(No Model.)

D. S. WALLACE.

AUTOMATIC SIPHONING DEVICE.

No. 591,067. Patented Oct. 5, 1897.

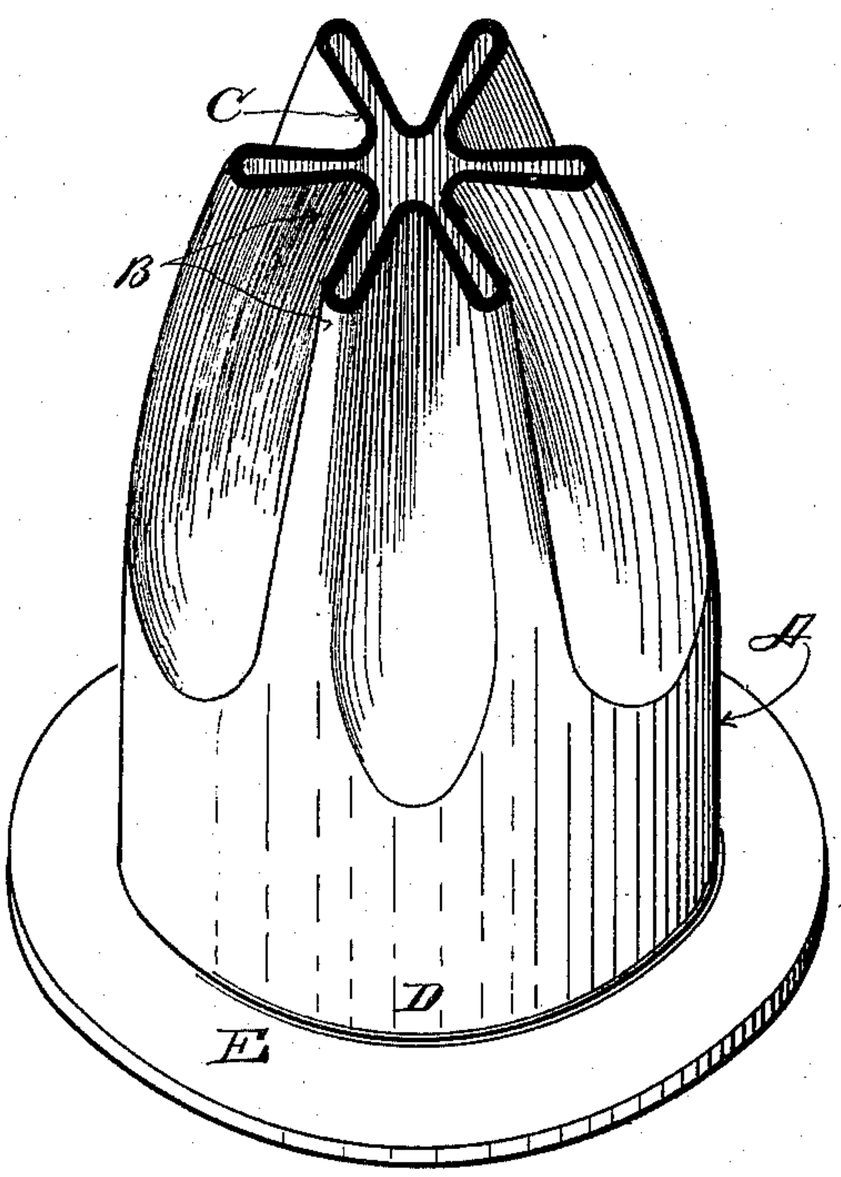

Fig. 1.

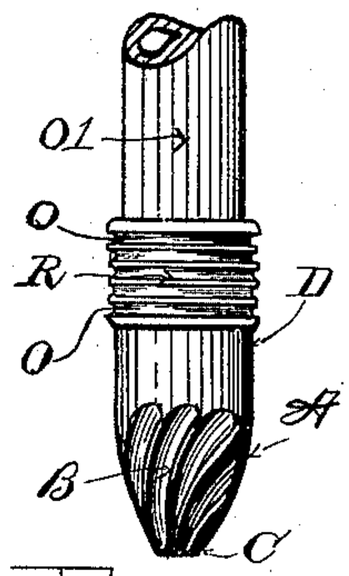

Fig. 4.

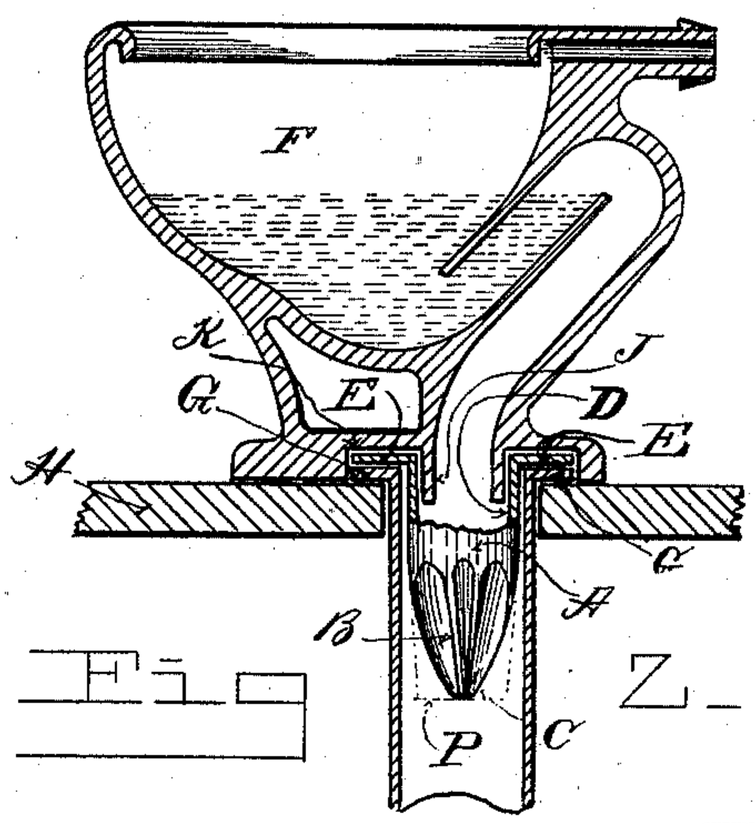

Fig. 3.

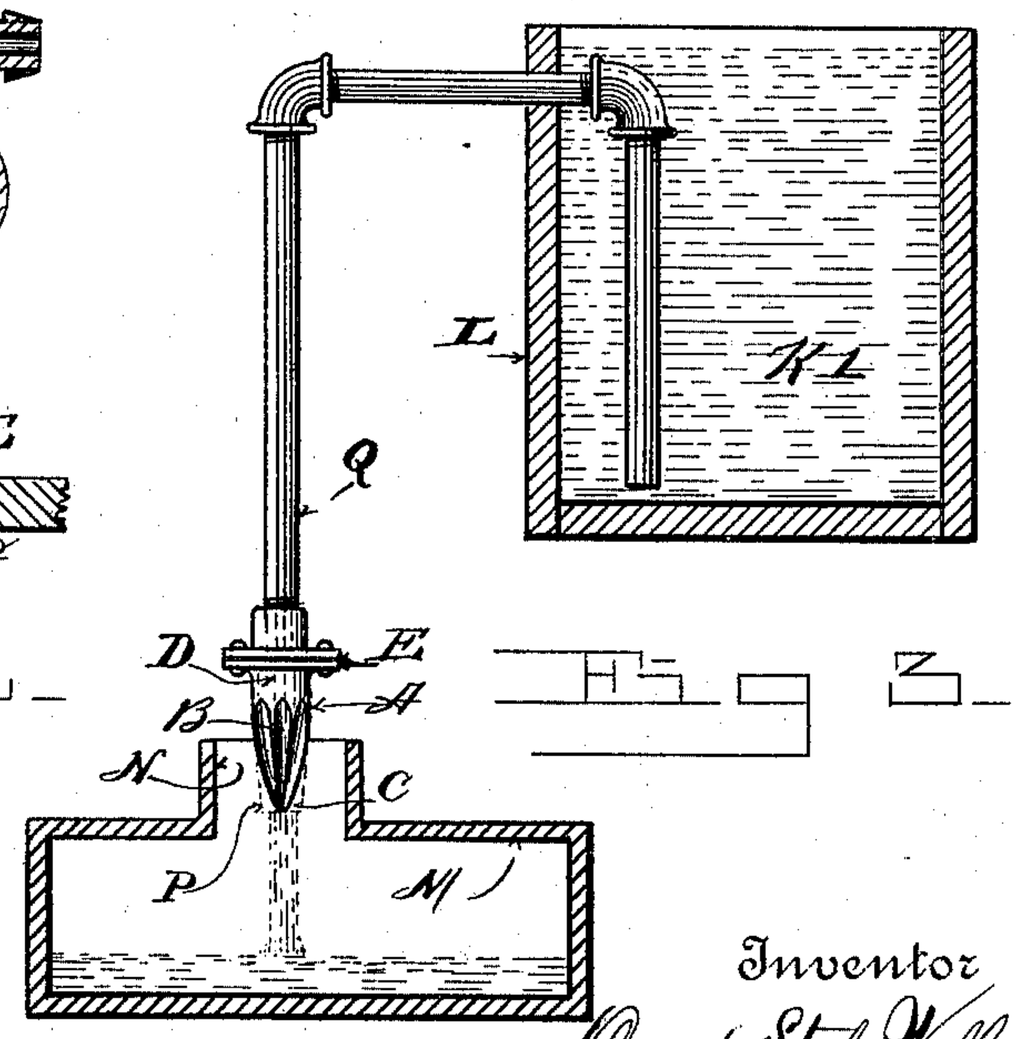

Fig. 2.

Witnesses

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AUTOMATIC SIPHONING DEVICE.

SPECIFICATION forming part of Letters Patent No. 591,067, dated October 5, 1897.

Application filed December 12, 1896. Serial No. 615,528. (No model.)

To all whom it may concern:

Be it known that I, DAVID STEEL WALLACE, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Automatic Siphoning Devices; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to an improved automatic siphoning device which is adapted to be connected to the terminal end of the discharge-passage in water-closets, flushing-tanks, reservoirs, and to the end of any delivery-passage through which a body of liquid is to be transported from one place to another; and the object of my invention is to provide a terminal end for discharge-passages which is normally contracted to a small aperture, but which possesses the power to expand under the pressure of the liquid as the size of the discharging stream of liquid increases to the full size of the discharge-passage and to contract in size as the size of the stream decreases—in other words, to provide a device which will automatically adjust itself to fit with a resilient pressure any sized stream of liquid flowing through it and will prevent any air whatever from entering the passage while the stream is flowing. I attain this object by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents a perspective view; Fig. 2, a cross-section of a water-closet bowl, showing the siphoning device connected to the terminal nipple of its discharge-passage. Fig. 3 is a sectional view showing the siphoning device connected to a discharge-outlet of a reservoir or tank, and Fig. 4 a view of a siphoning device provided with a nipple-connecting end instead of a flange.

Similar letters of reference refer to similar parts throughout the several views.

Referring to Fig. 1, A designates the siphoning device. It comprises a flexible sleeve constructed, preferably, of rubber, the discharge end of which is concentrically converged and contracted to a small orifice and its circumference formed or molded into a number of flute-shaped waves or corrugations B, which extend from the contracted end C axially toward the inlet or connecting end D several inches. The flutes or corrugations are preferably made of approximately equal breadth and depth and in close successive order around the entire circumference of the device. This gives to this end of the device the appearance of a fluted cone-shaped tube. I have illustrated the flutes in Fig. 1 extending parallel with the axis of the sleeve, but they could be arranged spirally, as shown in Fig. 4, and possibly with advantage in some cases, as the spiral arrangement might check to some extent the velocity of the flow and cause the water to exert a greater lateral pressure upon the inner walls of the sleeve and thus make a tighter fit of the discharging end of the sleeve against the flowing column of water.

E designates a flange which I form on the connecting end of the siphoning device when it is used on the discharge-passage of water-closets. These are generally provided with an integral depending discharge-nipple portion J. I also use a flange to connect the ends of all discharge-pipes having a flanged terminal end, as shown in Fig. 3.

In Fig. 2 I illustrate my automatic siphoning device secured to the discharging-nipple of the discharge-passage of a water-closet bowl. In this view F designates the water-closet bowl, A the siphoning device, and G the brass ring and top of the soil-pipe. This ring is screwed down to the floor H, and the flange E of my siphoning device rests directly on top of the ring and between it and the surface of the closet in the recess K, formed in the base, and when the closet is screwed down tight the flange E is clamped tightly to the ring. The body of the siphoning device depends from around the discharge-nipple J down into the soil-pipe, its discharging end being entirely free and independent of it.

In Fig. 3 I represent the siphoning device secured to the end of a discharge-pipe Q, which is arranged to siphon the water K′ from tank L into tank M. The opening N of tank

M is much larger than the siphoning device, which is suspended in open space at the mouth of the opening N.

In Fig. 4 I illustrate the siphoning device with a connecting end R of increased diameter, which is adapted to be stretched over the ends of pipes. It is provided with circumferential grooves O, in which wires may be wound to secure a device to the pipe O′, or in place of wires a common form of metal hose-clamp may be used for securing this form of connecting the end to the end of the pipe.

The operation of the siphoning device is automatic and is as follows: When the water either in the bowl or closet or in the tank L first begins to overflow into its respective discharge-passage, it runs down through the siphoning device, and as the normal area of the central and radial outlets in the ribs and between the flutes in the discharging end is very small only a small amount of water can flow through it. The remainder of the water backs up in the discharge-passage, and as it flows carries out any remaining air and a perfect siphon is created, and as the pressure of the column of discharging water increases the flutes or corrugated folds of the device begin to expand gradually and move concentrically outward, thus increasing the size of the outlet or orifice. This expansion of the orifice continues under the continual increasing column of water until the column of water passing through the siphoning device is nearly as large as the area of the discharge-passage, as shown in the dotted lines P, Figs. 2 and 3.

The pressure of the entire fluted end of the siphon device against the column of water flowing through it is caused by the resilient property of the material of which the device is made, although I preferably use rubber, as it is flexible, pliable, and elastic and maintains at all times an absolutely air-tight contact against the column of water until the normal position of the fluted portion is reached, when the siphon is broken, when used on a water-closet, by the admittance of air into the short leg of the siphon.

In the case of the closet while the soil-pipe is fitted with a perfectly air-tight joint to the closet's base there is always air enough in the pipe coming from the sewer to operate the siphoning device. These automatic siphoning devices are especially adapted for use on water-closets having a very short siphon-leg, as shown in Fig. 2, while they can be made in various sizes for large reservoirs or for flushing-tanks and for laboratory use. They may also be made of any desirable form of cross-section, such as square or polygonal.

I do not wish to be confined to the exact form and arrangement of the siphoning device as herein shown, as many changes are possible without departing from the spirit of my invention.

Having described my invention, what I claim as new is—

1. In a siphoning device a tubular, flexible sleeve having one end adapted to be connected to the discharging terminal end of liquid-discharging passages, pipes and conduits, and a normally-converged, opposite discharging end adapted to automatically enlarge under co-acting internal varying pressures of the liquid and the constant external pressure of the elastic material of which the siphon device is made, substantially as described.

2. A siphoning device consisting of a flexible and elastic rubber sleeve provided with a connecting end adapted to be secured to the terminal ends of discharging-passages, conduits and pipes, and a discharging end molded or formed into a plurality of flexible, corrugated-shaped folds or flutes, the bottoms of which approach close to the sleeve's axis and normally contract the internal area of the sleeve at its connecting end to a very small discharging-orifice, the said flutes being adapted to unfold concentrically under internal pressure of water running through said sleeve and to contract under the elastic pressure of the sleeve as the pressure of the water decreases, substantially as described.

3. A siphon device comprising a pliable rubber conical-shaped sleeve having its apex molded into a series of flutes adapted to normally diminish its discharging end to a small orifice and arranged and adapted to expand and enlarge under the pressure of water flowing through it and to maintain through the external pressure of the rubber sleeve an air-tight contact with the flowing water, and a flange upon the inlet end at approximately right angles to the body of the sleeve.

4. In an automatic siphoning device, the combination of a pliable and elastic conical-shaped sleeve having one end arranged and adapted to be connected to the discharging-outlets of water-closet bowls and its discharging end provided with a plurality of radially-disposed ribs and intervening flute-shaped depressions extending either axially or spirally from the discharging end along a portion of the sleeve's length, the said depressions converging concentrically at the end in close proximity to the axis of the sleeve and leaving a very small central outlet-orifice with narrow radial outlets extending into said ribs, the said ribs and depression being adapted under the coöperating influence of the liquid flowing through it and the resilient pressure of the conical rubber sleeve upon its external surface to maintain a perfect siphon in the discharge-passage.

In testimony whereof I affix my signature in presence of two witnesses.

DAVID STEEL WALLACE.

Witnesses:

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EDITH E. RAYMOND.