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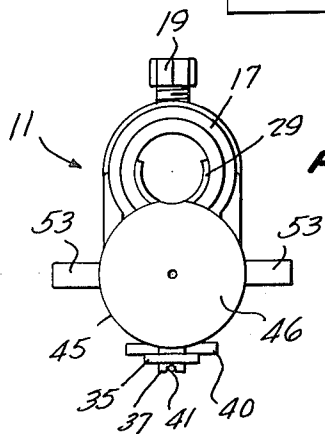
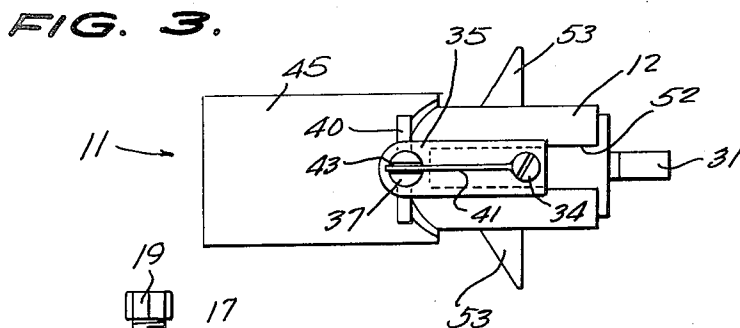
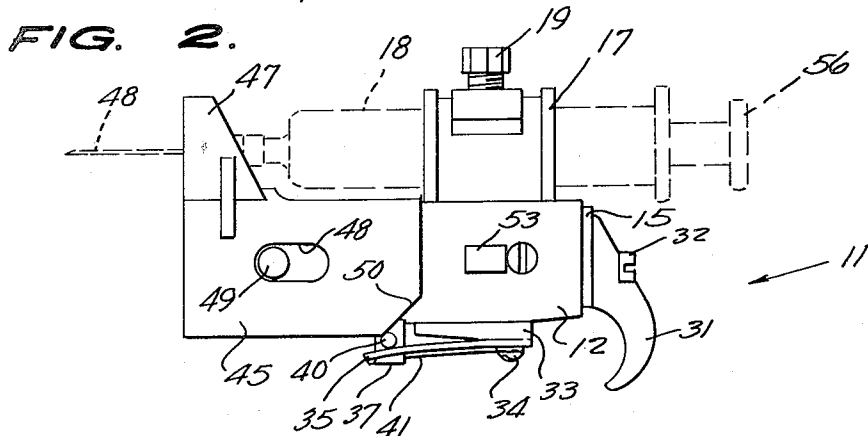
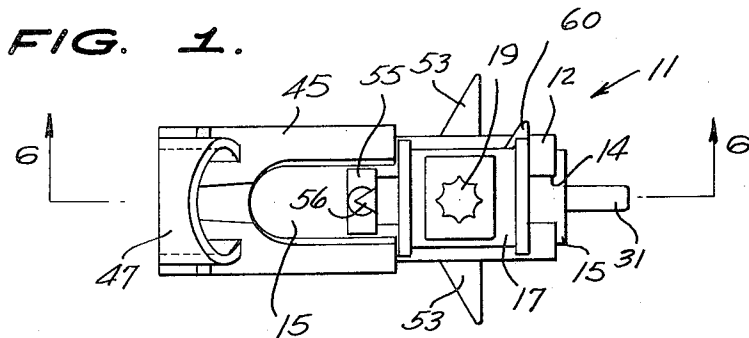
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2,918,063

AUTOMATIC SYRINGE INJECTOR DEVICE

Filed July 18, 1958

2 Sheets-Sheet 1



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FIG. 5.

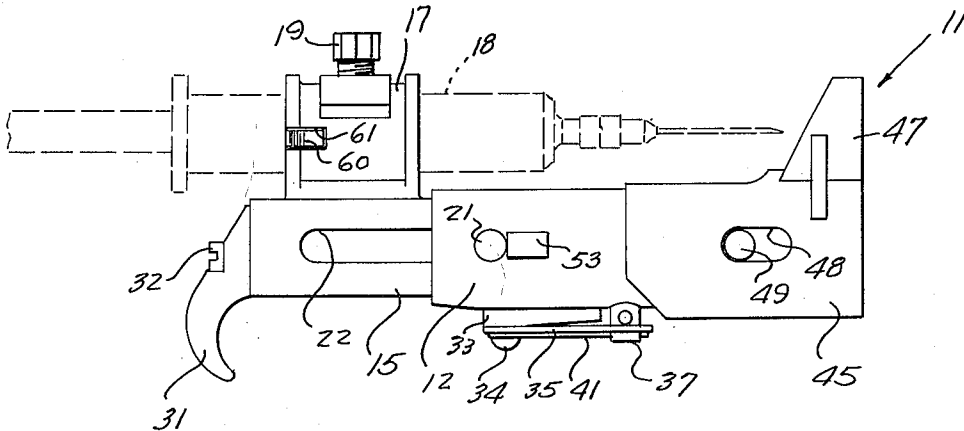


FIG. 6.

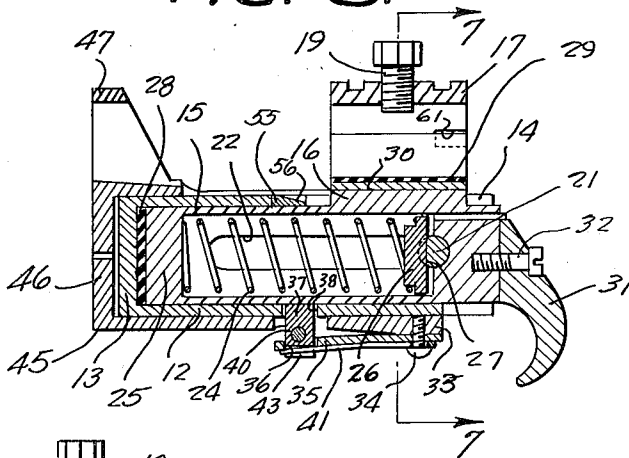
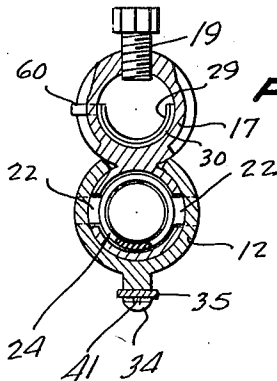


FIG. 7.



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AUTOMATIC SYRINGE INJECTOR DEVICE

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4 Claims. (Cl. 128—218)

This invention relates to automatic syringe injectors, and more particularly to a hypodermic syringe injector device adapted to be employed with a hypodermic syringe for enabling a person to accurately perform an injection without requiring the assistance of a technician.

A main object of the invention is to provide a novel and improved automatic hypodermic syringe injector device which is simple in construction, which is arranged so that a hypodermic needle may be easily and accurately mounted therein to provide a desired depth of penetration of the needle thereof, and enabling a person to perform an injection without requiring the assistance of a technician and greatly reducing nervous tension and other effects which heretofore have created forces of inaccuracy in the performance of an injection.

A further object of the invention is to provide an improved automatic syringe injector device enabling a person to perform a hypodermic injection without requiring the assistance of a technician, the device being inexpensive to fabricate, being durable in construction, being arranged so that the movement of the hypodermic syringe can be accurately controlled, and requiring only a few simple manual operations in order to prepare for and accomplish a hypodermic injection.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a top view of an automatic syringe injector device constructed in accordance with the present invention.

Figure 2 is a side elevational view of the injector device of Figure 1 showing a hypodermic syringe mounted therein in dotted view.

Figure 3 is a bottom view of the automatic syringe injector device of Figures 1 and 2.

Figure 4 is a front end elevational view of the injector device of Figures 1 to 3.

Figure 5 is a side elevational view, similar to Figure 2, but showing the plunger member of the device in rearwardly retracted position, preparatory to an injection.

Figure 6 is a longitudinal vertical cross sectional view taken on the line 6—6 of Figure 1.

Figure 7 is a transverse vertical cross sectional view taken on the line 7—7 of Figure 6.

Referring to the drawings, the syringe injector device is designated generally at 11 and comprises a sleeve-like main body 12 which is provided with a forward end wall 13 and which is formed with a longitudinal slot 14 opening at its rear end, said slot being located in the top wall portion of the member 12, as viewed in Figure 6. A hollow plunger member 15 is slidably mounted in the sleeve-like main body 12, said plunger member being integrally formed with an upstanding lug 16 which extends outwardly through the longitudinal slot 14 and which is further formed with a sleeve 17 extending parallel to the main body 12 and being adapted to receive a

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conventional hypodermic syringe 18, as shown in dotted view in Figures 2 and 5. Threadedly engaged in the top wall of the supporting sleeve 17 is a clamping screw 19 which may be tightened to securely lock the hypodermic syringe 18 in a longitudinally adjusted position in the sleeve 17.

A transverse pin member 21 is secured in the rear portion of main body 12 and extends through a pair of longitudinal slots 22, 22 formed in the hollow plunger 15. A coiled spring 24 is disposed inside the hollow plunger 15, bearing between the forward end wall 25 of said plunger and a follower disc 26 engaged against the intermediate portion of the transverse pin member 21, said intermediate portion being flattened, as shown at 27, to receive the follower disc 26. The flattened portion 27 comprises the bottom of a recess formed in the transverse pin member 21 facing the follower disc 26 and being of sufficient length to accommodate said disc. Thus, the spring 24 biases the plunger member 25 forwardly in the sleeve-like main body 12 and into abutment with a cushioning pad 28 of resilient deformable material secured in the forward end of main body 12, namely, to the inside surface of the forward end wall 13 of said main body.

As shown in Figures 4, 6 and 7, the syringe-supporting sleeve member 17 is provided in its bottom with a semicylindrical pad or lining 29 of resilient deformable material adapted to resiliently engage the hypodermic syringe 18 clamped in the sleeve 17 by the clamping screw 19. The resilient pad 29 is secured on a generally semicylindrical shim member 30 which is seated in the lower portion of the sleeve 17, as is clearly shown in Figures 6 and 7.

The member 30 may be rigidly secured in the clamping sleeve 17 so as to form a permanent part thereof or alternatively, the shim 30 may be made removable so that shims of various thicknesses may be employed to accommodate various sizes of hypodermic syringes in the clamping sleeve 17.

Thus, the shim member 30 may be formed at one end thereof with an outwardly extending lug 60 which extends through a slot 61 formed in the rear portion of the sleeve member 17 and opening rearwardly at the end of said sleeve member, the lug 60 and slot 61 serving to lock the shim member 30 in the position thereof illustrated in Figures 6 and 7 but being available for removing the shim member when desired.

Designated at 31 is a depending hook-like handle member which is secured to the rear end of the plunger member 15 by any suitable means, for example, by a fastening screw 32, as shown in Figure 6.

Rigidly secured to the rear portion of the bottom wall of main body 12 opposite the slot 14 is a block member 33. Secured to the block member 33 by a screw 34 is a flexible arm 35 which extends forwardly and which is formed at its free end portion with an aperture 36 through which extends a detent lug member 37. Lug member 37 extends through an opening 38 provided in the main body 12 and normally engages against the wall surface of the plunger member 15. A transverse pin 40 extends through the lug member 37, projecting on the opposite sides thereof and engaging against the top surface of the arm 35, as viewed in Figure 6. A spring wire 41 is secured at one end beneath the head of the fastening screw 34 and extends through a groove 43 formed in the bottom of the lug member 37, biasing the lug member 37 inwardly so that said lug member will lockingly engage with the end wall 25 of plunger member 15 when said plunger member is retracted sufficiently to move wall 25 rearwardly of the lug member 37.

Designated at 45 is an outer sleeve member which is slidably engaged on the forward portion of the main

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body 12, said outer sleeve member comprising the centrally apertured front wall 46 and the ring-like upper member 47 formed integrally with the outer sleeve member 45. As shown in Figure 6, the ring-like member 47 is located on the same axis as the syringe-supporting sleeve 17 so that the needle 48 of the hypodermic syringe 18 secured in the sleeve member 17 will pass through the ring-like member 47. As shown in Figures 2 and 6, the transverse vertical front plane of ring-like member 47 is flush with the plane of the forward end wall 46 of outer sleeve member 45.

The outer sleeve 45 is formed at its opposite side portions with relatively short longitudinal slots 48 through which extend lug elements 49 provided on the main body 12, whereby to retain the outer sleeve 45 on said main body while allowing limited longitudinal movement thereof. The outer sleeve 45 is formed at its rear lower corners with the beveled cam-like edge portions 50 which are cammingly engageable with the end portions of the transverse pin member 40, responsive to rearward movement of the outer sleeve 45 relative to the main body 12, whereby to retract the locking lug 37 and release the plunger member 15 when an injection is to be performed, as will be presently described.

Respective outwardly projecting side lugs 53, 53 are provided on the main body 12 to facilitate holding said main body while the plunger 15 is retracted to prepare the device for an injection.

As shown in Figure 3, the rear portion of main body 12 is formed with the open ended slot 52 through which manual retarding force may be applied to the plunger member 15 to regulate speed of release thereof and to thus regulate the speed of penetration of the needle 48 of the hypodermic syringe 18.

An index block 55 of suitably colored material is secured in the top wall portion of main body 12 adjacent the forward end of the longitudinal slot 14, said block 55 being provided with an index recess 56, serving as a reference point for the adjustment of a hypodermic needle 18 in the supporting sleeve 17, whereby to properly adjust the syringe 18 to obtain a desired degree of penetration of its needle 48 during an injection.

In using the device, the hypodermic syringe 18 is first mounted in the sleeve member 17 at a position of adjustment corresponding to the desired depth of penetration of its needle 48 for the injection. When the syringe 18 has been adjusted to its proper position the clamping screw 19 is tightened, locking the syringe on the plunger member 15. The plunger member 15 is then retracted by means of the depending hook-like handle member 31 until the lug 37 lockingly engages against the forward end wall 25 of said plunger member, as above described. In retracting the plunger member 15, the outer sleeve 45 is preferably held so that said sleeve is moved forwardly relative to the main body 12, and so that the lugs 49 abut the rear end of the slot 48, as illustrated in Figure 5, and so that the camming edges 50 are located forwardly of the end portions of the transverse pin 40. The injector device is thus prepared for injection and assumes the position thereof illustrated in Figure 5. To perform the injection, the ring element 47 is engaged against the area in which the injection is desired, and forward pressure is applied on the main body 12, whereby said main body travels toward the sleeve member 45 and the end portions of pin 40 cammingly engage against the beveled edge elements 50. The camming engagement of the pin 40 retracts the locking rod 37 and thus releases the plunger member 15, allowing the spring 24 to expand, whereby the hypodermic syringe 18 is driven forwardly and its needle 48 penetrates into the specified area intended to receive the injection. The penetration terminates when the end wall 25 of plunger member 15 engages the cushioning pad 28. As above mentioned, the speed of penetration may be regulated by applying manual force against said plunger member through the

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slot 52. After the needle 48 has penetrated into the desired area, the desired amount of contents of the hypodermic syringe may be discharged in the usual manner by applying discharge force on the plunger head 56 of the syringe.

As will be readily apparent, the area intended to receive the injection may be accurately located by centering same in the ring member 47, and the injection may be quickly and easily performed by merely applying forward pressure on the main body 12 with the ring member 47 engaged against the area intended to receive the injection. This allows for accurate and rapid injection with a minimum amount of nervous tension and consequently with minimum risk of pain or soreness. Furthermore, the depth and direction of penetration of the hypodermic syringe needle 48 is accurately controlled, and the speed of penetration of said needle may be also controlled in the manner above described by applying manual frictional retarding force through the slot 52.

While a specific embodiment of an improved automatic syringe injector device has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. An automatic syringe injector device comprising a sleeve-like main body, a plunger member slidably mounted in said main body, spring means biasing said plunger member forwardly in said main body, means on said plunger member extending outside said sleeve-like main body and being formed and arranged to support a hypodermic syringe parallel to said main body with its needle directed forwardly, yieldable detent means on said main body engageable with a portion of said plunger member to at times hold said plunger member in a rearwardly retracted position, an outer sleeve member slidably mounted on the forward end of said main body, and means on said outer sleeve member cammingly engageable with said detent means to disengage same from said plunger member responsive to forward movement of the main body relative to said outer sleeve member, whereby to release said plunger member for forward movement by said spring means.

2. An automatic syringe injector device comprising a sleeve-like main body, a plunger member slidably mounted in said main body, spring means housed in said plunger member and bearing between the plunger member and a rear portion of said main body, biasing said plunger member forwardly in said main body, said main body being formed with a longitudinal slot, means on said plunger member extending through said slot and outside said sleeve-like main body and being formed and arranged to support a hypodermic syringe parallel to said main body with its needle directed forwardly, yieldable detent means on said main body engageable with a portion of said plunger member to at times hold said plunger member in a rearwardly retracted position, an outer sleeve member slidably mounted on the forward end of said main body, and means on said outer sleeve member cammingly engageable with said detent means to disengage same from said plunger member responsive to forward movement of the main body relative to said outer sleeve member, whereby to release said plunger member for forward movement by said spring means.

3. An automatic syringe injector device comprising a sleeve-like main body, a plunger member slidably mounted in said main body, spring means housed in said plunger member and bearing between the plunger member and a rear portion of said main body, biasing said plunger member forwardly in said main body, said main body being formed with a longitudinal slot, means on said plunger member extending through said slot and outside said sleeve-like main body and being formed and

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arranged to support a hypodermic syringe parallel to said main body with its needle directed forwardly, yieldable detent means on said main body engageable with a portion of the plunger member to at times hold said plunger member in a rearwardly retracted position, an outer sleeve member slidably mounted on the forward end of said main body, a ring-like guide member rigidly carried by said outer sleeve member and being axially aligned with said hypodermic syringe support means, and means on said outer sleeve member cammingly engageable with said detent means to disengage same from said plunger member responsive to forward movement of the main body relative to said outer sleeve member whereby to release said plunger member for forward movement by said spring means when said ring-like guide member is engaged against a person's body and forward pressure is exerted on said main body, and whereby the needle of a hypodermic syringe mounted in said support means is moved forwardly through said ring-like guide member.

4. An automatic syringe injector device comprising a sleeve-like main body, a plunger member slidably mounted in said main body, spring means housed in said plunger member and bearing between the plunger member and a rear portion of said main body, biasing said plunger member forwardly in said main body, said main body being formed with a longitudinal slot, means on said plunger member extending through said slot and outside said sleeve-like main body and being formed and arranged to support a hypodermic syringe parallel to said main body with its needle directed forwardly, yieldable detent

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means on said main body engageable with a portion of said plunger member to at times hold said plunger member in a rearwardly retracted position, an outer sleeve member slidably mounted on the forward end of said main body, a ring-like guide member rigidly carried by said outer sleeve member and being axially aligned with said hypodermic syringe support means, and means on said outer sleeve member cammingly engageable with said detent means to disengage same from said plunger member responsive to forward movement of the main body relative to said outer sleeve member, whereby to release said plunger member for forward movement by said spring means when said ring-like guide member is engaged against a person's body and forward pressure is exerted on said main body, and whereby the needle of a hypodermic syringe mounted in said support means is moved forwardly through said ring-like guide member, said sleeve-like main body being formed with an opening through which frictional retarding pressure may be manually applied to said plunger member.

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