(No Model.)

H. S. DURAND.

PORTABLE SIPHON.

No. 453,628. Patented June 9, 1891.

Fig. 1.

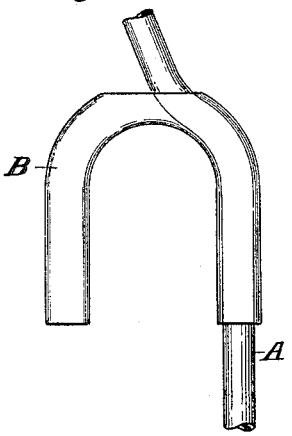


Fig. 2.

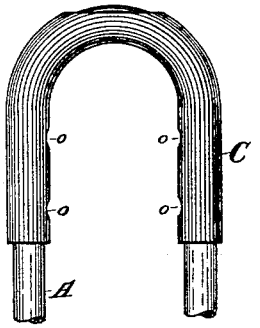


Fig. 3.

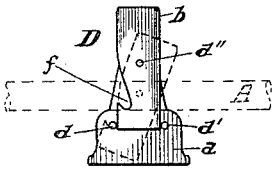


Fig. 4.

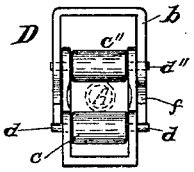


Fig. 5.

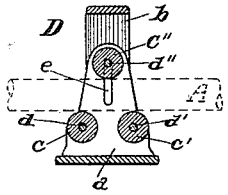


Fig. 6.

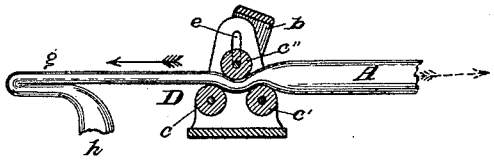
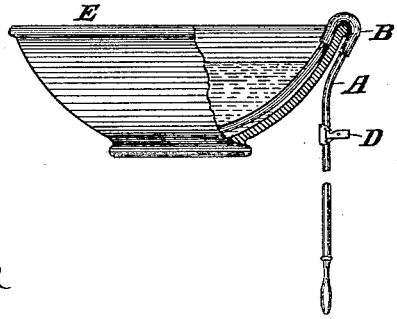


Fig. 7.



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UNITED STATES PATENT OFFICE.

HENRY S. DURAND, OF ROCHESTER, NEW YORK.

PORTABLE SIPHON.

SPECIFICATION forming part of Letters Patent No. 453,628, dated June 9, 1891.

Application filed April 19, 1890. Serial No. 348,744. (No model.)

To all whom it may concern:

Be it known that I, HENRY S. DURAND, a citizen of the United States, residing in the city of Rochester, county of Monroe, and State of New York, have invented certain new and useful Improvements in Portable Siphons, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to the improvements in portable siphons hereinafter described and claimed; and the object of my invention is to provide a siphon which shall be easily used and operated and which shall be cheap, compact, and not liable to get out of order.

In the accompanying drawings, forming part of this specification, in which similar letters refer to similar parts throughout the several views, Figure 1 shows the U-shaped tube of glass with the flexible tube drawn through one leg of the U-tube and through the hole in the bend thereof. Fig. 2 shows the U-shaped tube of elastic material having notches cut on the inner sides of the legs of the U-tube with the flexible tube drawn completely through it. Fig. 3 shows a side elevation of my siphon-starter, the solid lines showing the positions of the parts when it is open and the dotted lines showing the positions when it is closed. Fig. 4 shows a front elevation of my siphon-starter when open. Fig. 5 shows a vertical section of my siphon-starter when open. Fig. 6 shows a vertical section of my siphon-starter closed upon a flexible tube. Fig. 7 shows my siphon in position on an ordinary basin ready for use.

A represents a flexible collapsible tube.

B represents a U-shaped tube of a bore at least as large as the outside diameter of the flexible tube A and having a portion of the outer side of the bend cut away.

C represents such a U-shaped tube made of an elastic material and having notches *o o* formed on the inner sides of the legs of the tube.

D represents my siphon-starter, having a frame formed in two parts *a* and *b* and rollers *c c' c''*.

E represents an ordinary washing-basin containing water.

My device in its ordinary form consists in an ordinary flexible soft india-rubber tube and one or both of two additional devices—viz., a U-shaped tube fitting outside of the soft-rubber tube and a siphon-starter.

In my device the U-shaped tube is made of glass, vulcanized india-rubber, or of other suitable material, and is used to form and retain a bend in the soft india-rubber tube, and in addition to form a hook, so that the soft india-rubber tube may be hung upon the rim of an ordinary domestic vessel without slipping out, as would be the case whenever the weight of the long leg of the siphon outside of the vessel is greater than the weight of the short leg.

In order that the soft tube may be easily inserted in the U-tube, I remove a portion of the material of the U-tube from the outer side of the bend thereof, so that the soft tube may be inserted into the end of one leg and may be forced through this leg and out of the hole made by removing this material. The soft tube may then be turned and inserted again through this hole, and so out through the other leg. This is a much easier operation than forcing the soft tube directly around the bend of the U, as in this latter case the friction between the inner tube and the outer tube is very great, and the flexibility of the inner tube makes it bend and buckle while undergoing this treatment. When this U-tube is made of vulcanized india-rubber or of other similarly-elastic material, I cut notches or serrations on the inner sides of the legs of the tube, (see *o o*, Fig. 2,) which enable the legs of the U-tube on being sprung apart to grasp the molding or other irregularity of the rim of a vessel to which it may be applied, and thus the siphon will more certainly remain in the described position. The use of a U-tube is advantageous in that it supports the flexible tube throughout the bend thereof and prevents the flexible tube from being obstructed by kinks or abrupt bends.

My siphon-starter D, Figs. 3 to 6, is formed of two frame-pieces of sheet metal *a* and *b*, each bent into the form of three sides of a parallelogram or into U form. One of these parts *a* has journaled in it two parallel transverse rollers *c c'*, and the ends of the pins *d d'*, on which these rollers revolve, preferably project slightly outside of the frame *a*. In each of

the legs or side pieces of this frame *a* I make a vertical slot *e*. The other frame-piece *b* (at a suitable point between the bend and the ends of the legs thereof) has journaled in it a transverse roller *c''*, so set that its axis shall be parallel to the axes of the rollers *c c'*. This roller *c''* is of the same length as the rollers *c c'*. The frame-piece *b* is of such size and is so bent that the legs or side pieces will fit either outside or inside of the slotted legs of the other frame-piece *a*. The roller *c''* is journaled on a pin *d''*, which passes through it and projects on either side through the slots in the other frame-piece and into the fixed bearings in the legs of the frame-piece *b*. The legs of the frame-piece *b* are of such width that they may slide easily between the pins *d d'*, which thus form guides to determine the limits of the motion of the piece *b*. On the sides of the legs of this frame-piece and near the ends are cut suitable notches *f f*, which are so placed that these notches will, when the siphon-starter is closed, engage with the ends of the pin *d* upon turning the piece *b* slightly about the axis *d''*. The roller *c''* is so placed in the frame *b* and the slots *e e* are of such length that the roller *c''* may be moved away from the rollers *c c'* so far that a soft india-rubber tube of suitable diameter may be drawn through this space without any compression.

The operation of the siphon-starter is as follows: A soft india-rubber tube A is pushed into the space between the roller *c''* and the rollers *c c'*. A sharp bend is then made in the tube A, as shown at *g*, Fig. 6. The frame-piece *b* is then pushed down so that the roller *c''* compresses the tube A against the rollers *c c'* and forces the compressed tube into a slight curve, and this compression should be sufficient to collapse the tube A and bring its flattened walls into contact. The frame-piece *b* is turned slightly about the axis *d''*, and the notches *f f* engage the ends of the pin *d*, thus retaining this position of the rollers and retaining the compression of the tube. (See Figs. 3 and 6.) The tube A is then pulled through the siphon-starter in the direction of the arrow in Fig. 6. The rollers revolve, and thus permit this operation to be easily performed. The air in the tube A will be forced out of the tube in the direction of the dotted arrow in Fig. 6, and while the bend *g* is retained no air can enter that part of the tube between the bend *g* and the position of the siphon-starter. If now while the siphon-starter remains closed the end *h* of the flexible tube is placed in a vessel of fluid and the bend *g* is released, the fluid will rush into the partial vacuum, and if the flexible tube A, with its **U**-tube B, is placed in the position shown in Fig. 7 by releasing the notches *f f* and allowing the siphon-starter to open into the position shown in Fig. 4 the fluid will flow in a continuous stream through the siphon thus made, or one end of the flexible tube may be placed in the fluid. The siphon-starter is closed on the tube as near as may be convenient to the liquid, and is then moved along the tube away from the liquid. This will expel the air from the tube and the fluid will rush into the tube and follow the siphon-starter. When the siphon-starter is opened, the fluid will flow continuously through the siphon formed by the flexible tube and the bent **U**-tube.

The parts of the siphon-starter are so adjusted to slide upon each other that the elasticity of an ordinary soft india-rubber tube will open it when the notches *f f* are disengaged from the pin *d*.

My siphon-starter is formed as above described, so as to be operated, closed, locked, unlocked, and opened by one hand of the operator, his other hand being left free to hold the flexible tube in any desired position. This is of great advantage over other devices where the adjustment of the rollers to close upon the tube or to lock in the closed position requires the use of both hands of the operator for this purpose. If necessary to unfasten the screw which holds the compressing parts together, it will be found needful to hold the siphon-starter with one hand while the other hand is used to unfasten the screw, and it will be impossible at the same time for one operator to hold or direct the flexible tube. If when my siphon-starter is open, the thumb is placed on the frame-piece *b* and a finger is placed under the frame-piece *a*, the pressure of the fingers will close the rollers on the tube, and the parts are easily locked together by moving the thumb backward or forward, as the case may be, thus causing the frame-pieces to oscillate on the pin *d''* and permitting the notches *f f* to engage the projecting ends of the pin *d*. To open the device the frame-pieces are pressed together by the fingers and are unlocked by a slight movement of the fingers, causing the frame-pieces to oscillate, as aforesaid, and permitting the notches *f f* to disengage from the ends of the pin *d*, and then the elastic expansion of the india-rubber tube will force the rollers apart and will allow free way to the liquid to be moved.

I prefer the use of three rollers in my siphon-starter, since this arrangement requires less pressure to close the tube completely than where only two opposing rollers are used, and is more easily operated than in the latter case. It is evident that the same functions may be performed by my siphon-starter when one roller is used instead of the two *c* and *c'*, as shown in the drawings. In other words, two opposed rollers can be used in my siphon-starter instead of three.

What I claim is—

1. In a portable siphon, the combination of a flexible tube and a bent **U**-tube of more rigid material fitting outside of the flexible tube and adapted to form and retain the bend in the flexible tube, the **U**-tube having a hole in the outside of the bend thereof, and hav-

ing notches or serrations formed on the inner side of the legs thereof, for the purposes described.

2. In a siphon-starter, the combination of a frame-piece, one or more transverse rollers journaled therein, and another frame-piece sliding upon the first and movable to and from the same and a transverse roller journaled therein, the two frame-pieces connected by transverse bearings on which the same oscillate with reference to each other, together with means for locking the two frame-pieces by an oscillatory movement in a closed position on a flexible tube.

3. In a siphon-starter, the combination of a frame-piece provided with transverse smooth or anti-friction surfaces, and another frame-piece loosely connected to the first and movable to and from the same and provided with smooth or anti-friction surfaces opposed to the anti-friction surfaces of the first frame-piece, the two frame-pieces connected by transverse bearings on which the same oscillate with reference to each other, together with means for locking the two frame-pieces by an oscillatory movement in a closed position on a flexible tube.

4. In a siphon-starter, the combination of a frame-piece having suitable projections on the sides thereof, one or more transverse rollers journaled therein, and another frame-piece provided with notches adapted to engage the projections on the first frame-piece, and a transverse roller journaled in said second frame-piece, the two frame-pieces adapted to slide upon each other and connected by transverse bearings on which the same oscillate with reference to each other, whereby the same are adapted to be closed upon a flexible tube and said notches may be caused to engage with said projections.

5. In a siphon-starter, a frame-piece *a*, having slots *e e* in the sides thereof and having projections upon said sides, with one or more transverse rollers *c c'* journaled in said frame-piece, in combination with a frame-piece *b*, and a roller *c''*, journaled in said frame-piece *b*, the axis of said roller *c''* passing through said slots *e e*, and notches in said frame-piece *b*, adapted to engage with said projections to retain the same in a predetermined position.

6. In a siphon-starter, a frame-piece *a*, having slots *e e* in the sides thereof, with one or more transverse rollers *c c'* journaled in said frame-piece, the bearings of one of said rollers *c c* passing through said frame-piece, in combination with a frame-piece *b*, and a roller *c''*, journaled in said frame-piece *b*, the bearings of said roller *c''* passing through said slots *e e*, together with notches in said frame-piece *b*, adapted to engage with the projecting ends of one of said rollers *c c'* to retain the same in a predetermined position.

7. In a siphon-starter for portable siphons, the combination of two frame-pieces sliding upon each other on transverse bearings, with opposing parallel rollers journaled in said frame-pieces adapted to compress a flexible tube, and provided with a latch suitable to be operated by continuous pressure and movement of the fingers for closing and fastening said rollers in a position to compress said tube.

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