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HOLDER AND OPERATOR FOR HYPODERMIC SYRINGES

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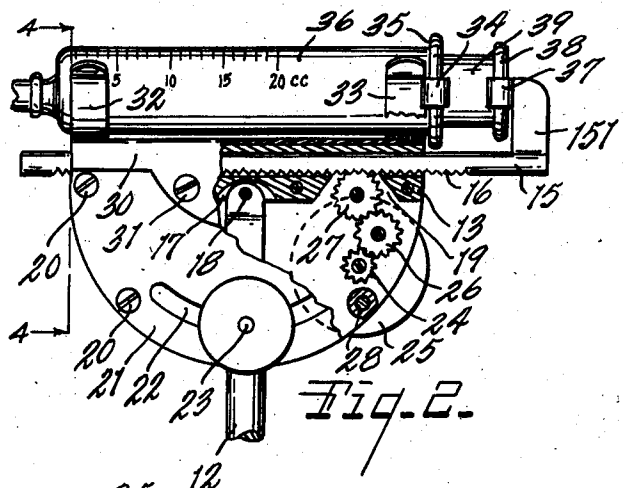


Fig. 2.

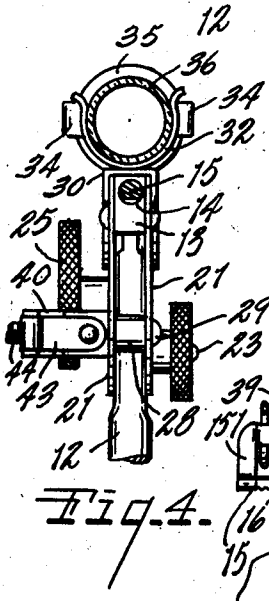


Fig. 4.

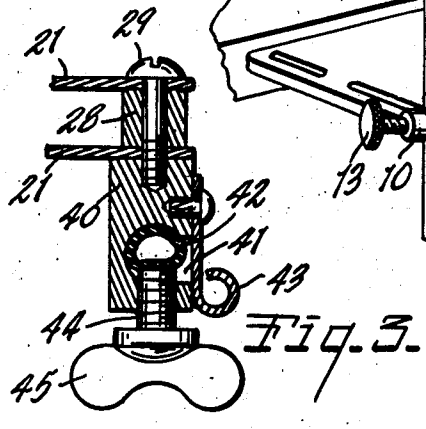


Fig. 3.

Fig. 1.

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HOLDER AND OPERATOR FOR HYPODERMIC SYRINGES

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7 Claims. (Cl. 128—218)

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This invention relates to holder and operator for hypodermic syringe. More particularly the invention relates to a mounting device arranged to be clamped to a surgical operating table to hold a hypodermic syringe in operative relationship to a patient on the operating table. The holder includes mechanism for operating the syringe to eject a measured amount of fluid or to draw in a measured amount of fluid from a reservoir.

The principal objects of this invention are:

First, to provide a holder for a hypodermic syringe that will securely hold the barrel of a syringe in adjustably fixed position and permit accurate manipulation of the piston or plunger of the syringe by means of a rotatable hand wheel.

Second, to provide a holder for a hypodermic syringe which includes a clamp adapted to act as a holder for a hypodermic needle and case until such time as the needle is needed during a surgical operation and which may thereafter be used as a hose clamp to control the flow of a fluid to the hypodermic syringe for re-filling the syringe.

Third, to provide a syringe holder that is easily assembled and operated and which can be completely sterilized for use in an operating room.

Fourth, to provide a syringe holder that occupies a minimum of space while permitting complete freedom of operation of the syringe for accurate injection of a fluid or re-filling the syringe from a reservoir.

Other objects of my invention will be apparent from a consideration of the following description and claims.

The drawings of which there is one sheet illustrate a highly practical embodiment of my syringe holder.

Fig. 1 is a fragmentary perspective view of a portion of a surgical operating table and arm rest board therefor with my syringe holder operatively mounted on the arm rest board and supporting the hypodermic syringe connected to a reservoir suspended above the operating table.

Fig. 2 is an enlarged side elevational view of the holder partially broken away in vertical cross section to illustrate the operating elements thereof.

Fig. 3 is a fragmentary transverse cross sectional view through the holder and the hose clamp portion thereof taken along the plane of the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary transverse vertical cross

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sectional view taken along the plane of the line 4—4 in Fig. 2.

In the drawings a portion of a surgical operating table is indicated at 1. An arm rest board extending normally from one side of the table is indicated at 2. Supported vertically alongside of the operating table as by a clamp 3 is an upright rod or standard 4 having a cross piece 5 at its upper end. Hooks 6 on the ends of the cross piece are adapted to support an inverted bottle 7 containing a fluid needed or used during surgical operations. The arm rest board 2 is desirably provided with longitudinally extending slots 8 along its edges which are arranged to receive a bracket 9 having an apertured arm 10 projecting therefrom. My syringe holder generally indicated at 11 includes a depending rod 12 which fits into the apertured arm 10 and is adjustably clamped therein by a set screw 13. Obviously the bracket 9 and the rod 12 can be rotated about their vertical axes to adjust the position of the holder and the rod 12 can be positioned at various levels within the arm 10.

The holder 11 is built around an elongated bar like body 13 having a longitudinally extending bore 14 formed therethrough. The bore is adapted to slideably receive an operating rod 15 having teeth 16 cut on its under surface. The underside of the body 13 is slotted as at 17 to receive the upper end of the upright support rod 12 and the rod is joined to the body by a pivot pin 18. Rearwardly from the slot 17 the body 13 is slotted as at 19 to form a space opening into the bore 14.

Secured to each side of the body 13 as by screws 20 are side plates 21. The plates 21 are semi-circular in shape and depend below the body. One of the plates has an arcuate slot 22 formed therein through which the shank of a lock screw 23 extends into the support rod 12. By loosening the screw 23 the holder can be tilted to any adjusted position relative to the support rod and then clamped in place. The sideplates 21 serve as supports for a plurality of gears that are disposed between the plates. A first driving gear 24 has its shaft extended through one of the side plates and connected to an operating hand wheel 25. The gear 24 meshes with an idler gear 26 and the idler gear in turn meshes with a driving gear 27 the upper edge of which extends through the slot 19 and drivingly engages the teeth 16 on the bottom of the operating rod. Spacers 28 are clamped between the peripheries of the semi-circular side plates by means of screws 29.

Fitted over the top and side of the body 13 is

a cover plate 30 of downwardly opening U-shaped cross-section. The side flanges of the cover plate are fastened to the body 13 by means of screws 31. The flat topped surface of the cover plate 30 has upwardly opening U-shaped spring clips 32 and 33 welded to its ends. The rear spring clip 33 has laterally extending hook flanges 34 formed on its rear edge with the flanges opening transversely inwardly and vertically to lockingly receive and retain the rear flange or rim 35 of the barrel 36 of a hypodermic syringe.

The rear end of the operating rod 15 is provided with an upstanding arm 151 to the forward edge of which is attached a clip with inwardly opening U-shaped arms 37 on each end. The U-shaped arms 37 are adapted to retainingly receive the flange 38 on the plunger 39 of the syringe. By rotation of the hand wheel 25 and driving gear 24 the operating rod 15 can be reciprocated to correspondingly reciprocate the plunger of the syringe for either filling or emptying the syringe of accurately measurable amounts of fluids. It will be noted that the teeth 16 terminate short of the front end of the operating rod 15 to act as a stop to prevent accidental removal of the operating rod and the syringe plunger from the barrel of the syringe.

One of the screws 29 near the lower rear edge of the side plates 21 is extended to engage and secure a block 40 on the side of the holder. The block 40 is laterally slotted from one side as at 41 to receive a length of rubber hose as at 42 in Fig. 3. A gate in the form of a short strip of metal 43 is pivotally secured on the side of the block 40 to swing across the open end of the slot 41. A screw 44 having a wing nut head 45 is threaded into the end of the block 40 to project into the slot 41 and engage the tube 42 either as a retaining clamp or as a closing valve. It is thus possible to set up the holder in the manner illustrated in Fig. 1 with a hose 42 extending through the slot 41 to the hypodermic needle 46 that may be enclosed in a sterile tube 47. The hose 42 extends to a three-way valve 48 mounted on the delivery end or tip of the syringe. A second rubber tube 49 may extend from the reservoir 7 to the valve 48. The syringe and holder are thus in a position which permits the needle to be readily available when needed during a surgical operation. After the needle has been placed in the arm of a patient the hose 49 may be placed in the slot 41 and the screw 44 tightened to close off the hose 49 until it is necessary to replenish the fluid in the syringe.

My holder makes it an easy matter to prepare for the administration of an intravenous injection during a surgical operation without the necessity of moving away from the operating table and also permits the quantity of fluid delivered by syringe to be accurately controlled. The holder together with the valve 14 and clamp screw 44 also permit re-filling the syringe without contaminating any parts that might be exposed to the patient.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A hypodermic syringe holder comprising, an elongated body member having a longitudinally extending bore formed therethrough with a slot in the under side opening to said bore, an operating rod slidable in said bore and having teeth on its under side, a support rod pivotally secured to the under side of said body intermediate of the ends thereof, side plates secured to the sides of said body and extending therebelow, one of said plates having an arcuate slot formed therein, a clamp screw extending through said arcuate slot and engaged with said support rod, a cover plate of U-shaped cross-section fitting over the top and sides of said body, upwardly opening U-shaped spring clips on the ends of said cover plate, vertically and laterally inwardly opening U-shaped flanges on one of said clips adapted to receive the flange on the rear of a syringe barrel, an upright on the end of said rod adjacent said U-shape flanges, other U-shaped flanges on said upright adapted to receive the flange on the plunger of a hypodermic syringe, entrained gears supported between said side plates with one gear engaged with the teeth on said operating rod, a hand wheel mounted outside one of said side plates and connected to one of said gears, and a clamp secured to one of said side plates, and having a laterally opening slot formed therein with a clamp screw extendable into said slot.

2. A hypodermic syringe holder comprising, an elongated body member having a longitudinally extending bore formed therethrough with a slot in the under side opening to said bore, an operating rod slidable in said bore and having teeth on its under side, a support rod pivotally secured to the under side of said body intermediate of the ends thereof, side plates secured to the sides of said body and extending therebelow, means for clamping said support rod to one of said plates, a cover plate of U-shaped cross-section fitting over the top and sides of said body, upwardly opening U-shaped spring clips on the ends of said cover plate, vertically and laterally inwardly opening U-shaped flanges on one of said clips adapted to receive the flange on the rear of a syringe barrel, an upright on the end of said rod adjacent said U-shaped flanges, other U-shaped flanges on said upright adapted to receive the flange on the plunger of a hypodermic syringe, entrained gears supported between said side plates with one gear engaged with the teeth on said operating rod, a hand wheel mounted outside one of said side plates and connected to one of said gears, and a clamp secured to one of said side plates and having a laterally opening slot formed therein with a clamp screw extendable into said slot.

3. A hypodermic syringe holder comprising an elongated body member having a longitudinally extending bore formed therethrough and having a slot formed in its under side opening to said bore, an operating rod slidably received in said bore and projecting from the rear end thereof, said rod having teeth formed on its under side, side plates secured to the sides of said body and projecting therebelow in spaced relationship, one of said side plates having an arcuate slot formed therein, a support rod pivotally secured to the bottom of said body member and depending therefrom between said plates, a clamp screw engaged with said support rod and extending through said slot, a gear supported between said plates and extending through said slot in the bottom of said body member and drivingly engaging the teeth on said operating rod, a hand wheel rotatably supported along the outside of one of said side plates and drivingly connected to said gear, a pair of upwardly opening U-shaped spring clips secured to the ends of said body member, vertically and laterally inwardly opening U-shaped flanges on the spring clip at the rear of said body member adapted to retainingly receive the end flange on a syringe barrel when

the barrel is received within said spring clips, other laterally inwardly and vertically opening U-shaped flanges carried on the rear end of said operating rod to retainingly receive the flange on the end of the plunger, of the syringe in said clips, and a hose clamp mounted on one of said side plates and having a laterally opening slot adapted to receive a flexible tube for supporting and clamping action.

4. A hypodermic syringe holder comprising, an elongated body member having a longitudinally extending bore formed therethrough and having a slot formed in its under side opening to said bore, an operating rod slidably received in said bore and projecting from the rear end thereof, said rod having teeth formed on its under side, side plates secured to the sides of said body and projecting therebelow in spaced relationship, a support rod secured to the bottom of said body member and depending therefrom between said plates, a gear supported between said plates and extending through said slot in the bottom of said body member and drivingly engaging the teeth on said operating rod, a hand wheel rotatably supported along the outside of one of said side plates and drivingly connected to said gear, a pair of upwardly opening U-shaped spring clips secured to the ends of said body member, vertically and laterally inwardly opening U-shaped flanges on the spring clip at the rear of said body member adapted to retainingly receive the end flange on a syringe barrel when the barrel is received within said spring clips, other laterally inwardly and vertically opening U-shaped flanges carried on the rear end of said operating rod to retainingly receive the flanges on the end of a plunger of the syringe in said clips, and a hose clamp mounted on one of said side plates and having a laterally opening slot adapted to receive a flexible tube for supporting and clamping action.

5. A hypodermic syringe holder comprising an elongated body member having a longitudinally extending bore formed therethrough and having a slot formed in its underside opening to said bore, an operating rod slidably received in said bore and projecting from the rear end thereof, said rod having rack teeth formed therealong, side plates secured to the sides of said body and projecting therebelow in spaced relationship, a support rod pivotally secured to the bottom of said body member and depending therefrom between said plates, means clamping said support rod in adjusted position relative to said body, a gear supported between said plates and extending through said slot in the bottom of said body member and drivingly engaging the teeth on said operating rod, a hand wheel rotatably supported along the outside of one of said side plates and drivingly connected to said gear, a pair of upwardly opening U-shaped spring clips secured to the ends of said body member, vertically and laterally inwardly opening U-shaped flanges on the spring clip at the rear of said body member adapted to retainingly receive the end flange on a syringe barrel when the barrel is received within said spring clips and other laterally inwardly and vertically opening U-shaped flanges carried on the rear end of said operating rod to retainingly receive the flange on the end of the plunger of the syringe in said clips.

6. A syringe holder and operator comprising, a body having syringe barrel engaging clips on the top thereof, the clip at one end of said body having laterally inwardly and vertically opening flanges thereon adapted to receive the end flange on a syringe barrel, a rack bar slidably supported by said body and underlying said clips in the advanced position of the bar, other vertically and laterally inwardly opening flanges carried by the end of said rack bar and adapted to retainingly engage the flange on the rear end of the plunger of the syringe in said clips, a gear carried by said body and drivingly engaged with said rack bar, a hand wheel supported by said body and drivingly connected with said gear, a support pivotally connected to said body and extending therebelow, and means for clamping said support in adjusted position with respect to said body.

7. A syringe holder and operator comprising, a body having syringe barrel engaging clips at the top thereof, the clip at one end of said body having laterally inwardly opening flanges thereon adapted to receive the end flange on a syringe barrel, a rack bar slidably supported by said body and longitudinally overlapping said clips in the advanced position of the bar, means carried by the rear end of said rack bar and projecting therefrom to retainingly engage the flange on the rear end of the plunger of the syringe in said clips, a gear carried by said body and drivingly engaged with said rack bar, a hand wheel supported by said body and drivingly connected with said gear, and a support connected to said body and extending therebelow.

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