

No. 729,011.

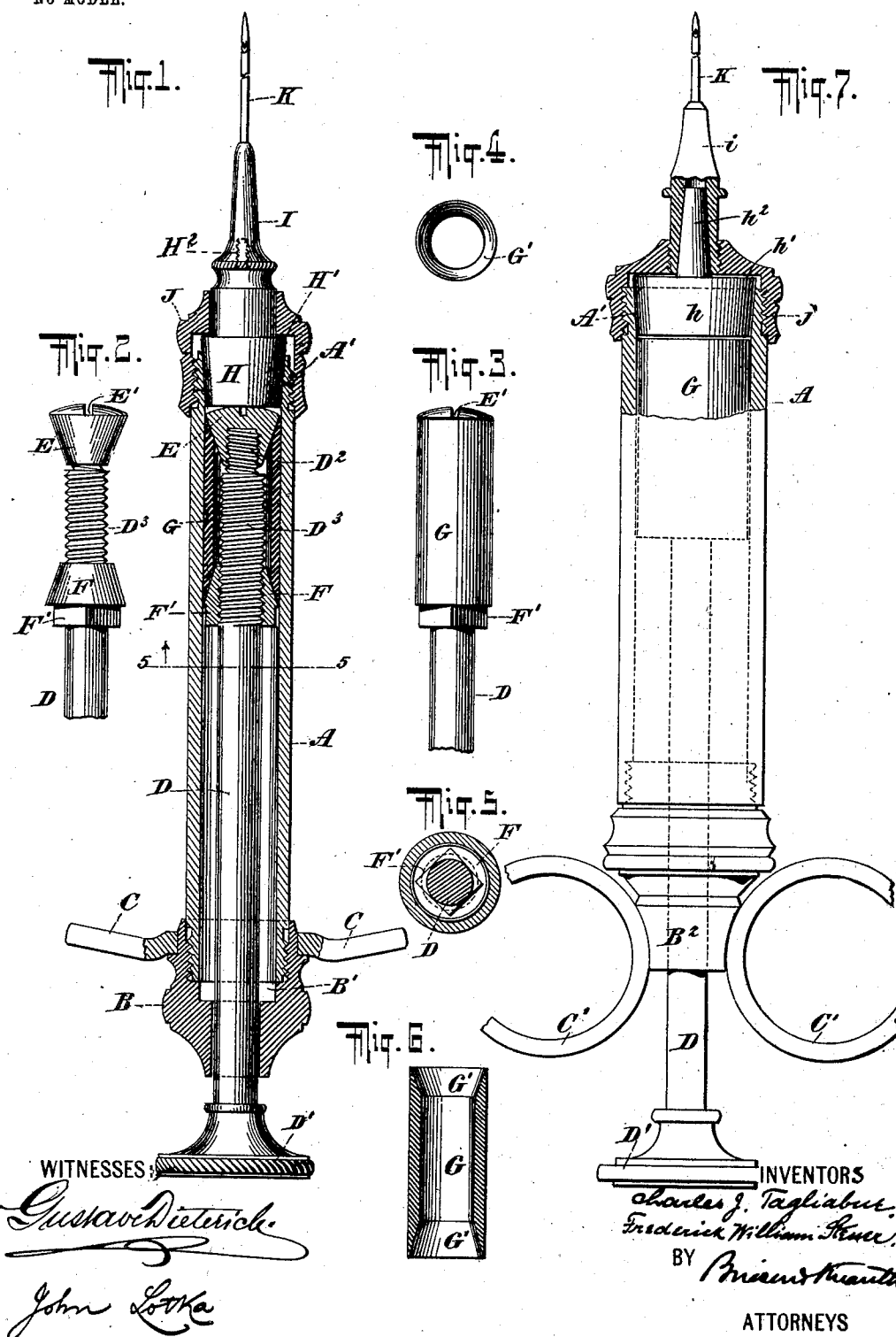
PATENTED MAY 26, 1903.

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HYPODERMIC SYRINGE.

APPLICATION FILED DEC. 9, 1901.

NO MODEL.



# UNITED STATES PATENT OFFICE.

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## HYPODERMIC SYRINGE.

SPECIFICATION forming part of Letters Patent No. 729,011, dated May 26, 1903.

Application filed December 9, 1901. Serial No. 85,127. (No model.)

*To all whom it may concern:*

Be it known that we, CHARLES J. TAGLIABUE, a citizen of the United States, and FREDERICK WILLIAM STEUER, a subject of the King of Denmark, both residing in the borough of Brooklyn, Kings county, city and State of New York, have invented certain new and useful Improvements in Hypodermic Syringes, of which the following is a specification.

Our invention relates to hypodermic syringes, and has for its object, first, to provide an improved construction for obtaining a tight joint at the delivery end of the syringe where the injection-needle is applied, and, second, to improve the piston with a view of enabling the same to be readily pressed more or less tightly against the barrel.

Our invention will be fully described hereinafter and the features of novelty pointed out in the appended claims.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a longitudinal section of one form of our improved hypodermic syringe. Fig. 2 is a detail view of part of the piston-rod and means for expanding the piston. Fig. 3 is a side view of the piston and the adjacent parts of the piston-rod. Fig. 4 is an end view of the piston. Fig. 5 is a cross-section upon line 5 5 of Fig. 1. Fig. 6 is a longitudinal section of the piston, and Fig. 7 shows another form of our invention with parts in section.

In carrying out our invention we employ a suitable barrel A, preferably cylindrical and of the same diameter throughout its length except at the delivery end, as will be more fully set forth hereinafter. At the suction end the barrel may be of any suitable construction, and, as shown in the drawings, it may be provided with a cap B, adapted to screw on the barrel, and fitted with or carrying projections C, adapted to be grasped by the operator's fingers. The cap B is perforated for the passage of the piston-rod D, having a head D' and provided at its inner end with two screw-threaded portions D<sup>2</sup> D<sup>3</sup> of opposite pitch. On these screw-threads are mounted two expanders E F, respectively, which are provided with tapering faces, their

smaller diameters facing toward each other. The expander E is screwed tightly against the end of the piston-rod, and to facilitate this the expander may be provided with a slit E'. The expander F has a polygonal or angular extension F' at its outer portion, and this angular extension is adapted to become seated in a similarly-shaped recess B' of the cap B. Thus when the piston-rod is drawn outward and the expander F by its extension F' becomes locked against turning relatively to the barrel A the rotation of the piston-rod D will cause the said rod, together with the expander E, to move slowly inward or outward, and thus the distance between the two expanders E and F may be increased or diminished without taking the instrument apart. With the inclined faces of the expanders E and F are engaged similar faces G' at the ends of a piston G, which is a thin sleeve of very hard steel, such as is known under the name of "glass-hard" steel. This material has sufficient elasticity to bulge outward when the expanders are pressed toward each other, and it will be understood that by the means hereinbefore described the pressure of the piston G against the inner wall of the barrel A may be varied at will, so as to always insure a tight joint.

The advantage of having the screw-threaded portions D<sup>2</sup> D<sup>3</sup> of the piston-rod D which engage the threads of the expanders E F of opposite pitch will be apparent upon considering the action occurring when it is desired to expand the sleeve member G of the piston. For this purpose the rod D would be turned so as to screw it outwardly in the expander F, the latter being then seated in the recess B', and therefore stationary. This movement would in consequence of the threads D<sup>2</sup> D<sup>3</sup> being of opposite directions cause the rod D to screw into the expander E, or at least give it a tendency to do so. Were the two threads of like pitch there would obviously be danger of the expanders E becoming loose and rendering the device inoperative.

The delivery end of the barrel A is made with a flaring seat A', adapted to receive a conical hollow plug H, which, as shown in Fig. 1, has a screw-stem H<sup>2</sup> to receive the needle-carrier I, or said carrier may be made in-

tegral with the plug H. A shoulder H' is formed upon the plug H, and against this shoulder bears a cap J, which screws on the barrel A. Therefore by screwing down the cap J the plug H will be pressed firmly against the seat A', and a tight joint will be obtained at this point also.

The construction shown in Fig. 7 differs from the one illustrated by Fig. 1 in that the plug h is provided with an upwardly-reduced projection h<sup>2</sup>, which fits into the needle-carrier i, which is provided at its lower end with a conical seat arranged to fit the projection h<sup>2</sup>. For the sake of clearness we have somewhat exaggerated in the drawings the taper of this projection and of the conical seat. The cap j, which, as in the construction first described, engages the shoulder h' of the plug and throws the latter against the barrel A, is provided at its center with a screw-thread adapted to receive the lower end of the needle-carrier i. It will of course be understood that in both constructions the plug H h is perforated from end to end, so that the substance to be injected may pass through the plug. In the construction represented in Fig. 7 there are two joints between contacting conical surfaces—to wit, one joint between the plug h and the seat A' and another joint between the projection h<sup>2</sup> and the interior seat on the needle-carrier i. We desire it to be understood that the needle-carrier may be formed integral with the needle K, or the needle may be attached thereto in any approved manner. Fig. 7 also shows a slightly-different form of suction-cap B<sup>2</sup> from that shown in Fig. 1 and a different arrangement of finger-holds C'.

The cap J j and the end of the barrel A, with the shoulder H' h' of the plug H h, form together a chamber which is imperforate, so that even if some of the liquid should pass the joint between the plug and the barrel it could not escape directly to the outer surface of the barrel.

All the parts of our improved syringe, or at least all that come in contact with the substance to be injected, may be metallic and are therefore not exposed to deterioration to the same extent as constructions in which rubber joints and the like are employed. An absolute tight joint may be obtained both at the piston and at the delivery end of the barrel, and the wear of the piston may be compensated for by expanding it in the manner here-

inbefore described without any necessity for taking the syringe apart.

When the needle-carrier is detachable from the plug, we secure the important advantage of being able to employ a set of different needles with the same plug. Owing to its conical shape, the plug will fit barrels of various sizes within certain limits.

Having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination of the barrel, the piston-rod mounted to turn and slide therein, said rod being provided, at different points of its length, with screw-threads of opposite pitch, expanders screwing respectively on said threaded portions of opposite pitch, an expandible member engaging said expanders and the inner wall of the barrel, and means, located in the path of one of the expanders, for holding such expander against rotation.
2. The combination of the barrel, the piston-rod mounted to move therein, two expanders mounted on said rod at different points of its length and movable one relatively to the other, said expanders being beveled or tapered toward each other, and an expandible sleeve made of elastic material and having its ends engaged with the beveled surfaces of the expanders while the body of said sleeve surrounds at a distance that portion of the piston-rod which is between the expanders, leaving the body of the sleeve free to move toward or from said rod, the outer surface of the sleeve being in engagement with the inner surface of the barrel.
3. The combination of the barrel having a beveled surface at its delivery end, the piston movable in the barrel, the perforated plug arranged to engage said beveled surface and to form a tight joint therewith, said plug being provided upon its outside with a central projection which tapers toward its free end, a cap for pressing the plug against the barrel, and a tubular needle-carrier supported on said cap and having a flaring inner surface arranged to engage the projection of the plug and to form a tight joint therewith.

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Witnesses:  
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