

June 5, 1934.

G. N. HEIN

1,961,490

SYRINGE EQUIPMENT

Filed Jan. 20, 1931

Fig. 4.



Fig. 1.

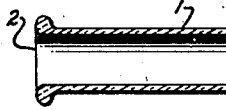


Fig. 2. Fig. 3.

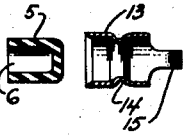


Fig. 5.

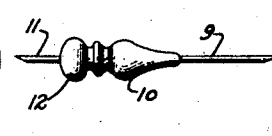


Fig. 6.

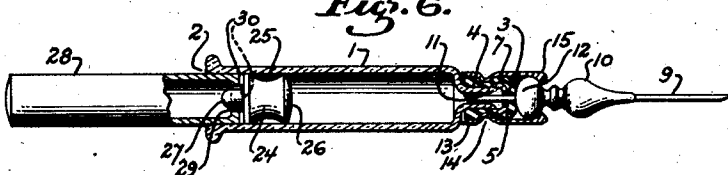


Fig. 7.

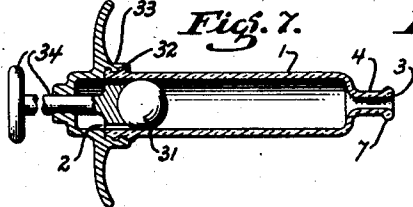


Fig. 8.



Fig. 9.



Fig. 10.

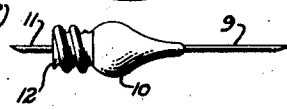


Fig. 11.

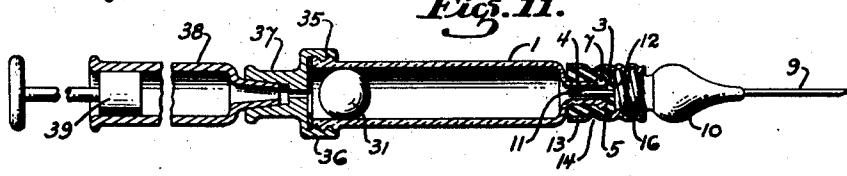


Fig. 12.

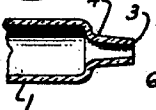


Fig. 13.

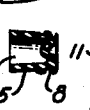


Fig. 14.

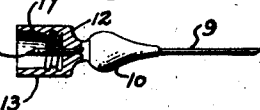


Fig. 15.

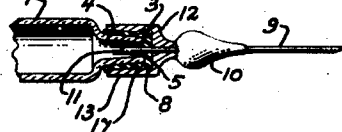


Fig. 16.

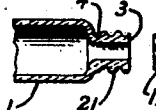


Fig. 17.

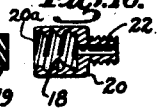


Fig. 19.



Fig. 20.

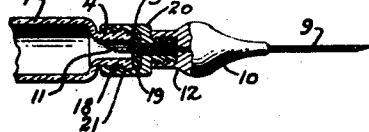


Fig. 21.

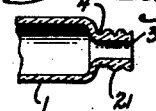


Fig. 22.

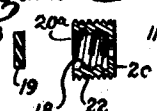


Fig. 23.

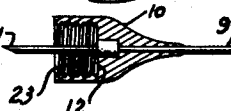
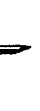


Fig. 24.



INVENTOR.
George N. Hein.
BY *J. S. Graham*
ATTORNEY

UNITED STATES PATENT OFFICE

1,961,490

SYRINGE EQUIPMENT

George N. Hein, San Francisco, Calif.

Application January 20, 1931, Serial No. 509,957

2 Claims. (Cl. 128—218)

This invention relates to syringe equipment and particularly to a type of syringe equipment wherein the material to be ejected is sealed in a vial. Such equipment is very desirable in the dental and medical professions, and is adapted for packaging of a number of the syringe vials in a case, so that each vial may contain a desired quantity of fluid which will be maintained against impurities, and be ready of access in a sterilized condition when used.

Objects of the invention are to provide a syringe vial economical in production so that it may be discarded when emptied, and which is adaptable for packaging of a number of individual units in a case or container; to provide for maintaining the contents of the vials against impurities until used; to provide a vial to which an injection needle may be easily and positively attached without exposing the contents of the vial to the atmosphere or necessitating transfer of contents to separate syringe barrels which may not have been adequately sterilized; to provide a sealed syringe vial which requires no fracturing of glass body; to provide a positively mounted and self retaining closure member for a syringe vial, which may be punctured by a tubular needle mounted in association with the discharge end of the vial; to provide a packing gland against leakage; and generally to improve upon syringe equipment.

With the above mentioned and other objects in view, the invention consists in the novel construction and combination of parts hereinafter described, illustrated in the accompanying drawing and pointed out in the claims hereto appended; it being understood that various changes in the form, proportion, size and minor details of construction within the scope of the claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

To more clearly comprehend the invention, reference is directed to the accompanying drawing, wherein—

Fig. 1 is a longitudinal section of tubular body.

Fig. 2 is a longitudinal section of closure member.

Fig. 3 is a longitudinal section of ferrule member, with spring clips.

Fig. 4 is a longitudinal section of closure member for filling end.

Fig. 5 is a longitudinal side view of needle base and cannula, for use with the ferrule of Fig. 3.

Fig. 6 is a longitudinal view, partly in section,

of the assembly of Figs. 1 to 5 inclusive, and including a plunger member.

Fig. 7 is a longitudinal section of modified form of tubular body.

Fig. 8 is a longitudinal section of modified form of the closure member of Fig. 2, for discharge end.

Fig. 9 is a longitudinal section of modified form of ferrule.

Fig. 10 is a side view of threaded needle base and cannula for use with the ferrule of Fig. 9.

Fig. 11 is a longitudinal section of an assembly in syringe forming relation with an adapter socket for reception of a standard syringe.

Fig. 12 is a longitudinal broken section of a modified form of tubular body, showing discharge end only.

Fig. 13 is a longitudinal section of modified form of closure.

Fig. 14 is a longitudinal view, partly in section, of needle base and cannula, adapted for use with the closure member of Fig. 13.

Fig. 15 is a longitudinal view, partly in section, of an assembly of devices in Figs. 12 to 14 inclusive.

Fig. 16 is a longitudinal section of modified form of discharge end of tubular body.

Fig. 17 is a cross section of closure member,

Fig. 18 is a longitudinal section of modified form of ferrule.

Fig. 19 is a longitudinal side view of needle base and cannula, partly in section.

Fig. 20 is a longitudinal side view, partly in section, of an assembly of devices of Figs. 16 to 19 inclusive.

Fig. 21 is a longitudinal section of discharge end of a form of tubular body for reception in the ferrule of Fig. 23.

Fig. 22 is a cross section of closure member.

Fig. 23 is a longitudinal cross section of ferrule member.

Fig. 24 is a longitudinal cross section of needle base and cannula adapted to use with the devices of Figs. 21 to 23 inclusive.

Referring to the drawing, wherein like characters of reference designate corresponding parts:— A vial is provided, preferably circular in transverse section, in which 1 is an elongated tubular body of impervious material, preferably of glass, hard rubber or the like, open at a filling end 2 and at a discharge end 3. The portion of the body 4 adjacent the discharge end preferably provides a neck of smaller diameter than the remainder of the body, so that there may be conveniently mounted thereon, so as to close the opening

of said discharge end, a puncturable closure member 5, which closes the discharge opening and which is preferably of resilient material, such as elastic rubber, so that it serves not only as a closure member to seal the end of the vial but also serves as packing gland for an injection needle inserted therethrough. The resilient closure member 5 is of suitable type and shape to close the opening 3, and may assume cup-like form, as shown in Figs. 2, 8 and 13, or disc form, as in Figs. 17 and 22.

While the closure member 5 is of the cup-like form, it is preferred that the diameter of the recess 6 therein should be a trifle less than the diameter of the outer wall of the neck so that the side walls of the cup will grip by their resiliency the outer wall of the neck when mounted thereon. It is also preferred that the inner wall of the recess 6 shall be straight axially longitudinally so as to avoid expense in forming an internal annular recess therein, and also for the purpose of making it necessary to stretch the elastic material of the closure member 5 over the bead 7, where the vial of Fig. 1 is used, so that the expanding of the closure when the bead 7 is fully seated will exert a resilient contraction of the wall against the neck 4 of the vial. If desired, the cup may be sealed to the neck by wax or cement to insure its tight adherence, and may have an arcuate internal end wall, as in Figs. 8 and 13, providing resilient pressure upon the open discharge end of the vial to more securely close same.

From practical experience, it has been demonstrated that unless the closure member at the discharge end and the injection needle have means whereby they are positively attached to or in relation to the syringe vial, they are liable to be forced from their respective mountings under the pressure necessary to an injection or a discharge of the vial contents. Therefore, the discharge end of the vial is preferably adapted for positively and securely mounting the puncturable closure member 5, and may also be provided to positively engage a tubular injection needle. For this purpose the discharge end of the vial may be provided with an annular bead 7 extending radially outwardly relative to the longitudinal axis of the vial, externally of the neck at its discharge end portion, so that when the resilient cup-like closure 5 is mounted thereover, the cup by its resiliency will assume externally the form of said bead, as shown in Figs. 6 and 11; or said annular bead may be provided externally circumferentially of the closed end of the cup-like member 5, as shown in Figs. 13 and 15, in which case it may be threaded externally, as at 8. A tubular needle having a discharge end 9 is adapted to be mounted at the discharge end of the vial, and is provided with any suitable type of needle base 10, having the cannula 11 extending therethrough and beyond the butt 12 of the base, so as to provide a point for puncturing the resilient closure member 5.

The means of attachment of the needle to the vial may assume various forms; preferred forms of which are illustrated in the accompanying drawing. In the assembly of Figs. 6 and 11, a ferrule 13 is mounted longitudinally circumferential of the resilient closure member, the ferrule being provided with an annular groove 14 forming an inwardly extending projection which, by virtue of the resiliency of the cup-like closure 5, slides over the annular bead thereof and grips the closure member rearwardly of the bead. The

ferrule is provided at its unmounted end with means to engage the needle base, and is exemplified in Figs. 3 and 6 by spring metal tongues 15 which spread sufficiently to permit the needle base to pass therebetween; and as shown in Figs. 9 and 11 consists of threads 16 adapted to engage complementary threads of the needle base; while in Figs. 14 and 15 the ferrule 13 is made integral with the needle base and is provided with an internal thread 17 adapted to engage the thread 8 of the closure and thereby positively and securely mount the needle base.

In Figs. 17 and 22 are shown modifications of resilient closure members consisting of discs 19 adapted to seat within the recess 20a of bridged collars 20 which are internally threaded, as at 18, to engage complementary external threads 21 on the neck portion of the vial, the bridged collars being provided with external threads 22 adapted to be engaged by threaded sockets 23 in the needle bases, shown in Figs. 19 and 24, respectively.

It will be noted that in each instance the puncturable closure member is tightly secured to, and is adapted to tightly seal the discharge end of the vial, and when punctured by the cannula 11 is adapted to form a gland or washer to provide a tight leaf-proof joint between the vial and needle base.

The opposite open end 2 of the vial is closed by a closure member 24, snugly and slidably fitting the internal walls of the tube 1, and preferably being of resilient material and preferably formed with circumferentially concaved side walls 25, so as to reduce the frictional contact with the walls of the vial, and provided with a convex end 26 to more completely expel the contents of the vial. The closure 24 serves as a piston head and preferably is provided centrally of its outer end with a projection 27 adapted to be engaged by plunger 28 which is slidable within said tubular body, and is provided with an opening 29 at one end adapted to receive said closure projection 27, so that the plunger and closure member are relatively guided in aligned reciprocation.

Since it may be desirable to seal the closure member 24 within the vial by suitable moisture-proof wax, or in case said closure member adheres to the side walls, it is advantageous to provide teeth 30 at the end which engages the closure 24, so that any seal existing between the piston closure member and the walls of the vial may be broken by rotation of the cork axially of the vial, to prevent any sudden and unintentional discharge of the vial contents in operation of the syringe.

Fig. 7 and Fig. 11 show a modified form of closure for the filling end 2, consisting preferably of a spheroidal member 31 of elastic or compressible material, such as soft vulcanized rubber, slidable within body 1, and slightly deformable so as to tightly seal said open end. The container vial 1, as shown in Fig. 7, may be formed at its open end 2, preferably threaded as at 32, so as to mount thereat a support 33 for a plunger member 34, or as shown in Fig. 11, may mount, as by threads 35, a socket 36 having a tubular neck 37, the neck being adapted to receive within its tubular portion the discharge end of a syringe 38 of standard and well known type, so that the vial may be used with standard ejection equipment without transference of the contents, in which case the standard syringe may be filled with water or air which serve as a piston

or plunger to actuate the closure member 31 upon depression of the plunger 39. The type of closure member 24 shown in Fig. 4, is equally adaptable to use in the structures shown in Figs. 7 and 11 and vice versa.

It is to be understood that in Figs. 12, 16 and 21 an end portion only is shown of the vial, and that the opposite end portion of the vial may assume forms similar or equivalent to the end portions of the figures in which the entire length of vial is shown.

Having thus described the invention what is claimed as new and desired to be protected by Letters Patent is:—

1. The combination of a syringe vial adapted to contain a medicament, said vial adapted to be discarded when emptied, the needle end of said vial terminating in a reduced portion, said reduced portion terminating in an annular outwardly extending bead portion, a cup shaped puncturable closure member disposed on said annular bead and reduced portion, of an injection needle, and means for holding said needle in puncturable relation with said closure member, said means comprising a ferrule, said ferrule being provided at substantially an intermediate point with an annular, radially, inwardly extending bead, said bead adapted to engage and cooperate with said outwardly extending bead for positively holding

said closure member in fixed relation with said reduced portion, the outermost end of said ferrule being provided with means whereby the needle may be snapped into said ferrule, said means comprising a resilient means.

2. In a syringe structure, the combination of a vial adapted to contain a medicament, said vial normally having a filling and discharge end, a closure member for said filling end, the discharge end of said vial terminating in a reduced portion, the latter terminating in an outwardly extending annular flange forming a bead and a puncturable closure member disposed over said bead and said reduced portion, of an injection needle having a base portion, and means for flexibly connecting said needle to said vial, said means comprising a ferrule, the latter being provided with an inwardly extending annular bead, the last said bead adapted to engage the first said bead for positively holding said puncturable member in rigid fixed relation with said discharge end and for fastening said ferrule to said vial, the outermost end of said ferrule terminating in diametrically oppositely disposed tongues, the outermost end of said tongues terminating inwardly, said tongues adapted to grasp and hold said base portion of said needle in operable fixed relation with said puncturable member.

GEORGE N. HEIN.