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SURGICAL AND MEDICAL SYRINGE

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FIG. 1.

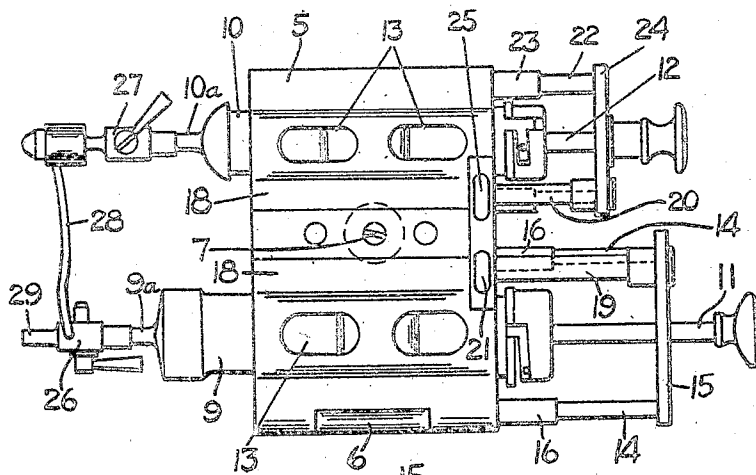


FIG. 2.

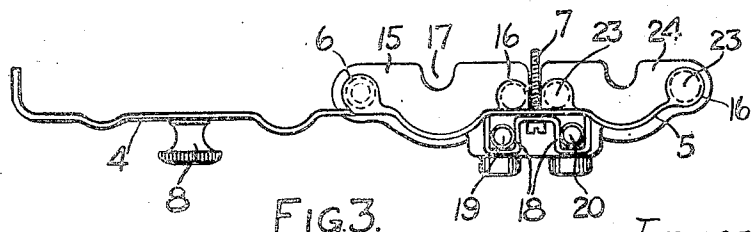
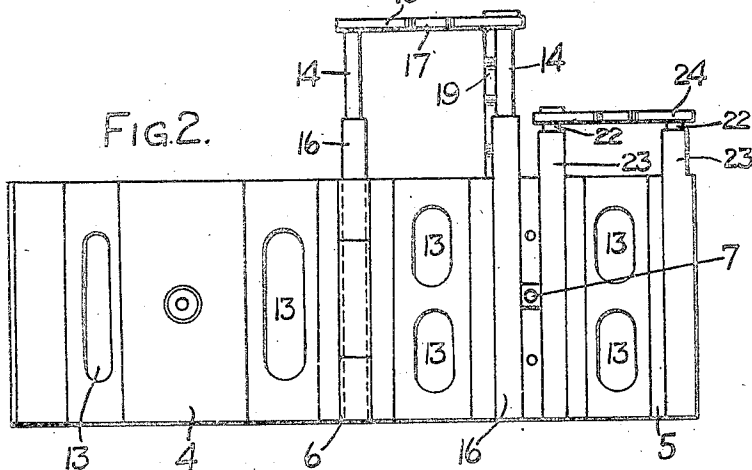


FIG. 3.

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SURGICAL AND MEDICAL SYRINGES

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3 Claims. (Cl. 128—214)

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This invention has reference to surgical and medical syringes or injectors and pumps of the piston and plunger type, and has for its object to provide an appliance for automatically withdrawing blood from a vein and for injecting liquid into the same vein without changing the syringe or pump and without withdrawing the needle. The appliance is particularly applicable to intravenous injection, for example, in the treatment of varicose veins.

The appliance of the present invention comprises a holder for detachably holding a pair of syringes of the piston and plunger type, resilient means for retracting the plunger of one of the syringes, releasable locking means for controlling the movement of the said plunger, and a connection for attachment to and for connecting the nozzles of the two syringes, said connection being adapted for the attachment thereto of a hypodermic needle. The plungers of both syringes may be independently retracted by resilient means provided on the holder, releasable locking means controlling movement of each plunger independently of the other.

In carrying out my invention the holder may be a hinged case made in two parts hinged together and between which the two syringes are clamped. Spring means are provided on the holder or case to engage the plunger of one of the syringes to retract it from the syringe, and a detent controls the action of said spring means.

The invention will be more readily understood by reference to the accompanying drawings whereon Fig. 1 is a plan view of one form of the surgical appliance showing the syringe plungers partly retracted. Fig. 2 is a plan view of the case opened out and with the syringes removed. Fig. 3 is an end view of the case shown in Fig. 2.

As illustrated, the holder comprises a case made in two parts 4 and 5 connected together by a hollow hinge 6. The parts 4 and 5 are shaped as shown to receive and hold two syringes between them when the case is closed. A screw 7 fixed to the part 5 is adapted to be engaged by a nut 8 rotatably fitted on the part 4 to enable the syringes to be clamped securely in the case. The syringes are designated 9 and 10 and their plungers are marked 11 and 12 respectively. Apertures 13 in the case enable the contents of the syringes to be seen. Fitted to the part 5 of the case is a pair of rods 14 connected together by a crosshead 15. The rods 14 slide in tubes 16 fixed to the inside of the part 5 and springs (not shown) in the tubes 16 urge the rods 14 outwards. One of the tubes 16 is shown fitted into the

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tubular hinge 6. A recess 17 in the crosshead 15 receives the plunger 11. Fitted in housings 18 secured to the outside of the part 5 is a pair of ratchet-toothed rods 19 and 20. Rod 19 is secured at its outer end to crosshead 15 and a spring push button 21 projecting from the housing 18 is adapted to control a detent which normally engages the ratchet teeth of rod 19 to prevent the spring-controlled rods 14 from moving the crosshead 15 and plunger 11 outwards. By pressing on the push button 21, the ratchet-toothed rod 19 can be released, to permit the spring-controlled rods 14 to move the crosshead 15 outwards, thus retracting the plunger 11.

Similarly, rods 22 slide in tubes 23 and springs in the tubes 23 urge the rods 22 outwards. The rods 22 are connected to a crosshead 24 which engages plunger 12 and ratchet-toothed rod 20 is connected to crosshead 24 and controlled by a push button 25, so that movement of plunger 12 can be controlled (if required) by depressing push button 25.

Adapted to be detachably fitted to the nozzles 9a and 10a of the syringes are valves 26 and 27, the outlet from valve 27 being connected to the outlet from valve 26 by means of a tubular connection 28. The valve 26 has a nozzle end 29 to enable a hypodermic needle to be fitted thereto. The connection 28 may be either a flexible rubber tube or a rigid metal tube. The valve 27 may be omitted, and the valve 26 may be a two-way valve controlling the syringe nozzle 9a and the connection 28.

Instead of the construction described and illustrated for resiliently controlling the plungers of the syringes and for releasably locking the plungers, any other suitable resilient controlling and releasable locking means may be provided; also the means for resiliently controlling and releasably locking one of the plungers, such as the plunger 12 of syringe 10, may be omitted.

The improved appliance permits a vacuum to be automatically created in one of the syringes such as the syringe 9, by first depressing the plunger 11 until the plunger is locked in its innermost position. The needle is then inserted lightly into the skin above the vein to be treated or punctured, and thereupon, by depressing the push button 21, to release the locking means and permit the crosshead 15 to retract the plunger 11, the syringe 9 acts as a pump by creating a vacuum in its cylinder, so that blood can be drawn from the vein and will be immediately visible in the glass or transparent cylinder of the syringe. By this means the operator can as-

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certain when the point of the needle is in correct position inside the vein for injection. Liquid from the other syringe 10 can then be safely injected by depressing plunger 12 of the injection syringe 10. In order to prevent liquid in the injection syringe 10 from being drawn into the vacuum in the syringe pump 9 during blood withdrawal, valve 27 is closed, and the plunger 12 of the injection syringe 10 may be automatically locked by the locking means in its retracted position, so that the piston of the injection syringe 10 cannot move until the locking means is released by depressing the push button 25.

Either syringe can be used alternately, according to individual needs, as a pump for withdrawing blood from the vein, and as an injector for intravenous injection, by suitably controlling valves 26 and 27.

Heretofore, using a single syringe for varicose treatment, or injecting liquid into a vein immediately after having withdrawn blood from it, it has been necessary to remove the syringe from the needle, after using the syringe as a pump for blood withdrawal, and to substitute another syringe containing the injection liquid, leaving the needle in the vein. This has the drawback that, when changing the syringes, it is difficult to retain the point of the needle in the proper position particularly if the vein is small or contorted. The appliance of the present invention avoids this drawback.

A further advantage of the appliance of the present invention is that, for finding the lumen or cavity of the vein to be treated, or any other cavity in the tissues of the body which it is desired to puncture (abscesses, cysts and the like), after the needle has been inserted beneath or into the skin over the vein or cavity, a vacuum can be created in one syringe and the needle pushed cautiously in the direction of the vein until entry of the needle into the vein or cavity is indicated by the appearance of blood, pus, or serum in the vacuum syringe. Heretofore, in seeking the interior of the vein or cavity, the needle was frequently passed right through it, rendering it difficult to find the cavity therein.

Although I have shown the holder in the form of a hinged case containing two syringes, the holder may be in two parts comprising a main holder for one syringe detachable from an auxiliary holder for the other syringe, the main holder for the syringe 9 or both of the holders having resilient means for retracting the plunger, and releasable locking means for controlling the movement of the plunger, so that the main holder and the syringe 9 can be used without the auxiliary holder, for example, for puncturing without injection.

I claim:

1. A hand tool for holding and manipulating a pair of surgical syringes for alternate extraction and injection through a single hypodermic needle connected to both syringes, comprising a holder, means for detachably holding both syringes individually in said holder in parallel spaced relationship, a pair of tubular spring guides on said holder for each syringe, the spring guides of each pair being disposed one at each side of the associated syringe, tubular rods slidable one in each of said spring housings, crossheads connecting the ends of the pairs of rods slidable in the associated spring guides, said crossheads being adapted to

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engage the plunger rods of said syringes, helical compression springs housed in said rods and extending into said spring guides for urging said crossheads outwards away from the holder, detent means for holding each pair of said spring rods independently in fully extended position, and finger-actuated means for controlling said detent means to enable one plunger rod to be urged outwards and to be held retracted while the other plunger rod is held in its retracted position, and to enable the last-mentioned plunger rod to be released and to be pressed manually inwards while the first-mentioned plunger rod is held in retracted position by said detent means.

2. A hand tool for holding and manipulating a pair of surgical syringes, one for extraction and the other for injection, both through a common hypodermic needle connected through stop cocks to said syringes, comprising a holder, means for detachably holding both syringes in said holder in parallel relationship, resilient means at each side of each syringe, said resilient means being connected in pairs by crossheads for engaging and retracting the plunger rods of said syringes, a pair of racks slidable in said holder and arranged one adjacent each of the syringes, each of said racks being secured to one of said crossheads, and spring-controlled finger operated detent means mounted on said holder for co-operation with said racks to enable said crossheads to be independently controlled against the action of said resilient means.

3. A hand tool for holding and manipulating a pair of surgical syringes, one for extraction and the other for injection, comprising a hinged pair of clamping jaws recessed to receive and engage the syringes in parallel spaced relationship between them, with the plunger rods of said syringes extending outwards from one side of said jaws, two pairs of spring-controlled retracting rods mounted on one of said jaws, said rods being disposed at opposite sides of the syringes, a crosshead connecting the ends of each pair of jaws and engaging one of said plunger rods midway of said crosshead, and detent means associated with each pair of retracting rods for controlling retraction of said plungers independently of one another.

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