Jan. 19, 1926. 1,569,961

M. F. BAUCHERT

HYPODERMIC SYRINGE

Filed Oct. 8, 1919

Fig. 1.

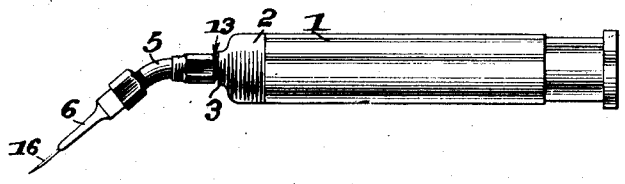


Fig. 2.

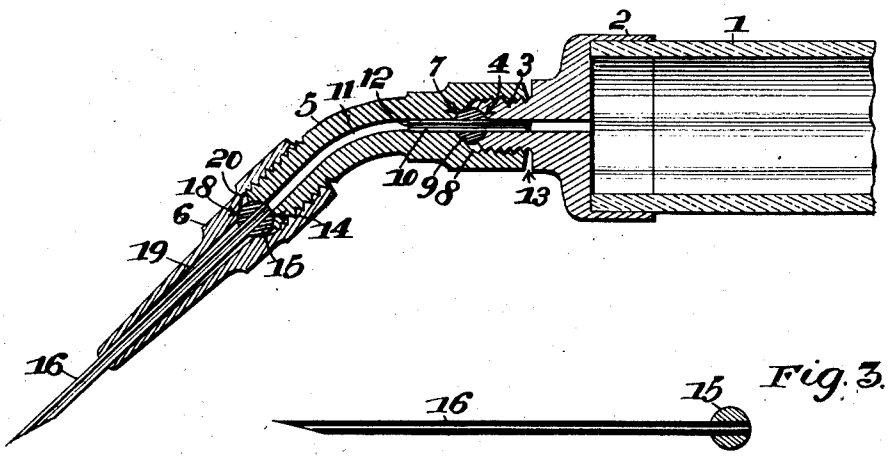


Fig. 3.

Fig. 4.

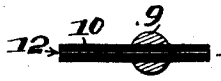


Fig. 5.

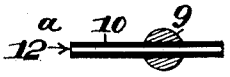


Fig. 6.

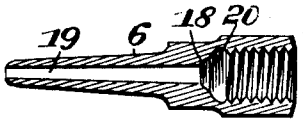
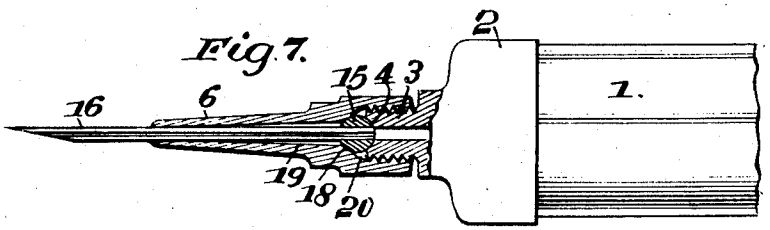


Fig. 7.



WITNESSES

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UNITED STATES PATENT OFFICE.

MAHLON FLOYD BAUCHERT, OF EL PASO, TEXAS.

HYPODERMIC SYRINGE.

Application filed October 8, 1919. Serial No. 329,251.

To all whom it may concern:

Be it known that I, MAHLON FLOYD BAUCHERT, a citizen of the United States, and a resident of El Paso, in the county of El Paso and State of Texas, have made certain new and useful Improvements in Hypodermic Syringes, of which the following is a specification.

My invention relates to improvements in hypodermic syringes, and it consists in the constructions, combinations and arrangements herein described and claimed.

One of the foremost objects of my invention is to provide in a hypodermic syringe, a removable needle having a ball head of any suitable fusing metal at a high temperature, enabling the sterilization of the needle in a flame without danger of injury to the needle.

A further object of the invention is to provide a hypodermic needle which is finished flush with an attached metallic ball, the opening at this point being of the same size as the bore of the needle, thereby avoiding the possibility of the formation of a depression into which foreign particles can be forced to obstruct the bore and render the needle useless.

A further object of the invention is to provide a hypodermic needle with a ball head of hard metal, this head forming one member of a fluid tight joint when the associated parts of the syringe are assembled.

A further object of the invention is to provide a hypodermic needle including various parts arranged to be assembled, said parts having ball-sockets to cooperate either with the ball head of the improved needle, or the ball head of a flow regulator described below.

A further object of the invention is to provide in a hypodermic needle, improved means for regulating the fluid flow, said means comprising interchangeable tubings of variously sized bores.

A further object of the invention is to provide an improved union for the various syringe parts of a hypodermic needle, said union being made with bores of various sizes so as to regulate the fluid flow according to the particular size of bore selected.

A further object of the invention is to provide an improved ball union and flow regulator, as designated above, which permits the elimination of washers, soft metallic rings, etc., for making tight joints in hypodermic syringes.

A further object of the invention is to provide in a hypodermic syringe, various interchangeably connectable parts having ball-sockets to cooperate either with the ball end of an improved needle or union, or all in combination, to make fluid-tight joints.

Other objects and advantages will appear in the following specification, reference being had to the accompanying drawings, in which:—

Figure 1 is a side elevation of a hypodermic syringe constructed in accordance with my invention, the usual piston being omitted,

Figure 2 is a greatly enlarged longitudinal section of the needle end of the syringe, showing how fluid-tight joints are made by means of the improved ball-sockets and ball heads of the needle and union,

Figure 3 is a detail longitudinal section of the improved hypodermic needle,

Figure 4 is a sectional view of one form of union, showing a fine bore in the tube,

Figure 5 is a sectional view of a union, showing a larger bore in the tube,

Figure 6 is a detail sectional view of the improved nozzle, and

Figure 7 is a detail sectional view showing the nozzle and needle connected directly to the nipple of the syringe.

In carrying out my invention I provide a glass syringe barrel 1, which is of any ordinary design and in which a piston operates, this piston being omitted, however, from the drawings. Affixed to one end of the glass barrel 1 is a metallic cap or ferrule 2, which has a screw threaded nipple 3 terminating in a ball-socket 4.

Either the curved extension 5 or the nozzle 6 can be screwed on the nipple 3, both applications being illustrated respectively in Figures 2 and 7. The extension 5 has a complementary ball-socket 7 which merges at 8 with the internal screw threads. The ball 9 of an improved union is tightly clamped between the complementary ball-sockets 4 and 7 so as to prevent the escape of fluid around the joint.

This union, besides enabling the making of a fluid-tight joint, also constitutes a fluid flow regulator. To this end, the union includes a short section of tube 10 which extends at each side of the ball and fits in the bore 11 of the extension 5 and the bore of the nipple 3 when the ball 9 of the union is seated in the ball-socket 7.

In Figure 4, the bore 12 of the tube 10 is very fine, consequently reducing the flow of fluid to a very small amount. In Figure 5 the bore 12ª of the tube 10 is of relatively great diameter, thereby permitting a far greater quantity of fluid to flow through the hypodermic needle. The spaces 8 shown above and below the ball 9 of the improved union in Figure 2, designate an annular chamber left around the ball 9 when the parts are screwed in place.

Obviously the extension 5 can be screwed down on the nipple 3 and the ball 9 as hard as the strength of the fingers of the operator will permit. Even an ordinary effort is sufficient to clamp the parts so tightly together that the escape of fluid around the joints is absolutely prevented. By means of this arrangement, no washers of any kind are required to be used in the space 13 between the end of the extension 5 and the base of the nipple 3. This is so because the improved union and flow regulator makes the use of any kind of washer unnecessary.

The other end of the extension 5 has a ball-socket 14, precisely like the socket 7 just described, for the purpose of receiving the ball 15 of the hypodermic needle 16 when the nozzle 6, having a complementary ball-socket 18, is screwed in place. The bore 19 of the nozzle 6, is tapering as shown, the large end of the bore terminating at the ball-socket 18, which in turn merges at 20 with the internal threads. When the parts are screwed together, the portion 20 forms an annular space with the end of the extension 5, indicating that the nozzle and extension can be screwed together very tightly and bind so hard on the ball 15 that no fluid can escape around the joints.

Such metals as gold, silver, platinum, iridium, or their alloys, can be used for the ball 15 of the needle 16 and the ball 9 of the union 10. Gold or silver is preferably used because when these metals are employed the hypodermic needle can be sterilized in an alcohol or other flame without danger of the ball fusing and thus rendering the needle useless. It is thus to be observed that one of the principal objects of the invention resides in the employment of a difficultly fusible metal ball on the end of the hypodermic needle which permits flame sterilization and makes a very efficient joint in that the parts can be screwed down very tightly on the ball without danger of mutilating it.

Foreign particles are prevented from being forced into the bore of the needle 16, because the tubing of the needle is brought through and faced flush with the ball 15, as shown in Figure 3. More correctly speaking, the ball 15 is swaged, or otherwise affixed, to the blunt end of the needle. It is thus clearly shown that the bore of the needle is continuous from end to end, terminating at the base of the ball 15, and therefore, it naturally follows that there is no room for the accumulation of foreign particles at the mouth of the bore to be forced in by the imposed fluid pressure.

It should also be stated that the needle is preferably made of iridio-platinum, although it can be made of steel if desired. When made of iridio-platinum it can be sterilized in the flame throughout the entire length without any damage whatsoever to it, this being something impossible with any other form of needle heretofore manufactured.

The advantages may be briefly reviewed in part, by making a comparison with hypodermic needles now in popular use. There are at present certain types of removable needles on the market, all of which universally employ soft metal heads of various shapes for the purpose of making fluid-tight joints, when screwed in place.

Naturally a soft metal head is easy to become disfigured and mutilated, it not infrequently happening that the bore of the needle is entirely closed by the metal in screwing the parts together. Such a needle, namely, one with a soft metal head, cannot be sterilized in a flame, but sterilization must be effected either by means of boiling or plunging the needle in a suitable chemical. Neither of these methods is practical, because boiling takes too long and chemical sterilization also has its drawbacks.

By using an iridio-platinum hypodermic needle with a gold ball head, sterilization can be effected in a flame without danger of ruining the needle. As already pointed out above, the hard gold head of the needle forms a tight joint when the associated parts are screwed together, because these parts have a compressing action on the head, rather than a "mashing" or mutilating action thereon. The bore of the needle, which as stated above is finished flush with the outer surface of the ball 15, is therefore not to be closed up, and furthermore by reason of the fact that a depression is not likely to be formed in this gold ball by the action of screwing the nozzle and extension 5 or nipple 3 together, the possibility of foreign particles collecting at the mouth is far removed. In needles of the present type, this collection of foreign particles at the mouth of the needle bore is a serious objection.

Another advantage has been discovered in this particular kind of needle when the needle proper is made of steel. It has been found that when placing the ball end of the needle in the flame for purposes of sterilization, the temper of the needle near the ball is slightly drawn, but instead of this being a disadvantage, it is an advantage in that upon subsequently re-inserting the needle in the supporting parts, the needle is found to

be more readily adapted than before. This slight drawing of the temper appears to compensate for any slight irregularity in manufacture, so that the needle after it is once subjected to the heat of the flame in the manner stated, is found better fitted for use than before.

While the construction and arrangement of the improved hypodermic needle and syringe parts as herein described and claimed, is that of a generally preferred form, obviously modifications and changes may be made without departing from the spirit of the invention or the scope of the claims.

I claim:—

1. A hypodermic syringe including a combined coupling and flow regulating member comprising a joint-forming ball and a tubular member with a bore of predetermined diameter, extending through and beyond the ball thereby providing means for retaining the coupling in place upon separation of cooperating receiving parts and also means enabling the grasping and removal of the coupling.

2. A hypodermic syringe, comprising a ferrule having a nipple with a ball-socket, an attachable extension with a complementary ball-socket, combined coupling and flow-regulating means including a tube insertable in said bore with a passage of predetermined diameter, and a ball head seated between said sockets; a needle having a ball head, and a nozzle for the needle, with a ball-socket merging into a concavity leaving a space around the ball head when the nozzle is affixed to the extension and the ball head is bound in a complementary ball-socket in the other end of said extension.

3. A hypodermic syringe comprising a barrel having a nipple with a bore, a member adapted to be fitted upon said nipple also having a bore, and combined coupling and fluid flow regulating means comprising a ball seated between the nipple and member having a tube transfixing the ball and entering both bores, said tube having a bore of predetermined size.

4. A hypodermic syringe comprising a barrel having a nipple with a ball-socket and bore, a member adapted to be fitted upon said nipple having a complementary ball-socket and bore, and combined coupling and fluid flow regulating means comprising a ball seated in said sockets having a tube transfixing the ball and entering both bores, said tube having a bore of a predetermined size.

MAHLON FLOYD BAUCHERT.