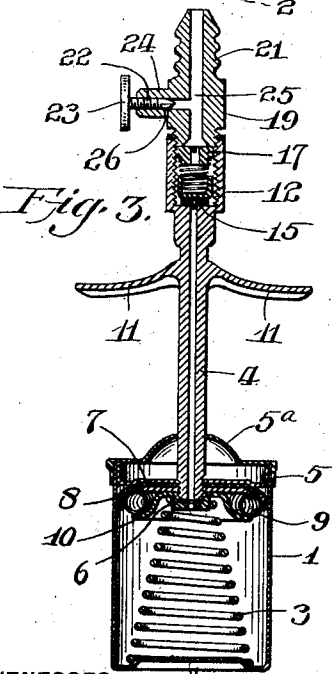
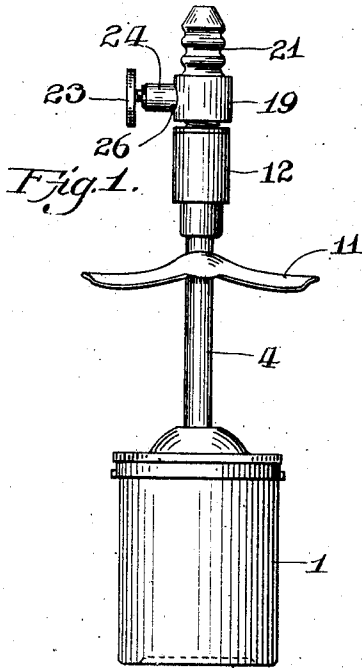


C. J. PILLING.
AIR PUMP.

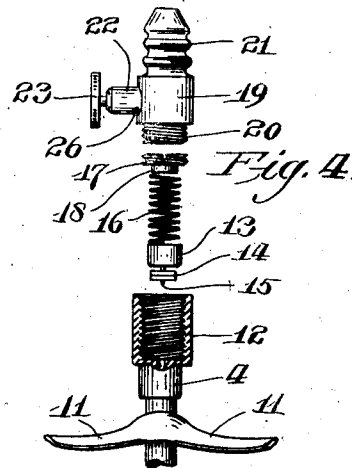
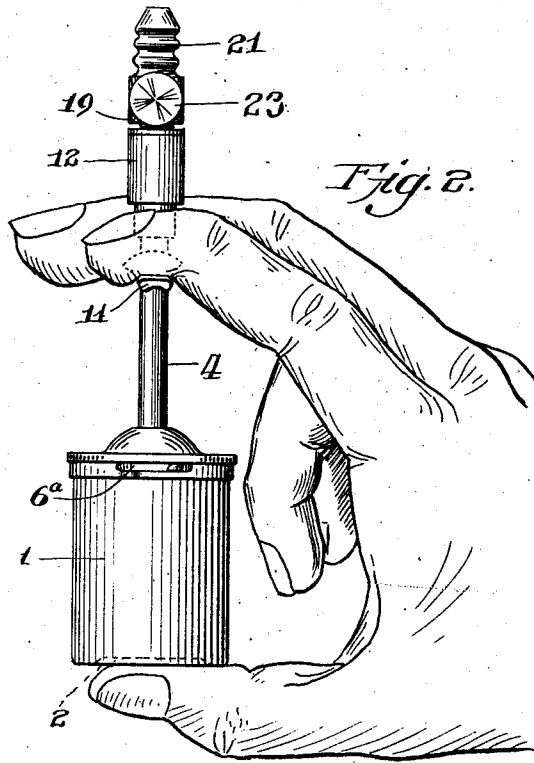
APPLICATION FILED FEB. 6, 1912.

1,054,866.

Patented Mar. 4, 1913.



WITNESSES
[Signature]
C. M. Biddle



INVENTOR

BY

Charles J. Pilling
H. J. Fenton

ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES J. PILLING, OF PHILADELPHIA, PENNSYLVANIA.

AIR-PUMP.

1,054,866.

Specification of Letters Patent.

Patented Mar. 4, 1913.

Application filed February 6, 1912. Serial No. 675,762.

To all whom it may concern:

Be it known that I, CHARLES J. PILLING, citizen of the United States, residing in the city of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Air-Pumps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention has for its object to provide a manually-operated air-pump of small compass, adapted especially for the actuation, by compressed air, of apparatus used in pathological and surgical work, and in which means are provided to use a hollow piston rod and its adjuncts to operate the piston, means to regulate the volume of compressed air delivered through said hollow rod, and to provide a valvular device comprising adjunctive means to attach it to the hollow piston rod, to detachably connect thereto a flexible air-delivery tube, to close communication between said elements when desired, and to open an air-port for the discharge of compressed air from said flexible tube.

To these ends my invention consists of the elements in combination, hereinafter described, constituting an air-pump having the structural and functional characteristics stated.

In the accompanying drawings illustrating the same, Figure 1 is a front elevation; Fig. 2 a side elevation illustrating the mode of holding the device and operating the piston. Fig. 3 a central vertical section, and Fig. 4 a like section, partly in elevation, of some of the elements, detached, but in position to be assembled.

Referring now to said drawings: 1 indicates the cylindrical barrel, preferably provided with a struck-up base 2 to provide a convenient support for a coiled spring 3, which is preferably tapered so that its upper convolution will closely engage the lower end of a hollow piston rod 4. The barrel is closed by a cap 5 having a raised center 5*, and is removably secured by a bayonet joint 6 on its flange. The barrel is packed, or made air-tight, by a packing through which a threaded end of the piston rod passes, and is secured by a centrally perforated nut 6. The packing and its adjuncts consist of an inverted flanged cap 7, a suitably shaped base plate 10, supporting an

annularly disposed spiral spring 9 and a washer 8 of any soft material, the whole being held in assembled relation by the nut 6 on the threaded end of the piston rod.

The pump is adapted to be most conveniently operated by one hand only, and to this end the piston rod is supplied with a pair of grasping handles 11, 11, in order that they may be actuated by the first and second fingers while the base of the barrel is supported by the thumb. Where the device is used in connection with surgical apparatus, this construction, which leaves the other hand of the operator, perfectly free, is found most convenient and useful.

Mounted on the free end of the hollow piston rod 4, and preferably integral therewith, is an interiorly-threaded cup 12, with an aperture in its basal end coinciding with the hollow interior of the piston rod. Said cup is provided to operatively contain a resiliently-operating check valve, constructed as follows, namely, a plunger 12 carries on its lower end a pin 15 which projects through a washer 14, the pin serving as well to centrally dispose the washer and to enter the aforesaid basal aperture in the cup 12, and also enable the washer, when worn, to be readily removed and replaced by a new one. Superposed over the washer and bearing thereon is a spiral spring 16 adapted to be put under compression. A screw 17 is provided with a hub end 18 entering the opposite end of the spiral spring, and is made hollow to afford a passageway for compressed air to be discharged through it from the pump cylinder and its hollow piston rod. The screw 17 is preferably threaded, as shown in Fig. 4, and hence adapted to register with the interior threads of the holding cup to hold the spring in compressed condition, but in any event the parts stated are held in operative position by the threaded end 20 of the element 19 now about to be described. The detail construction of these elements and the method of assembling them will best be understood by reference to Fig. 4 showing the several parts detached and ready to be assembled in the manner stated. It will be apparent from this description that the washer 14 and pin 15 operate as a spring-actuated check valve, normally closing the air-discharge passage between the hollow piston rod and the aperture formed by the hollow binding-screw 17, while opening against the pressure of

the spring when the cylinder piston is actuated to compress and discharge compressed air; and it is obvious that the delivery may, by these means, be adjusted and controlled as desired.

The remaining element of the device consists of what I may call a valvular nipple, shown in detached elevation at top of Fig. 4 and in section, in assembled position at top of Fig. 3. It consists of a longitudinally hollow body portion 19 having the aforesaid threaded lower end 20 adapted to enter and register with the interiorly-threaded cup 12. On its opposite end is provided a corrugated nipple 21 to detachably hold, as usual, a section of rubber tubing, not shown, leading to the desired ultimate point of discharge of compressed air. But in order to enable the operator to use this element to receive and discharge or exhaust through it, in the opposite direction, a return volume of the compressed air, it is provided with an interiorly-threaded hub 24 extending transversely to the body portion 19, and acting as a bearing for a screw-threaded needle valve 22 on the outer end of which is an operating wheel 23. The point of the needle valve 22 is adapted to extend into the hollow interior or air-passage 25 of the body portion and operates to close the said air-passage when suitably actuated by the hand wheel 23. It is obvious that the volume of discharge of compressed air, through the nipple, may be regulated thereby; and cut off entirely when the valvular device is to be employed to discharge, in the opposite direction, a return volume of such air, for which purpose the needle valve is provided with a suitable slot in its periphery which, on rotation, is brought into coincidence with the discharge aperture 26 in the bearing hub 24 of the device.

The operation of the device, the functions of its several parts, and its utility, are obvious from the description.

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

1. An air-pump of the class recited comprising a cylinder, piston, hollow piston rod communicating with the interior of the cylinder, and means to actuate said rod, of adjustable valvular means coincident with the tubular interior of the piston rod, normally

closing said tubular passageway, said means comprising an interiorly-threaded valve casing, a plunger therein carrying a washer and a pin adapted to enter and close the open free end of the hollow piston rod, a coiled spring resiliently acting on said plunger, and a centrally-apertured spring-holding and adjusting screw engaging interiorly the opposite threaded end of the valve casing.

2. An air pump of the class recited comprising in combination with a cylinder, piston, hollow piston rod communicating with the interior of the cylinder, with means to actuate the same, of means to regulate the delivery of compressed air through the piston and hollow piston rod and also to prevent its return to the cylinder, said means comprising an interiorly threaded valve casing operatively coincident at its lower end with the tubular interior of the piston rod, and a centrally-apertured screw nut adapted to enter its opposite end; a plunger carrying a washer and a pin, with a spiral spring adapted to be adjustably tensioned by said apertured screw nut, and constituting an adjustable and resiliently-acting check valve in said casing, normally closing the air-passage of the piston rod, and a valve-controlled tubular air-delivery means operatively engaging the opposite end of said check-valve casing.

3. In a device of the class recited, the combination with a piston cylinder, hollow piston rod, and devices to reciprocate said two last-mentioned elements, of tubular means communicating with the delivery end of the hollow piston rod, said means comprising a hollow valve body provided with an alining corrugated nipple, and a transversely-disposed hub, threaded interiorly and having an aperture in its periphery, a threaded and slotted needle-valve and means to operate it mounted on said threaded hub, whereby it may be rotatively brought into closing rotation to said nipple and into register with said aperture in the hub to discharge compressed air through the same.

In testimony whereof, I have hereunto affixed my signature this 31st day of January A. D. 1912.

CHARLES J. PILLING.

Witnesses:

A. M. BIDDLE,
R. A. DUNLAP.