

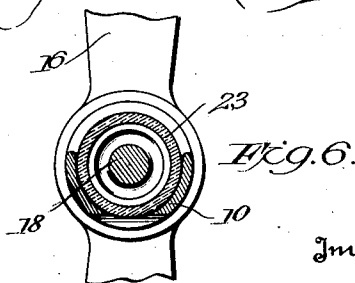
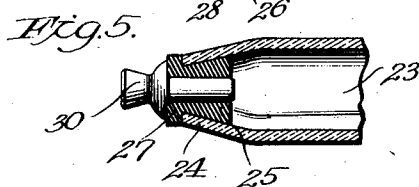
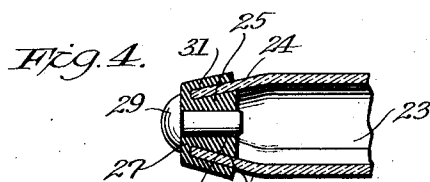
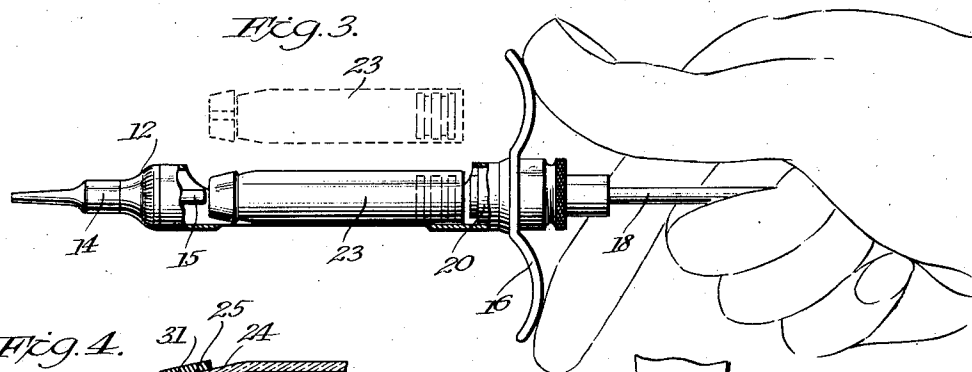
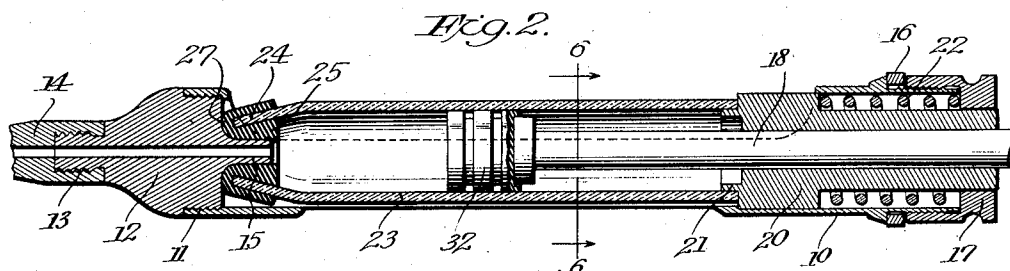
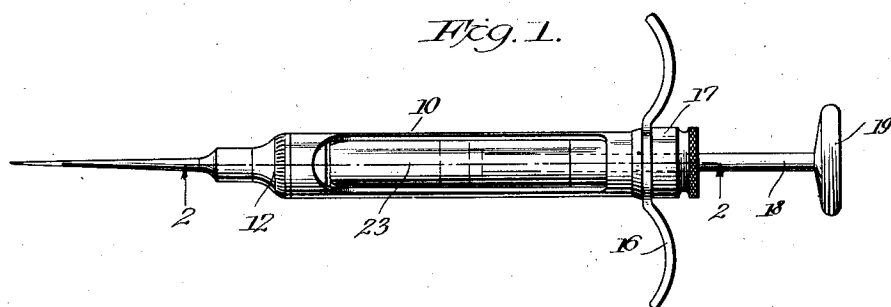
Aug. 11, 1931.

W. H. H. BIXLER

1,818,670

HYPODERMIC EQUIPMENT

Filed Sept. 24, 1929



Inventor

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UNITED STATES PATENT OFFICE

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HYPODERMIC EQUIPMENT

Application filed September 24, 1929. Serial No. 394,843.

This invention relates to improvements in hypodermic equipment and is of particular value in connection with syringe apparatus designed for use with factory-filled or pre-

5 loaded medicament cartridges or ampoules containing the hypodermic solution or fluid.

The principal aims and advantages of the invention are generally to improve hypodermic equipment of this character, to provide

10 an arrangement for obtaining and maintaining a high degree of asepsis in the use of hypodermic solution, to provide apparatus which may be manipulated easily and used safely and conveniently, and provide an ar-

15 rangement which is susceptible of economy in manufacture as compared with existing devices.

Illustrative of one embodiment of the invention, reference may be had to the following detailed description of the accompanying drawings wherein

20 Fig. 1 is a side elevation of a complete syringe with the cartridge or ampoule positioned therein;

25 Fig. 2 is an enlarged longitudinal, sectional view through the syringe shown in Fig. 1;

Fig. 3 is a view similar to Fig. 1 illustrating the manner of inserting the cartridge or ampoule in the syringe;

30 Fig. 4 is a detailed fragmental sectional view of a medicament cartridge or ampoule and its closure;

Fig. 5 is a similar view of a modified form thereof; and

35 Fig. 6 is a transverse sectional view taken on the line 6—6 of Fig. 2.

In the illustrated embodiment of the invention as shown in the drawings the syringe

40 comprises a body member of suitable design and construction adaptable for the insertion and use of pre-loaded medicament containing cartridges or ampoules, but is preferably formed of an opensided cylindrical barrel 10

45 threaded at one end as at 11 to receive a needle connection 12 having an apertured extension 13 for receiving a needle 14 of standard construction. The connection 12 also is provided with a rearwardly extending conduit or nip-

50 ple 15 adapted to project within the forward

end of the cartridge or ampoule when the latter is positioned in the syringe ready for use to afford a free passage of fluid from the cartridge to the needle.

The rearward end of the syringe barrel 10 55 is suitably shaped to receive loosely a finger grip bar 16 and is threaded to receive a retainer or cap member 17 through which is slidably mounted the plunger rod 18 provided at its rearward end with the usual handle or thumb piece 19. Surrounding the plunger rod 18 and slidably mounted within the rearward end of the barrel 10 is a sleeve member or ampoule follower 20 having its forward end shouldered to provide a projecting portion 21 adapted to fit within the rear open end 60 of the cartridge or ampoule and align the cartridge within the barrel of the syringe. The rear portion of the sleeve 20 is reduced so as to accommodate a spring 22 between a shoulder thereof and the retainer cap 17 so 65 that the sleeve is resiliently pressed against the cartridge holding the forward end firmly and resiliently against the needle connecting member 12. It will be observed that the sleeve 20 is slidably and resiliently mounted 70 within the barrel of the syringe and may be retracted to permit the insertion of a cartridge by means of a shoulder portion on the forward end of the plunger actuating rod 18 which is seated in a countersunk recess in the forward end of the sleeve (see Figs. 2 and 3).

The cartridges or ampoules according to my invention (see Figs. 4 and 5) are formed of a substantially cylindrical tube or container 23 which may be of glass or other suitable material and are preferably of reduced cross section at the forward or discharge end 24 thereof, as by being tapered; said discharge end adapted to be closed by means of a closure member 25 of rubber or suitable resilient-like material positioned within the reduced or tapered end of the container. The plug member or closure 25 is preferably formed with a tapered body portion 26 adapted to be positioned within the tapered end walls of the container and with a laterally projecting flanged end 27 adapted to cover the end of the container, thus to cushion the cartridge against the needle connection 12 when the 100

cartridge is in place in the syringe. The closure or plug member 25 is preferably formed with a longitudinal bore 28 adapted to receive the rearwardly extending nipple 15 of the needle connection when the cartridge is in operative position in the syringe or to receive a plug member 29 of glass or suitable material to effectively seal the forward end of the cartridge when it is filled with a hypodermic solution at the factory. It will be observed that the construction described comprises means to prevent inward displacement of the resilient closure 25 when the pin or plug member 29 or the nipple member 15 is being entered into its preformed aperture; or outward displacement thereof during the withdrawal of such members therefrom; such means being constituted, in the embodiment shown, by the flanged or equivalent formation of the portion 27 of the resilient closure, and the frusto-conical or similar cooperating formation of the main portion thereof and of the internal walls of the body portion 24. Advantageously the plug 29 may be formed with a handle portion 30 to facilitate ready removal of the plug from the closure 25 (see Fig. 5).

The resilient closure member 25 may be formed with a skirt portion 31 attached to the laterally extending flange 27 and adapted to be folded back on the outside of the tapered end of the cartridge (see Fig. 4) in order better to cushion the cartridge in the syringe and prevent breakage of the frangible body thereof, although in some instances this skirt portion 31 may be omitted, the cartridge being cushioned by the projecting flange 27 (see Fig. 5).

The medicament or hypodermic solution is maintained sealed within the body of the cartridge by means of a slidable closure or plug member 32 in the rear end thereof which serves as a piston for the expulsion of the fluid from the cartridge through the needle of the syringe when in use as is well understood in the art.

When it is desired to insert the pre-loaded cartridge in the syringe, the sleeve 20 is retracted by withdrawal of the plunger rod 18 against the tension of the spring 22 and the cartridge or ampoule is placed in the cylindrical barrel of the syringe through the side opening thereof, the plug member 29 having first been removed from the discharge end.

When the sleeve is fully retracted, the cartridge may be inserted in the barrel with its axis parallel to the axis of the barrel (see Fig. 3) and upon releasing the tension on the sleeve 20, the entire cartridge is properly positioned in the syringe ready for use. The retraction of the sleeve member is conveniently accomplished by grasping the handle or thumb piece 19 between the palm of the hand and the second finger and with the thumb and index finger against the bar 16,

retracting the plunger rod 18 and sleeve 20 (see Fig. 3). On releasing the compression of the spring, the sleeve 20 will be forced forwardly positioning the ampoule centrally within the syringe barrel because of the shoulder contact 21 between the sleeve and the interior of the rear end of the cartridge (see Fig. 2). This forward movement of the sleeve forces the cartridge forwardly so that the aperture in the forward closure 25 is positioned around the rearwardly extending nipple 15 of the needle connection 12 and it will be seen that a tight seal is thus effected around the nipple by reason of the resilient closure 25. When the proper needle is placed upon the forward end of the needle connection 12, the syringe is ready for use and the contents of the cartridge may be expelled through the needle by pressure on the plunger rod which in turn forces the rear plug member forwardly through the body of the cartridge.

It will be observed that leakage of the contents of the cartridge is prevented by reason of the tapered body of the cartridge closure member within the restricted or discharge end of the cartridge so that pressure exerted upon the contents of the cartridge will force the side walls of the body of the closure tightly against the inner side walls of the cartridge. Further, it will be observed that the cartridge is cushioned when placed within the syringe, the forward end thereof being protected against the rigid metal of the container and the needle connection 12 by means of the flange and/or the skirt member as a part of the closure so that in use my improved equipment is capable of withstanding extremely heavy pressures exerted upon the fluid without liability of breakage of the cartridge or leakage of the fluid.

The advantages of the invention reside principally in the high degree of asepsis maintained by reason of the novel construction of the ampoule which may be maintained sterile without liability of contamination of the hypodermic solution which is liable in existing devices where the closure member must be punctured by the needle. The equipment further provides for the ready interchange of needles during the administration of a single solution. The novel means for positioning the cartridge in the barrel of the syringe and maintaining it in proper alignment with respect to the needle and plunger prevents breakage of the glass body of the ampoule. Furthermore, the ability to position the cartridge in and remove it from the barrel of the syringe in a parallel position, increases the efficiency and convenience in handling the equipment.

Obviously my invention is not restricted to the details shown and described which are merely intended as illustrative of my invention.

I claim:

1. A side-loading syringe of the removable cartridge-ampoule type comprising, in combination, a syringe body provided with a side opening adapted for the insertion and withdrawal of a cartridge-ampoule therethrough, an apertured needle-connection at one end of movable cartridge ampoule comprising a said body, and a spring-pressed retractable ampoule-follower at the other end thereof, said apertured needle-connection embodying an inwardly projecting nipple-member, a removable cartridge ampoule comprising a glass body having a piston member movable from the rear-end toward the forward end thereof and having a resilient closure member in the forward end thereof provided with a pre-formed aperture extending therethrough adapted to receive and closely embrace said nipple-member, said ampoule being of less overall length than the space between the inner end of said nipple-member and the ampoule-follower when the latter is retracted, whereby upon retraction of said follower-member an ampoule can be dropped from the side into said body without engagement over said nipple and thereafter be engaged therewith by movement of said follower, and means operable through said follower for moving said piston member of said cartridge-ampoule.

2. A side-loading syringe of the removable cartridge-ampoule type comprising, in combination, a syringe body provided with a side opening adapted for the insertion and withdrawal of a cartridge-ampoule therethrough, an apertured needle-connection at one end of said body, and a retractable ampoule-follower at the other end thereof, said apertured needle-connection embodying an inwardly projecting nipple-member, a removable cartridge ampoule comprising a glass body having a piston member movable from the rear-end toward the forward end thereof and having a resilient closure member in the forward end thereof provided with a pre-formed aperture extending therethrough adapted to receive and closely embrace said nipple-member or a closure pin and further provided with means for resisting inward displacement of said resilient closure member when said nipple-member or said pin is being entered into said preformed aperture, said ampoule being of less overall length than the space between the inner end of said nipple-member and the ampoule-follower when the latter is retracted, whereby upon retraction of said follower-member an ampoule can be dropped from the side into said body without engagement over said nipple and thereafter be engaged therewith by movement of said follower, and means operable through said follower for moving said piston member of said cartridge-ampoule.

3. A side-loading syringe of the removable cartridge-ampoule type comprising, in combination, a syringe body provided with a side opening adapted for the insertion and withdrawal of a cartridge-ampoule therethrough, an apertured needle-connection at one end of said body, and a retractable ampoule-follower at the other end thereof, said apertured needle-connection embodying an inwardly projecting nipple-member, a removable cartridge ampoule comprising a glass body having a piston member movable from the rear-end toward the forward end thereof and having a resilient closure member in the forward end thereof provided with a preformed aperture extending therethrough adapted to receive and be expanded by and closely embrace said nipple-member, said resilient closure member comprising an inwardly flaring frusto-conical section with an outwardly extending flange at its smaller base and said glass body having an internally outwardly narrowing frusto-conical section engaged therewith constituting means to avoid displacement of said closure member, and said ampoule being of less overall length than the space between the inner end of said nipple-member and the ampoule-follower when the latter is retracted, whereby upon retraction of said follower-member an ampoule can be dropped from the side into said body without engagement over said nipple and thereafter be engaged therewith by movement of said follower, and means operable through said follower for moving said piston member of said cartridge-ampoule.

4. A cartridge ampoule comprising a glass body interiorly cylindrical throughout the greater part of its length and provided with a section interiorly substantially frusto-conical with its smaller base constituting an opening through the forward end of the body; a piston member interiorly movable from the rear-end toward the forward end of said body; and a closure for the forward end of said body comprising a resilient member consisting of a frusto-conical portion fitted to said interiorly frusto-conical body section and a flange portion extending outwardly about the smaller base of said frusto-conical portion for abutting the forward end of said glass body surrounding the opening therethrough, said resilient member having a substantially axial preformed aperture extending therethrough adapted to receive, tightly embrace and be expanded by either a closing-pin or a nipple-member associated with a hypodermic needle holder, said flange portions constituting both means to prevent said resilient member from being driven into the glass body when such closing-pin or nipple-member is being entered into said preformed aperture and means for abutting a supporting face when the ampoule is mounted in a discharging device to provide cushioning.

ioned support therefor, and said inwardly expanding frusto-conical portion constituting means compressible against such nipple member and the frusto-conical section of said body under the influence of internal pressure in the ampoule when the same is being discharged to tightly seal the forward end thereof as well as means for preventing pulling out of said resilient member from said body when such closing-pin or nipple-member is being withdrawn from said preformed aperture.

5. A cartridge ampoule comprising a glass body interiorly cylindrical throughout the greater part of its length and provided with a section interiorly substantially frusto-conical with its smaller base constituting an opening through the forward end of the body; a piston member interiorly movable from the rear-end toward the forward end of said body; and a closure for the forward end of said body comprising a resilient member consisting of a frusto-conical portion fitted to said interiorly frusto-conical body section and a flange portion extending outwardly about the smaller base of said frusto-conical portion for abutting the forward end of said glass body surrounding the opening therethrough, said resilient member having a substantially axial preformed aperture extending therethrough adapted to receive, tightly embrace and be expanded by either a closing-pin or a nipple-member associated with a hypodermic needle holder, said flange portion constituting means to prevent said resilient member from being driven into the glass body when such closing-pin or nipple-member is being entered into said preformed aperture, and said inwardly expanding frusto-conical portion constituting means compressible against such nipple member and the frusto-conical section of said body under the influence of internal pressure in the ampoule when the same is being discharged to tightly seal the forward end thereof as well as means for preventing pulling out of said resilient member from said body when such closing-pin or nipple-member is being withdrawn from said preformed aperture.

6. A cartridge ampoule comprising a glass body interiorly cylindrical throughout the greater part of its length and provided with a section interiorly substantially frusto-conical with its smaller base constituting an opening through the forward end of the body; a piston member interiorly movable from the rear-end toward the forward end of said body; and a closure for the forward end of said body comprising a resilient member consisting of a frusto-conical portion fitted to said interiorly frusto-conical body section and a flange portion extending outwardly about the smaller base of said frusto-conical portion for abutting the forward end of said glass body surrounding the opening

therethrough, said resilient member having a substantially axial preformed aperture extending therethrough adapted to receive, tightly embrace and be expanded by either a closing-pin or a nipple-member associated with a hypodermic needle holder, said flange portion constituting both means to prevent said resilient member from being driven into the glass body when such closing-pin or nipple-member is being entered into said preformed aperture and means for abutting a supporting face when the ampoule is mounted in a discharging device to provide cushioned support therefor, and said inwardly expanding frusto-conical portion constituting means compressible against such nipple member and the frusto-conical section of said body under the influence of internal pressure in the ampoule when the same is being discharged to tightly seal the forward end thereof.

In testimony whereof, I have signed my name to this specification.

WILLIAM H. H. BIXLER.

CERTIFICATE OF CORRECTION.**Patent No. 1,818,670.****Granted August 11, 1931, to****WILLIAM H. H. BIXLER.**

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 106, for the word "field" read fluid; page 3, line 8, claim 1, strike out the words "movable cartridge ampoule comprising a"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3rd day of November, A. D. 1931.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)