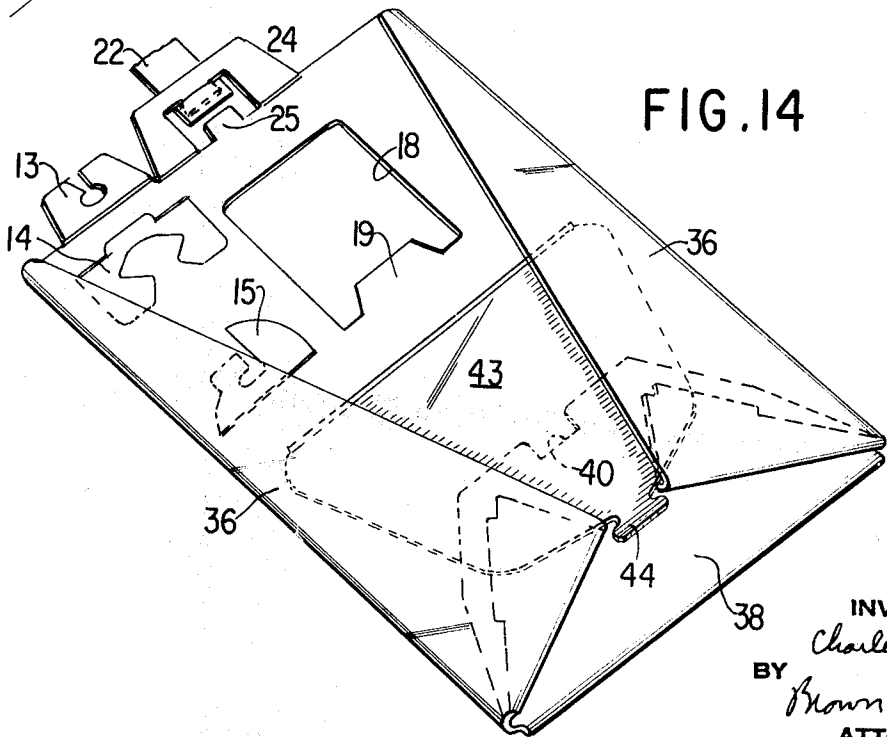
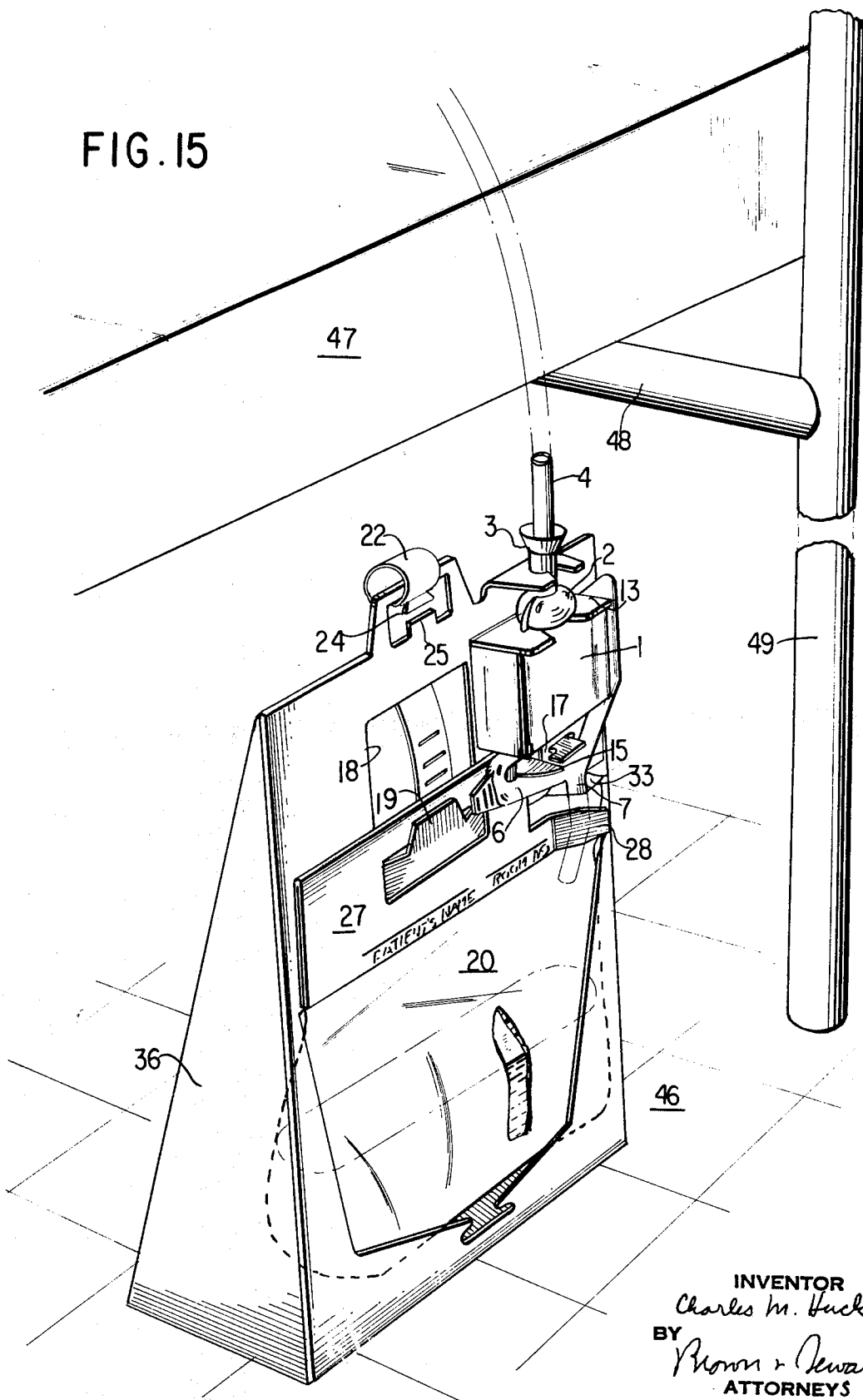


FIG. 14



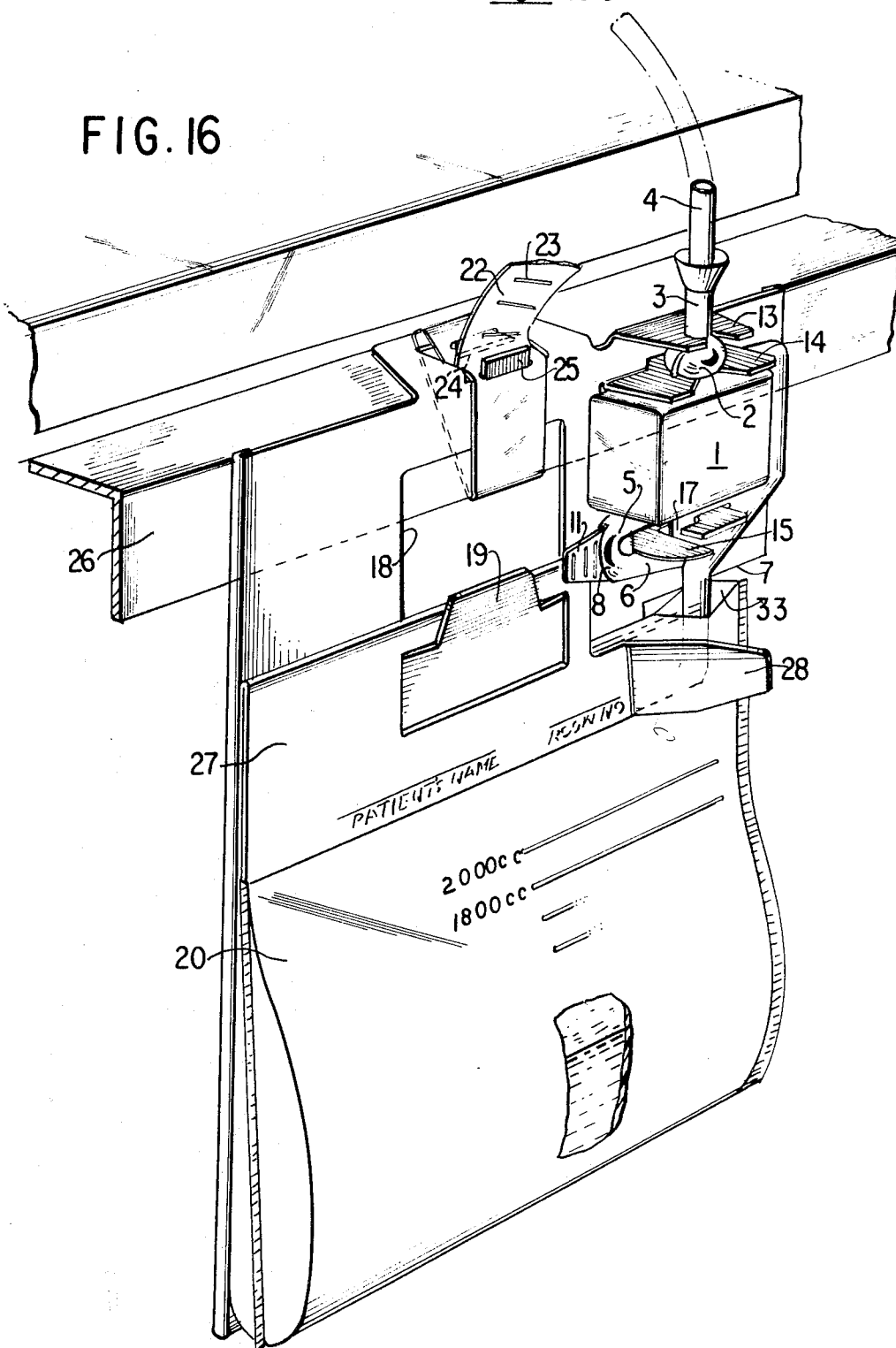
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FIG. 15



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FIG. 16



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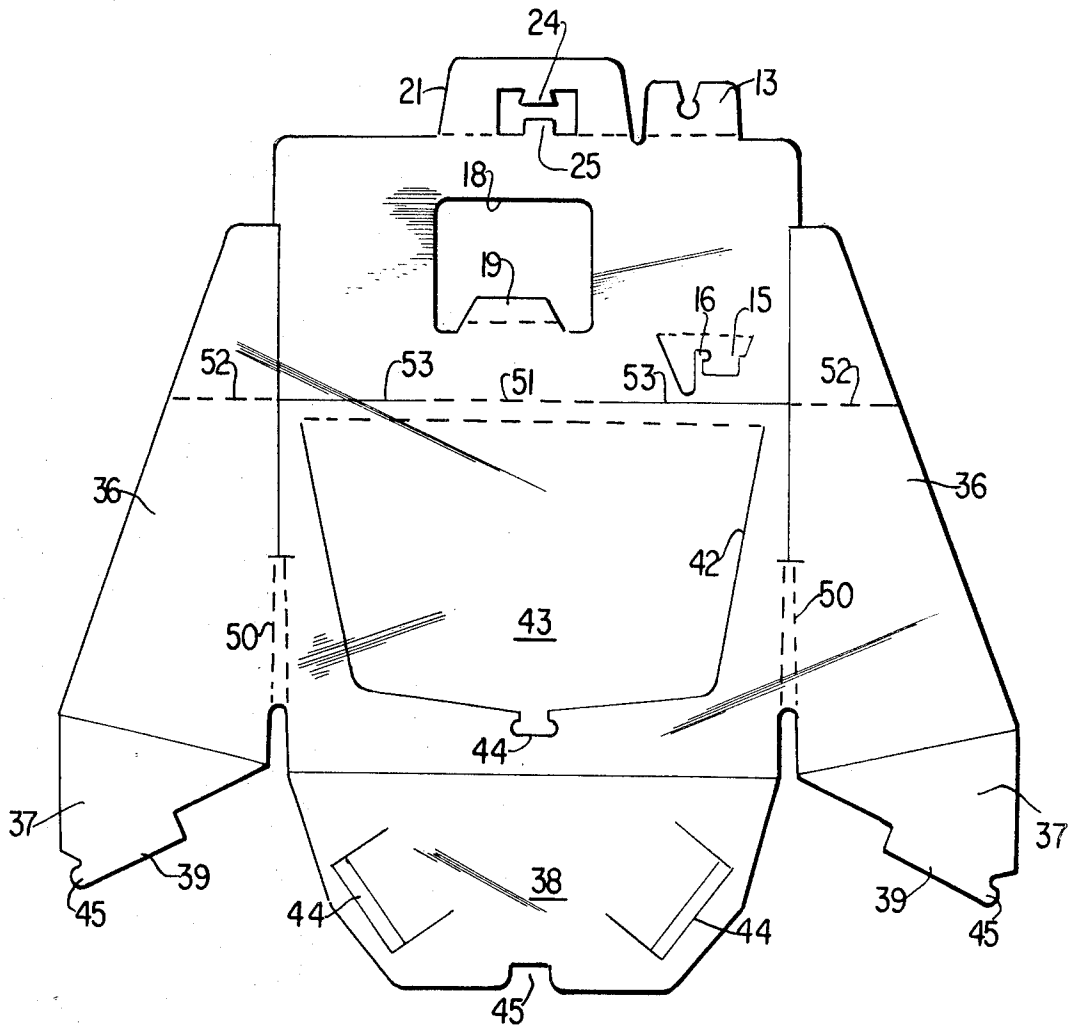


FIG. 17

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BEDSIDE AND AMBULATORY PORTABLE DRAINAGE SYSTEM

The "Bedside and Portable Drainage Collector" itself is described and claimed in copending application Ser. No. 377,218, filed June 23, 1964, now U.S. Pat. No. 3,309,008, issued Mar. 14, 1967.

This invention relates to a bedside and ambulatory portable drainage system for the collection of human body fluids such, for instance, as result from catheterization, and has for an object the provision of such a system that is equally adapted for hanging from the bed frame or mounting on a floor stand or being carried by the user when moving about.

Another object is the provision of such a system that comprises essentially a transparent observation chamber and a transparent drainage collector both of which may be molded or formed from a suitable plastic such, for instance, as polyethylene, together with novel means for operatively associating the observation chamber with a drainage tube, as from a catheter, and with the drainage collector.

Another object consists in forming the upper part of the observation chamber with a drip receiver that is approximately spherical and the inlet of which is adapted for the entry with a close fit of the lower end of the drainage tube, while its outlet opens into the top of the observation chamber.

Another object is to provide the observation chamber with an integrally formed outlet fitted for closure as occasion may require by the mere bending and latching of the outlet itself, and with an also integrally formed exterior overflow tube extending from its upper portion to its outlet that is designed to communicate with the drainage collector.

Another object is to provide a drainage collector composed of exceptionally thin material, which is formed with a mouth at one side of its top and is securely adhesively sealed, front and back, to a folded header, composed of cardboard or the like, which latter includes a bendable tab that normally cooperates with a mating portion of the header for embracing the mouth and may be manually pulled to open the latter; the header also embodying a cut out opening that serves the double purpose of receiving a supporting lug on the bed hanger or stand when the collector is in operative position, and also constituting a hand hold for manipulating or carrying the collector when the latter is removed, while the fact that the header gives widely distributed support for the collector enables the latter to be composed of very thin material.

Another object is to provide such a system in which the drainage collector may be disposed flat in the shipment pack and a plurality of collectors may be included attached to the hanger or stand with the outside one having the outlet of the observation chamber inserted ready for use.

Another object is to offer such a system which is completely preassembled, compactly packed in sterile storage and shippable condition, and ready to be put in use in whatever specific manner the circumstances may indicate, e.g. hanging from a bed frame, supported by a stand, or hand carried by the user.

Another object consists in providing a hanger that is so formed as to embody means for supporting the observation chamber; means for latching the bendable closure of the outlet of the chamber; means for strapping the hanger to a bed frame or the like; and means for the hanging thereon of the drainage collector.

A further object is the provision of such a system that efficiently attains all the previously stated objects as well as others that are inherent in this invention.

A practical embodiment of the invention is represented in the accompanying drawings, in which:

FIG. 1 represents a view in perspective of the complete system suspended from a rail of a bed frame in position for use;

FIG. 2 represents a plan view of the cardboard header for the drainage collector, unfolded;

FIG. 3 represents a plan view of the drainage collector laid flat and without the header;

FIG. 4 represents a detail end view, partly in section, of the folded header and upper portion of the drainage collector in

position to be adhesively united by closing pressure and heat if needed, on the header;

FIG. 5 represents a perspective, broken, detail view of the header attached to the drainage collector;

FIG. 6 represents a flat plan view of the hanger;

FIG. 7 represents a perspective view of the same in folded cooperative condition;

FIG. 8 represents, on an enlarged scale, a front elevation, partly in section, of the observation chamber and drip receiver, with the outlet of the former open;

FIG. 9 represents a detail section, partly in elevation, taken on the line IX-IX of FIG. 8, looking in the direction of the arrows, with the outlet of the observation chamber folded and latched in pinch-off position;

FIG. 10 represents a plan view of the floor stand and hanger, unfolded;

FIG. 11 represents a rear perspective view of the same almost completely folded;

FIG. 12 represents a rear perspective view of the same completely set up;

FIG. 13 represents, on a larger scale, a detail broken away medial vertical section through the lower portion of the floor stand;

FIG. 14 represents a perspective view of the floor stand and hanger folded for packing, storage and shipment;

FIG. 15 represents, on a larger scale, a perspective view of the complete system in use with the floor stand, showing portions of the floor and bed;

FIG. 16 represents, on a still larger scale, a similar view with the hanger supported from a bed frame rail; and

FIG. 17 represents a plan view of a modified form of floor stand, unfolded.

In brief summary, the invention contemplates a system of the character and adaptability above-indicated which comprises an observation chamber fitted at its inlet with a drip receiver designed for the entry of a drainage tube, and at its outlet with a foldable tube that connects the chamber with a nozzle and will permit liquid flow when unfolded but inhibit the same when folded into a bent form, as well as an overflow bypass tube interconnecting the top of the observation chamber and the same nozzle, all the above recited elements being integrally formed from a suitable transparent plastic, such as polyethylene; together with a drainage collector in the form of a bag composed of very thin flexible, transparent material, again such as polyethylene, that is fitted at its top with a stiff header which leaves a mouth for the bag at one side designed, when open, to accept the outlet nozzle of the observation chamber, the said header being provided with cooperating rigid and foldable flaps for the manual opening and closing of the mouth. The system also includes a hanger of stiff material formed to receive and hold in position the above-mentioned members and to adapt the same for operative positioning with respect to a bed or floor stand or for manual transportation. The invention is further directed to two forms of the floor stand itself. Both the observation chamber and drainage collector may be calibrated on an exposed surface to indicate the approximate volume of liquid therein at any time.

Turning now to the drawings, the observation chamber is denoted generally by the reference numeral 1 and its drip receiver by 2; the chamber being preferably rectangular and the drip receiver substantially spherical with an uprising flaring inlet 3 for the reception with a close fit of the end of a drainage tube 4. This tube 4 preferably extends to approximately the center of the drip receiver to interrupt the wet track between the patient and the collection area and prevent upward migration of bacteria. The outlet at the bottom of the chamber 1 is developed into a horizontally disposed tube of approximately U-shape having an upper arm 5 (FIG. 8) that opens directly into the chamber; a lower arm 6 which communicates with the outlet nozzle 7, and a blunt vertical end 8 connecting the two arms. An overflow by-pass tube 9 provides communication between the top of the observation chamber 1 and its nozzle 7, although, if preferred, the overflow tube

could continue downward independently and communicate with the bag of the drainage collector (to be described) through its own nozzle or through a separate lumen in the common nozzle.

All the elements above described, with the single exception of the drainage tube 4, are preferably integrally formed into a unitary combination which may readily be molded from a material such as the heretofore named transparent plastic polyethylene having enough rigidity normally to retain its form, although the arms 5 and 6 of the substantially U-shaped outlet are foldable as will now be described. When it is necessary or desirable to stop the flow of liquid from the bottom of the observation chamber 1, this may simply and easily be accomplished by folding the arms 5 and 6 through about 90° from left to right (FIG. 8) and latching them in this folded or bent position by means later to be described. This closing condition is illustrated in FIG. 9. It will be observed that the arms 5 and 6 are shown in FIGS. 1 and 8 as having vertical depressions or deformations 10, 10, at the line of folding, these depressions helping to determine approximately the location of the fold to ensure proper engagement of the folded portion with the element provided for holding it, as explained below. In some instances the depressions 10, 10 may be found unnecessary; the arms 5 and 6 are shown without them in FIGS. 15 and 16. A vertically ribbed pull tab 11, integral with the end 8 of the outlet, facilitates the manual bending procedure.

An important feature of this invention is the hanger which constitutes a support for the observation chamber 1, together with its associated elements, as well as the drainage collector (to be described hereinafter), and which is also adapted for attachment to a bed frame or to serve as a supporting floor stand.

This hanger is represented by itself in FIGS. 6 and 7. It is indicated as a whole by the reference numeral 12, and is suitably and preferably comprised of fibre board having appropriate strength and moisture resistant characteristics that is well known and available on the open market.

At the upper right hand edge of the hanger is an appropriately shaped projection 13 that is fitted, when bent at right angles to the body of the hanger as shown in FIG. 7, to grasp the inlet 3 of the drip receiver 2, while another properly shaped cutout 14 that remains unserved from the hanger at both sides of its upper edge may also be bent at right angles to the hanger by a hinging motion (see FIG. 7) for embracing the drip receiver at its juncture with the observation chamber. See FIGS. 1, 15 and 16. A second cutout 15, which is unserved along its lower edge, may likewise be bent to extend forwardly and enter between the arms 5 and 6 of the observation chamber outlet for supporting the lower portion of the said chamber with its associated parts. This cutout 15 is fashioned with a latchlike recess 16 that fits a small web 17 which connects the arms 5 and 6 of the observation chamber outlet and serves nicely to hold this unitary member of the system in operative position on the hanger 12. Furthermore, the forwardly projecting end of this cutout provides a means for securing the said outlet in closed or folded condition due to its entry between the said arms 5 and 6, and its engagement, when folded, with the upward extension 8, as illustrated in FIG. 9.

The hanger 12 is additionally provided with a relatively large opening 18 from the bottom of which projects upwardly a lug 19, designed for removably supporting the drainage collector that is denoted generally by 20 and will be later described in detail. This lug is susceptible to a forwardly bending action as though hinged to the hanger if such movement facilitates its purpose, while the open space thereabove is handy for manipulation of the hanger with its attached elements.

An upwardly extending wing 21 serves to cooperate with a hanger strap 22 whether the system be hung from a bed frame or a floor stand (see for instance FIGS. 1 and 15). This strap is preferably composed of a sufficiently strong and only slightly stretchable plastic provided with a longitudinal series of ap-

propriately spaced horizontal slots 23 which are suited to fit tightly over lugs 24 and 25 formed in the said wing. It will be seen that the lug 24 has an enlarged extremity which holds the strap thereon when a slot 23 at one end of the strap is slipped onto the said lug, the composition of the strap being such as to permit a slight distortion thereof for this purpose. See FIGS. 1 and 12. The free portion of the strap is passed around a member 26 of the bed frame when the system is to be suspended from a bed, as illustrated in FIG. 1, inserted from the rear through the opening 18, and one of its slots 23 is fitted over the lug 25 (see FIG. 16), the slot selected for this purpose being adapted to establish a fairly tight fastening. If desired, the wing 21 may be folded downwardly onto the bed frame member 26, as shown in FIG. 1.

It is deemed pertinent to emphasize that the hanger above-described in detail may be fabricated by a single stamping, which also forms the cutouts, tabs, the strap wing, and scores on the back of all the elements that are intended to be folded or bent at an angle to the body of the hanger, with a hingelike motion, to their operative positions. The only separate element required for the whole functioning of the hanger is the simple strap 22.

The drainage collector 20 above-mentioned as intended to be hung from the lug on the hanger 12, is an essential member of the system in that it accounts for the final disposition of the fluid through its reception of flow from the nozzle 7 of the observation chamber 1.

This collector consists of a bag composed of a suitable transparent flexible plastic such, for instance, as polyethylene, having front and back adhesively sealed together in a well-understood manner preferably along all sides (if made of flat stock) or along two or three sides (if made of tubular or folded stock) leaving, however, an unsealed opening or mouth near or at one side of the top. The upper portion of the bag, excepting the mouth opening, is tightly clasped between a folded header composed of some comparatively stiff material, such as cardboard, that is firmly secured in position by the use of any well known and suitable adhesive which responds to pressure, alone or with heat. If desired, the whole top of the bag may be left unsealed as it will be clasped together by the header. The header is formed with two, front and back, laterally projecting tabs at the mouth opening, the back tab being fixed and the front one foldable or bendable forwardly with the result that the mouth may remain closed when the two tabs are in parallelism but will be opened by the mere pulling or bending of the front one forwardly, due to the fact that the tabs are adhered respectively to the front and back of the bag. The header is fashioned with a cutout serving to hang the bag and also as a hand hold.

The collector bag and its header are depicted individually in FIGS. 2, 3 and 4, together in FIG. 5, and in position on the hanger in FIGS. 1, 15 and 16. Specifically describing the same, the bag portion per se is, as above noted, marked 20. The unfolded header comprises a front 27, with its bendable tab 28, and a back 29 with its fixed tab 30. The front and back of the header may be coated on one side with an appropriate pressure-susceptible (with or without heat) adhesive, as indicated at 31 and 32, FIG. 2. The tab 30 preferably terminates a short distance (e.g. 1 inch) from the edge of the bag while the tab 28 extends to or beyond the edge of the bag, and the adhesive covers the whole of the surface of the tab 30 but only that portion of the tab 28 which is coextensive with the tab 30, so that a slight pulling of the tab 28 forwardly will serve to open the mouth of the bag which is indicated by 33. It is practical to make the fixed tab 30 the same length as the tab 28 but, to accomplish the opening of the mouth 33 by pulling forwardly the tab 28, it is necessary that the adhesive on the two tabs be coextensive so that the extremity of the tab 28 is left free for movement independently of the tab 30.

When assembling the bag with the header, the latter is folded as shown in FIG. 4 to embrace the upper portion of the former with the adhesive coated sides facing each other and in position to contact the front and back of the bag when pressed

there-against into the final position illustrated in FIG. 5, with the front 27 of the header and part of its bendable tab 28 adhering to the front of the bag, while the back 29 of the header and the whole of its fixed tab 30 adhere to the back of the bag, unless the two tabs are made of the same length. As well shown in FIGS. 2 and 5, the front and back of the header are formed with cutouts 34, 34, that combine, when the header is folded, in constituting an opening for receiving the supporting lug 19, of the hanger 12, as well as providing a hand hold for manipulating or carrying the collector when removed from the hanger.

Both the bag 20 of the drainage collector and the observation chamber 1 are calibrated on the front as is well shown in FIGS. 1, 3 and 8. With respect to the bag, this enables ready observation of the quantity of liquid therein at any time; and, with respect to the observation chamber, accurate short term evaluations and measurements of the rate of drainage can be made at any time by merely closing the bottom outlet. Furthermore, specimen collection may also be accomplished in like manner without disturbing the bag of the drainage collector except temporarily to disengage its mouth from the nozzle of the observation chamber. Again, the drainage collector can be changed or emptied without interruption of normal drainage and without disconnecting any tubing, since, while the bottom outlet of the observation chamber is closed, the interim drainage is held therein; and, even if the said outlet is inadvertently left closed too long, the liquid will simply escape through the overflow tube instead of backing up into the drip receiver, thus destroying its purpose, or causing any back pressure.

In another aspect of this invention, the hanger which has heretofore been denoted as a whole by 12 and shown and described as a single element, may, if desired, be incorporated with other elements to constitute a floor stand for supporting the drainage collector instead of suspending the latter from a bed rail. This modified embodiment of the invention is portrayed in FIGS. 10-15 and will now be explained.

The hanger, with some added features, forms a front body panel 35 of the stand which is in general of triangular or wedge shape when set up and, as the various tabs and the like previously described in connection with the hanger are duplicated on this panel in both structure and function, they are given similar reference numerals and the description thereof will not be repeated.

The panel 35 has triangular wings 36, 36, with lower extensions 37, 37, and a bottom tab 38 of angularly tapering shape. The said wings, extensions and tab have their connections with the panel 35 adapted for hingelike folding by the provision of double parallel lines of scoring on the back. All these parts are suitably composed of strong fibreboard of, say, .060" thickness and having desirable moisture resistant characteristics, similar, for instance, to the fibreboard commonly employed for beer cases.

The wing extensions 37, 37 are formed with elongated locking tongues 39, 39 on their lower edges; a notch 40 is cut in the lower edge of the tab 38, and elongated slots 41, 41 are also cut in the said tab, all for a purpose to be explained.

The panel 35 differs from the hanger 12 in that the lower portion of the said panel is cut to form a large opening 42 (see FIG. 13) which presents a tab 43 having downwardly tapering sides and a small tongue 44 on its lower edge, the tab being, in effect, hinged along its upper edge by rear scoring.

It will be understood that the panel 35 and associated parts and formations just described may be made by a single stamping operation, as in the case of the hanger 12; and that the parts may be folded and interlocked, with gluing if desired, into the useful floor stand shown in FIG. 12.

To this end, the bottom tab 38 is swung rearwardly, the wing extensions 37, 37 are folded upwardly toward their respective wings 36, 36 and the latter are folded inwardly to enable the locking tongues 39, 39 to be inserted through the slots 41, 41 (see FIGS. 12 and 13), the tongues being shaped to cause an interlocking engagement with the slots chiefly through the effect of their projecting noses 45, 45 (FIG. 10). The tongue 44

on large tab 43 is then mated with the notch 40 in the rear edge of the tab 38, thus completing the arrangement of the parts to constitute a stable stand for operative functioning in the system as heretofore stated and shown in FIGS. 12 and 15.

It is regarded as being unnecessary to explain at length the cooperation of this stand with the other elements of the system in view of the detailed explanation above in connection with the suspension of the system from a bed frame member as illustrated in FIG. 1, but it may be observed that the stand is placed on the floor 46 adjacent to the bed frame 47, 48, 49 (FIG. 15) and that the strap 22 is without function when the stand rests on the floor, although it may, if occasion dictates or makes desirable, be used to suspend the stand from a bed frame as described in connection with the hanger 12 (see FIG. 1). The bag 20 of the drainage collector may be pushed through the opening 42 in the panel 35 so that the weight of its contents will aid in holding the stand steady in upright position when on the floor.

For storage or shipment the several parts attached to the panel 35 may be folded flat against the latter as shown in FIG. 14; and the drainage collector 20 may also lie flat against the folded stand.

The modified form of floor stand exhibited in FIG. 17 closely conforms to the form illustrated in the plan view FIG. 10, but differs in certain details and especially in the feature that permits the folded stand, as indicated in FIG. 15, to be further folded along a median horizontal line to facilitate packing. For clarity and simplicity, the parts of the form of FIG. 17 which are substantially and functionally similar to corresponding parts of the form represented in FIG. 10 will be given the same reference numerals without repetitious description.

Touching the difference between the showings of FIG. 10 and FIG. 17, it will be noticed that the cutout 14 of the former which is designed to embrace the drip receiver at its junction with the observation chamber is omitted as not essential, although it may be included if circumstances so dictate. Again, the upper portions of the wings 36, 36, are broadened in the form of FIG. 17 to increase the strength and rigidity of the stand when set up. There is also an elongated, narrow tapering "hinge" 50, 50 formed by perforated scores between the panel 35 and lower portion of each wing 36 to facilitate folding. Finally and most importantly, a horizontal line of alternate scoring and cutting runs across the panel and wings just above the large opening 42 that surrounds the tab 43. The line of scoring is denoted by 51, in the center part of the panel 35, and by 52, 52 in the wings 36, 36. Between each score line 52, 52 and the central score line 51 the material is cut through completely, as indicated at 53, 53. The valuable function of this scoring and cutting is that it permits the stand, after being folded flat in a manner as depicted in FIG. 14 of the other form of stand, to be additionally folded backward on a horizontal axis for compact packaging. The complete cuts 53, 53 through the panel permit the adjacent cut edges to spread apart when the stand is folded, thus accommodating the double thickness of the side panels 36, 36, each of which is folded first around its vertical score line and then horizontally along the score lines 52, 52.

It should be mentioned that the various lines of scoring may consist of mere partial cutting of the material composing the stand, or may consist of interrupted complete cutting through the material according to the requirements, and the characteristics of the material being used. A suitable material for this form of the stand is 70 point solid Kraft moisture proof stock with a white liner on both sides, although other known materials having the necessary characteristics may be substituted.

The whole system may be packed together in a suitable container and, as the observation chamber is of some thickness, the package may include a coiled drainage tube which is generally about 5 feet long, as well as a catheter preassembled with the tube, and a plurality of drainage collectors, the entirety being sterilized and sealed but ready for immediate use upon opening.

Claims to the drainage collector per se are not included herein because that is covered in a separate application filed

by me on June 23, 1964, with the serial number 377,218, now U.S. Pat. No. 3,309,008.

It is believed that the foregoing makes clear the structural and functional advantages and novel aspects of this invention, as well as its attainment of the objects set forth and others that are inherent therein, but it should be understood that various changes may be made in the form, structure and material of the several parts without departing from the spirit and scope of the invention, so that the latter is not limited to the details shown or described except as they may be included in the claims or be required by disclosures of the prior art.

I claim:

1. A therapeutic system designed and adapted for the collection of human liquid drainage in which the elements of the system include a drip receiver adapted for the insertion of a drainage tube, an observation chamber in communication with the drip receiver at its top and provided with an outlet having a nozzle at its bottom, and a drainage collector operatively associated with the outlet nozzle of the observation chamber, the outlet of the observation chamber being tubular and adapted to be temporarily closed by bending the tube, said system including a support and said elements being fixed on the support by tabs projecting from the latter and embracing the inlet of the drip receiver and engaging the tubular outlet of the observation chamber.

2. A system as defined in claim 1 in which the drip receiver is essentially spherical, the observation chamber is essentially rectangular, the outlet is essentially of horizontal U-form with upper and lower arms, and the said elements are fixed on the support by tabs projecting from the latter and embracing the inlet and outlet of the drip receiver as well as extending between the arms of the tubular outlet of the observation chamber.

3. A system as defined in claim 2 which also includes a web connecting the arms of the tubular outlet of the observation chamber, and in which the tab that extends between the said arms is formed with a recess that engages the said web.

4. A system as defined in claim 3 in which the tab that extends between the arms of the outlet of the observation

chamber also serves to latch the said arms releasably in outlet-closing position.

5. A therapeutic system designed and adapted for the collection of human liquid drainage in which the elements of the system include a drip receiver adapted for the insertion of a drainage tube, an observation chamber in communication with the drip receiver at its top and provided with an outlet having a nozzle at its bottom, and a drainage collector operatively associated with the outlet nozzle of the observation chamber, the observation chamber being composed of material that permits the flow and level of the liquid to be noted, said chamber having an inlet in the top of the chamber, an outlet passage at the bottom of the chamber, an outlet opening from said passage in communication with the drainage collector, means for releasably closing the outlet passage, and an overflow passage extending from the upper part of the observation chamber to a point adjacent the outlet opening, said outlet passage including at least one substantially horizontal portion, and the said passage being releasably closable by folding said portion.

6. A system as defined in claim 5 which also includes a support for the system that comprises a flat stiff body panel which is cut, scored and folded into triangular form as a whole for the hanging of the collector therewithin, and capable of standing independently on a flat surface, such as a floor, in operative position at the bedside.

7. A system as defined in claim 6, in which the said support includes means for suspending the same and the elements carried thereby from a bed in operative position.

8. A system as defined in claim 7, in which the support is also adapted to be folded into essentially flat condition for storage or shipment.

9. A system as defined in claim 5, in which the drainage collector is fitted at its top with a stiff header that leaves a mouth at one side of the top of the collector to accept the outlet nozzle of the observation chamber, the said header being provided with cooperating rigid and foldable tabs for the manual opening and closing of the mouth.

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