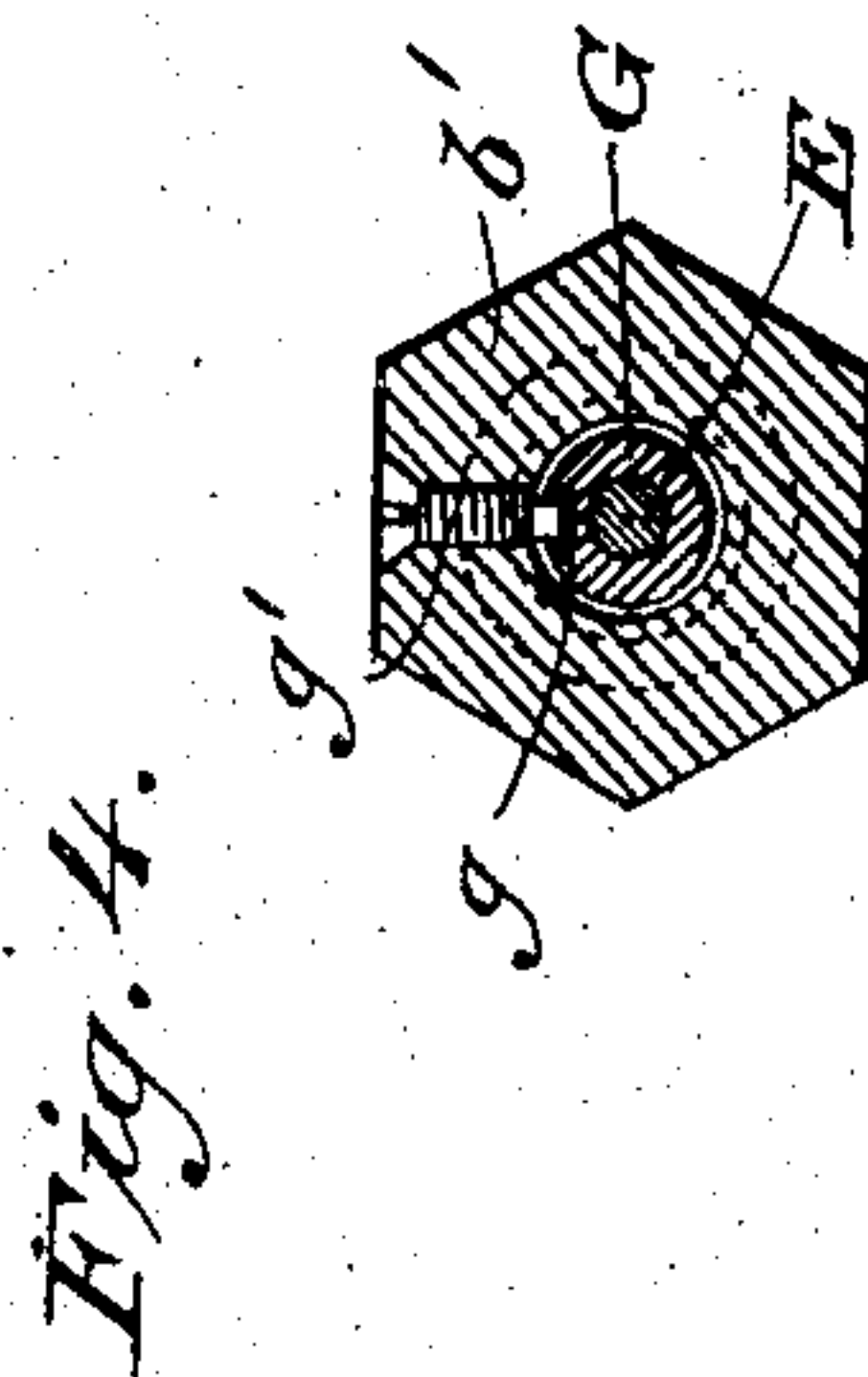
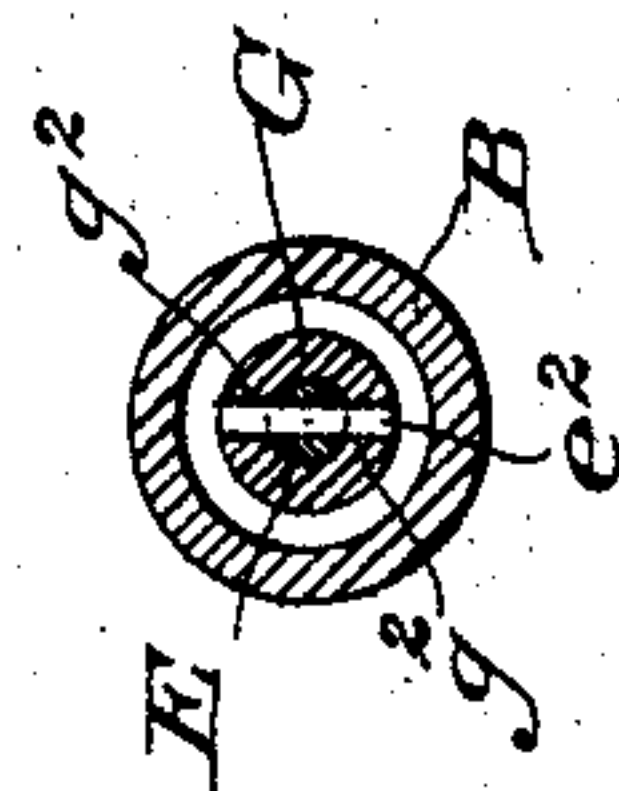
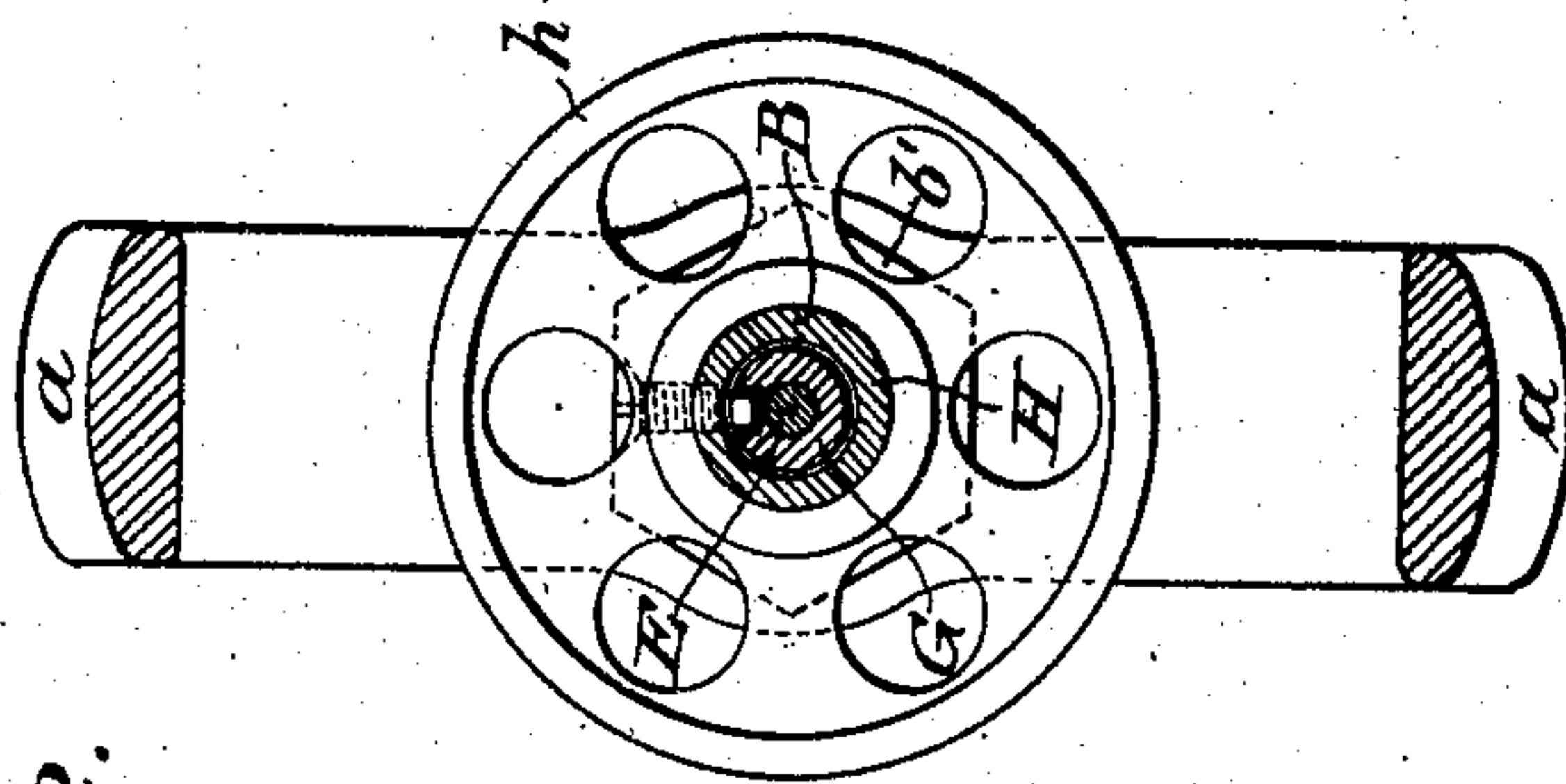
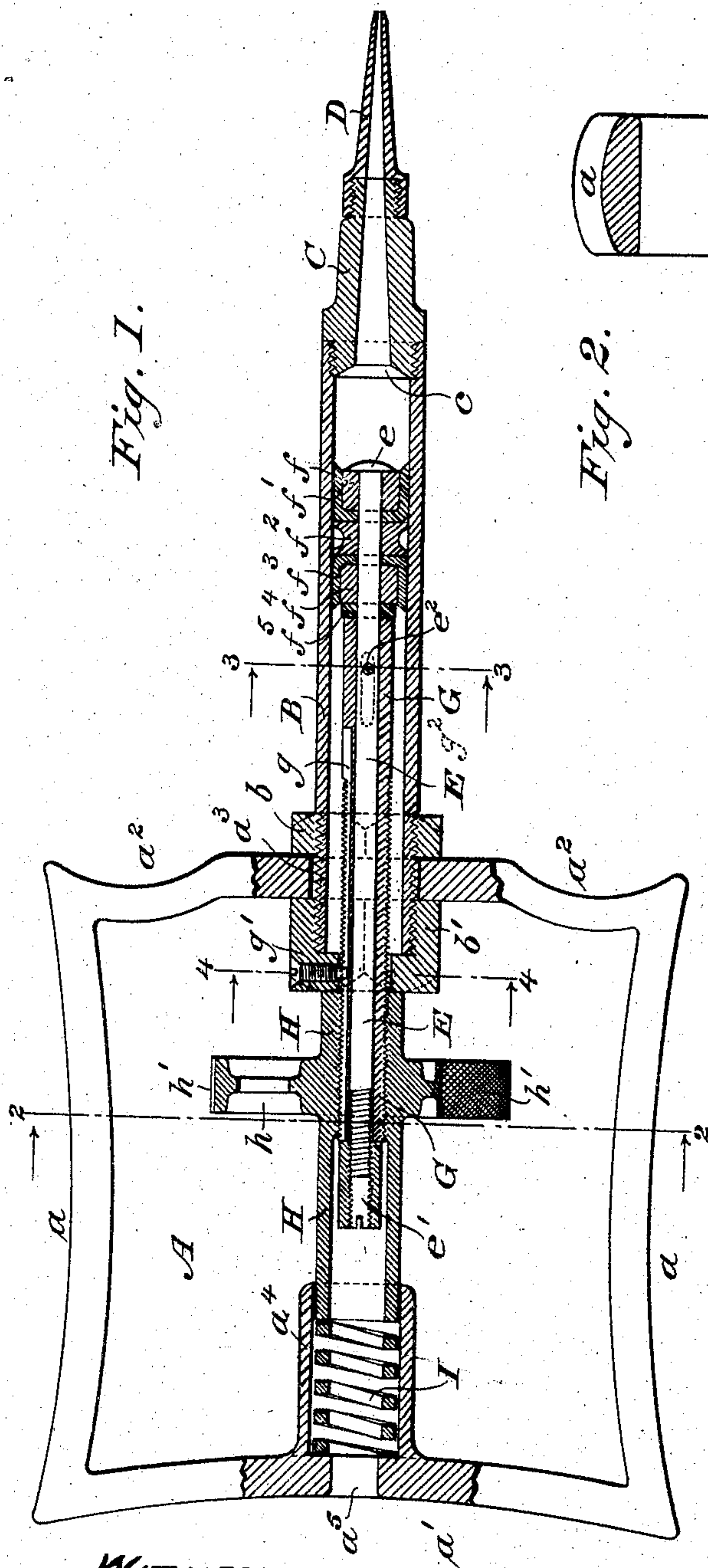


No. 781,283.

PATENTED JAN. 31, 1905.

F. A. HIGGINS.
HYPODERMIC POWER SYRINGE.
APPLICATION FILED JUNE 27, 1904.



WITNESSES:

W. B. Skinkle.
Fritz Johanneau

INVENTOR:

Frank A. Higgins
by his attorney
Wm A. Skinkle

UNITED STATES PATENT OFFICE.

FRANK A. HIGGINS, OF BELLEVUE, OHIO.

HYPODERMIC POWER-SYRINGE.

SPECIFICATION forming part of Letters Patent No. 781,283, dated January 31, 1905.

Application filed June 27, 1904. Serial No. 214,275.

To all whom it may concern:

Be it known that I, FRANK A. HIGGINS, a citizen of the United States, residing at Bellevue, Huron county, Ohio, have invented certain new and useful Improvements in Hypodermic Power-Syringes, of which the following is a specification that will enable those skilled in the art to which my invention pertains to make and use the same, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to syringes particularly adapted to forcibly injecting fluid remedies, anesthetics, &c., into the dentine, bones, or other highly-resistant parts of a patient. Its principal objects are to produce a syringe in which very great pressure may be generated on the liquid charge therein; to provide a screw-feed for the piston that will advance it with great power and will hold it at any point against reaction; to provide an expandible piston-packing that may be adjusted to fit the barrel as tightly as desired; to provide a handle that may be grasped with equal facility either endwise or sidewise between the palm and fingers of the operator; to provide a strong spring-cushion between the handle and the piston-moving mechanism, so that a fairly-constant and even pressure may be maintained on the point of the instrument when it is being used, and to produce an instrument of this character that will be neat, simple, compact, handy, easily operated, and kept clean and that may be cheaply constructed and placed upon the market at a reasonable price.

My invention consists of such features and combinations of features adapted to effect its objects, as will hereinafter be fully described and claimed.

The accompanying drawings show my invention in general form and construction of details now deemed most desirable by me; but changes not requiring the exercise of invention might be made therein by a skilful mechanic without departing from the spirit of my invention as set forth in the claims at the end of this specification.

Figure 1 is a view, partly in elevation, but mainly in central longitudinal section, through

a power-syringe embodying my invention. Fig. 2 is a transverse section across the same on the line 2 2 of Fig. 1. Figs. 3 and 4 are similar sections on the lines 3 3 and 4 4, respectively, of Fig. 1.

The handle A of my syringe is a frame of preferably cast metal about square in its general outline, with its sides a and back end a' incurved from corner to corner, as shown, and incurved, as at a^2 , at each side of the center on its front end. This makes a very light and strong handle of a shape particularly favorable to be strongly grasped in either direction. The front bar is swelled at its center and has a perforation a^3 , through which the rear screw-threaded end of the barrel B passes. A check-nut b on the barrel presses against the front face of the bar a^2 , while a hollow nut b' is screwed onto the rear end of the barrel, partly closing it and acting with the nut b to securely lock the barrel to the handle. The front end of the barrel is provided with the usual nipple C and supplementary nipple or hollow needle-point D, the first being screwed into the barrel and the needle-point screwed onto the nipple, as shown. The nipple is conically bored or countersunk at its inner end c to the full diameter of the barrel, so that there are no hollow spaces, corners, or projecting ledges in or behind which air might lodge or impurities accumulate.

The needle-point is preferably square-ended, as shown—that is, it is not ground or cut at an angle, as is done where the point is to have a cutting or penetrating edge. The piston is mounted on the front end of a central rod E, having a head e , behind which is a block f , of rubber or other suitable elastic material, seated in a cup or hydraulic washer, of leather or other suitable material, which is fitted to the bore of the barrel. Back of this cup is loose metal washer f^2 , having a peripheral groove to carry lubricant, and back of this, again, is another cup or hydraulic washer f^3 , pointing in the opposite direction from the cup f , and inclosing a block of rubber f^4 , against which lies a loose metal washer f^5 . Behind this washer and surrounding the rod E is a hollow piston rod or sleeve G, which extends beyond the rear end of the barrel and

its lock-nut b' and is screw-threaded for a greater portion of its length, as shown. Upon the projecting extremity of this piston-sleeve is screwed a tubular sleeve-nut H, upon which
 5 is a thumb nut or wheel h , milled on its outer face, as shown at h' . The rear end of this tubular nut extends into a hollow socket a^4 , formed on the rear bar a' of the handle, and between the end of the nut and the bottom of
 10 the socket is a strong spiral spring I, adapted to resist any backward movement of the piston and its actuating mechanism. The end of the rod E extends beyond the end of the piston-sleeve G and is screw-threaded for the
 15 reception of a hollow nut e' , which bears against the end of the piston-sleeve. When this nut is turned, it draws the head e of the rod toward the front end of the piston-sleeve, contracting the space between them and com-
 20 pressing the rubber blocks, which expand laterally and force the cups f' and f^3 into closer contact with the walls of the barrel. The leather cups might be dispensed with but for the fact that the rubber blocks if brought
 25 directly into contact with the walls of the barrel would have an adhesion that would prevent their slipping as freely as does the leather under the same pressure. In order to prevent the piston-sleeve from turning with the sleeve-
 30 nut H, I form a groove g along one side, somewhat deeper than the screw-threads, and into this groove I project the point or end of a screw g' in the lock-nut b' . This prevents the turning of the piston-sleeve, while allow-
 35 ing it to move longitudinally.

In order to prevent the rod E from turning with its nut e' when the rubber piston-blocks are being expanded, I secure a cross-pin e^2 in the rod and let its projecting ends lie in slots
 40 g^2 in the piston-sleeve, these slots being long enough to allow of all necessary endwise movement of the rod. The aperture a^5 in the rear bar of the handle admits the passage of a screw-driver to adjust the nut e' in the piston-
 45 rod.

Having thus described my invention, what I claim as new and useful, and desire to secure by Letters Patent, is—

1. In a syringe, the combination of the syringe-barrel, an open frame secured to the bar-
 50 rel, a piston having a screw-threaded piston-rod which projects from the end of the barrel and a nut screwed on said piston-rod the outward thrust of which is resisted by the outer
 55 bar of the frame; substantially as described.

2. In a syringe, the combination of the syringe-barrel, an open frame secured to the bar-
 60 rel, a piston having a screw-threaded piston-rod which projects from the end of the barrel and a nut screwed onto said piston-rod, with a spring interposed between the back end of the nut and the rear bar of the frame; sub-
 stantially as described.

3. In a syringe, the combination of the syringe-barrel, an open frame secured to the end
 65 of the barrel and having a socket formed on its rear bar in axial line with the barrel, a piston having a screw-threaded piston-rod which projects from the end of the barrel, a tubular
 70 nut screwed onto the piston-rod and bearing at its front end against a fixed portion of the frame while its rear end extends into the frame-socket, with a spring in the socket in-
 75 terposed between the end of the nut and the bottom of the socket; substantially as de-
 scribed.

4. In a syringe, the combination of the syringe-barrel, an open frame-handle secured to the rear end of the barrel and having its op-
 80 posing sides incurved as shown, with a piston having a screw-threaded piston-rod which projects beyond the end of the barrel and a screw-nut on said piston-rod having its end bearings between the front and rear bars of the handle-
 85 frame; substantially as described.

5. A substantially square open frame-handle for a syringe having its sides incurved; substantially as described.

6. An open frame-handle for a syringe having its side and rear bars incurved as shown
 90 while its front bar is apertured at its middle for the reception of a syringe-barrel and incurved at each side of said aperture; substantially as described.

7. In a syringe, the combination of the syringe-barrel, a piston provided with expansible
 95 washers and having a hollow piston-rod projecting beyond the end of the barrel and screw-threaded on its exterior, a screw-nut on the hollow piston-rod to move it endwise, and
 100 a groove in the rod engaged by a fixed pin to keep it from turning, a central piston-tightening rod passing through the hollow piston-rod with a nut on its end bearing on the hollow
 105 piston-rod, and a cross-pin in the central rod extending into slots in the hollow piston-rod; substantially as described.

8. In a syringe, the combination of the syringe-barrel, a piston provided with expansible
 110 washers and having a hollow piston-rod projecting beyond the end of the barrel and screw-threaded on its exterior, a screw-nut on the hollow piston-rod, a groove in the rod engaged by a fixed pin, a central piston-tightening rod in the hollow piston-rod with a nut on
 115 its end bearing on the end of the hollow piston-rod, and means for preventing said tightening-rod from turning in the hollow piston-rod; substantially as set forth.

In testimony whereof I have signed my name
 120 to this specification in the presence of two subscribing witnesses.

FRANK A. HIGGINS.

Witnesses:

C. A. WILT,

W. HERBERT GREENSLADE.