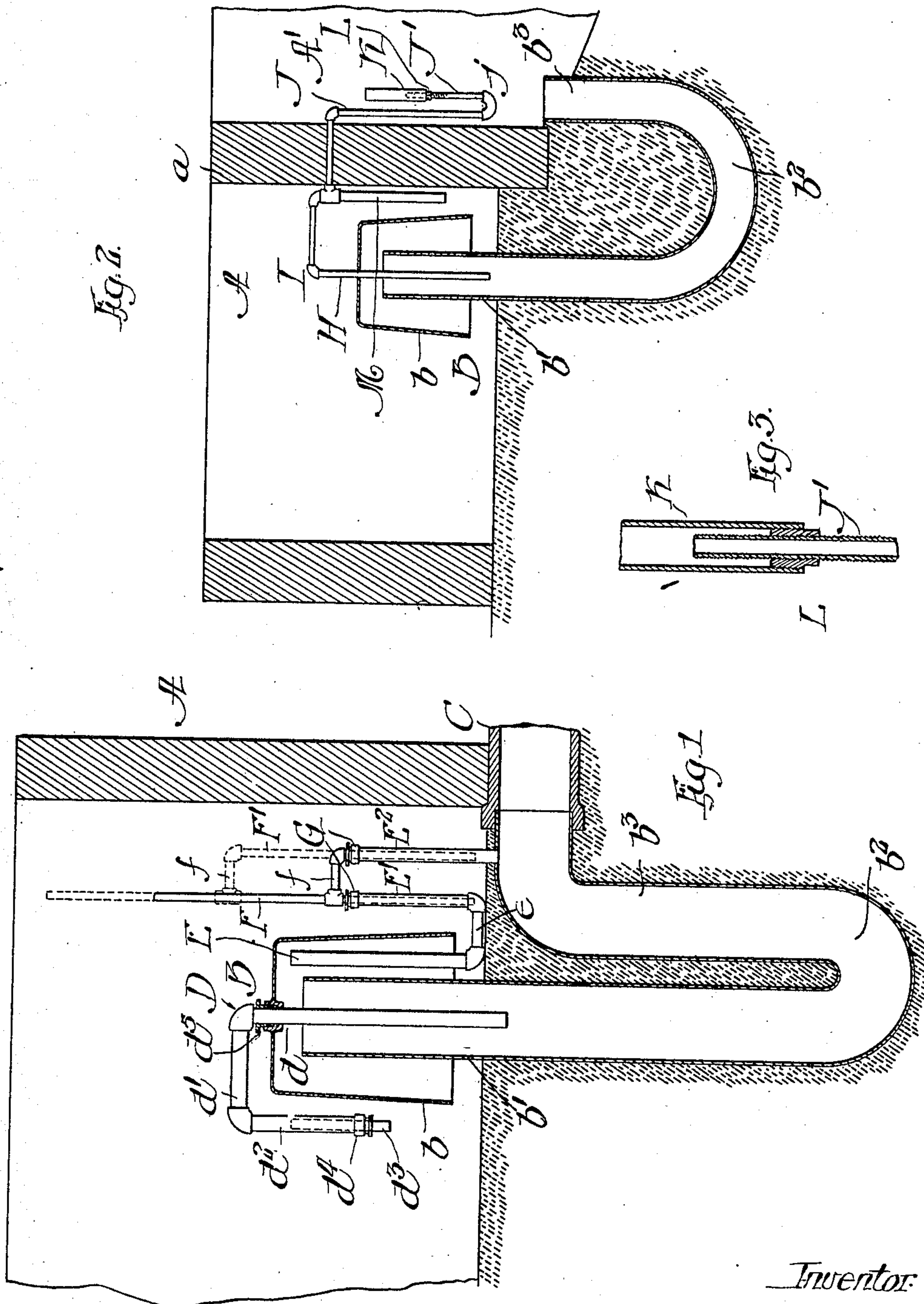


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PATENTED NOV. 19, 1907.

S. W. MILLER.  
CONTROLLING DEVICE FOR DEEP SEAL SIPHONS.  
APPLICATION FILED OCT. 8, 1906.



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# UNITED STATES PATENT OFFICE.

SIDNEY W. MILLER, OF CHICAGO, ILLINOIS.

## CONTROLLING DEVICE FOR DEEP-SEAL SIPHONS.

No. 871,427.

Specification of Letters Patent.

Patented Nov. 19, 1907

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*To all whom it may concern:*

Be it known that I, SIDNEY W. MILLER, a citizen of the United States, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Controlling Devices for Deep-Seal Siphons; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in automatic, deep seal trapped siphons designed to automatically empty the liquid contents of a tank or receptacle.

The invention relates more specifically to an improved auxiliary or blow-off trap designed to adjustably control the emptying operation of the siphon, and relates further to a novel venting device for venting siphons of this character, and constructed to regulate the level at which the siphon is sealed and vented during the operation thereof.

Among the objects of the invention is to provide improvements in auxiliary or blow-off traps for siphons of this character so constructed as to be capable of adjustment to vary the effective seal of the blow-off or auxiliary trap, whereby the siphon may be brought into operation under different liquid levels in a tank which the siphon is designed to empty, or the blow-off trap may be adjusted to operate with a given or required head in the tank. In the first mentioned mode of adjustment, the siphon may be operated to empty varying quantities of liquid from the tank.

A further object of the invention is to provide an improved venting device which is adjustable to vary the sealing and venting level of the siphon and thereby varying the liquid level in the tank at which the siphon operates to empty the tank.

Further objects of the invention will appear from the description which follows and the invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

In the drawings:—Figure 1 is a vertical sectional view of a siphon and my improved venting and auxiliary or blow-off trap equipment, showing a fragment of the tank which is emptied by said siphon to illustrate the relation of the siphon thereto. Fig. 2 illustrates my improved blow-off or auxiliary

trap connected with a siphon, wherein the blow-off trap is located in a chamber separate from the tank which is emptied by said siphon. Fig. 3 is a detail illustrating a modified form of adjustment for the outlet leg of the trap.

Referring first to the construction shown in Fig. 1, A designates a tank which is filled from any suitable source supplying liquid, and B designates, as a whole, a deep seal, trapped siphon through the medium of which said tank is emptied. Said siphon is of familiar form, its shorter leg *b* of which comprises a downwardly opening bell arranged in inverted position over the longer leg *b*<sup>1</sup> of the siphon. Said longer leg *b*<sup>1</sup> of the siphon discharges through a deep seal trap *b*<sup>2</sup>, the outlet or rising leg *b*<sup>3</sup> of which discharges its contents into a pipe or conduit C that directs the liquid contents to any suitable place for the disposal of same.

D designates, as a whole, a venting device comprising a member *d* that extends downwardly through the bell *b* into the longer leg of the siphon to a point below the lower end of the outlet end thereof, a transverse portion *d*<sup>1</sup> and a downwardly opening vertical member *d*<sup>2</sup> located outside the bell and constituting the outlet end. The said venting device embraces features of novelty which will hereinafter be described.

The siphon B is equipped with an auxiliary or blow-off trap comprising an inner vertical leg E that rises upwardly into the bell or shorter leg of the siphon, an outer vertical leg E<sup>1</sup> arranged generally parallel with the inner leg and connected at its lower end with the lower end of said inner leg by a transverse connection *e*. The overflow of the blow-off trap is drained, when liquid overflows the upper end of the outer leg E<sup>1</sup> thereof, through the medium of a pipe E<sup>2</sup> that communicates with the outer leg E<sup>1</sup> through a cross-connection and discharges its contents into the outlet leg of the deep seal trap of the main siphon. In accordance with one feature of my invention, the said blow-off or auxiliary trap is designed to be elongated or shortened longitudinally of its length, so as to vary the depth of seal thereof, and the parts are so arranged, when applied to a siphon of the construction herein shown, that the maximum elongation of said trap provides a seal in the blow-off trap of somewhat less depth than that of the deep seal trap of the main siphon, and said auxil-



iary or blow-off trap may be adjusted to operate the siphon at varying liquid levels of the tank A, ranging gradually from the shortest depth of seal of said blow-off trap to a depth of seal slightly less than that of the deep seal trap of the main siphon. In some forms of siphonic apparatus this relation of the depth of seal of the blow-off and main siphon trap need not be maintained. The construction shown whereby this result is attained consists in providing the outlet leg of the blow-off with a vertically adjustable elongation or pipe F that is herein shown as having telescopic engagement with said leg of the blow-off trap, either of the pipes fitting within the other as most convenient or desirable. The said extension member F of said outlet leg is designed in all of its adjustments to extend beyond the maximum liquid level in the tank which is emptied by the siphon. In the form of trap herein shown, wherein the overflow of the trap is drained into the outlet leg of the deep seal trap, an extension drain pipe F<sup>1</sup> is provided that is connected with the extension of the outlet leg of the blow-off trap by a transverse connection *f* at a point between the ends of said outlet leg extension. Thus said transverse connecting pipe *f* constitutes the draining level of the adjustable blow-off trap in all positions of adjustment of said trap.

The adjustment of the auxiliary or blow-off trap shown in full lines in Fig. 1 provides the least depth of seal under which said trap operates. The adjusted position shown in dotted lines provides the approximate maximum depth of seal of said blow-off trap. In the adjustment shown in full lines, the siphon is adapted to operate at the minimum liquid level in the tank A, for the dimensions shown, while in the adjustment shown in dotted lines, the siphon is adapted to operate at the maximum liquid level thereof. Various ranges of adjustment may be made between the limits shown, each particular adjustment effecting a corresponding depth of seal of the auxiliary or blow-off trap.

The said outlet leg and drain pipe extensions F F<sup>1</sup> are shown as extending through suitable stuffing boxes G G located at the tops of the main outlet leg of the blow-off trap and the drain pipe. Said stuffing boxes are arranged to prevent the escape of water between the telescopic pipes. It will be observed that the connection between said parts E<sup>1</sup> and F need only be made sufficiently tight to prevent the escape of water, inasmuch as the blow-off trap contains a column of water between said joint G and the pressure space in the siphon, so that air under pressure of the siphon does not find its way to said joint until the blow-off trap is forced and the pressure in the siphon released to bring the siphon into operation. Any suitable joint for this purpose may be

provided. The stuffing boxes G may be replaced by suitable metal to metal fit of the telescoping pipes, or a clamping device may be provided to produce said joint in any well known or familiar manner.

In Fig. 2 I have shown my improved blow-off trap adapted to a slightly different form of siphon apparatus, wherein the outlet leg *b*<sup>3</sup> of the deep seal trap *b*<sup>2</sup> discharges into a chamber A<sup>1</sup> separated from the tank A by a wall *a*. In the construction shown in Fig. 2, the blow-off trap is combined with the venting device of the siphon, the parts being constructed as follows: H designates a pipe that extends downwardly through the bell or shorter leg of the siphon into the longer leg thereon to a level below the outlet leg of the vent pipe. I designates a horizontal pipe that communicates at one end with said pipe H and extends through an opening in the dividing wall *a* into the chamber A<sup>1</sup>. There the said pipe is connected with an auxiliary or blow-off trap comprising a downwardly extending leg J and an upwardly extending or outlet leg J<sup>1</sup>, connected at its lower end with the lower end of said leg J, by a cross-connection *j*. The said outlet leg of the siphon is provided, as in the prior construction, with an extension pipe K that has longitudinally adjustable connection with the pipe J<sup>1</sup>. As herein shown, the pipe K is made larger than the pipe J<sup>1</sup> and is fixed to a nut L that fits outside of and engages exterior screw-threads on said pipe J<sup>1</sup>. The pipe K, therefore, telescopes outside the pipe J<sup>1</sup>. The interfitting screw-threads afford the close joint between the pipes. Such a connection may be used in the other trap described, or in connection with the adjustable vent device to be described. In this construction, the blow-off trap is refilled after each operation by liquid from the tank A through the medium of a downwardly opening pipe M, located in the tank A, in open communication at its upper end with the cross or horizontal pipe I. Therefore, after the auxiliary or blow-off trap is forced and air from the siphon escapes through said trap the liquid rushes through the pipes M and I and refills the auxiliary or blow-off trap before the level of the liquid in the tank drops below the pipe I, and thereby seals said trap. The pipe M may be made larger than the pipe I so as to insure the filling of the auxiliary trap, notwithstanding the fact that a portion of the water passing upwardly through the pipe M finds its way into the main siphon through the vent pipe H. It will be furthermore noted that the pipes H, I and M have the further function of venting the siphon after the completion of the emptying operation thereof. In the construction shown in Fig. 2, it will be observed that the auxiliary or blow off trap is rendered accessible at all times for inspection and repair by



reason of its location in a chamber separate from the tank A. In said latter construction, furthermore, the deep seal siphon discharges into the chamber A<sup>1</sup> from whence the liquid is directed through a suitably located discharge pipe or conduit (not shown).

An important feature of advantage of the adjustable blow-off trap herein shown is that the blow-off trap itself is fixed in place and does not in itself require to be moved out of operative position for adjustment of the trap for the purpose set forth. Moreover, the extension of the normally stationary portion of the outlet leg of the trap is always maintained upright and is connected with said stationary outlet leg in a manner not tending to throw stress on any part of the construction or to produce wear during re-adjustment thereof. A further advantage of my improved adjustable trap is found in the wide range of adjustment which may be effected thereby. A still further advantage of the construction is that its use in either of the types of apparatus herein disclosed, or other types of apparatus to which it may be applied, is such that it is easy of access for adjusting purposes and for the purpose of repairing or replacing the parts.

My improvement in the venting device embraces, in part, an extension pipe  $d^3$  extending downwardly from and having telescopic or elongated connection with the downwardly extending member  $d^2$  of said vent pipe. The joint or connection between said pipes is such as to prevent leakage of air under pressure, locked in the body of the siphon, just before it operates. Such connection may consist of a suitable form of stuffing box  $d^4$  or it may be provided by metal contact of the pipes brought together in any suitable manner to provide the desired integrity of the joint. The position of said adjustable or elongated extension of the outlet member of the venting pipe is such that the venting or sealing level of the pipe and the siphon may be varied at will within the limits of the length of said venting pipe and the practical conditions surrounding the use of the apparatus. Thus said venting device may operate itself, or in connection with the adjustable blow-off or auxiliary trap just described, to vary the depth of liquid in the tank required to bring the siphon into operation to empty the tank, and to vary the amount of liquid discharged from the tank in each operation of the siphon.

A further improvement in the venting device with which the extension outlet end  $d^3$  of the pipe  $d^2$  cooperates, consists in providing a sliding adjustable connection of the pipe  $d$  with the top wall of the bell, whereby the level of the lower end of said pipe  $d$  may be varied without the necessity of removing the pipe from the siphon or

removing or disturbing the bell. The said pipe  $d$  extends through a suitable stuffing box  $d^5$  in the top wall of the bell, such stuffing box or other equivalent joint being constructed to prevent escape of air around the pipe. By reason of such adjustment, and the adjustable outlet end of the vent pipe, a perfect adjustment of said parts may be established and maintained.

It will be obvious that my improvements may be applied to siphons of various constructions, differing from those herein shown as demanded by the uses to which the siphons are employed, without departing from the spirit of the invention. I do not wish, therefore, to be limited to the constructions herein described except as hereinafter made the subject of specific claims.

I claim as my invention:—

1. An auxiliary or blow-off trap for siphons adapted to extend at one end into the siphon, the outlet end of the trap being adapted to move endwise relatively to the siphon and to the inlet end of the trap for the purpose of varying the depth of seal of said trap.

2. An auxiliary or blow-off trap for siphons, the outlet end of which has an endwise adjustment relatively to the siphon and to the inlet end of the trap, and means providing a tight joint between the outlet end of said trap and the part in which it slides.

3. An auxiliary or blow-off trap for deep seal siphons embracing, in combination with its outlet leg, an extension pipe having telescopic connection therewith constructed to vary the depth of seal of the blow-off trap.

4. An auxiliary or blow-off trap for siphons embracing, in connection with its outlet leg, an extension pipe having telescopic connection therewith, and means providing a close joint between the telescoping members.

5. In an auxiliary or blow-off trap for siphons, the combination with the outlet leg thereof and a drain pipe through which the outlet leg of the trap is adapted to drain, of adjustable extension pipes for said outlet leg of the trap and drain pipe provided with a cross-connection movable with said extension pipes.

6. In a blow-off or auxiliary trap for siphons, the combination with the outlet leg thereof and a drain pipe through which the contents of the outlet leg of the trap is adapted to drain, of extension pipes adapted to have telescopic connection with said outlet leg of the trap and drain pipe, respectively, and connected between the ends of the outlet leg extension by a transverse connection.

7. The combination with a siphon having a trapped discharge limb, of an auxiliary or blow-off trap, the outlet leg of said auxiliary



trap being located outside the siphon and adapted for sliding adjustment for the purpose set forth.

8. The combination with a siphon having a trapped discharge limb, of an auxiliary or blow-off trap, the outlet leg of said auxiliary trap being located outside the siphon and longitudinally extensible for the purpose set forth.
9. The combination with a siphon having a trapped discharge limb, of an auxiliary or blow-off trap, a drain pipe into which the blow-off trap drains, and means for varying the depth of seal of the auxiliary or blow-off trap.
10. The combination of a siphon having a trapped discharge limb, of an auxiliary trap, means whereby the outlet end of the blow-off trap has an up-and-down sliding adjustment to vary the depth of seal thereof, and a drain pipe connected with the outlet leg of the blow-off trap in all positions of adjustment of the latter.
11. The combination with a siphon having a trapped discharge limb, of an auxiliary trap, a drain pipe into which the outlet leg of the auxiliary or blow-off trap drains, an extension pipe for the outlet leg of the trap adjustable for varying the depth of seal in said trap, and an extension pipe for the drain pipe connected with said extension of the outlet leg of the blow-off trap.
12. The combination with a siphon having a trapped discharge limb, of an auxiliary trap, and an extension pipe having telescopic engagement with the outlet leg of said blow-off trap at a point outside the siphon for the purpose set forth.
13. The combination with a siphon having a trapped discharge limb, of an auxiliary trap, an extension pipe having telescopic engagement with the outlet leg of said blow-off trap at a point outside the siphon for the purpose set forth, and means for providing a close joint between said extension pipe and the outlet leg of the blow-off trap.
14. The combination with a downwardly opening intake limb of a siphon, of an auxiliary trap comprising an upwardly opening pipe extending upwardly into said intake limb at the side of discharge limb of siphon, and an upwardly opening pipe outside said limb connected at its lower end with the inner pipe by a transverse pipe.

15. The combination with a downwardly opening intake limb of a siphon, of an auxiliary trap comprising an upwardly opening pipe extending upwardly into said intake limb at the side of discharge limb of siphon, and an upwardly opening pipe outside said limb connected at its lower end with the inner pipe by a transverse pipe, and means for varying the depth of seal in said outer pipe.

16. The combination with a downwardly opening intake limb of a siphon, of an auxiliary trap comprising an upwardly opening pipe extending upwardly into said intake limb at the side of discharge limb of siphon, an upwardly opening pipe outside said limb connected at its lower end with the inner pipe by a transverse pipe, said outer pipe being longitudinally extensible, for the purpose set forth.

17. The combination with a downwardly opening intake limb of a siphon, of an auxiliary trap comprising an upwardly opening pipe extending upwardly into said intake limb at the side of discharge limb of siphon, an upwardly opening pipe outside said limb connected at its lower end with the inner pipe by a transverse pipe, a drain pipe connected with the upper end of said outer pipe.

18. The combination with a downwardly opening intake limb of a siphon, of an auxiliary trap comprising an upwardly opening pipe extending upwardly into said intake limb at the side of discharge limb of siphon, an upwardly opening pipe outside said limb connected at its lower end with the inner pipe by a transverse pipe, a drain pipe connected with the upper end of said outer pipe, said outer pipe of the trap and the drain pipe being longitudinally extensible, for the purpose set forth.

19. The combination with a siphon, of a vent pipe, the longer leg of which enters, and has vertical adjustment relatively to, the siphon, and provided with a vertically adjustable outlet end.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 5th day of October A. D. 1906.

SIDNEY W. MILLER.

Witnesses:

WILLIAM L. HALL,  
GEORGE W. WILKINS.