United States Patent

[11] 3,625,210

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[21] Appl. No. **27,329**
[22] Filed **Apr. 10, 1970**
[45] Patented **Dec. 7, 1971**

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a part interest

[54] **CANNULA CLAMP**
18 Claims, 9 Drawing Figs.

[52] **U.S. Cl.** ..... **128/214 R,** 128/133
[51] **Int. Cl.** **A61m 05/00**
[50] **Field of Search** ..... 128/133, 214 R, 327, 346, 215, 87, 89, 90

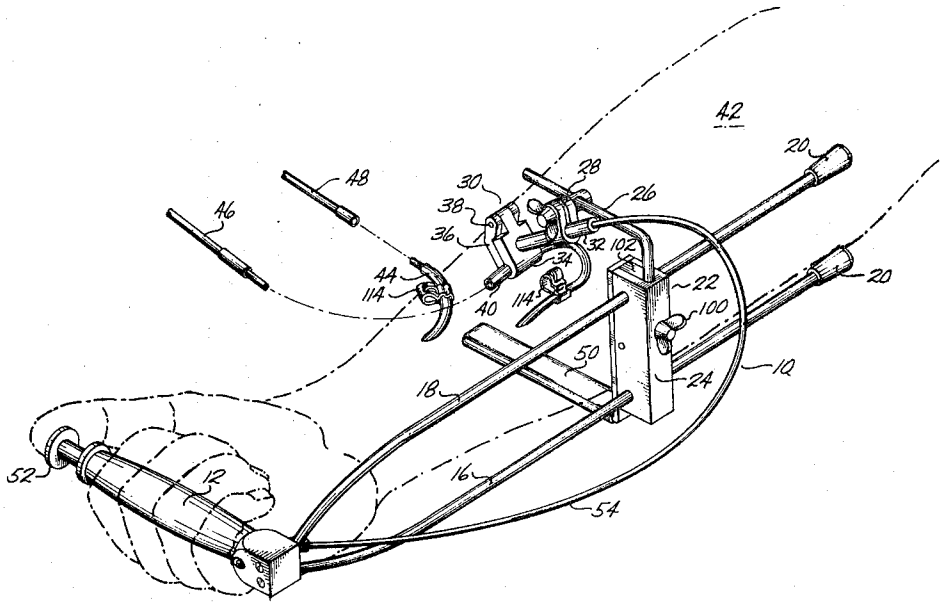
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ABSTRACT: A device for holding a cannula connected to a vein or artery in the arm of a kidney machine patient comprising a handgrip having a longitudinal brace extending therefrom, the longitudinal brace including slidable support means for a clamp. The clamp having a bight portion peculiarly adapted to hold but not compress the cannula, and a cable extending from the clamp to the handle whereby the patient may actuate the clamp by use of the hand of the arm in which the cannula is implanted. In another embodiment compressors are provided to stop the flow of blood in a vein in the arm of the patient.



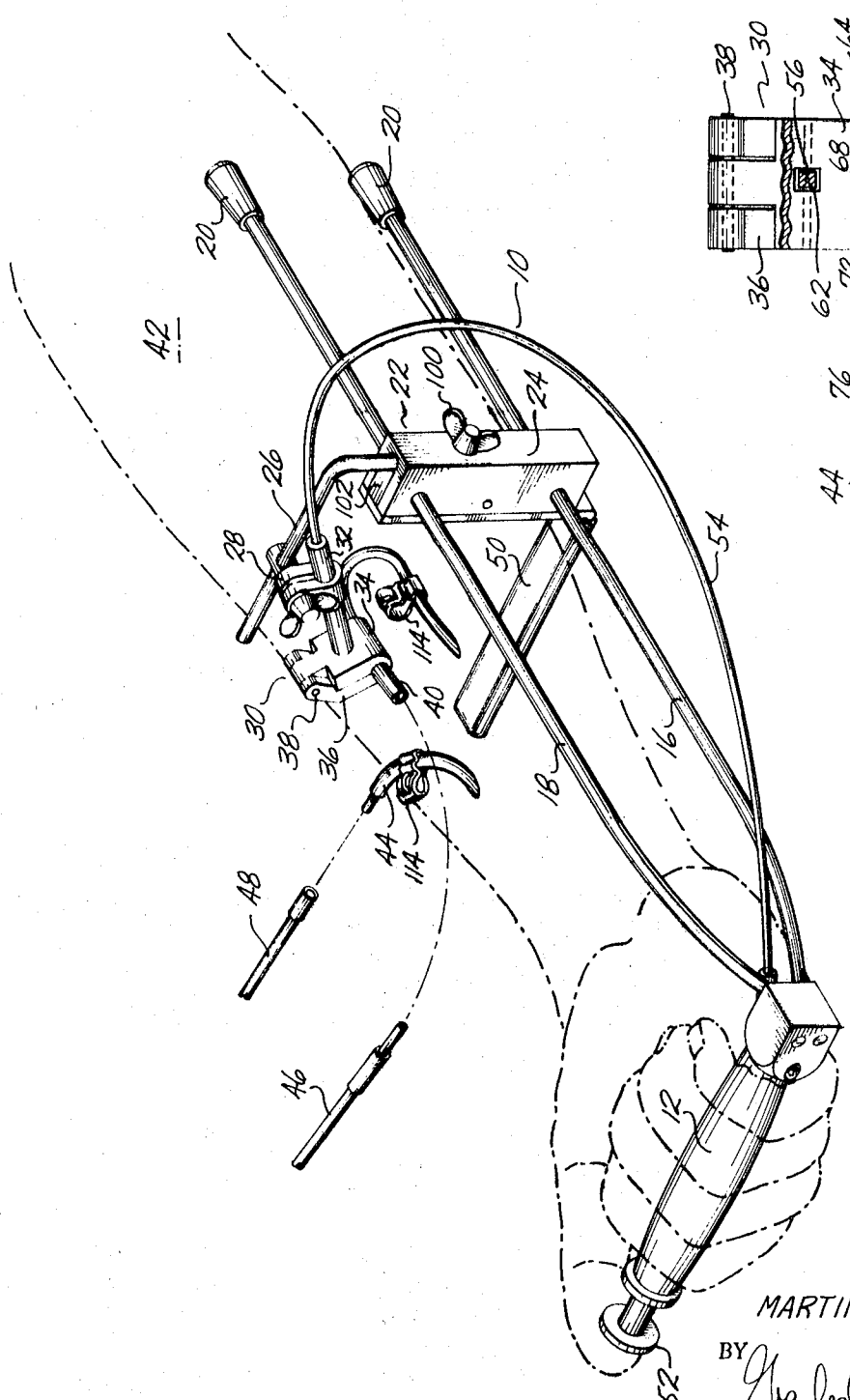


Fig. 1.

Fig. 2.

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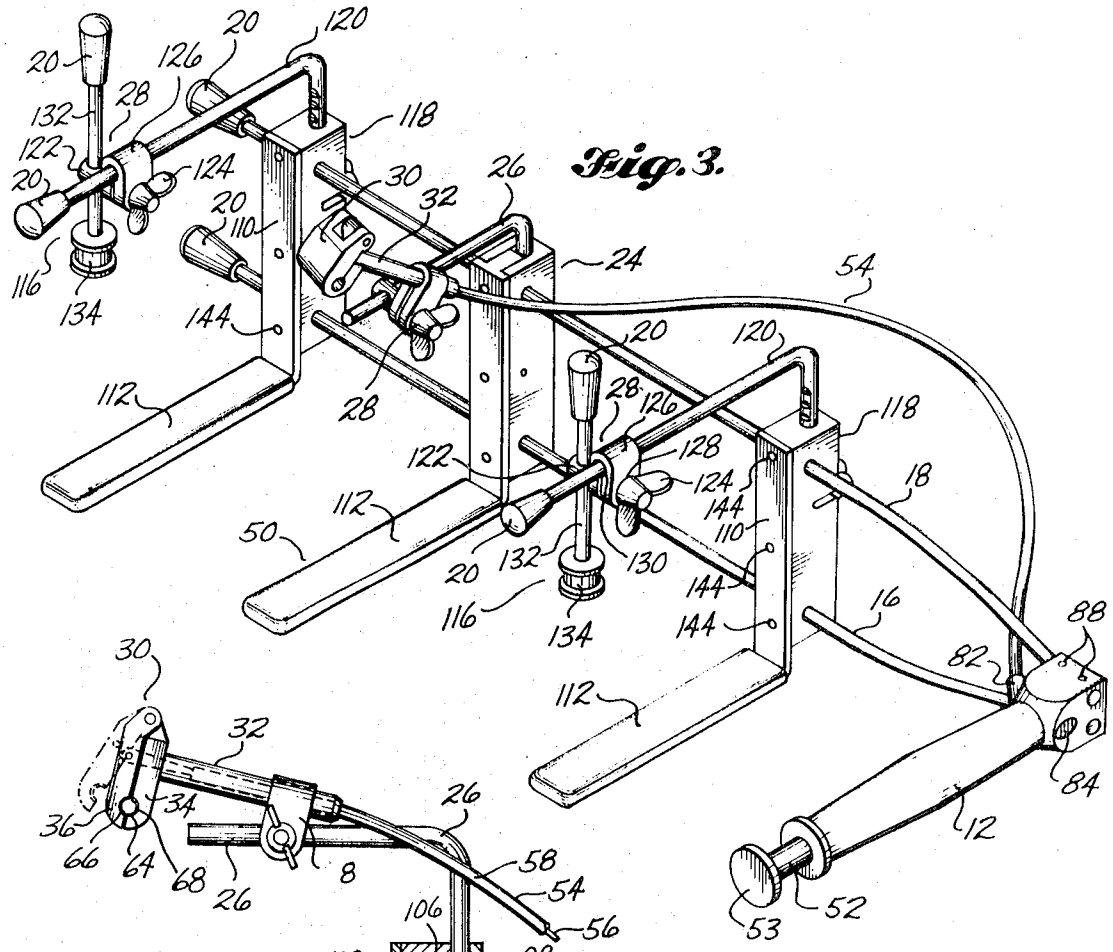


Fig. 3.

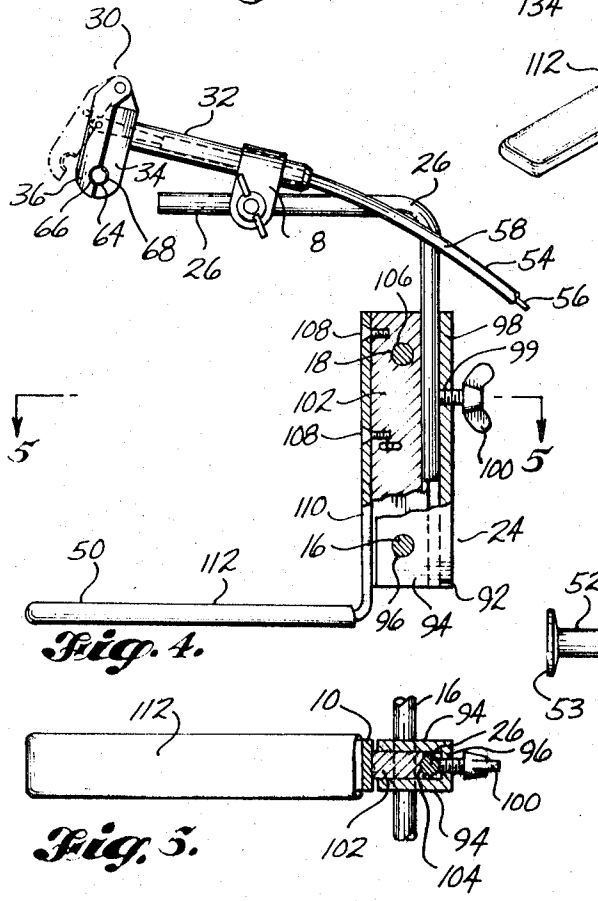


Fig. 4.

Fig. 5.

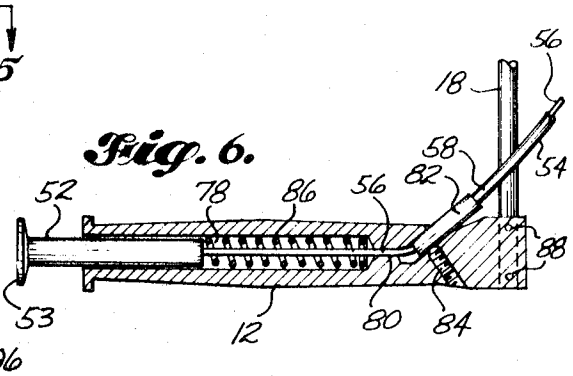


Fig. 6.

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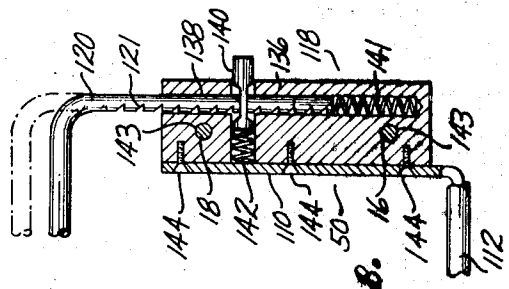


Fig. 8.

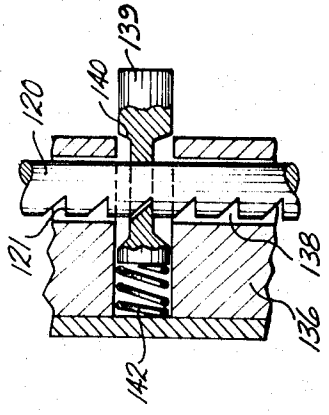


Fig. 9.

Fig. 7.

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CANNULA CLAMP

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to artificial kidney machine systems, and more particularly to a device for holding a cannula implanted in a patient's arm to enable the patient to connect and disconnect himself from the kidney machine without assistance.

2. Description of the Prior Art

In the past, the connection and disconnection of a kidney machine patient from a kidney machine before or after treatment required the assistance of an attendant. The number of kidney machines available and the number of patients undergoing treatment has increased significantly in recent years, and the demand for trained assistants has often exceeded the supply. The present invention provides apparatus which enables a kidney patient, whether he has an external cannula shunt or an internal fistula connection between a vein and artery in his arm, to both connect and disconnect himself from the kidney machine without assistance.

In general, kidney disease sufferers who must undergo periodic blood cleansing by dialysis on an artificial kidney machine have a surgically constructed direct connection between a vein and an artery, usually in an arm. This direct connection may comprise either an external cannula shunt or an internal fistula connection. A conventional external cannula shunt connection comprises two plastic tubes, one connected at one end to an artery and the other connected at one end to a vein inside the patient's arm. These tubes extend outwardly from the patient's arm and include a coupling mechanism so that the external ends may be releasably joined. Thus an external short circuit of the patient's blood flow directly from an artery to a vein is provided which may be easily tapped for kidney machine treatment. For connection to an artificial kidney machine the external coupling between the cannulas is simply disconnected and the two cannulas are joined to tubes extending from the machine.

A fistula connection results from a surgical procedure whereby a direct internal connection is made between an artery and a vein, usually in a patient's arm. The pressure of the blood flowing directly from the artery into the vein often causes the vein to swell adjacent the fistula connection thus making the vein clearly visible below the surface of the skin. For connection to an artificial kidney machine a pair of specially shaped cannulas are inserted into the enlarged vein, generally angularly opposite each other. Conventionally these cannulas are slightly tapered at one end and are inserted into the swollen vein by disposing them over a relatively large needle on a syringe. The needle point cuts a channel into the vein which the cannula follows. Once the tapered point of the cannula is within the vein the needle is removed. The outward ends of the cannulas are then connected to tubes running to the artificial kidney.

When the connection to an artificial kidney machine is made from an external cannula shunt or internal fistula connection located in one arm of a patient, it will be readily understood that the hand of this arm is rendered relatively useless and thus the patient has only one free hand to use for connecting and disconnecting the external cannulas or for implanting the cannulas into the swollen vein. These procedures are extremely difficult if not impossible to perform with only one hand and thus, in the past, it has been necessary for an assistant to be present during the critical connecting and disconnecting periods.

BRIEF SUMMARY OF THE INVENTION

The present invention provides a clamp and supporting structure whereby the opening and closing of the jaws of the clamp is controlled by the hand of an arm in which is implanted an external cannula shunt or internal fistula through which a connection is made to an artificial kidney machine. Support means are provided for the clamp which allow it to be adjusted both longitudinally and transversely with respect to the patient's arm as required by the external cannula shunt or internal fistula placement, as well as additionally allowing the clamp to be swiveled or pivoted universally to hold a clamped cannula in any convenient position during connection or disconnection from an artificial kidney machine.

Further, the clamp includes a ridged clamping surface to hold a cannula with minimum deformation of its cross-sectional area.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a typical embodiment of the present invention, including a human right arm shown in dotted line having a pair of cannulas extending therefrom, and further including end portions of tubing extending from an artificial kidney machine and adapted to be connected to the cannulas.

FIG. 2 is a partial sectional view of a typical clamp of the present invention, including a partial sectional view of the connection joint between two cannulas.

FIG. 3 is a perspective view of a typical embodiment of the present invention including vein compressors.

FIG. 4 is a partial sectional elevation view of a typical clamp and clamp support system of the present invention, including the clamp shown in the open position in dotted line.

FIG. 5 is a sectional view taken along line 5—5 in FIG. 4.

FIG. 6 is a partial sectional plan view of a typical hand grip of the present invention, including a clamp actuating switch.

FIG. 7 is a perspective view of a typical embodiment of the present invention, including a human left arm shown in dotted line having a pair of cannulas extending therefrom, and further including a pair of vein compressors.

FIG. 8 is a partial sectional view of a typical compressor support mechanism, including the compressor support arm shown in a raised position in dotted line.

FIG. 9 is a partial sectional view of the toothed clamp mechanism of the compressor support arm.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to FIG. 1, a cannula clamp and support mechanism 10 is disclosed which is a typical embodiment of the present invention, including handle portion 12 having a longitudinal support frame extending radially outward therefrom. The support frame comprises a pair of braces 16 and 18 having resilient nonskid protectors 20 mounted on their ends distal the handle portion. A clamp support generally labeled 22 is provided including clamp support arm holding portion 24, angular clamp support arm 26 and pivotal connecting means 28 mounted on the support arm.

A clamp generally labeled 30 is connected by connecting means 28 to support arm 26. Clamp 30 includes hollow neck portion 32 having fixed jaw portion 34 disposed on one end and movable jaw portion 36 connected near one edge of jaw 34 by conventional pin means 38.

Clamp 30 is shown clasping a cannula 40 which has been implanted in human arm 42 by conventional surgical techniques. Human arm 42 further includes cannula 44 which is normally joined end-to-end with cannula 40. For purposes of this discussion, it will be assumed that cannula 40 has been connected to an artery within arm 42 while cannula 44 has been surgically connected to a vein. It is understood that when the ends of these two cannulas are connected an external circuit is formed whereby blood flows directly from the artery into the vein. As will be discussed more completely with reference to FIG. 2, cannula 44 includes a male end while cannula 40 includes a female end such that these two cannulas may be easily joined to form a secure leakproof seal. It should be understood that the configuration of these ends may be reversed, or other conventional joining means may be disposed on the cannula ends without departing from the spirit of this invention. The ends of tubes 46 and 48 which are connected at their opposite ends to an artificial kidney machine

(not shown) include corresponding male and female ends for mating with cannulas 40 and 44. Tube 46 which, as shown, is adapted to be connected to artery cannula 40 carries blood from the patient's body to the artificial kidney machine. As is well known, the patient's heart acts as the pump to drive the blood through tube 46 into the kidney machine. Tube 48 which is connected to vein cannula 44 carries the blood back from the kidney machine into the patient's body.

As will be discussed more completely with reference to FIG. 4 and 5, human arm support 50 is shown extending outwardly from clamp support arm holding portion 24. Handle portion 12 includes plunger 52 mounted longitudinally therein, and as will be discussed more completely with reference to FIG. 6, this plunger is connected through cable 54 to clamp 30 such that thumb actuation of the plunger causes jaw 36 to pivot about pin 38.

Referring now to FIG. 4, cable 54 comprises an inner flexible portion 56 which is adapted to slide within an outer flexible casing 58. In one embodiment of the present invention the outer casing is a Teflon tube while the inner flexible member is a woven metal wire. Cable 54 extends through hollow neck 32, through a hole in fixed jaw 34 and is connected by conventional means to movable jaw 36.

Referring also to FIG. 2, a portion of clamp 30 and a typical slip joint connection between two cannulas is disclosed, Hole 62 in fixed jaw 34 through which woven wire 56 extends is seen. Fixed jaw 34 includes groove 64, while movable jaw 36 includes groove 66 in one face. Grooves 64 and 66 further include a raised transverse shoulder portion 68 disposed centrally therein. Grooves 64 and 66 and shoulders 68 are in register when jaws 34 and 36 are clamped together and thus form a channel extending through the clamp 30 having a narrowed central portion.

Referring now to the slip joint connection between cannulas 40 and 44, it will be seen that cannula 40 which comprises the female end of the slip joint includes a hollow cylindrical member 70 inserted into the end of cannula 40. The outside diameter of cylindrical member 70 is slightly larger than the unstretched inside diameter of cannula 40 and thus he insertion of this member into the end of the cannula stretches the end of the cannula to define an external shoulder 72 adjacent the internal end of member 70. Groove 64 is adapted to accommodate the expanded portion of the cannula 40, while internal shoulder 68 bears on shoulder 72 to limit the movement of the cannula through the groove. It will be readily understood that shoulders 68 of both the fixed and movable jaws of the clamp cooperate to define a circular support for circular shoulder 72 when the jaws of the clamp are pressed together. Thus, cannula 40 may be firmly held against longitudinal movement in at least one direction through the clamp 30 without significant reduction of its internal cross section. Similarly, cannula 44 includes hollow cylindrical member 74 inserted longitudinally in its end. The external diameter of cylinder 74 is slightly larger than the internal diameter of cannula 44 and consequently external shoulder 78 is defined adjacent the inner end of member 74. Hollow cylindrical member 74 extends longitudinally outward from the end of cannula 44 and is slightly smaller in external diameter than the internal diameter of member 70 such that member 74 may be inserted therein to form a tight, leak-free joint. Although not shown in the drawings, it is common practice to additionally wrap the slip joint with a sterile tape to prevent accidental disconnection of the cannulas.

Referring now to FIG. 6, the clamp actuating mechanism of handle 12 is disclosed including internal longitudinal chamber 78 which is adapted to slidably receive plunger 52. Wire 56 which is connected to plunger 52 runs through slot 80 and sleeve 82 and then to clamp 30 where it is connected to movable jaw 36. Sleeve 82 receives and holds the external portion 58 of cable 54 and is in turn held within handle 12 by conventional setscrew 84. As discussed above, actuating wire 56 is adapted to slide within casing 58. Spring 86 is disposed within handle 12 and is adapted to bias plunger 52 longitudinally outwardly from chamber 78 thereby tending to extend connected wire 56 and causing movable jaw 36 of clamp 30 to be pressed against fixed jaw 34. It will be readily understood that the application of pressure inward with respect to chamber 78 on head 53 of plunger 52 causes wire 56 to move within casing 58 such that jaw 36 is pivoted away from fixed jaw 34 to open clamp 30. Absent the application of inward pressure, however, jaws 34 and 36 remain in the clamped position under the pressure of spring 86. It is also contemplated that a compressible air-filled bulb might be substituted for handle 12 as described above, including a hollow tube communicating with clamp 30 such that compression of the bulb would cause jaw 36 to pivot away from jaw 34.

Handle 12 is fixedly mounted on longitudinal support beams 16 and 18 by conventional means such as setscrews 88. Referring additionally to FIGS. 4 and 5, it will be seen that clamp support arm holding structure 24 is adjustably mounted on longitudinal supports 16 and 18. Clamp support arm holding structure 24 includes outer casing 92 comprising sidewall portions 94 and end wall portion 98. Sidewall portions 94 include holes 96 which are adapted to receive support members 16 and 18, while end wall 98 includes threaded hole 99 which is adapted to receive cooperatingly threaded clamp nut 100. Generally rectangular tongue 102 including grooved edge portion 104 is adapted to slip between sidewalls 94 of casing 92. Tongue 102 further includes a pair of holes 106 substantially in register with holes 96 and through which supports 16 and 18 also pass. Groove 104 is adapted to receive a portion of the arcuate outer surface of angular clamp support arm 26. Rotation of clamp nut 100 such that it exerts no transverse pressure on arm 26 allows this arm to slide freely in groove 104, while at the same time, outer casing 92 and tongue 102 may be freely moved on longitudinal supports 16 and 18. Rotation of clamp nut 100 such that it bears transversely against support arm 26, however, causes tongue 102 to move within casing 92 such that holes 96 and holes 106 move out of register and bind longitudinal supports 16 and 18. Thus the rotation of clamp nut 100 allows clamp support arm holding portion 24 to be restrained against movement with respect to support bars 16 and 18, while at the same time angular clamp support arm 26 is restrained against movement with respect to clamp support arm holding portion 24.

Angular human arm support 50 is mounted by means of conventional fasteners to an edge portion of tongue 102. Support 50 comprises angular metal portion 110 having a nonskid cushion 112 made, for example, of rubber or plastic, disposed on its transversely extending portion. This cushion prevents the entire cannula clamp from sliding when rested on a surface during use, as well as providing a relatively soft cushion for the human arm.

Referring again to FIG. 1 wherein a pair of external cannulas are adapted to interconnect an artery and a vein in a human right arm, it will be understood that a patient desiring to connect himself to an artificial kidney machine using the present invention first grasps the handle 12 of the invention substantially as shown in FIG. 1 such that the patient's forearm is supported by support 50. The sterile gauze generally wrapped around the cannulas and the patient's forearm, as well as the tape used to secure the slip joint between the cannulas, may be first removed. Plunger 52 is actuated as illustrated to open clamp 30 to allow arterial cannula 40 to be disposed between jaws 34 and 36 and be clamped such that cannula shoulder 72 bears against internal shoulder 68 of the clamp as described above. Conventional cannula compressing clamps 114 are applied to both cannular 40 and 44 to stop the flow of blood through the shunt connection, thereby allowing the ends of the cannula to be slipped apart without excessive loss of blood. The patient, using his free left hand, inserts one end of tube 46, which is connected at its opposite end to the artificial kidney machine, into the cooperating end of arterial cannula 40. This connection is easily made since cannula 40 is securely held by clamp 30. At this time clamp 114 on arterial cannula 40 may be removed to allow blood to flow into the artificial kidney machine to fill it.

Plunger 52 is then actuated such that clamp 30 releases cannula 40 which is removed from between the jaws and cannula 44 is inserted in its place such that cannula shoulder 76 abuts against clamp shoulder 68. When the artificial kidney machine is filled, blood begins to fill outlet tube 48. Clamp 114 is removed from venous cannula 44 which itself fills with blood due to the back pressure in the vein. When both cannula 44 and tube 48 are substantially filled with blood to minimize the possibility of the introduction of harmful quantities of air into the patient's blood stream, they are connected. Again this connection is easily accomplished due to the holding of the cannula by clamp 30. Plunger 52 is again actuated to release the cannula 44 to allow the patient to remove his arm from the cannula clamp 10 during the remainder of his treatment which often lasts between 8 and 12 hours.

At the completion of the treatment period, arterial cannula 40 is clamped by conventional clamp 114 to cut off the flow of blood from the patient to the kidney machine. Cannula 40 may then be held by clamp 30 as described above and tube 46 disconnected therefrom. In normal practice the end of tube 46 is elevated to allow gravity to force the blood therein into the kidney machine. The kidney machine itself is disposed at an elevated position with respect to the patient's arm and thus gravity acts to force the remaining blood through tube 48 and into venous cannula 44. When the machine and tube 48 are substantially empty of the patient's blood, conventional clamp 114 is clamped on cannula 44 to prevent backflow of blood out of the patient's arm. Plunger 52 is actuated to open the jaws of clamp 30 to allow cannula 40 to be removed and cannula 44 inserted and clamped therebetween. Cannula 44 is then disconnected from tube 48. While cannula 44 is still held in the clamp 30, conventional clamps 114 are released to allow both cannula 40 and 44 to fill with blood to displace the air in the cannulas. The female end of cannula 40 is then disposed onto the male end of cannula 44 to again set up the cannula shunt flow circuit in the patient's arm. The slip joint may then be taped to prevent accidental disconnection, cannula 44 released from the grip of clamp 30, and protective gauze wrapped around the patient's arm and the cannula shunt connection.

Referring now to FIGS. 3 and 7, another typical embodiment of the present invention, including vein and artery compressors generally indicated at 116, is disclosed. FIG. 3 again discloses the instant invention adapted for use with a patient's right arm, while the embodiment of FIG. 7 is adapted for use with a patient's left arm. These devices are peculiarly suited for use by patients having internal fistula connections between an artery and a vein in one of their arms. As described above, a fistula is a direct surgical connection between an artery and a vein. The pressure of the flow of blood from the artery directly into the vein often causes the vein to expand and become clearly visible under the surface of the skin. As will be described hereafter, compressors 116 perform a function in the fistula situation similar to that performed by conventional clamps 114 in the external cannula shunt situation.

Compressors 116 include compressor support arm holding portions 118, angular compressor support arms 120 and adjustable connecting means 28. These adjustable connecting means may be similar to the adjustable connecting means used to join clamp neck 32 to clamp support arm 26. Connecting means 28 include a pin 122 threaded on one end to cooperate with an internally threaded wing nut 124. Pin 122 includes a transverse hole near its end distal the threads, and additionally is adapted to run through a pair of aligned holes 128 in the leg portions of horseshoe clamp 126. Clamp 126 includes a third hole or enlarged cylindrical notch 130 near its base portion extending through the clamp in a direction transverse holes 128. As will be clearly seen from the drawings, pin 132 having flexible compression member 134 mounted on one end, is slidably mounted in the hole in pin 122. Compression member 134 is adapted to bear against the arm of the patient to compress the enlarged vein below the surface of the skin. Angular compressor support arm 120 extends through hole 130, and thus the rotation of nut 124 on the threaded end of pin 122 allows connector 28 to clamp and hold both pin 132 and support arm 120. Rotation of nut 124 in the opposite direction allows pin 132 to be rotated, extended or retracted, and further allows U-shaped member 126 to be moved longitudinally along angular support beam 120. Conventional resilient protective members 20 are additionally disposed both on pin 132 and angular support arm 20.

Referring also to FIGS. 8 and 9, it will be seen that angular support arm 120 includes a plurality of ratchet teeth 121 aligned on its lower portion. Compressor support arm holding portion 118 includes a generally rectangular body portion 136 having a channel 138 extending longitudinally therein adapted to receive the toothed end of angular support arm 120. A resilient member such as spring 141 may be disposed in channel 138 to bias arm 120 upward, while as best shown in FIG. 9, ratchet 140 is biased by spring 142 to engage the ratchet teeth 121 to prevent upward movement of the support arm. It will thus be understood that compression of spring 142 by the application of pressure to the head 139 of ratchet 140 allows the support arm to be moved upwardly with respect to body portion 136 by spring 141. The shape of the ratchet and cooperating ratchet teeth allow arm 120 to be moved downwardly in channel 138 by the simple application of downward force to the angular support arm.

Rectangular body 136 further includes a pair of holes 143 through which longitudinal supports 16 and 18 are disposed. Holes 143 are of approximately the same internal diameter as the diameter of supports 16 and 18 and thus, while body 136 is relatively tightly mounted on these supports, it is still slidable thereon. Human arm supports 50 comprising outwardly extending angular portion 110 having a nonskid protective coating 112 on its outwardly extending end are connected to body portion 136 by conventional means such as screws 144.

A patient, having an internal fistula disposed in his left arm, desiring to connect himself to an artificial kidney machine using the present invention first grasps handle 12 of the invention substantially as shown in FIG. 7 such that the patient's wrist and forearm are supported by supports 50. It is understood that if the patient has an internal fistula disposed in his right arm, the cannula clamp may easily be taken apart and reassembled in the form shown in FIG. 3. Compressor means 116 are adjusted to compress the enlarged vein at spaced points adjacent the fistula connection between the vein and artery. This compression cuts off the flow of blood in the portion of the vein between the two compressors. A conventional cannula inserting syringe (not shown) is prepared by disposing a conventional cannula used by patients having a fistula shunt connection between an artery and a vein over the relatively large needle of the syringe. These cannulas are generally slightly tapered near the end which is disposed adjacent the point of the needle, and thus the cannula easily follows the needle through the wall of the enlarged vein. A first cannula is inserted into the vein at a point between the compressors 116 on a diagonal such that the external portion of the cannula is generally aligned with the vein and makes an acute angle with the surface of the patient's arm. Clamp 30 is then actuated to clamp the inserted cannula and hold it in place while the needle of the inserting syringe is removed. In the same manner, a second cannula is inserted into the vein between the compressors diagonally opposite the first cannula as is illustrated by cannulas 146 and 148 in FIG. 7. Assuming the blood flow in the vein connected to the artery by the fistula to be down the patient's arm, it will be seen that the internal end of upstream cannula 146 will divert a substantial portion of the blood flow. Cannula 146 is thus clamped by clamp 30 and connected to a tube (not shown) running to the intake or arterial side of the kidney machine in substantially the same manner as discussed above with reference to use of the instant device with an external cannula connection. Inserted cannulas 146 and 148 may include male and female connectors on their external ends, and the ends of the tubes extending to and from the kidney machine may include cooperating male and female ends to allow easy connection and disconnection. Shoulders may also

be provided on cannulas **146** and **148**, as was described above with reference to FIG. **2**, such that internal shoulders **68** of clamp **30** may bear against them, but it is understood that clamp **30** holds these cannulas firmly but without undue cross-sectional compression even without these shoulders. After cannula **146** is connected to the intake or arterial side of the kidney machine, head **139** of ratchet **140** is depressed allowing support arm **120** and connected compressor **116** to be raised by resilient member **141** to allow blood to begin to flow through the cannula **146** and into the kidney machine. Clamp **30** is then removed from cannula **146** and used to clamp cannula **148**. When the kidney machine is filled, and the outlet tube (not shown) extending from the kidney machine is also filled, compressor **116** below cannula **148** is slightly loosened to allow blood to flow by back pressure through the cannula **148** to displace the air in the cannula. When both the outlet tube and the cannula are substantially filled with blood they are connected. Clamp **30** may then be removed from cannula **148** and the entire cannula clamp **10** removed from the patient's arm during the remainder of the treatment. At the conclusion of the treatment, upstream arterial cannula **146** is simply removed from the patient's arm and the connected kidney machine intake tube elevated such that the blood in the intake tube flows by force of gravity into the kidney machine. The blood in the kidney machine will continue to flow into the patient's arm by a force of gravity through the outlet tube and venous cannula **148**. When the kidney machine is empty, and the outlet tube from the kidney machine and cannula **148** are substantially empty, cannula **148** is removed from the patient's arm. Sterile compresses may be applied over the wounds in the patient's arm to stop any bleeding. Thus it is seen that the instant invention is not necessary for disconnection of the patient having an internal fistula from the kidney machine.

It will be readily understood that the instant device may be employed in a variety of manners. For instance, clamp **30** may be used to hold a test tube while a patient removes a blood sample from this own arm, a procedure which most kidney disease sufferers must undergo at least once a week.

The invention may be embodied in other specific forms without departing from the spirit or central characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore to be embraced therein.

What is claimed is:

1. A device for enabling an individual having a cannula shunt or fistula connecting a vein and artery in one arm to connect and disconnect himself from an artificial kidney machine comprising handle means adapted to be gripped by the hand of said one arm, support frame means extending from said handle and adapted to support said one arm, clamp support mean adjustably disposed on said support frame means, clamp means adjustably supported by said clamp support means, said clamp means including cable means connected to said handle whereby said clamp may be actuated by said hand.

2. The device of claim **1** wherein said handle means includes a thumb switch connected to said cable means such that said clamp may be actuated by movement of the thumb of said hand.

3. The device of claim **1** wherein said support frame means includes at least one longitudinal member extending radially from said handle means substantially parallel said one arm.

4. The device of claim **1** wherein said clamp support means includes a clamp support arm holding portion adapted to be slidably moved on said at least one longitudinal member.

5. The device of claim **4** wherein said clamp support arm holding portion includes an outwardly extending support for said arm having a cannula shunt or fistula connecting a vein and artery therein.

6. The device of claim **4** wherein said clamp support means includes an angular clamp support arm held by and adapted to move with respect to said clamp support arm holding portion.

7. The device of claim **6** wherein said clamp support arm holding portion and said clamp support arm may be restrained against movement with respect to each other and with respect to said support frame means by rotation of a single screw member.

8. The device of claim **6** wherein said clamp support means includes an adjustable connecting means disposed on said angular clamp support arm, said connecting means adapted to adjustably connect said clamp means to said angular clamp support arm.

9. The device of claim **1** wherein said clamp means includes a neck portion, a fixed jaw disposed on one end of said neck portion, a movable jaw connected near one edge to said fixed jaw, spring-loaded cable means connected to said movable jaw to releasably clamp said movable jaw to said fixed jaw.

10. The device of claim **9** wherein said movable jaw and said fixed jaw each include a longitudinal groove on one face, said groove having a centrally located shoulder such that when said jaws are clamped together said grooves and said shoulders are in register to define a channel having a centrally located narrowed portion.

11. The device of claim **1** including means for compressing the vein connected by said fistula at spaced points adjacent said fistula connection.

12. The device of claim **11** wherein said means for compressing the vein include a pair of compressors adapted to compress said vein, compressor support arm holding portions adjustably mounted on said at least one longitudinal member, angular compressor support arms adjustably mounted in said compressor support arm holding portions, adjustable connecting means disposed on said compressor support arms and adjustably connecting said compressors to said compressor support arms.

13. A device for clamping a cannula inserted in a human arm comprising a handgrip portion, a longitudinal support portion extending from said handgrip portion, a clamp support arm holding portion adjustably disposed on said longitudinal support portion, a clamp support arm adjustably held by said clamp support arm holding portion, adjustable connecting means disposed on said support arm, a clamp pivotally connected to said adjustable connecting means, said clamp including means connected to said hand grip portion whereby said clamp may be manually actuated.

14. The device of claim **13** wherein said clamp support arm holding portion also includes an angular support for said human arm.

15. The device of claim **13** wherein said clamp includes a neck portion, a fixed jaw disposed on said neck portion and a movable jaw pivotally connected to said fixed jaw.

16. The device of claim **15** wherein said means connected to said hand grip portion for manually actuating said clamp include a plunger, a cable interconnecting said plunger and said movable jaw, and a spring bearing on said plunger and biasing it such that said cable releasably clamps said movable jaw to said fixed jaw.

17. The device of claim **15** wherein said movable jaw and said fixed jaw includes grooves on their mating faces, said grooves being in register to define a channel, said grooves including registered ridge portions to define a shoulder within said channel.

18. A device for clamping a cannula inserted in a vein connected by a fistula connection to an artery in a human arm comprising a handgrip portion, a longitudinal support portion extending from said handgrip portion, a pair of compressors adapted to squeeze said vein, compressor support arm holding portions adjustably disposed on said longitudinal support portion, a clamp mounted on a clamp support arm holding portion adjustably disposed on said longitudinal support portion between said compressor support arm holding portions, compressor support arms adjustably mounted in said compressor

support arm holding portions, and a clamp support arm adjustably mounted in said clamp support arm holding portion, adjustable connecting means disposed on all of said support arms adjustably connecting said compressors and said clamp to said support arms, said clamp including means connected to said handgrip portion whereby said clamp may be manually actuated.

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