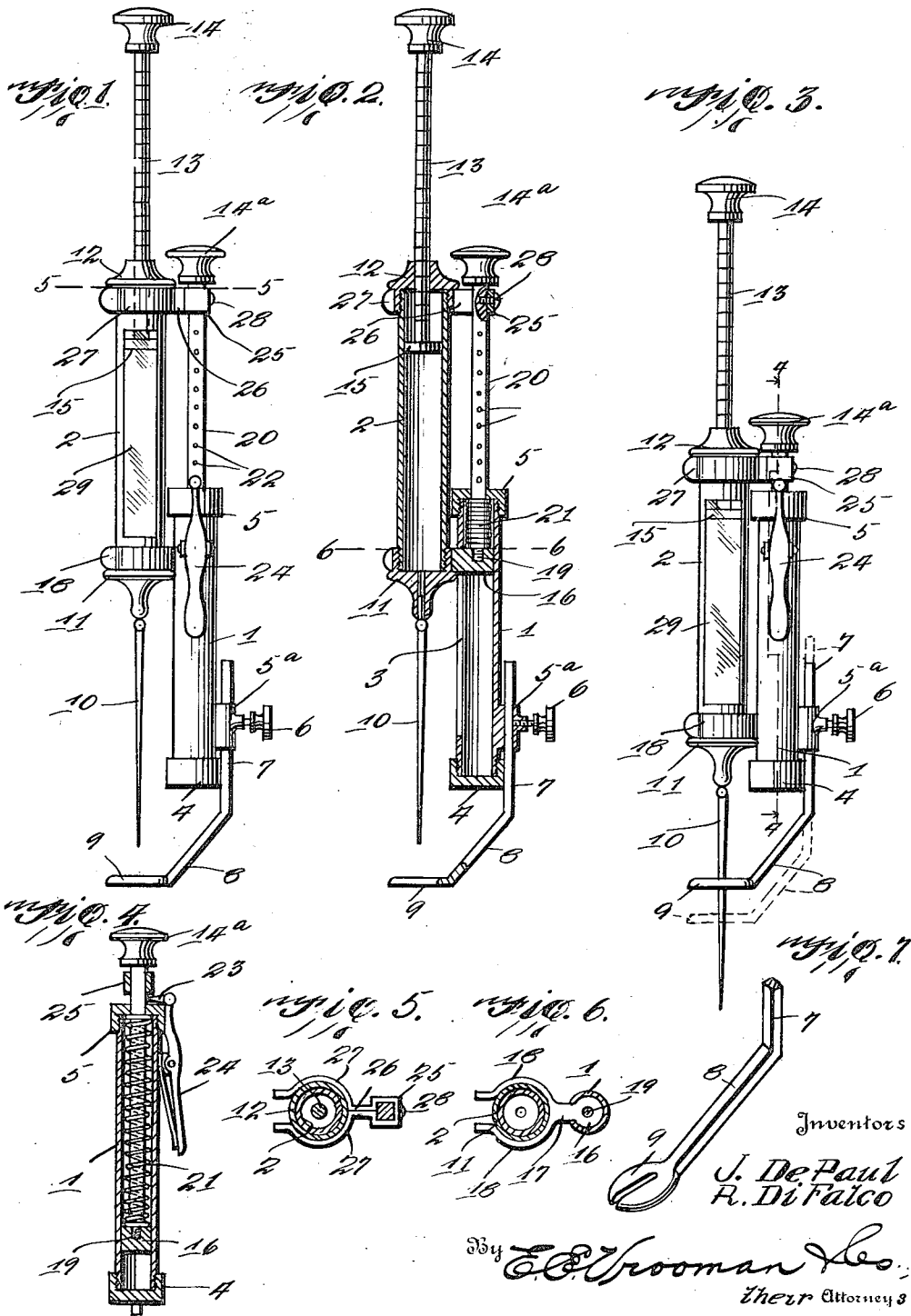


R. DI FALCO AND J. DE PAUL.
 AUTOMATIC INJECTION SYRINGE.
 APPLICATION FILED FEB. 18, 1919.

1,320,536.

Patented Nov. 4, 1919.



Inventors

J. De Paul
 R. Di Falco

By *E. E. Frooman & Co.*
 Their Attorneys

UNITED STATES PATENT OFFICE.

RAYMOND DI FALCO AND JOHN DE PAUL, OF ELLWOOD CITY, PENNSYLVANIA.

AUTOMATIC INJECTION-SYRINGE.

1,320,536.

Specification of Letters Patent.

Patented Nov. 4, 1919.

Application filed February 18, 1919. Serial No. 277,784.

To all whom it may concern:

Be it known that we, RAYMOND DI FALCO and JOHN DE PAUL, citizens of the United States of America, residing at Ellwood City, in the county of Lawrence and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Injection-Syringes, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an automatic injecting syringe, and more particularly to that type of syringe known as a "hypodermic" syringe.

The object of the invention is the construction of a syringe apparatus, which is provided with a primary barrel, in which is positioned a spring-device, and to which spring-device is detachably secured a liquid-containing barrel, and which liquid-containing barrel carries the ordinary hypodermic needle and hypodermic-plunger.

Another object of the invention is the construction of a simple and efficient hypodermic syringe apparatus that is provided with means for regulating the penetration of the flesh or muscle by the needle, which apparatus is also furnished with means for forcing the needle into the flesh without manual exertion being exercised.

With these and other objects in view, the invention consists of certain novel constructions, combinations, and arrangements of parts as will be hereinafter fully described and more particularly pointed out in the appended claims.

In the drawings:

Figure 1 is a view in side elevation of our improved syringe-device or apparatus, while

Fig. 2 is a vertical sectional view of the device or apparatus shown in Fig. 1; both in Fig. 1 and in Fig. 2, the device is shown in position for action, while

Fig. 3 is a view in side elevation of the device, showing the same in the position in which it appears when the needle has moved to its lowest position, and the liquid-containing barrel is in its lowest position upon the spring-containing barrel.

Fig. 4 is a vertical sectional view taken on line 4—4, Fig. 3.

Fig. 5 is a horizontal sectional view taken on line 5—5, Fig. 1.

Fig. 6 is a horizontal sectional view taken on line 6—6, Fig. 2.

Fig. 7 is a fragmentary perspective view of the gage.

Referring to the drawings by numerals, 1 designates the spring-containing barrel and 2 the liquid-containing barrel. The spring-containing barrel is provided with an elongated slot 3 extending approximately the height of the side thereof, and said barrel 1 is closed, at its lower end, by a threaded cap 4, and at its upper end, by a threaded cap 5. Near the lower end of barrel 1, is an apertured, integral lug 5^a, provided with a thumb-screw 6. In the apertured lug 5^a is mounted the vertical straight portion 7 of the gage, and at the lower end of portion 7 is an angle-portion 8, terminating in the flat bifurcated foot 9, in which bifurcated portion of the foot a hypodermic needle 10 is adapted to be positioned, as clearly shown in Fig. 3. The needle 10 is attached to cap 11 threaded upon the lower end of the liquid-containing barrel 1, and in the cap 12, at the upper end of barrel 2, is slidably mounted a plunger rod 13, which plunger-rod 13 is provided with the usual grip or head 14, at its outer end. The rod 13 is provided, at its inner end, with the usual piston head 15, for sucking the liquid into barrel 2 and discharging the same from said barrel when desired, by the action of the plunger rod 13 being reciprocated in barrel 2, in the ordinary manner known to the art.

Mounted in the spring-containing barrel 1, is an auxiliary piston-head 16, which piston-head is provided with a neck 17 (Fig. 6) terminating in spring prongs 18—18 that surround the lower end of barrel 2 and the upper end of cap 11, Fig. 2. The auxiliary piston-head 16 is provided with a threaded socket 19, into which is threaded the lower end of the auxiliary piston-rod or bar 20, and surrounding bar 20 is a coil-spring 21, which spring 21 is positioned between cap 5 and the piston-head 16. The auxiliary piston-rod or bar 20 is provided with a row or a plurality of sockets 22 which are engaged by the point 23 of the spring-pressed lever or catch-device 24, so that the spring-pressed auxiliary head 16 can be locked in a raised or adjusted position, and when it is desired to cause the needle to move toward the foot portion 9 of the gage, all that the operator has to do is to press down on the outer end of the spring-catch device

24, releasing the auxiliary plunger-rod or bar 20, whereupon the barrel 2 and the needle 10 will be carried to their innermost or lowest position, as clearly shown in Fig. 3.

5 To securely anchor the auxiliary or liquid-barrel 2 upon the spring-actuated device of our syringe, we provide a spring-holding device at the upper end of the apparatus, which spring-holding device comprises a surrounding body 25, having a neck portion 26 and spring prongs or surrounding fingers 27. The body portion 25 of this upper spring-clamping device is detachably secured to the upper portion of the auxiliary rod or plunger 20 by means of a set-screw 28, Fig. 2; it will, therefore, be seen that the upper spring-clamping device is detachably secured to the auxiliary plunger-rod, and that it surrounds the inner end of cap 12 in the same manner that the lower clamping-device surrounds the lower end of barrel 2 and cap 11. Grip 14^a is attached to the outer or upper end of the auxiliary or piston-rod or plunger 20, similar to the grip or knob 14.

The gage carried by the extension or lug 5^a may be adjusted within the lug 5, as shown by dotted lines in Fig. 3, so that the operator can adjust the depth or penetration of the needle 10 into the muscle or vein of the patient. After the gage has been adjusted to the desired position for regulating the depth of penetration of the needle 10 the set-screw 6 can be tightened, thereby securing the gage in the desired position.

The liquid-containing barrel 2 is provided with a gage-glass 29, so that the operator can easily ascertain the amount of liquid contained in the barrel or container 2.

40 In operation, the apparatus is first positioned as shown in Fig. 3, then the needle 10 is inserted into the liquid to be injected into the patient, then the plunger-rod 13 is moved outwardly to the position shown in Figs. 1 and 2, as well as in Fig. 3, thereupon filling the liquid-container or barrel 2, then the gage is adjusted upon the lug 5^a, and fastened in its adjusted position, and then the auxiliary spring-pressed plunger 20 is moved to its set position, Figs. 1 and 2, and locked, through the locking device 24, in the set position, then upon placing the foot 9 of the gage against the flesh and releasing the catch or locking device 24, the needle will enter the flesh, and then by forcing inwardly upon the grip or head 14, the liquid will be discharged from the barrel or container 2, through needle 10 and into the muscle or vein of the patient.

60 From the foregoing description, it is to be noted that we have provided an ordinary hypodermic syringe with means for limit-

ing the penetration of the needle, through the positioning of the gage, and that we have also provided a suitable driving or forcing device in the nature of said spring-containing barrel.

It is also to be noted that we reserve the right to make certain alterations and changes in the construction of our apparatus that shall fairly fall within the scope of the appended claims, without deviating from the spirit of this invention.

What we claim is:

1. In an apparatus of the class described, 75 the combination with a slotted barrel, of a piston-head mounted in said barrel and provided with clamping means, a piston rod detachably connected to said piston-head, said piston rod provided with an alined row of sockets throughout its length, an auxiliary clamping device upon the piston rod, a manually-operated locking device carried by the slotted barrel and being adapted to engage the sockets of the piston for holding the piston in different adjusted positions; means in the slotted barrel and engaging the piston-head for forcing the piston-head toward one end of the barrel, and a liquid-containing barrel provided with a plunger 80 engaging the clamping means of the piston-head and the auxiliary clamping device carried by the piston.

2. In an apparatus of the class described, the combination with a slotted barrel, of a 95 piston-head mounted in said barrel, said piston-head provided with a threaded socket in one face and with a neck extending at right angles to the socket and through the slotted portion of said barrel, said neck terminating in spring-fingers, a liquid-containing barrel mounted in said fingers, a piston rod threaded at its inner end into said threaded socket of the piston-head, a spring on said piston rod and normally pressing upon said piston head, said piston rod provided with a row of sockets throughout its length, an auxiliary clamping device on said piston rod, said auxiliary clamping device provided with spring-fingers surrounding said liquid-containing barrel, a set screw on said auxiliary clamping device and engaging said piston rod near its outer end for securing the clamping device thereon, and a manually-operated locking device 110 adapted to engage any one of the sockets of the row on the first-mentioned piston rod for holding this piston rod and the liquid-containing barrel in different adjusted positions upon the slotted barrel.

In testimony whereof we hereunto affix our signatures.

RAYMOND DI FALCO.
JOHN DE PAUL.