

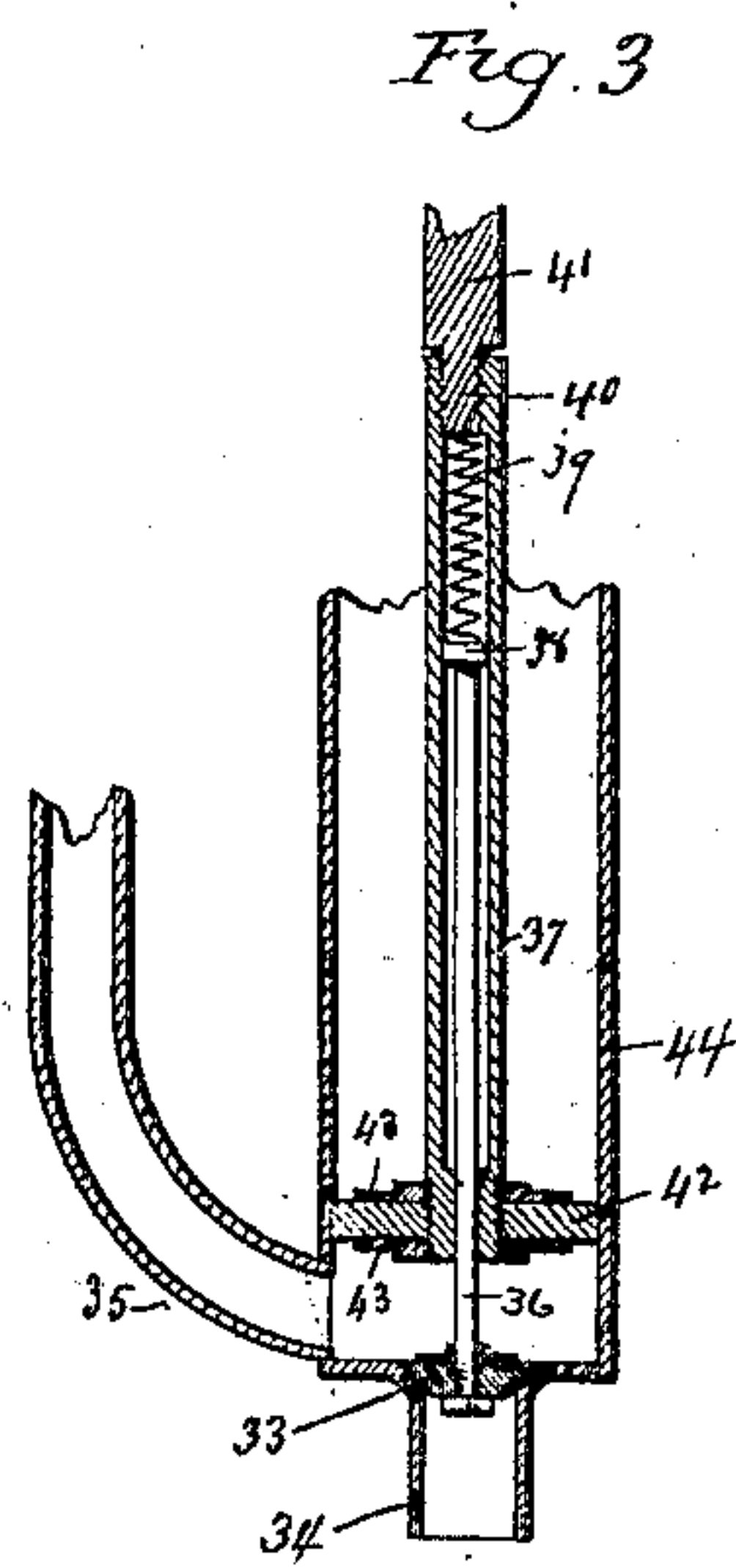
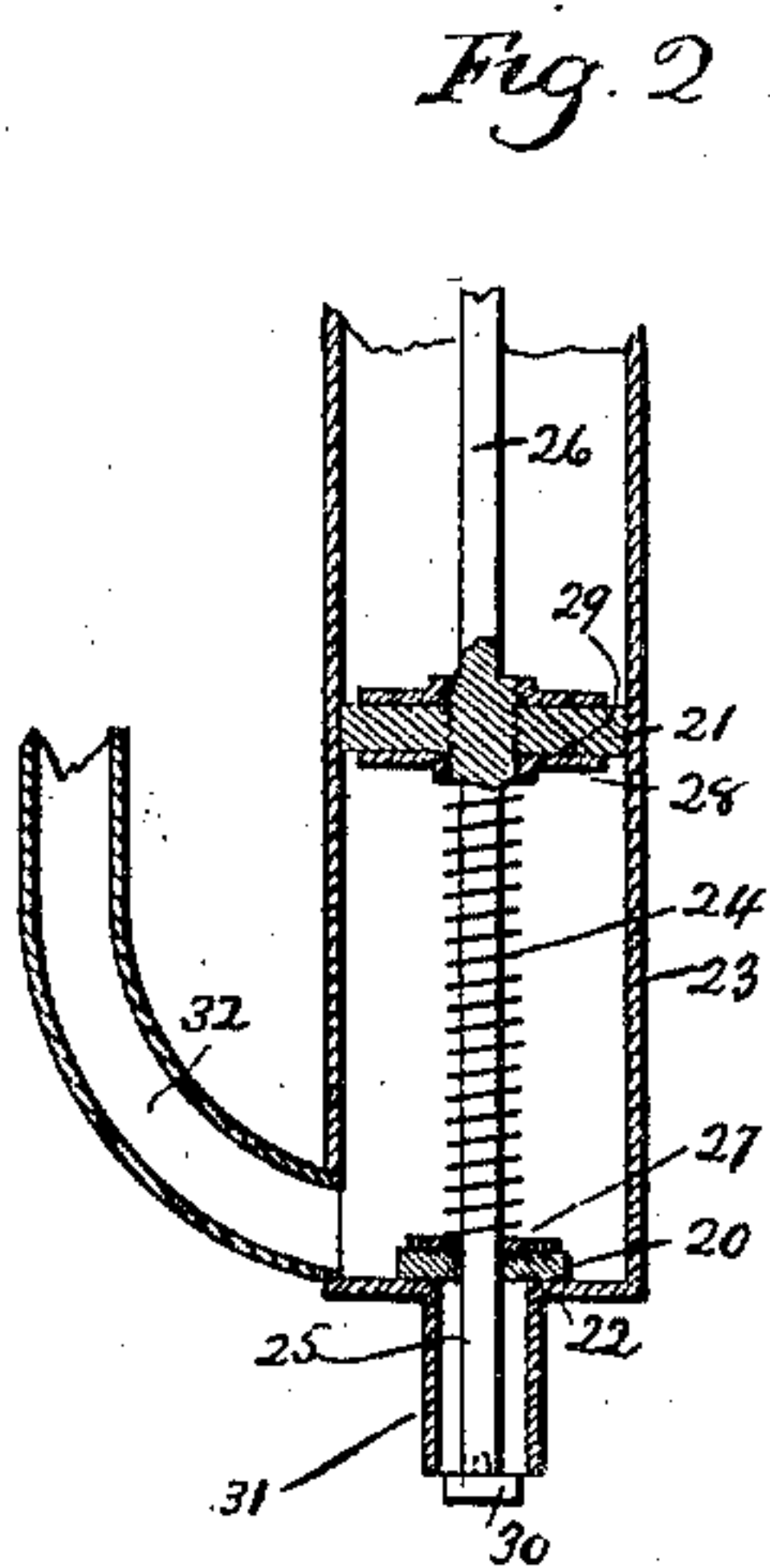
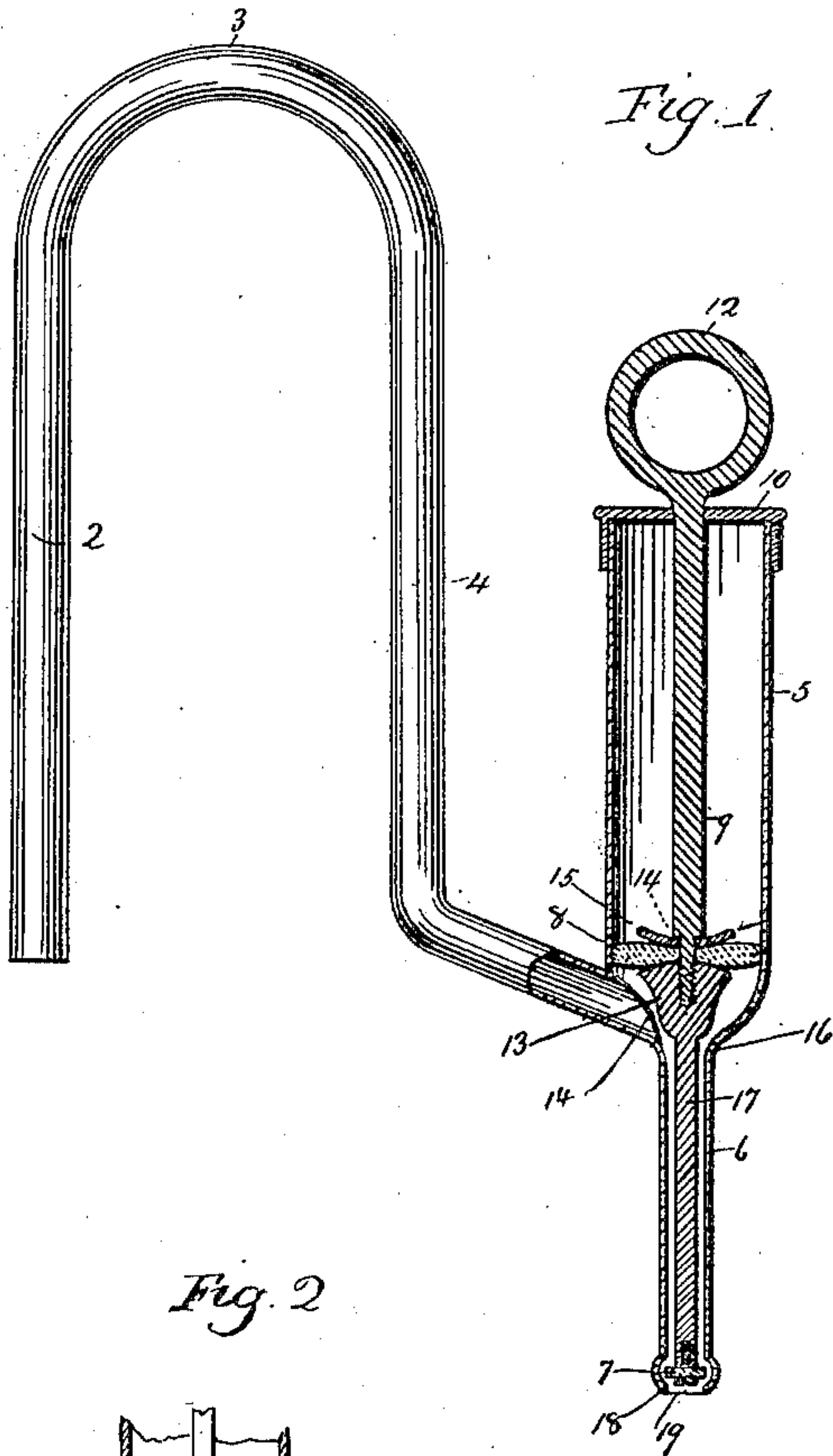
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Patented Dec. 17, 1901.

D. A. KREIDER.
SIPHON.

(Application filed May 1, 1901.)

(No Model.)



Witnesses.
J. H. Shumway
Lillian D. Kelsey.

David Albert Kreider.
Inventor.
C. atty Seymour Earle

UNITED STATES PATENT OFFICE.

DAVID ALBERT KREIDER, OF NEW HAVEN, CONNECTICUT.

SIPHON.

SPECIFICATION forming part of Letters Patent No. 689,006, dated December 17, 1901.

Application filed May 1, 1901. Serial No. 58,306. (No model.)

To all whom it may concern:

Be it known that I, DAVID ALBERT KREIDER, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Siphons; and I do hereby declare the following, when taken in connection with the accompanying drawings and the figures of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a view, partly in plan and partly in vertical section, of one form which my improved siphon may assume. Figs. 2 and 3 are broken views, in vertical section, of two of the modified forms which the invention may assume.

My invention relates to an improvement in siphons, the object being to produce a simple, compact, and convenient siphon composed of few parts, adapted for laboratory or domestic use, and constructed with particular reference to avoiding the necessity of applying the mouth or the finger to any of its openings to start it and to providing for the regulation of its flow.

With these ends in view my invention consists in a siphon having certain details of construction and combinations of parts, as will be hereinafter described, and particularly recited in the claims.

In carrying out my invention as shown in Fig. 1 the siphon is formed by bending a glass tube and comprises an inlet end 2, a reach 3, and a discharge end 4. To the discharge end 4 of the siphon I apply a vertically-arranged pump having a cylinder 5, the volume of which is determined by that of the siphon-tube and the height over which the liquid is to be raised. The lower end of the said cylinder 5 is contracted and extended in the form of a tube 6, expanded near its mouth by an outwardly-projecting bead or groove to form a clearance-space 7, and virtually forming an extension of the discharge end of the siphon. The discharge end of the siphon enters the cylinder 5 at the contracted lower end thereof and just above the upper end of the tube 6. Within the cylinder 5 I locate a piston 8, which is connected with the lower end of a piston-rod 9, the upper end of which passes through a removable cap 10, applied

to the upper end of the cylinder, and is furnished with a ring-like handle 12. For the attachment of the piston 8 the lower end of the rod is reduced in diameter to form a stem 13, which is threaded, and also to form a shoulder 14 at the base of the said stem. A concavo-convex washer 15, abutted against the shoulder 14, has the upper face of the piston 8 placed against it, the piston being held against the washer by means of a bell-shaped head 16, receiving the end of the threaded stem 13 and having its upper face convexed or rounded. The said head 16 is formed at the upper end of a long valve-rod 17, substantially corresponding to the length of the tube 6, before mentioned, and provided at its extreme lower end with a valve 18, held in place by a screw 19. The said valve 18 is adapted in diameter to close the tube 6 except when it is brought into its lowest position, in which it occupies the clearance-space 7 at the lower end of the tube. Under this construction the valve 18 is connected with the piston 8 and piston-rod 9 and is moved simultaneously therewith in either direction and to the same extent. The location of the piston 8 between two convex surfaces enables me to employ a piston larger in diameter than the internal diameter of the cylinder 5 and permits the piston to very readily accommodate itself to changes in the direction of its movement as the piston-rod is moved up and down, at which time the edges of the piston will, so to speak, "drag" in the opposite direction. When the piston is changing its direction at either end of its stroke, it will be compressed and slightly reduced in diameter, causing its upper and lower faces to bulge, as shown in the drawings. The convex surfaces between which the piston is interposed give it room for its reversing movement and also for its thickening under inward compression.

Under the construction above described when the piston-rod 9 is pulled upward the piston 8 acts to produce the requisite degree of exhaustion within the cylinder 5 to start the siphon, the valve 18 operating to close the lower end of the tube 6 and prevent the entrance of any air into the cylinder 5 or into the siphon immediately after the beginning of the upward movement of the piston.

When the piston has reached the limit of its upward excursion, the valve 18 will be located within the lower end of the cylinder 5 and above the upper end of the tube 6. The valve 18 will therefore not interfere with the free action of the siphon, the discharge of which into the cylinder will be below it. However, the valve 18 may be used as a regulator to control the passage of the fluid through the siphon by moving it downward more or less, so as to contract the virtual area of the upper end of the tube 6. By forcing the piston downward at any time the liquid in the siphon may be driven out through the inlet end or short leg thereof, the tube 6 being closed at this time by the downward movement of the valve 18 into it. When the piston-rod has been pushed downward to the limit of its downward movement, the valve 18 will be brought into registration with the clearance-space 7 at the lower end of the tube 6, whereby the discharge end of the siphon and the cylinder 5 will be permitted to drain clean.

In the modified construction shown by Fig. 2 of the drawings the valve 20 does not partake of all of the movement of the piston 21, but is normally held upon its seat 22 in the lower end of the pump-cylinder 23 by means of a spiral spring 24, encircling a valve-rod 25, passing freely through the said valve and constituting an extension of the piston-rod 26, the lower end of the said spring impinging upon a washer 27, resting upon the valve, and the upper end of the spring impinging against one of the two heads 28, between which the piston 21 is interposed and which are applied to a threaded enlargement or hub 29 at the lower end of the piston-rod proper, 26. The lower end of the valve-rod receives a screw 30, having a head smaller in diameter than the discharge-tube 31 located at the lower end of the cylinder 23 and constituting an extension of the discharge end of the siphon.

When the piston-rod is lifted for the production within the cylinder 23 of the requisite degree of exhaustion to start the siphon, the valve 21 will be held upon its seat 22 by the spiral spring 24 until the head of the screw 30 in the end of the valve-rod engages with the lower face of the valve, after which the valve will be lifted so as to permit the fluid entering the lower end of the cylinder 23 from the discharge end 32 of the siphon to pass out through the discharge-tube 31 of the pump. After the siphon has been started the rapidity of the discharge through it may be regulated by adjusting the position of the valve 22, the same as described for the construction shown by Fig. 1. In this modified construction also all of the liquid in the siphon may be discharged through the inlet end thereof by forcing the piston downward. It will be seen that in this modified construction the piston-rod of the pump controls a valve which provides for closing the discharge

end of the siphon when the initial exhaustion thereof is being secured.

In the construction shown by Fig. 3 of the drawings the valve 33, which is seated in the discharge-tube 34, virtually constituting an extension of the discharge-end 35 of the siphon, is rigidly secured to the lower end of a valve-rod 36, the upper end of which extends upward into the piston-rod 37, which in this case is hollow and larger in internal diameter than the external diameter of the valve-rod, which is furnished at its extreme upper end with a head 38, the upper face of which is impinged upon by the lower end of a spiral spring 39, the upper end of which impinges against the inner end of a threaded stem 40, entered into the upper end of the piston-rod 37 and formed at the lower end of the handle portion 41 of the rod. The lower end of the tubular piston-rod 37 has the valve-rod 36 closely fitted into it and forms an abutment for the head 38 at the upper end of the said valve-rod and carries a piston 42, located between two washer-like heads 43 43, of any approved construction and application. In the operation of this form of my improved siphon the valve 33 is held upon its seat by the action of the spring 39 when the piston 42 is being lifted in the cylinder 44 for obtaining the requisite degree of exhaustion to start the siphon. When, however, the lower end of the tubular piston-rod 37 is brought into engagement with the head 38 at the upper end of the valve-rod, the same will be lifted, and with it the valve, the lifting of which will virtually open the discharge end of the siphon, the flow of which may be regulated by raising or lowering the valve over its seat. In this modified construction also the valve controlling the discharge end of the siphon is itself controlled and operated directly from the piston-rod.

It is apparent from the modifications shown and described and from others that may obviously be made that in carrying out my invention I may make changes from the constructions shown and described herein. I do not therefore wish to be understood as limited to the precise details of construction herein shown, but hold myself at liberty to make such alterations as fairly fall within the spirit and scope of my invention.

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

1. The combination with a siphon, of a pump located at the discharge end thereof, and a valve connected with a movable part of the pump and operated thereby for opening and closing the discharge end of the siphon.

2. The combination with a siphon, of a pump located at the discharge end thereof, and comprising a cylinder, a piston, and a piston-rod, and a valve connected with the said piston-rod and operated thereby in opening the discharge end of the siphon.

3. The combination with a siphon, of a pump

located at the discharge end thereof, and a valve connected with a movable part of the pump and operating to open the discharge end of the siphon, and arranged also to act as a regulator for the flow thereof.

4. The combination with a siphon, of a pump located at the discharge end thereof, and comprising a cylinder, a piston located therein, and a piston-rod, a tube forming an extension of the discharge end of the system, a valve-rod connected with the said piston-rod and extending downward in the said tube, and a valve located at the lower end of the valve-rod and movable up and down in the said tube and in the lower end of the cylinder.

5. The combination with a siphon, of a pump located at the discharge end thereof, and comprising a cylinder, a piston located therein, and a piston-rod for the said piston, a tube constituting an extension of the discharge end of the siphon, and formed at its lower end with a clearance-space, a valve-rod forming an extension of the piston-rod, and a valve applied to the lower end of the valve-rod and registering with the said clearance-space for the drainage of the discharge end of the siphon

and the pump when the piston and valve rods are at the limit of their downward movement.

6. The combination with a siphon, of a pump located at the discharge end thereof and comprising a cylinder, a piston located therein, and a piston-rod for the said piston, a tube constituting an extension of the discharge end of the cylinder and formed at its lower end with a clearance-space, a valve-rod forming an extension of the piston-rod, and having its upper end formed with a head, the upper end of which is convexed, a valve applied to the lower end of the valve-rod, and a washer applied to the piston-rod and presenting a convex face to the piston which is interposed between the said face and the convex upper face of the head at the upper end of the valve-rod.

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

D. ALBERT KREIDER.

Witnesses:

FREDERIC C. EARLE,
LILLIAN D. KELSEY.