

F. S. DICKINSON.
PUMP.
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963,528.

Patented July 5, 1910.

Fig. 1.

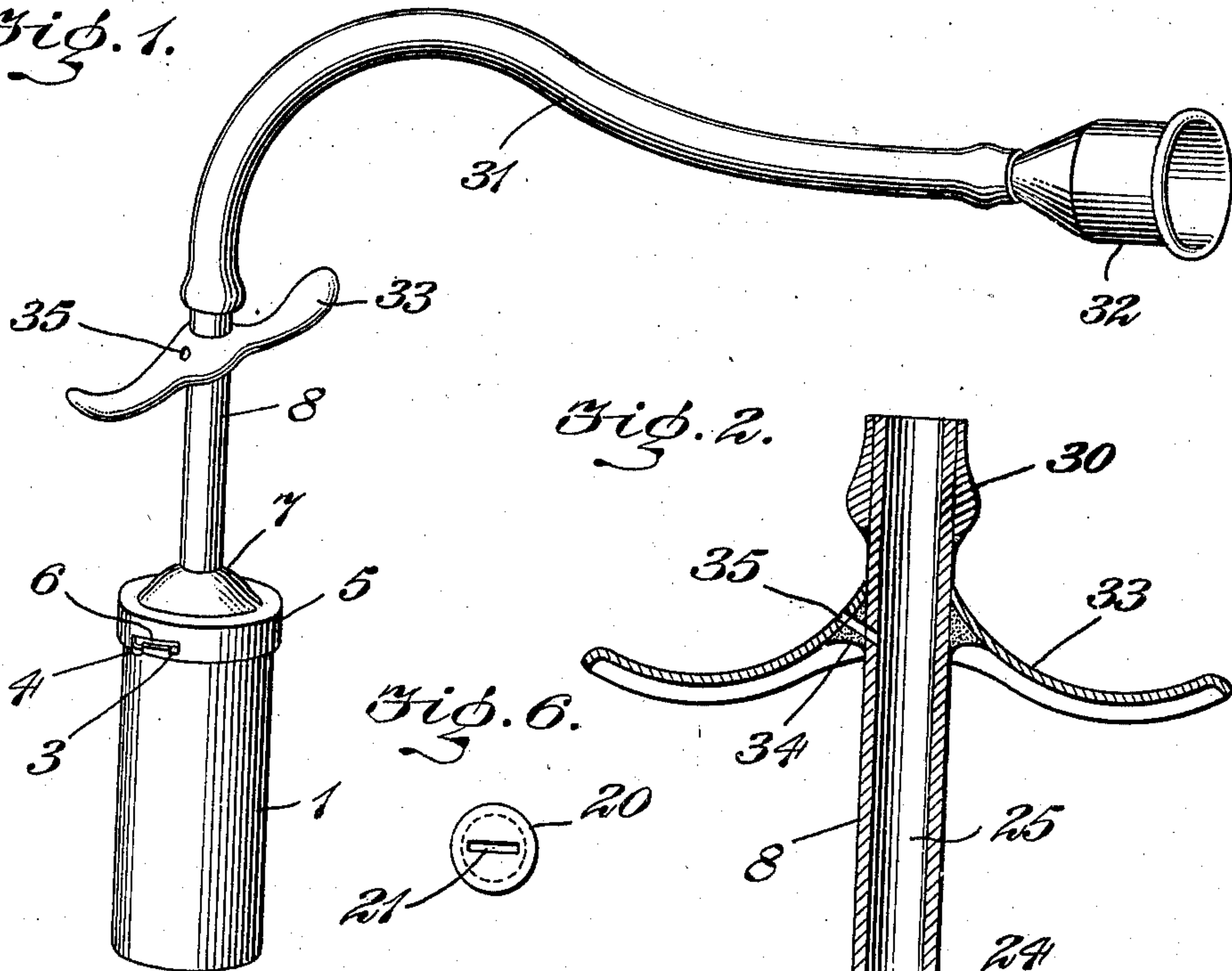


Fig. 2.

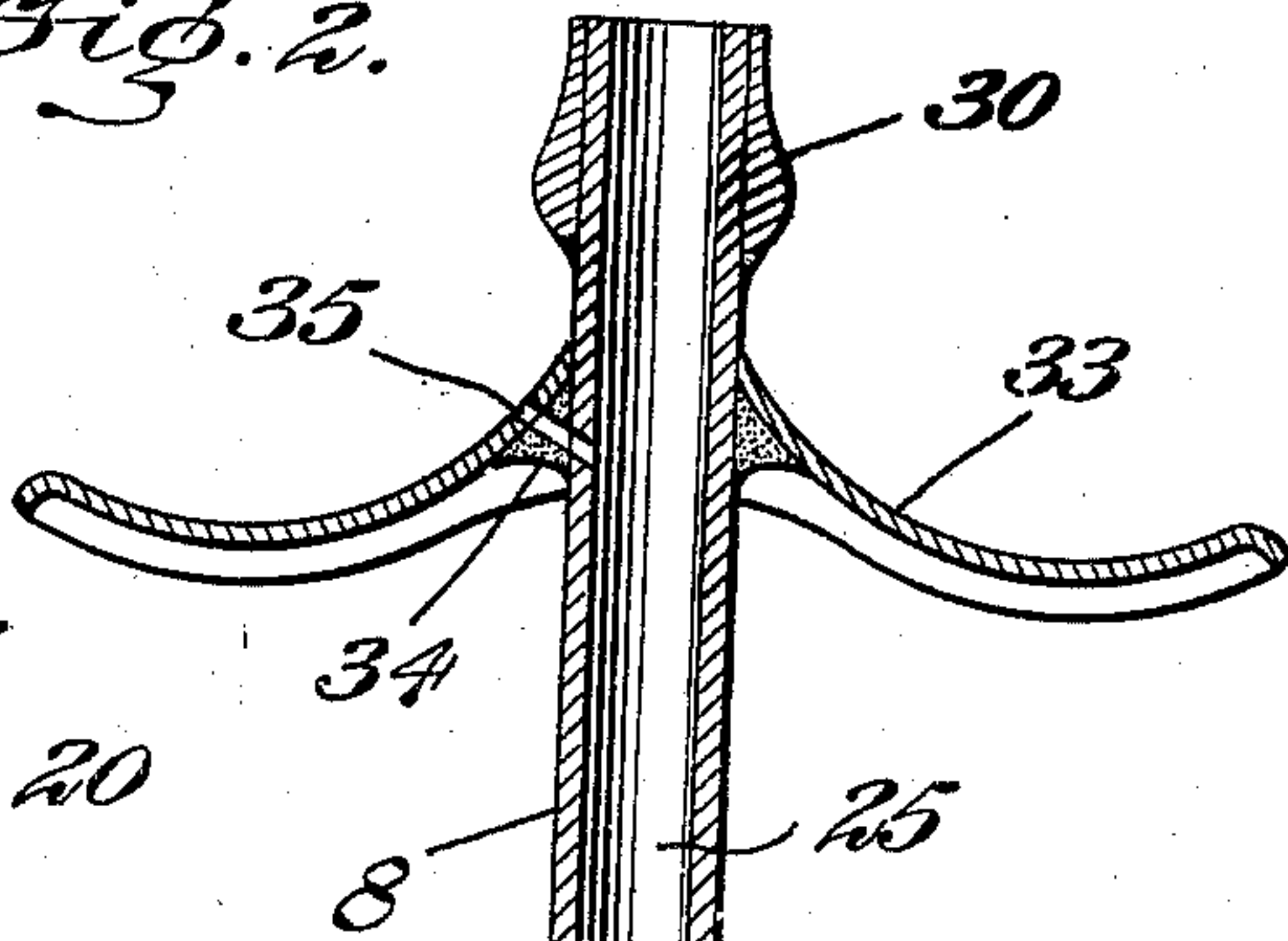


Fig. 6.

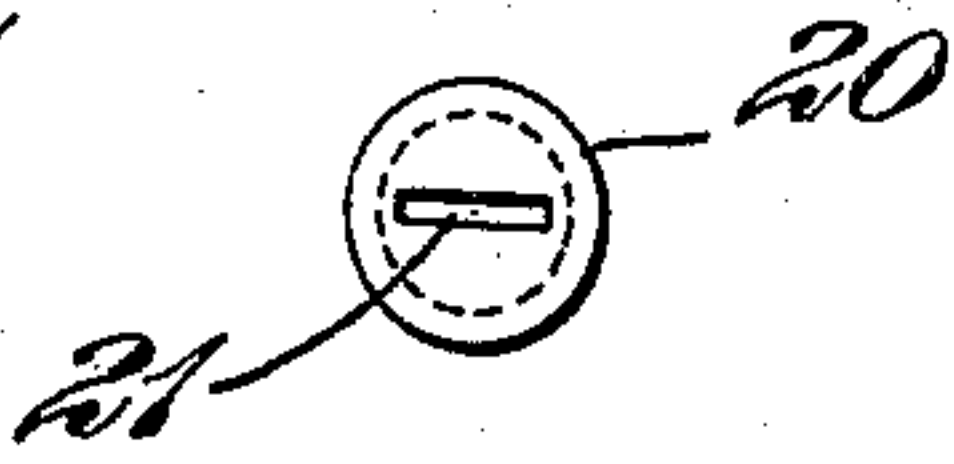


Fig. 3.

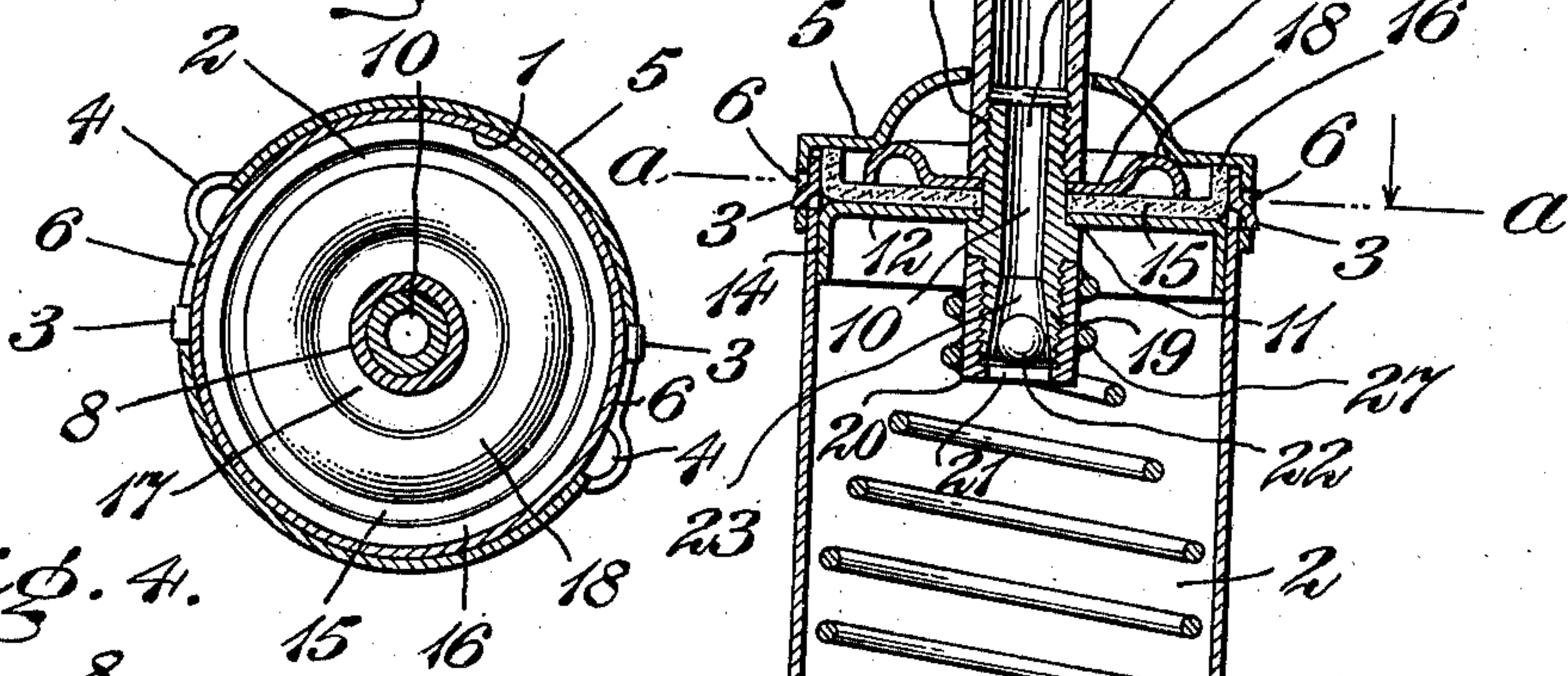


Fig. 4.

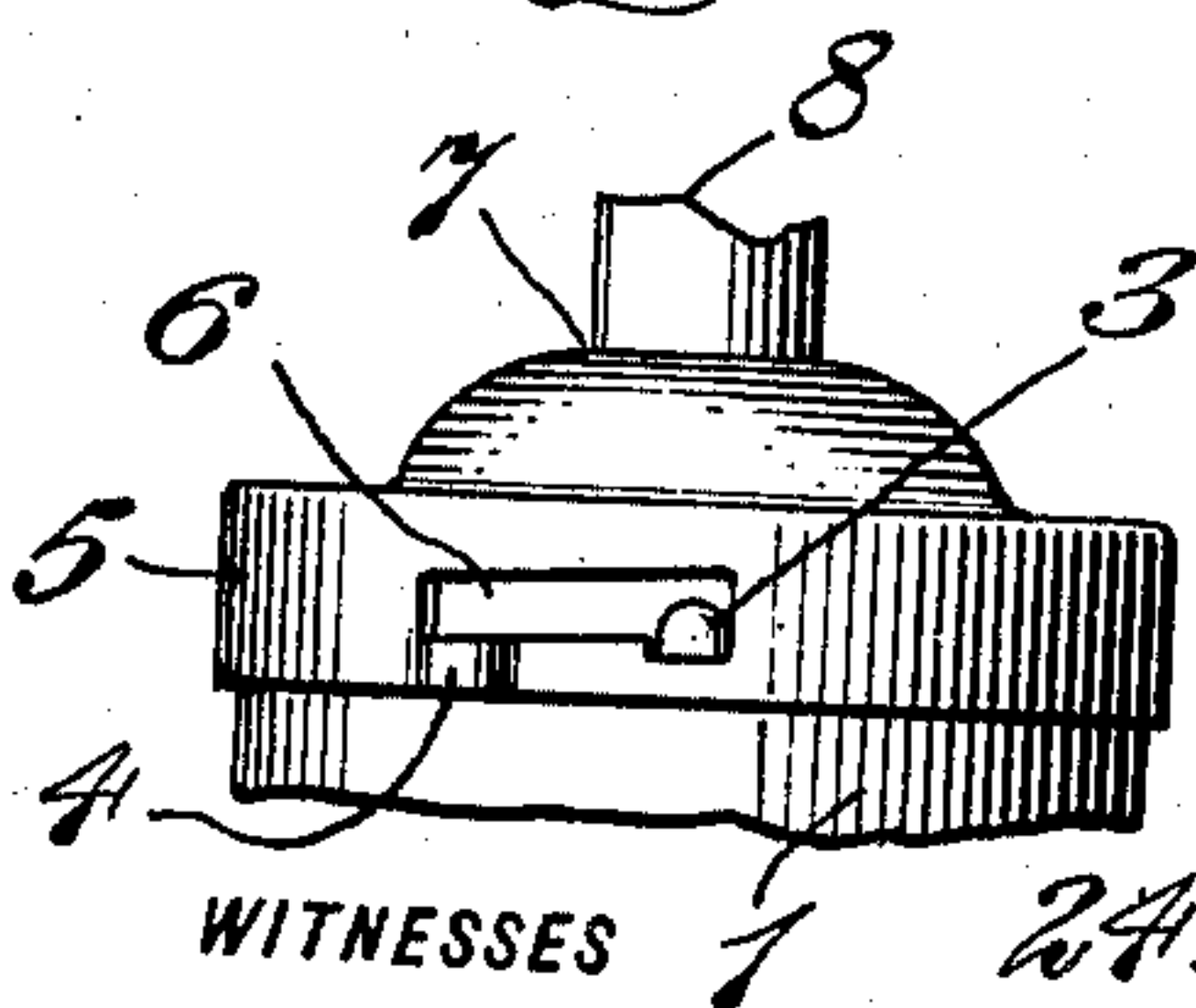
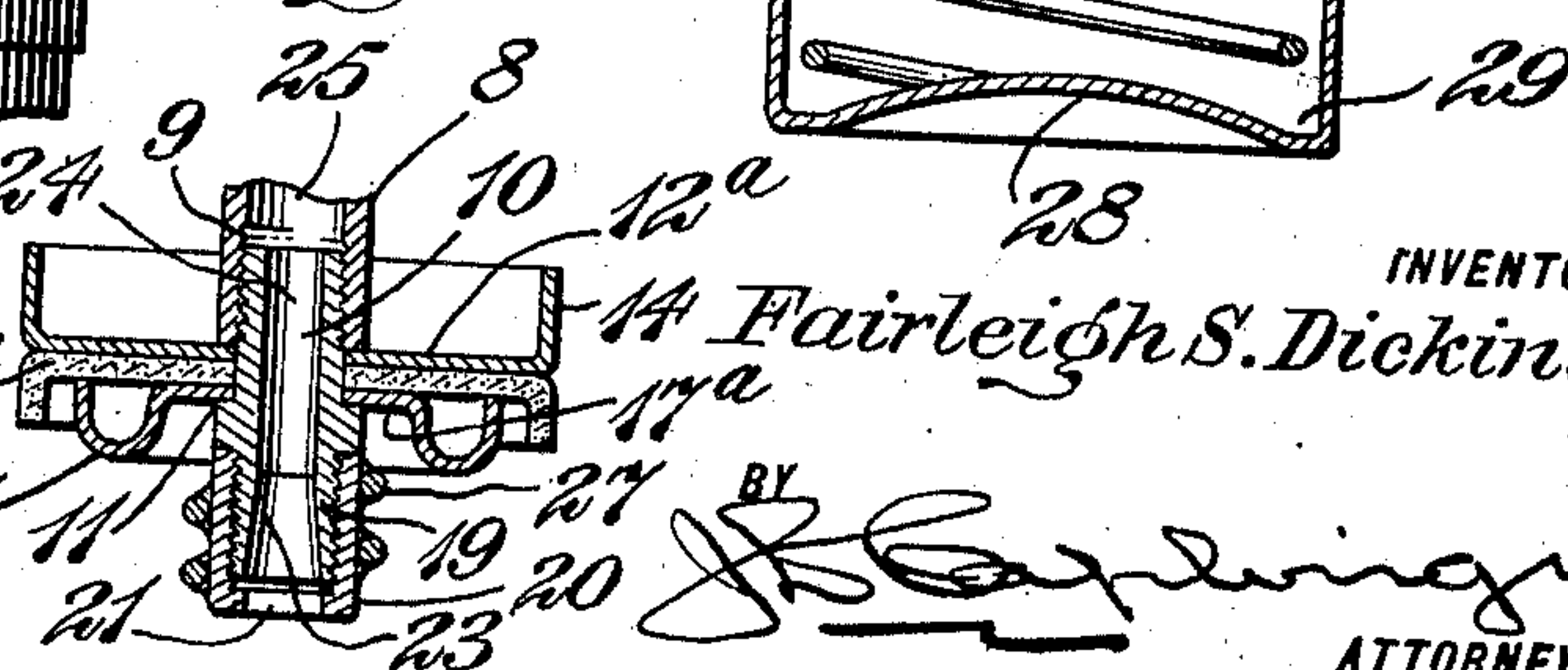


Fig. 5.



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PUMP.

963,528.

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To all whom it may concern:

Be it known that I, FAIRLEIGH S. DICKINSON, a citizen of the United States, and a resident of Rutherford, in the county of Bergen and State of New Jersey, have invented certain Improvements in Pumps, of which the following is a specification.

This invention relates to certain improvements in pumps and more particularly in that class of such devices which are especially designed and adapted for manual actuation, such, for example, as vacuum pumps, atomizers, massage instruments, and the like, and the object of the invention is to provide a device of this general character of a simple and comparatively inexpensive nature which shall be light, strong and compact, and capable of convenient operation without liability of derangement or breakage of its parts during use.

The invention consists in certain novel features of the construction, and combinations and arrangements of the several parts of the improved pump, whereby certain important advantages are attained, and the device is rendered simpler, less expensive and otherwise better adapted and more convenient for use, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

In order that my improvements may be the better understood, I will now proceed to describe my invention with reference to the accompanying drawings, wherein—

Figure 1 is a perspective view showing a pump constructed according to my invention, and capable of employment as a massage instrument; Fig. 2 is an enlarged sectional view taken axially through the improved pump constructed as shown in Fig. 1; Fig. 3 is a sectional view taken transversely through the improved pump in the plane indicated by the line *a—a* in Fig. 2, and showing certain features of construction to be hereinafter referred to; Fig. 4 is a fragmentary side elevation showing the means for holding the cap or closure detachably in position upon the pump barrel; Fig. 5 is a fragmentary sectional view showing a modified formation of the piston comprised in my present invention and Fig. 6 is a detached detail view showing the valve holding cap or casing in end elevation.

As seen in these views, 1 represents the barrel or cylinder of the improved pump,

formed from thin sheet metal having an interior chamber 2, and open at its upper end to permit the introduction of the piston as will be hereinafter explained, said barrel or cylinder being provided, adjacent to its said open end with outwardly pressed lugs or projections 3, 3, flattened at their under surfaces, and projecting at diametrically opposite points from the perimetral surface of said barrel or cylinder, and capable of engagement with guide ways or passages 4, 4, produced in the perimetral portion or flange of a cap or closure 5, which is adapted to be extended across the open end of the barrel or cylinder to close the same and prevent accidental withdrawal of the piston therefrom.

As shown herein, the guide ways or passages 4, 4 are produced by striking the metal of the cap or closure 5 outwardly, so that said guide ways or passages are produced upon the diametrically opposite inner surfaces of the flange or perimetral portion of said cap or closure, the lower ends of said guide ways or passages being open at the lower edge of such flange of the cap or closure, and their upper ends being adapted for communication with horizontally directed slots 6, 6, extended in the flange of such cap or closure at the sides of said guide ways or passages 4, 4, so that when the cap or closure is applied over the open end of the pump barrel or cylinder, the lugs or projections 3, 3 of the latter will traverse said guide ways or passages, and upon turning of the cap or closure 5 relatively to the barrel or cylinder 1, will pass from the guide ways 4 into the horizontal slotted openings 6, and being then out of alinement with said passages 4, 4, will serve to hold the cap or closure securely in place upon the barrel 1 until the same is reversely turned to again bring said lugs in alinement with said passages 4. The slotted openings 6, 6 have their lower surfaces provided with locking devices 6^a, 6^a, herein shown as made in the form of notches or recesses adapted for engagement with the lugs or projections 3, 3 of the barrel in such a manner as to lock the cap or closure 5 against such turning movement upon the barrel as is requisite to aline said projections 3, 3 with the passages 4, 4 in position to permit removal of said cap or closure from the barrel.

The cap or closure 6 is provided with an upwardly directed or elevated central por-

tion 7, projecting above its flange or perimetral portion and centrally apertured for the passage of a piston rod or stem 8, the lower end of which projects within the barrel or cylinder 1, and is internally screw-threaded as shown at 9 to receive a terminal member 10, which is externally threaded at its upper part for detachable connection with said lower end of the stem or rod 8, and is provided with a circumferential shoulder 11 produced around it and arranged opposite to the shoulder afforded by the lower end of the stem or rod 8, so that when the terminal member 10 is applied in position upon said stem or rod 8, said shoulders of member 10 and stem or rod 8 will be positioned for clamping engagement upon a piston or the like in order that such piston may be effectively secured to the lower end of the stem while being capable of ready removal therefrom when desired.

As shown in Figs. 2 and 3, such piston is reversible, so that when removed from the piston rod, it may be reversely applied thereto, for purposes to be hereinafter explained, and said piston comprises a thin metal disk or plate 12, centrally apertured for the passage of the reduced threaded upper end of said terminal member and rested above said circumferential shoulder 11 thereof and provided around its perimeter with a pendent annular flange or skirt 14, adapted to play in accurate contact upon the inner surfaces of the barrel 1, a packing ring or disk 15, rested above said disk or plate 12 and formed from leather or other pliant substance with edge portions 16 adapted to fit snugly against the walls of the barrel 1, and a grease cup or lubricating member 17, made in the form of a thin metal disk and rested above said packing disk 15 and contacting upon the shoulder afforded by the lower end of the stem 8 so that the central part of said packing disk is clamped between said member 17 and the disk 12, the perimetral portion of said thin metal disk member 17 being provided with an annular upwardly bent portion 18, within which is produced an annular groove or chamber concentric around the piston rod and open at that side of the disk which contacts with the pliant packing 15 and adapted to be filled with grease or lubricant which is thereby retained within the barrel in close contact with the upper surface of the pliant disk 15 so as to work into the texture thereof during use of the pump, and thereby to maintain proper lubrication of the parts so that leakage of air past the piston due to wear or hardening of the packing is effectively avoided. The member 17 is herein shown as made slightly less in diameter than the barrel 1, so that the edge portion of the packing disk 15 is left free for such movement as may be necessary to permit escape of the

air past the piston when the latter is pressed downwardly within the chamber 2 of the pump barrel. The projecting edge portion of the packing 15, outside of the lubricating member 17, is provided with an upturned marginal flange, fitting accurately to the walls of the barrel upon the upstroke of the piston, so as to prevent leakage of air into the piston chamber during such movement of the piston, but adapted to be separated from said wall of the piston chamber upon the downstroke of the piston so as to permit passage of air from the piston chamber during that stroke of the piston.

The lower end of the terminal member 10 depends below the stem 8 and is exteriorly screw-threaded, as seen at 19, to afford detachable connection with an internally threaded cap or valve casing 20, having its bottom provided with a slotted air inlet 21, and serving to retain a ball or other valve 22 in position within the expanded lower end portion of the bore 24 of said terminal member, the walls of such expanded lower end portion of the bore 24 being flared or tapered as shown at 23 in the drawings to afford a valve seat whereon the valve 22 is adapted for contact, when the piston is forced downwardly within barrel 1, in order that the bore of the terminal member may be sealed by such valve in a well known way. The diameter of the valve 22 is such that communication is established from the bore of member 10 to the cylinder or barrel when said valve is in lowered position as indicated in Fig. 2.

26 represents a spiral spring extended in the chamber 2 of the barrel or cylinder 1 below the piston, the upper end of said spring having its spirals contracted in diameter, so as to permit of being detachably engaged with the circumferential surface of the cap 20 or member 10, as indicated at 27 on the drawings, whereby a secure connection is effected between the spring and piston rod or stem in order that the spring may be inserted within or withdrawn from the barrel 1 with the piston. The lower end of the barrel or cylinder 1 is upwardly bent at its central part, as shown at 28, whereby a circumferential channel 29 is produced around the bottom of the chamber 2 wherein the lower spiral turn of the spring 26 is seated when the piston is inserted within the barrel. The employment of said spring 26 serves to maintain the stem 8 and connected parts normally pressed upwardly within the chamber 2 of the barrel, so as to facilitate use of the pump, and prevents lubricant or other substances which may collect at the bottom of the barrel from entering the valve chamber 23 and interfering with the operation of the valve 22, and the parts are so proportioned that the lubricating member 17 is pressed normally by the tension of said spring in contact upon the under sur-

face of the cap or closure 5 in such a manner as normally to hold the downwardly notched or recessed lower surfaces of the slotted openings 6, 6 positively engaged upon the undersides of the projections 3, 3 upon the barrel, whereby accidental turning of the cap or closure, such as might result in its disconnection from the barrel, is effectively prevented. This arrangement permits the cap or closure 5 to be made to fit very loosely upon the end of the barrel as is desirable to facilitate its removal and replacement.

The stem or piston rod 8 is provided with a bore or passage 25 extended axially through it, and communicating with the bore of the terminal member 10. Said stem, as herein shown, is produced from a short section or length of thin metal tubing, to the upper part of which is secured an annular part 30, which projects from the wall of the tube and affords a nipple wherewith may be detachably connected a flexible tube 31 of rubber or the like, the extremity of which may be connected with a nipple or attachment of any preferred kind. In Fig. 1 I have shown the tube provided with a cup 32 capable of employment in facial massage or the like, but it will be evident that this may be replaced by some equivalent part so as to permit of varying the application of the device.

33 represents a cross head or grip member secured upon the upper end of the stem or rod 8 and adapted for engagement by the fingers of the user for pressing the piston downwardly in the barrel or cylinder 1. As herein shown, this member is pressed or otherwise formed from sheet metal of proper gage, and is secured by solder as shown at 34 to said stem 8, there being a perforation or vent opening 25 produced in one wall of the tubular stem and extended through the solder 34, and metal of said member 33 with its outer end exposed at the upper surface of said member in order that the finger of the user may be conveniently applied over the same to close such vent or opening during the use of the device as a vacuum pump as will be hereinafter explained. As herein shown, such vent aperture 35 is produced by drilling through member 33, solder 34 and the side of stem 8 after the member 33 shall have been soldered in place upon said stem.

If the improved pump constructed as above described be desired for use as a force pump instead of as a vacuum pump, it is only necessary to readjust the parts as shown in Fig. 5, wherein the positions of guide disk 12^a, packing 15^a and lubricating member 17^a are reversed from the positions wherein they stand during use of the device as a vacuum pump, the valve 22 being removed from the chamber 23 of the terminal member, so as to permit free outflow of air

from the piston chamber of the pump barrel through the passage 25 of the piston rod, during descending movement of the piston, the pliant or flexible marginal flange of the packing 15 surrounding the lubricating member being then pendent so as to be adapted to be freely separated from the walls of the barrel upon the upward movement of the piston to an extent sufficient to permit entrance of air into the piston chamber during such upstroke in a well known way, and being adapted to fit accurately upon said walls of the barrel during downward movement of the piston so as to prevent leakage of air from the piston chamber during the downstroke of the piston, whereby the air in such chamber is placed under tension and is forced out through the passages of the piston rod and its terminal member. As seen in this view, the lubricating member 17^a is lowermost so that the grease contained in its chamber 18^a is in contact upon the underside of the packing 15^a, while the metal disk 12^a is above the packing, its flange 14 being upturned instead of pendent as in the structure previously described.

In the use of the device illustrated in Figs. 1 and 2 as in facial massage for example, the piston being pressed upwardly in barrel 1 by spring 26, the cup 32 will be applied to the face in the ordinary manner, the finger of the operator being positioned to close the outer end of the vent 35 to prevent leakage of air therethrough, after which, pressure being exerted by the operator to press the stem 8 into the barrel 1 against the tension of the spring 26, the air contained in chamber 2 will be forced out therefrom either through cup 32 or around the packing 15 of the piston as in an ordinary pump.

Pressure being relaxed upon the stem 8, the spring 26 will operate to uplift the piston in cylinder or barrel 1, so as to rarefy the air therein, after which the finger of the operator may be lifted from the vent aperture 35 to break such partial vacuum by the admission of air at said aperture, and permit the operation to be repeated. Where the device is primarily intended for use otherwise than as a vacuum pump, the vent aperture 35 will of course be omitted, but it is evident that when the device is intended for use as a vacuum pump or for interchangeable use both as a vacuum pump and force pump, the piston may be conveniently rearranged as indicated in Fig. 5, the vent aperture 35 being maintained closed by the finger of the user during use of the device as a force pump.

The employment of the lubricating member carried by the piston insures effective lubrication of the parts such as is needful to prevent leakage around the piston due to wear or hardening of the packing, and

the structure of the piston shown in Figs. 2 and 3 is particularly advantageous by reason of the readiness with which it may be inserted within and removed from the pump barrel, the upwardly directed edge portions of the packing offering no impediment to such insertion and removal.

From the above description of my invention it will be seen that the pump constructed according thereto is of an extremely simple and comparatively inexpensive nature, and is particularly well adapted for use by reason of the lightness and strength of its construction, and of the facility with which its parts may be assembled and separated for purposes of repair, rearrangement and the like, and it will also be obvious from the above description that the device is susceptible of considerable change without material departure from the principles and spirit of the invention and within the scope of the appended claims, and for this reason I do not desire to be understood as limiting myself to the precise formation and arrangement of the several parts herein set forth in carrying out my invention in practice.

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

1. A pump having a barrel, a piston rod movable therein, two members carried by the piston rod within the barrel, and a packing held at its central portion between said members and formed from pliant material and adapted for contact with the walls of the barrel, one of the members having a surface contacting with the central portion of

the packing and provided with an open annular chamber surrounding the piston rod and adapted to contain lubricant and capable of operation to supply the same to said pliant packing.

2. A pump having a barrel, a piston rod movable therein, and provided with a passage, a piston on said rod in the barrel, a grip member separately formed from the piston rod and held thereon, and a vent extended through said grip member at its joint with the piston rod and having its outer end positioned to be closed by the finger of the operator and its inner end extended through the wall of the piston rod and adapted for communication with the passage therein.

3. A pump having a barrel, a piston rod movable therein, a terminal member detachably held on said piston rod within the barrel, and a reversible piston detachably held between said piston rod and terminal member and including metallic parts and a pliant packing the central portion whereof is clamped between said parts, one of said metallic parts having its surface adjacent to said packing provided with an annular groove adapted to contain a supply of lubricant.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

FAIRLEIGH S. DICKINSON.

Witnesses:

J. D. CAPLINGER,
W. C. ABBOTT.