May 6, 1952 W. F. BUTLER 2,595,511

PINCH VALVE

Filed Oct. 29, 1948

FIG. 1

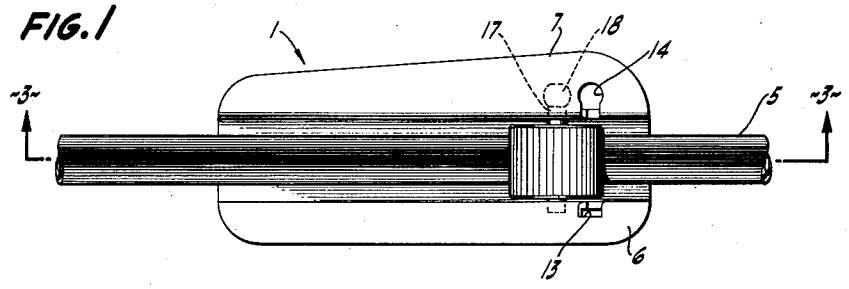


FIG. 2

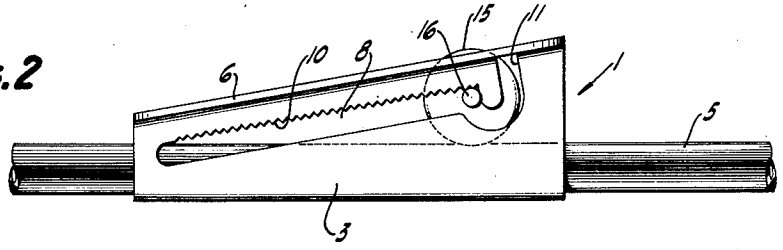


FIG. 3

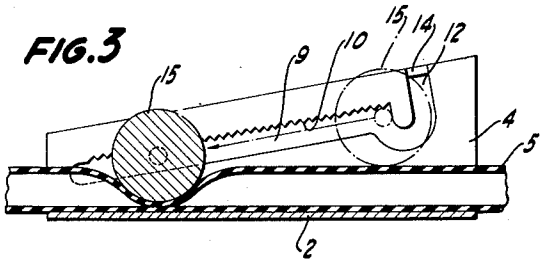
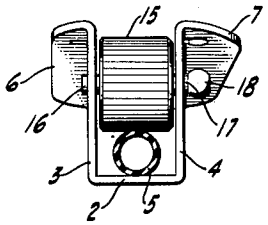


FIG. 4



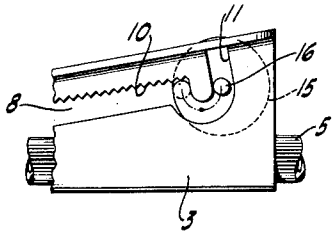


FIG. 5

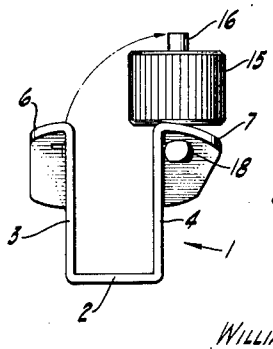


FIG. 6

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Patented May 6, 1952

2,595,511

UNITED STATES PATENT OFFICE

2,595,511

PINCH VALVE

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Application October 29, 1948, Serial No. 57,209

1 Claim. (Cl. 251—5)

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This invention relates to a pinch valve for controlling the flow of fluid through a section of collapsible tubing and particularly useful for controlling the flow of blood from a blood donor to a flask.

When taking blood from a donor, a hypodermic needle connected through a section of the collapsible tubing with a flask is inserted in the vein of the donor and then communication with the flask is established by opening a pinch valve associated with the tubing. Thereafter a rotary movement is imparted to the flask to agitate the blood going thereinto with a small volume of sodium citrate contained in the flask and which serves to prevent the blood from coagulating. During this operation due precautions must be taken to avoid pulling the hypodermic needle away from the donor for in the first place any movement of the needle is painful to the donor, and if, by chance, the needle is pulled away from the donor's vein it must of necessity be reinserted and this operation is at best disagreeable. Furthermore, precautions must be taken to prevent the introduction of any air into the blood for the introduction of air into the veins of a patient cannot be tolerated.

More specifically, the object of this invention is the provision of a pinch valve constituting an improvement to the valve shown in the Butler et al. Patent No. 2,309,302, which can be placed in its operative position over the collapsible tubing without the necessity of threading the tubing to the pinch valve and which enables the operator precisely to control the flow of blood through the tubing and into its associated flask.

These and other objects of the invention will be apparent from the ensuing description and the appended claims.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description where that form of the invention which has been selected for illustration in the drawings accompanying and forming a part of the present specification is outlined in full. In said drawings, one form of the invention is shown, but it is to be understood that it is not limited to such form, since the invention as set forth in the claims may be embodied in a plurality of forms.

Referring to the drawings:

Fig. 1 is a top plan view of a pinch valve embodying the objects of my invention.

Fig. 2 is a side elevation of the pinch valve shown in Fig. 1.

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Fig. 3 is a vertical mid-section taken on the line 3—3 of Fig. 1.

Fig. 4 is a right end elevation of the valve shown in Figs. 1 and 2.

Fig. 5 is a fragmental side elevation of the right end of the valve shown in Figs. 1 and 2 showing the roller of the pinch valve as it approaches its open position.

Fig. 6 is a right end elevation of my valve similar to Fig. 4 but with the roller of the valve in its fully opened position.

As shown in these various figures, my valve includes a channel generally designated by the numeral 1 and including a base 2 and upstanding sides 3 and 4, arranged to receive a section 5 of rubber tubing having a diameter somewhat smaller than the width of the channel 1. The sides 3 and 4 are wedge shaped with respect to the longitudinal axis of the channel and are overturned at their upper edges so as to form outwardly extending side wings 6 and 7. Formed in the sides 3 and 4 are inclined cam slots or trunnion ways 8 and 9, the upper edges of which are serrated as at 10. Forming an extension of the upper right hand end of each of the trunnion ways 8 and 9 are U-shaped slots 11 and 12 terminating in re-entrant openings 13 and 14 formed in the wings 6 and 7.

Accommodated within the channel 1 is a knurled roller 15 mounted on opposed axially aligned trunnions 16 and 17 receivable in the opposed trunnion ways 8 and 9. The trunnion 17 terminates in a sphere 18 of a diameter larger than the width of the trunnion ways 8 and 9. In the assembly of the roller 15 and the channel 1 the sphere 18 is inserted through the re-entrant opening 14 which from an inspection of Fig. 1 will be seen to be of spherical form. Initially the re-entrant opening 14 is of a diameter larger than the sphere 18. After the sphere 18 has been introduced through the re-entrant opening 14, the diameter of this opening is reduced in size by a conventional swaging operation, to prevent the trunnion 17 from passing through the re-entrant opening 14 or through its associated trunnion way 9. The opposed trunnion 16 may then be passed through its re-entrant opening 13 and both trunnions moved downwardly, then upwardly, within their associated U-shaped slots 12 and 13 and into their respective trunnion ways 8 and 9. As the trunnions enter the trunnion ways 8 and 9 the lower surface of the roller 15 comes into engagement with the upper edge of the section of the tubing 5 and if then the roller be moved to the left as viewed in Figs. 1, 2, 3 and 5, the tubing

will be progressively pinched from its fully open position as shown in Fig. 2 to its fully closed position as shown in Fig. 3. The knurled upper edge of the trunnion ways 8 and 9 serves to retain the roller 15 in any predetermined position along its trunnion ways.

From this description it will be seen that I have provided a pinch valve which can be placed on or removed from a section of tubing without the necessity of threading the end of the tubing through the valve and by which a very precise control of the flow of the fluid through the tubing can be readily maintained at all times.

I claim:

A device of the character described for controlling the flow of fluid through a section of flexible tubing comprising: a channel including a base and a pair of upstanding sides for the accommodation of said section of flexible tubing, said sides having outwardly extending wings; trunnion guide ways formed in said sides, said guide ways being inclined longitudinally with respect to said base and having re-entrant openings at the high ends thereof extending through said wings, and said guide ways being serrated only on their upper edges; and a roller receivable in said channel and mounted on trunnions receivable in said guide ways, the end of only one of said trunnions being enlarged to prevent its passage through its associated guide way.

WILLIAM F. BUTLER.

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