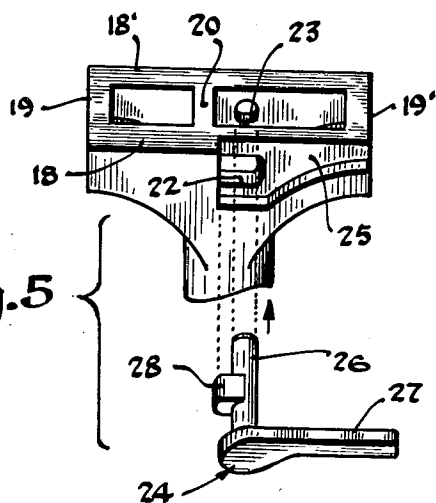
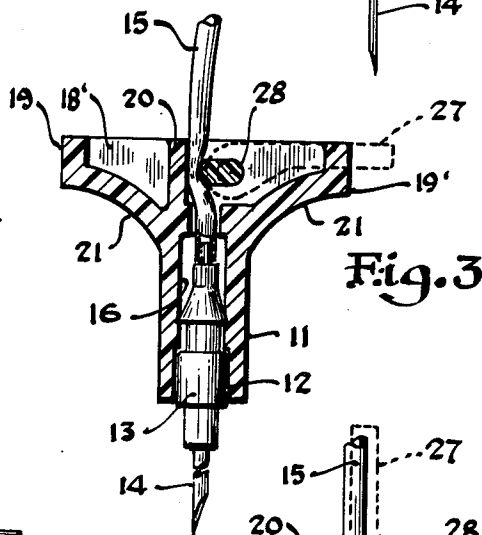
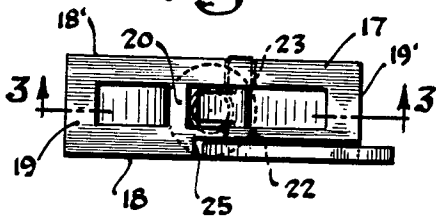
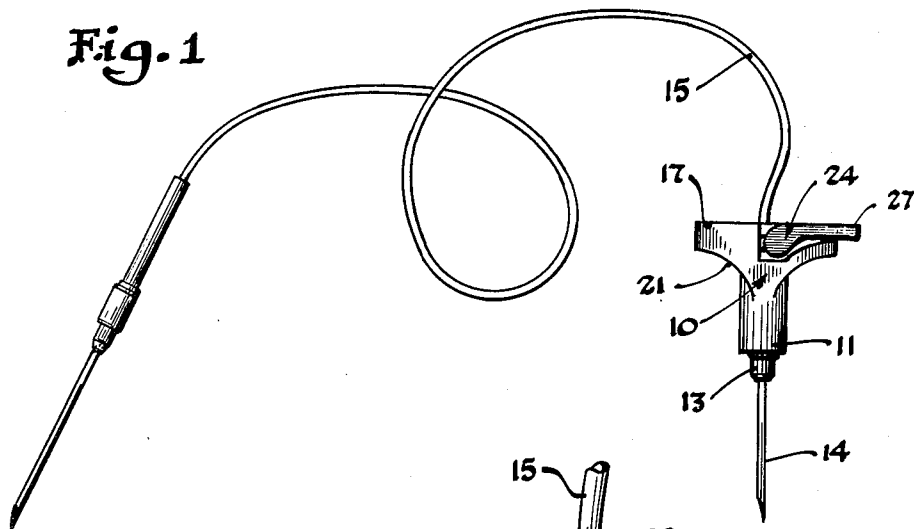


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VENOCLYSIS APPARATUS
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1

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4 Claims. (Cl. 251—9)

This invention relates generally to a venoclysis apparatus and more particularly to a needle holder and tubing clamp useful in the collection of blood and in the administration of parenteral fluids.

Since it is highly desirable to have a conveniently operated clamp for shutting off the flow of fluid through a length of flexible tubing when piercing the fluid container stopper prior to and during the administration or collection of a parenteral fluid, it is an object of the present invention to provide an improved needle holder and tubing clamp which substantially reduces the likelihood of inserting the closure needle through the rubber stopper or a fluid container while the tubing clamp is in the open position.

It is a further object of the present invention to provide an improved tubing clamp which is securely held in closed position regardless of any pulling force of the flexible tubing.

Other objects of the invention will be apparent from the following detailed description and claims to follow.

In the drawing, Figure 1 is a side elevation view showing the tubing clamp and needle holder operatively connected with a length of flexible tubing and having an administration needle attached to the end thereof.

Figure 2 is an enlarged plan view of the tubing clamp and needle holder shown in Figure 1.

Figure 3 is an enlarged vertical sectional view of the tubing clamp and needle holder in closed position taken along the line 3—3 of Figure 2.

Figure 4 is a side elevated view of the tubing clamp of the present invention partially in vertical section showing the tubing clamp in open position without needle attached.

Figure 5 is a fragmentary exploded perspective view of the tubing clamp.

The tubing clamp and needle holder assembly of the present invention comprises a body section 10 having a downwardly extending tubular section 11 with the outer end thereof adapted as at 12 to receive resiliently therein a hub 13 of a stopper piercing needle 14 with the needle hub 13 secured to the inner end of the needle 14 and which has attached thereto, a length of flexible tubing 15. The tubing 15 and needle 14 extend upwardly through the axial passage 16 of the tubular section 11. The upper portion of the body section 11 is comprised of a generally rectangular section 17 which is integrally connected to the tubular section 11 by inwardly tapering wall sections 21. The upper surface of section 17 is defined by substantially parallel spaced lateral walls 18, 18' and end walls 19, 19' which provide an uninterrupted axial passage for the tubing 15. A transversely extending tubing supporting wall 20 is disposed between the ends of the walls 18, 18' and adjacent the axial passage. The upper surface of section 17 lies preferably in a single plane to provide a suitable bearing surface which facilitates forcing the needle 14 through a rubber stopper.

The spaced lateral walls 18, 18' are provided at a point

2

spaced inwardly from the upper surface thereof with oppositely disposed openings therethrough forming a transversely extending passage spaced laterally from the longitudinal axial passage which extends through the body section 10. The opening 22 in the wall 18 is generally rectangular in form with its major axis extending substantially perpendicular to the longitudinal axial passage of the body section 10. The opening 23 in the wall section 18' has a smaller diameter than the opening 22 and is adapted to rotatably receive the end of a tubing clamp operating means 24. The wall 18 is also provided with a recessed section 25 extending from the inner edge of opening 22 laterally to the end of the rectangular section and from the upper edge thereof downwardly a distance sufficient to accommodate the inner end of the operating means 24 when operatively engaged in the body section 10 in any of its rotatable positions.

The tubing clamp operating means 24 is comprised of a cylindrical shaft 26 extending perpendicularly from the operating lever 27 which preferably is of such length as to project outwardly beyond the end wall 19' when the lever 27 is in a horizontal position and operatively engaged in the body section 10. The shaft 26 is provided intermediate the ends thereof with a cam surface 28 extending perpendicularly from the shaft in the opposite direction from that of operating lever 27 and lying in the same longitudinal plane as the operating lever 27. The end of shaft 26 is adapted to be rotatably received by the opening 23 in the wall 18'.

In assembling the tubing clamp and needle holder of the present invention, the clamp operating means 24 is first positioned with the end of shaft 26 opposite the opening 22 and with operating lever 27 parallel with the upper surface of the body section 10. The shaft 26 and cam surface 28 can then be inserted into the interior of the body section 10 through the opening 22 in the wall 18. With the end of shaft 26 seated in the opening 23, the operating lever 27 is moved to a vertical position, thereby moving the cam surface out of the axial passage extending through the body section 10 as shown in Figure 4. The tubing 15 can then be threaded through the axial passage in the body section and the stopper piercing and administration needles secured to the ends of the tubing. The stopper piercing needle hub is seated in the lower end of the tubular section 11.

It will be apparent from the foregoing description that when the tubing 15 extending through the body section of the clamp and with the operating lever 27 is in a position parallel to the upper surface of the body section with the cam 28 compressing the tubing against the support wall 20, the tubing will be closed and no fluid will pass therethrough. Further, when the cam 28 compresses the tubing against the support wall 20, the frictional engagement of the cam 28 with the tubing will prevent the clamp operating means 24 from being removed from the body section 10. Without such frictional engagement the cam 28 would be aligned with opening 22 and could be removed from the body section 10. It will also be apparent that any pulling force applied to the tubing during the administration operation will only tend to hold the clamp more tightly in a closed position. And, since the operating lever will extend above the upper surface of the clamp if the clamp is not completely closed, there is little chance of piercing the stopper of the fluid container while the clamp is open, particularly since the operation lever forms a part of the bearing surface which must be pressed downwardly during the stopper piercing operation.

While the present invention has been described as applied to a combined tubing clamp and needle holder, it should be understood that the invention broadly covers

the use of the novel tubing clamp in the manner shown in Figure 4, wherein no stopper piercing needle is attached to the tubular section 11.

The novel clamp of the present invention can be made of metal, plastic, vulcanized rubber, or any similar form retaining material. In the preferred embodiment, the clamp is formed of plasticized polyvinylchloride or polyethylene plastic.

Others may readily adapt the invention for use under various conditions of service, by employing one or more of the novel features disclosed or equivalents thereof. As at present advised with respect to the apparent scope of my invention, I desire to claim the following subject matter.

I claim:

1. A flexible tubing clamp assembly comprising in combination: a body section having an axial passage extending therethrough adapted to receive a length of flexible tubing, an operating means comprising a shaft rotatably disposed in said body section perpendicularly to said axial passage and having an operating lever extending perpendicularly from one end of the said shaft, said shaft having intermediate the ends thereof an outwardly projecting cam adapted in one of its rotatable positions to fully compress the walls of flexible tubing disposed in said axial passage, and a recessed section in the said body section which receives the said operating lever and which serves as a limiting stop means for the said lever when the operating means is in closed position, and said operating lever and said body section having their adjacent upper surfaces substantially coplanar when the operating lever is in the closed position.

2. A flexible tubing clamp assembly substantially as defined in claim 1 wherein the axial passage through the body section has at least one area of the wall defined by a plane transverse wall section disposed opposite the said cam.

3. A clamp assembly for use with a length of flexible tubing, said assembly comprising: a body member having a clamping section and a tubular section extending therefrom; said clamping section having a pair of spaced generally parallel walls and a transverse supporting wall between said parallel walls, an axial passageway extending longitudinally through said tubular section and between said parallel walls immediately adjacent said transverse wall, said passageway being of a size to slideably receive said tubing, said parallel walls having a pair of axially aligned circular openings therethrough adjacent the side of said passageway opposite said transverse wall and generally normal to said passageway, one of said parallel walls having a generally rectangular opening forming an extension of the circular opening therein and extending from said circular opening in the direction toward the transverse wall; and a tubing engaging means including a cylindrical shaft rotatably received in said circular openings, an operating lever integrally affixed to one end of said shaft outside of said one wall and extending normal to said shaft, and a cam integrally affixed to said shaft positioned between said parallel walls and extending from said shaft in a direction opposed to the direction that said lever extends from the shaft, said cam being slightly smaller than said generally rectangular opening so that with said shaft being set in the one angular position at which said cam is aligned with said rectangular opening said tubing engaging means may be moved into and out of said body member, said cam extending from said shaft a distance such that the combined thickness of the shaft

and cam is greater than the diameter of said circular openings so that said cam will prevent said means from being moved out of said body member at other rotated positions of said shaft; said cam extending substantially to said transverse wall when said shaft is in said one angular position and being arranged so that when a tubing is inserted into said passageway and said shaft is rotated toward said one angular position said cam will compress said tubing against said wall and the frictional engagement of the cam with the tubing will prevent the tubing engaging means from being removed from said body member.

4. A clamp assembly for use with a length of flexible tubing, said assembly comprising: a body member having a clamping section and a tubular section extending therefrom; said clamping section having a pair of spaced, generally parallel walls and a transverse supporting wall between said parallel walls, an axial passageway extending longitudinally through said tubular section and between said parallel walls immediately adjacent said transverse wall, said passageway being of a size to slideably receive said tubing, said parallel walls having a pair of axially aligned circular openings therethrough adjacent the side of said passageway opposite said transverse wall and generally normal to said passageway, one of said parallel walls having a generally rectangular opening forming an extension of the circular opening therein and extending from said circular opening in the direction toward the transverse wall; and a tubing engaging means including a cylindrical shaft rotatably received in said circular openings, an operating lever integrally affixed to one end of said shaft outside of said one wall and extending normal to said shaft, a recessed section in said parallel wall having the generally rectangular opening to receive said operating lever and serve as a limiting stop means for said lever when the operating means is in a closed position, and a cam integrally affixed to said shaft positioned between said parallel walls and extending from said shaft in a direction opposed to the direction that said lever extends from the shaft, said cam being slightly smaller than said generally rectangular opening so that with said shaft being set in the one angular position at which said cam is aligned with said rectangular opening said tubing engaging means may be moved into and out of said body member, said cam extending from said shaft a distance such that the combined thickness of the shaft and cam is greater than the diameter of said circular openings so that said cam will prevent said means from being moved out of said body member at other rotated positions of said shaft; said cam extending substantially to said transverse wall when said shaft is in said one angular position and being arranged so that when a tubing is inserted into said passageway and said shaft is rotated toward said one angular position said cam will compress said tubing against said wall and the frictional engagement of the cam with the tubing will prevent the tubing engaging means from being removed from said body member and said operating lever and said clamping section having their adjacent upper surfaces substantially coplanar when the operating lever is in the closed position.

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