April 25, 1944. H. P. GORMAN 2,347,179

ATTACHMENT FOR HYPODERMIC SYRINGES

Filed Sept. 15, 1943

Fig. 1.

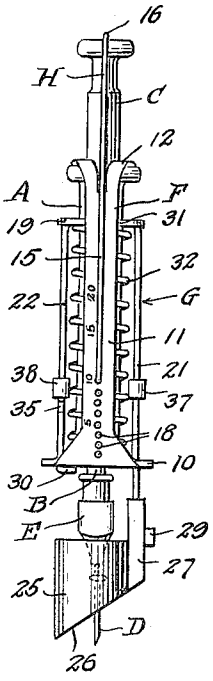


Fig. 2.

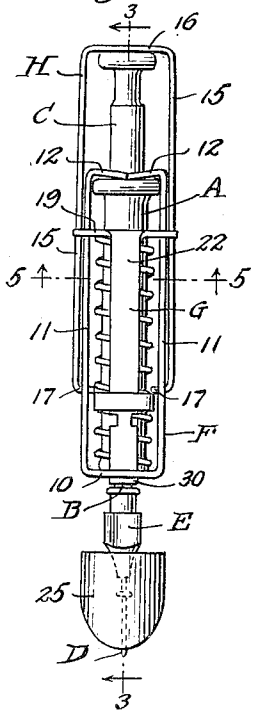


Fig. 3.

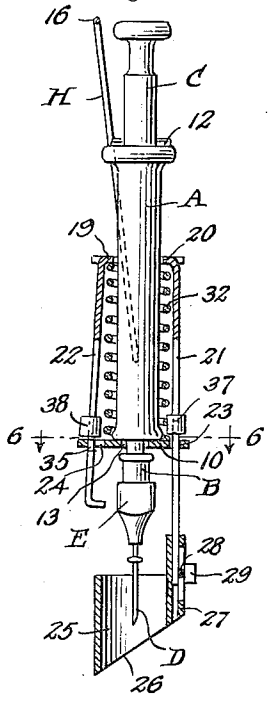


Fig. 4.

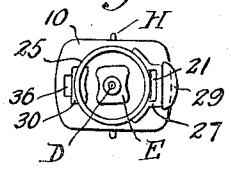


Fig. 5.

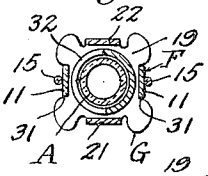


Fig. 6.

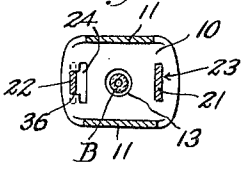
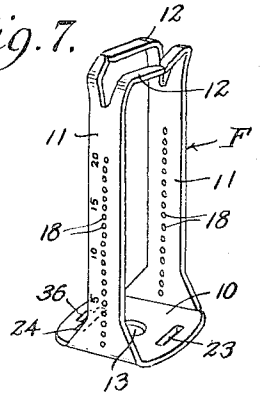


Fig. 7.



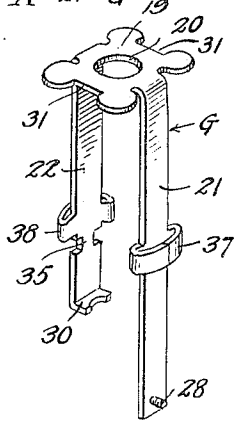


Fig. 8.

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ATTACHMENT FOR HYPODERMIC SYRINGES

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Application September 15, 1943, Serial No. 502,445

6 Claims. (Cl. 128—218)

This invention has relation to devices for administering hypodermic injections and is directed to an attachment for hypodermic syringes for facilitating and simplifying the self-administration of such injections.

The invention broadly comprehends in an attachment of the indicated character, means by virtue of which the prescribed dosage is accurately insured, the proper angle and depth of penetration of the needle is definitely established, the protection of the needle against damage or infection is attained and the charging of the syringe is facilitated.

More particularly, the invention contemplates an attachment for hypodermic syringes which is so constructed and arranged as to be readily assembled with the syringe and which, when associated therewith, remains as a permanent accessory thereto which permits of the changing of the needle and the cleaning and filling of the syringe barrel without displacement therefrom and which attachment functions to effect a rapid and comparatively painless penetration of the needle to the proper depth and at the proper angle without slippage or relative movement with reference to the selected point of insertion.

As a further feature, the invention embodies means for adjusting parts of the attachment so as to render the same capable of use with hypodermic syringes of different makes to compensate for slight variations in the length of the barrels thereof and for accommodating needles of relatively different lengths.

The invention further resides in an attachment for hypodermic syringes which is comparatively simple in its construction and mode of operation, which may be economically produced and which is highly efficient for its intended purpose.

With the above enumerated and other objects in view, the invention is set forth in greater detail in the following specification, particularly pointed out in the appended claims and illustrated in the accompanying drawing, in which:

Fig. 1 is a side view of a hypodermic syringe associated with an attachment constructed in accordance with the present invention and illustrating the position of parts prior to the setting of the device in retracted position.

Fig. 2 is a front view thereof.

Fig. 3 is a longitudinal sectional view therethrough taken approximately on the line 3—3 of Fig. 2 with the device set in retracted position.

Fig. 4 is a bottom plan view thereof.

Fig. 5 is a transverse sectional view taken on the line 5—5 of Fig. 2.

Fig. 6 is a transverse sectional view taken on the line 6—6 of Fig. 3.

Fig. 7 is a perspective view of the frame member or holder for the syringe.

Fig. 8 is a perspective view of the supporting member of the syringe attachment.

Referring to the drawing by characters of reference, A designates the barrel of a standard type of hypodermic syringe provided with an outlet nozzle or tip B at one end thereof and having a plunger C fitted therein for drawing the charge into the barrel through the nozzle or tip B and for discharging the same therefrom. The needle D is provided with the usual hub E adapted to frictionally fit over the nozzle or tip B.

The attachment or accessory for the syringe which constitutes the present invention includes a pair of slidably associated members designated generally by the reference characters F and G. The member F which serves as a frame or holder for the syringe is preferably fashioned from sheet metal or an equivalent resilient material to provide a substantially rectangular bight portion 10 having a pair of approximately parallel coextensive side arms 11 extending from opposite sides of the bight portion and formed with inwardly directed mating bifurcated terminals 12. The bight portion 10 is also formed with a centrally disposed aperture 13 of a size to freely receive therethrough the nozzle or tip B with the adjacent end of the syringe barrel engaging with the inner surface of the bight portion. The side arms 11 are of a length approximating the length of standard syringe barrels of a given capacity and it is to be understood that slight variations in the length of the barrel of different makes of syringes may be compensated for by bending the bifurcated terminals 12 toward or away from the bight portion 10 so that the barrel is clamped in fixed relation to the frame member or holder F. The inherent resiliency of the side arms 11 is such as to tension the same against relative outward movement so that the free terminals thereof are normally urged toward each other to grip the flanged upper end of the syringe barrel while straddling the plunger C. It is thus apparent that the side arms 11 may be spread apart sufficiently to permit of the emplacement of the syringe in the frame member or holder F and the removal of the same therefrom. When thus positioned within the frame member or holder F, it will be apparent that the needle D may be readily

applied to or removed from the syringe barrel A by engaging the hub E with or disengaging the same from the portion of the nozzle or tip B which protrudes from the bight portion 10. Likewise, the plunger C which extends between the bifurcated terminals 12, protrudes from the frame member or holder F so that the same may be manipulated in the usual manner for drawing the charge of liquid into the barrel and for discharging the same therefrom.

In order to accurately gage the dose or quantity of liquid to be injected by the syringe, a stop means H is provided for limiting the outward stroke of the plunger C and said stop means is preferably adjustable to vary the dose or quantity to be administered. As shown, the stop means is in the form of a bail fashioned from a length of resilient wire defining a pair of coextensive leads 15 joined by a connecting end portion 16 of a length approximating the width of the frame member or holder F and having inturned trunnions 17 at the opposite free ends thereof. The inherent resiliency of the bail is such as to normally swing the free ends of the side leads 15 toward each other and to tension the same against spreading. The side arms of the frame member or holder F are formed with aligned rows or series of perforations 18 corresponding in spacing to that of the usual graduations on the syringe barrel and inscribed with indicia comparable to that on the syringe barrel so that the trunnions 17 of the bail may be selectively engaged with the perforations corresponding to the predetermined dose prescribed. It thus follows that the side leads 15 when disposed parallel with the side arms 11, as shown in Figs. 1 and 2 of the drawing, locates the connecting end portion 16 of the bail in the path of outward movement of the plunger C to serve as a stop therefor, thus insuring the accurate measurement of the dose or quantity of liquid which will be drawn into the syringe barrel.

The member G which serves a support or mounting for the frame member or holder F comprises a head 19 formed with a central opening 20 which loosely fits over the barrel A and has depending from two opposite sides thereof legs 21 and 22 which extend respectively through slots 23 and 24 in the bight portion 10 of the frame member or holder F. The leg 21 is of greater length than the length of the leg 22 and carries at its lower end a tubular preferably cylindrical needle guard and skin engaging element 25, the lower end of which is cut away obliquely or at an angle as at 26. As illustrated, the element 25 is adjustable longitudinally of the leg 21 by means of a slotted slide bearing plate 27 secured thereto and through which protrudes the threaded stud 28 secured to and projecting laterally from the lower end of the leg 21 and with which stud a binding nut 29 is engaged to retain the adjustment. The other leg 22 is formed with an inturned extremity 30 which serves as a stop for retaining the members F and G in assembled relation and for limiting longitudinal separation thereof. The remaining opposite sides of the head 19 are formed with notches 31 for receiving and guiding the side arms 11 of the frame member or holder F. A coiled expansion spring 32 surrounding the syringe barrel A is interposed between the bight portion 10 of the member F and the head 19 of the member G and functions to exert a tension for normally moving the member F and the syringe downwardly so that the free end of the needle D is projected beyond or below a plane coinciding with the plane of the oblique or angular end of the needle guard and skin engaging element 25. The longitudinal adjustment of the element 25 with reference to the leg 21, as previously explained, is for the purpose of setting the same in accordance with the length of the needle being used thereby obtaining the desired degree of penetration of the skin and flesh.

In order to permit of the setting of the device and its retention in a position where the needle is retracted within the confines of the needle guard and protcted thereby, the leg 22 of the member G is provided with notches in its opposite side edges which define a reduced neck portion 35 spaced from the free end of the said leg while the outer wall of the slot 24 in the bight portion of the member F is formed with a notch 36 of a size to receive said neck portion. It thus follows that when the bight portion 10 of the member F is moved toward the head 19 of the member G against the tension of the spring 32, the leg 22 will spring laterally outward as soon as the reduced neck portion 35 registers with the notch 36. It will thus be apparent that the reduced neck portion 35 and the notch 36 constitute detent means for retaining the syringe and its needle together with the holder therefor in a retracted set position as shown in Fig. 3 of the drawings.

In use and operation, with the device in the set retracted position shown in Fig. 3, the barrel A of the syringe may now be filled by telescopically fitting the needle guard element 25 over the neck of the vial or ampoule which contains the liquid to be injected. In this manner the needle is positively guided to a concentric position for puncturing the thin central area of the stopper thus avoiding damage to the needle point by contact with the vial or ampoule. With the bail or stop means H in its active position shown in Figs. 1 and 2, the outward movement of the plunger C will be limited thereby so as to accurately insure the charging of the syringe with the amount coinciding with the setting of the stop means. The oblique or angular end 26 of the element 25 is then pressed firmly against the skin at the selected point for the injection and the shape of the said guard element precludes any possibility of slippage when the detent means is released by pressing the leg 22 inwardly. Upon release thereof, the member F together with the syringe and needle will instantly be driven downwardly under the expansive force of the spring so that the needle quickly penetrates the skin and flesh at the proper angle with practically little or no attendant pain. By then swinging the bail or stop means H to one side as shown in Fig. 3, the user has only to depress the plunger for injecting the plunger C for injecting the contents of the syringe barrel. In order to guide the user in effecting the release of the detent means, the legs 21 and 22 of the member G are preferably provided with the finger rests 37 and 38. It should also be noted that in removing and replacing the needle D, it is advisable to set the frame member or holder F in the retracted position shown in Fig. 3 as this affords a greater clearance space for grasping the needle hub E with the fingers.

What is claimed is:

1. In an attachment for hypodermic syringes, a holder for the syringe barrel including a centrally apertured bight portion through which protrudes the needle carrying outlet end of the

barrel and said bight portion having oppositely disposed slots, a pair of spaced parallel resilient arms extending from said bight portion alongside of the barrel and having inwardly directed bifurcated terminals engaging over the opposite end of the barrel and straddling the plunger and a stop element carried by the holder with which the plunger is adapted to engage to measure the dose to be administered, a support for slidably mounting said holder including a head having a central opening loosely fitted over the syringe barrel and having oppositely disposed marginal guide notches engaging the holder arms, a pair of resilient legs extending from opposite sides of the head and through the slots of the bight portion of the holder, a tubular needle guard and skin engaging element having an oblique outer end carried by one of the legs of the support, an inturned extremity at the free end of the other leg defining a stop with which the bight portion of the syringe barrel holder is adapted to engage to limit the movement thereof in the direction of the needle guard; a coiled expansion spring surrounding the barrel and interposed between the bight portion and the head for normally urging the holder into engagement with the stop and for moving the syringe toward the needle guard so as to project the needle beyond the plane of the oblique outer end thereof, and interengageable detent means formed respectively on the bight portion and the other leg of the support for releasably retaining the holder and syringe retracted with the terminal of the needle located within the confines of the needle guard.

2. In an attachment for hypodermic syringes, a frame member embracing the barrel longitudinally thereof with the syringe needle and plunger protruding from opposite ends of said frame, a stop element carried by the frame member with which the syringe plunger is adapted to engage to measure the dose to be administered, a supporting member for slidably mounting the frame member for guided longitudinal movement with reference thereto, normally parallel legs extending from one end of the frame member alongside of the syringe barrel, a tubular needle guard and skin engaging element having an oblique outer end carried by the end of one of said legs, a stop on the other leg with which the frame member is adapted to engage for limiting the movement of the frame member toward the needle guard, a coiled expansion spring surrounding the syringe barrel and interposed between one end of the frame member and the opposite end of the supporting member for exerting a tension to normally move the frame member into engagement with the stop on said other leg and to move the syringe to a position where the needle projects beyond the plane of the oblique end of the needle guard, and interengageable manually releasable detent means at the free end of the other leg of said supporting member and the needle end of the frame member for holding the frame member and needle retracted against the tension of the spring.

3. In an attachment for hypodermic syringes, a frame member embracing the syringe barrel longitudinally thereof with the syringe needle and plunger protruding respectively from opposite ends of said frame member, an adjustable laterally displaceable stop element carried by the frame member and with which the plunger is adapted to engage to measure the dose to be administered, a supporting member having parallel legs extending along opposite sides of the syringe barrel and with which the frame member is associated for guided longitudinal limited sliding movement with reference thereto, a tubular needle guard and skin engaging element having an oblique outer end, means mounting said element on the free end of one leg of the supporting member for longitudinal adjustment with reference thereto, a coiled expansion spring surrounding the syringe barrel and interposed between one end of the frame member and the opposite end of the supporting member for exerting a tension to normally move the frame member and syringe in a direction so that the needle projects beyond the plane of the oblique outer end of the needle guard, and interengageable manually releasable detent means on the other leg of said supporting member and at the needle end of the supporting frame for holding the frame member and needle retracted against the tension of the spring with the point of the needle disposed within the confines of the needle guard.

4. In an attachment for hypodermic syringes, a frame member embracing the syringe barrel longitudinally thereof with the syringe needle and plunger protruding respectively from opposite ends of the frame member, a supporting member having parallel legs extending along opposite sides of the syringe barrel and with which the frame member is associated for guided longitudinal limited sliding movement with reference thereto, a tubular needle guard and skin engaging element mounted on the free end of one leg of the supporting member, a coiled expansion spring surrounding the syringe barrel and interposed between one end of the frame member and the opposite end of the supporting member for exerting a tension to normally move the frame member and syringe in a direction so that the pointed end portion of the syringe needle projects a predetermined distance beyond the plane of the end of the needle guard, and interengageable manually releasable means on the other leg of the supporting member and at the needle end of the supporting frame for holding the frame member, needle and syringe retracted against the tension of the spring with the point of the needle disposed within the confines of the needle guard.

5. An attachment for hypodermic syringes including a pair of slidably associated reversely arranged members each having an apertured head at one end thereof and a pair of arms secured to opposite sides of the head and extending therefrom toward and having guided sliding engagement with the head of the other member, means for limiting the relative outward sliding movement of said members with reference to each other, a coiled expansion spring for effecting normal movement of the heads away from each other and adapted to surround a syringe barrel arranged between the arms of said members with the needle and plunger ends of the syringe extending respectively through the apertured ends of said members, bendable terminals at the free ends of the arms of one member for clamping the needle end of the syringe against the head of said member, a tubular needle guard carried by the terminal of one of the arms of the other member in surrounding relation to the syringe needle, and manually releasable detent means for retaining the members in retracted relation against the tension of the spring with the point of the needle disposed within the confines of the needle guard.

6. An attachment for hypodermic syringes in-

cluding a frame member embracing the barrel longitudinally thereof with the syringe needle and plunger protruding respectively from opposite ends thereof, a supporting member with which the frame member is associated for guided longitudinal limited sliding movement, said supporting member having an apertured head through which the upper plunger end of the barrel freely extends and having a pair of legs extending along opposite sides of the syringe barrel, a needle guard carried by one of the legs of the supporting member and formed with an oblique lower end adapted to engage with the skin to dispose the axis of the attachment together with the axis of the syringe needle at an angle to the skin, means for normally moving the frame member and the syringe with reference to the supporting member so as to project the point of the needle beyond the plane of the oblique lower end of the needle guard, and releasable detent means for holding said frame member and syringe retracted against the action of said means with the point of the needle disposed above the oblique lower end of the needle guard.

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