Feb. 15, 1955 G. R. BENT 2,702,036

DRIP TUBE

Original Filed Sept. 14, 1953

Fig. 1

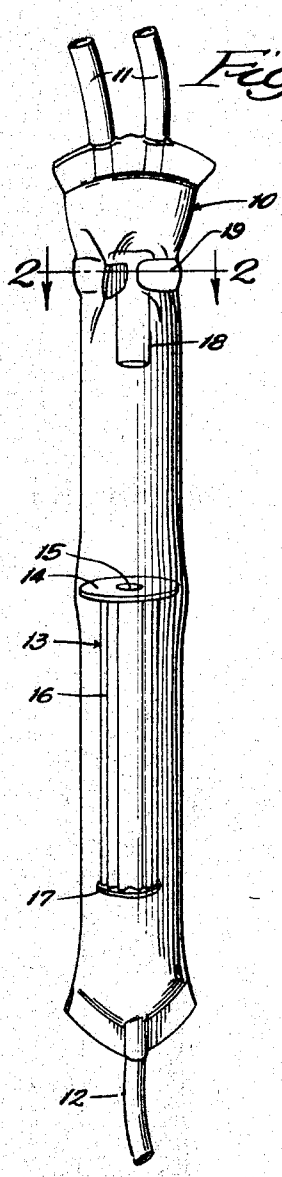


Fig. 2

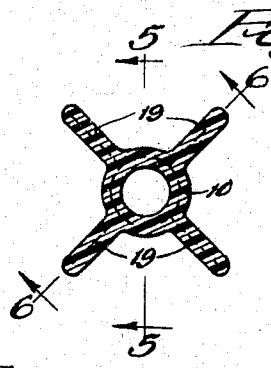


Fig. 3

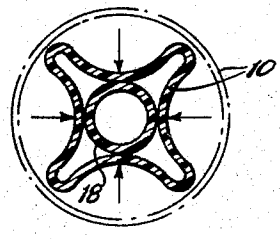


Fig. 4

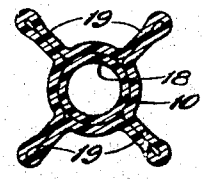


Fig. 5

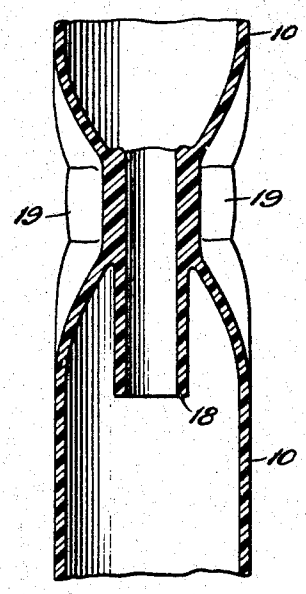
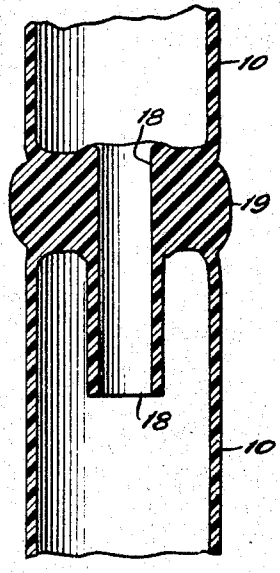


Fig. 6



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2,702,036

DRIP TUBE

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Continuation of application Serial No. 379,997, September 14, 1953. This application September 20, 1954, Serial No. 456,931

6 Claims. (Cl. 128—214)

This application is a continuation of my application, Serial No. 379,997, filed September 14, 1953.

This invention relates to a drip tube, and more particularly, to a sight drip tube in which liquid drops may be counted during the administration of parenteral solutions, and the like.

Considerable difficulty has been encountered in the fabrication of drip tubes in that the inlet tube from which the drop falls is often not fully centered within the tube and liquid tends to slide from the end of the inlet tube to a side wall of the main tube, thus preventing observation of the falling of the drop, while also obscuring the main tube. The problem is considerably aggravated when the inlet tube is made of plastic and when also the outer tube or main tube is made of plastic. Plastic tubes tend to bend under compression, and in the assembly of the parts, it is found that often the inner plastic tube tends to tilt toward one side wall of the main tube and thus cause the liquid to stream down the side wall of the main tube.

An object of the present invention is to provide a structure overcoming the above difficulties and providing an accurately assembled drip tube in which the inlet tube is centered to cause the drops to fall the full desired distance for observation. A further object is to provide a plastic tube having the characteristics described and in which the plastic is very substantially strengthened through the use of fins in the upper portion of the main tube, which thus strengthen the tube while at the same time centering the inner or drop tube within the main tube. A still further object is to combine a structure of this character in a filter device. Other specific objects and advantages will appear as the specification proceeds.

The invention is shown, in a specific embodiment, by the accompanying drawing, in which—

Figure 1 is a perspective view of a drip tube and connections therefor embodying my invention; Fig. 2, an enlarged, tranverse, sectional view, the section being taken as indicated at line 2—2 of Fig. 1; Fig. 3, a view similar to Fig. 1 but showing the initial bending of sectors of the main tube preparatory to forming the structure shown in Fig. 2; Fig. 4, a view similar to Fig. 3 but showing a second step following the step shown in Fig. 3; Fig. 5, a broken sectional view, the section being taken as indicated at line 5—5 of Fig. 2; Fig. 6, a sectional detail view, the section being taken as indicated at line 6—6 of Fig. 2;

In the illustration given, a tube 10 formed of plastic, or other suitable material, but preferably formed of a thermoplastic resin, is provided at its upper end with a tube or tubes 11 for supplying liquid to the tube 10, and at its lower end is provided with an outlet communicating with the drain tube 12. Since such structure is well known, a detailed description is believed unncessary.

Within the drip tube 10, a filter 13 may be interposed. The filter may be provided with a disc 14 having a central aperture 15 therein, and filter cloth or material 16 therebelow terminating in a closed disc 17.

Near the upper part of the tube 10 is the inlet tube or drop tube 18. This is the tube that gives trouble in the assembly operation because of its tendency to tilt in one direction or another and to approach one of the side walls of the tube 10 so that the liquid streams from the tube along the side rather than forming distinct drops which may be counted.

I have discovered that if opposite sectors of the tube 10 are first indented, as illustrated in Fig. 3, and the adjacent sector portions fused together to form fins 19, as illustrated in Figs. 2 and 4, that the fins will center the tube 18 fixedly within the main tube 10 while at the same time holding the tube 10 in fully round position. As those in the trade fully know, there is a tendency for plastic tubes to sag in areas and lose their perfectly cylindrical shape. By employing the fins 19, as illustrated, I find that the sagging tendency of the plastic can be overcome, while at the same time centering the inlet tube or drop tube 18 within the main transparent tube 10.

As above indicated, the process of forming the fins in the centering operation may be performed by first indenting sectors of the outer tube 10 to the position shown in Fig. 3, and then fusing the adjacent portions together, as illustrated in Fig. 4, the fusion being completed as illustrated in Fig. 2. In the final completing operation, I prefer to have the portions of the tube 10 which lie about the inlet tube 18 fused therewith, so that a completely integrated structure is formed, as illustrated more clearly in Figs. 5 and 6.

Any of the plastics commonly employed and found useful for the forming of drip tubes may be employed. For example, polyvinyl chloride, polyethylene, and similar well known plastics and thermoplastics may be used for the purpose indicated.

To accomplish the new results indicated, it is important that there be at least three fins which are effective in spacing the inner tube 18. Two oppositely-disposed fins are not sufficient, because they do not effectively center the tube with respect to the side walls which extend at right angles to the fins, and further, the main tube 10 may become flatter along one side and thus approach the end of the inlet tube 18. I have found that three fins 19 which are substantially equally spaced will center the tube 18 while also keeping the main tube 10 substantially in the desired round position. Also, four, five, six, or any number of fins may be employed for obtaining the same result. It may, therefore, be stated that the fins, to effect the new results described, must be at least three in number.

In the operation of the device, a main plastic tube 10, whether round or partly flattened, may be assembled as shown in Fig. 1, with an inner tube or drop tube 18 supported in a central spaced position by the use of three or more fins spaced about the tube. The spacing of the fins is not only effective in centering the tube 18, but also in distending the tube 10 about the inner tube 18, thus keeping the outer tube relatively round and fully distended. This improves the visibility of the drops from the tube 18, requiring that the drops fall the full length of the tube, or, at least, if a filter is used, to the top of the filter. At the same time, the fins 19 form relatively hardened ribs which strengthen the tube against crushing.

When the liquid flows through the connections 11 into the upper portion of tube 10, it passes into the drop tube or inner tube 18, forming drops as the liquid passes through the main tube 10. The nurse or doctor may count the drops so as to determine the weight of introduction of the liquid, etc. The liquid passes through the filter 16 and out through the drain tube 12 to a hollow hypodermic needle, through which the liquid is introduced into a patient or utilized for some other purpose.

While, in the foregoing specification, I have set forth a specific structure in considerable detail for the purpose of illustrating an embodiment of the invention, it will be understood that such details of structure may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. A drip tube, comprising a transparent tube body having in its upper portion an inlet tube and at its bottom portion an outlet, said tube having sector portions about the inlet tube brought together and fused to form at least three centering fins supporting said inlet tube in centered relation within said first-mentioned tube.

2. The structure of claim 1, in which the fins are fused with said inlet tube.

3. The structure of claim 1, in which the fins are formed of flexible thermoplastic material.

4. A drip tube, comprising a flexible thermoplastic

outer tube having a substantially transparent portion, and an inlet tube communicating with said transparent plastic portion and supported in centered relation within said outer tube, said outer tube having sector portions about said inner tube fused together to form radiating fins with their inner portions providing arcuate shoulders engaging said inner tube, said fins being at least three in number and forming a seal about said inner tube.

5. The structure of claim 4, in which the inner tube is also of flexible plastic material and is fused with the shoulder portions of said fins.

6. A thermoplastic tube union, comprising an outer tube of flexible thermoplastic material, said tube having an outlet opening at its bottom and an inlet tube in the upper portion of said first-mentioned tube, said first-mentioned tube having sector portions about said inlet tube fused together to form at least three radiating, relatively stiff fins centering said inlet tube within said first-mentioned tube.

No references cited.