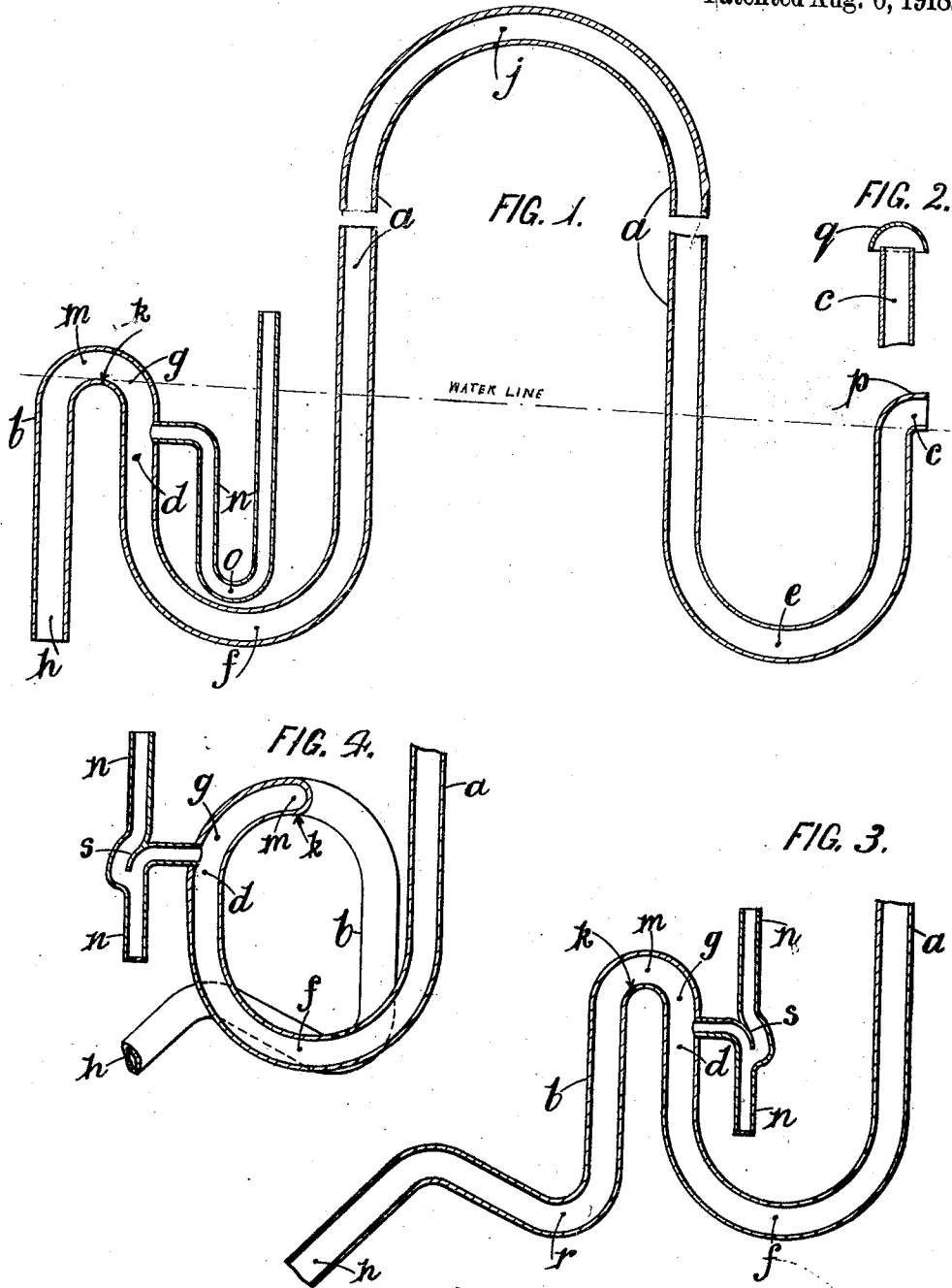


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SIPHON.

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SIPHON.

1,274,578.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE ROBERT NICHOLSON, a subject of the King of Great Britain and Ireland, residing at Croft-on-Tees, in the county of Durham, England, have invented new and useful Improvements in Siphons, of which the following is a specification.

This invention relates to siphons of the type in which traps are provided at both ends for the purpose of preventing the access of air to the siphon with means for admitting air to the outlet at the level to which it is desired that the level of the liquid in the tank from which the liquid is being drawn shall fall, said admission of air preventing the siphon from becoming emptied. The object of this invention is to provide an improved siphon so that the rate of delivery of the liquid through the siphon may be improved.

According to this invention we provide a supplemental siphon at the outlet end of the main siphon. The vent pipe for the purpose of admitting air to the outlet is disposed between the bend of the supplemental siphon and the outlet trap of the main siphon, said vent pipe extending to above the bend of the supplemental siphon. Preferably the outlet of the supplemental siphon is also trapped.

I will fully describe my invention with reference to the accompanying drawings wherein—

Figure 1 is a sectional elevation of one construction of compound siphon in accordance with my invention; and

Figs. 2, 3 and 4 are part similar views illustrating modifications.

Referring to Fig. 1, the siphon therein illustrated comprises a main siphon *a* and a supplementary siphon *b*. The main siphon *a* has an inlet at *c* and an outlet at *d*, said inlet and outlet being trapped at *e* and *f* respectively. The supplementary siphon *b* has an inlet at *g* and an outlet at *h*, the inlet *g* of the supplementary siphon being connected to the outlet *d* of the main siphon. The height of the bend *j* of the main siphon may be varied as desired below the limit fixed by atmospheric pressure. The lower edge *k* of the bend *m* of the supplementary siphon is preferably at the same level as the inlet *c* but may be varied, though it is essential that it should be above the inlet trap *e*. Opening out of the siphon pipe between the bend *m* and the outlet trap *f* is a vent pipe *n* which

is trapped at *o* and extends above the bend *m* and is normally open to air. The inlet *c* is preferably formed with a hood *p* to prevent eddying of the liquid as it is drawn into the siphon. Instead of the hood *p*, I may provide a suitably supported cap *q* arranged over the inlet *c*, as indicated in Fig. 2, for the same purpose.

The operation of my compound siphon is as follows:—

The inlet *c* is arranged to open out of the bottom or near the bottom of the tank or the like to be emptied and the siphon is charged, for example by drawing water therethrough by a suction pump temporarily connected to the outlet *h*, the vent pipe *n* being closed to air during charging only by inserting a plug in the upper end or by closing a cock or the like provided in said pipe, or otherwise suitably. The siphon having been primed, the liquid in the tank will be siphoned off, the vent pipe *n*, during siphoning being partially charged with liquid which acts as a seal and prevents air passing through the vent pipe to the bend *m*. As the head of liquid in the tank falls, the pressure tending to carry the liquid over the bend *j* fails, and the "pull" exerted by the supplementary siphon *b* draws the liquid out of the vent pipe *n* and the air enters and breaks the column of liquid passing through the siphon. The siphonic action then stops, but the main siphon *a* remains charged, the liquid standing in the inlet *c*; outlet *d* and vent pipe *n* to the level of the lower edge *k* of the bend *m*. The uncovering of the inlet *c* does not affect the liquid in the main siphon *a* which liquid is retained by the traps *e* and *f*, so that, when the main siphon has once been primed, it remains primed and ready to act. Any small quantity of liquid entering the tank out of which the inlet *c* opens will be taken up by the siphon and a similar quantity displaced over the edge *k* into the outlet *h*. Should a large quantity of liquid enter the tank, all the air will be driven out of the bend *m*, and the siphon will operate until the tank is again emptied. The effect of the vent pipe *n* is to break the column of liquid in the supplementary siphon *b* when the head of liquid in the inlet tank falls and before any air can be drawn through the inlet trap *e*.

I prefer to provide the outlet *h* of the supplementary siphon *b* with a trap *r* as shown in Fig. 3 which trap will prevent air leaking

into the bend *m* from the outlet *h* and thus tend to cause the compound siphon to operate at full bore from the inlet *c* to the outlet *h* when there is a sufficient head of liquid in the inlet tank. The outlet *h* may be extended to any desired length.

Fig. 3 also illustrates a modified construction of the vent pipe *n* in which the trap *o* is replaced by a downwardly-extending lip *s*. The vent pipe *n* is closed at its lower end. The action of this construction of vent pipe is exactly the same as that above described.

Fig. 4 illustrates a modified arrangement of the supplementary siphon *b* which in this case is turned in toward the main siphon to economize space.

A compound siphon in accordance with this invention, after it has once been primed, is perfectly automatic and adjusts itself to any flow from a mere dribble to full bore. It is simple and will not readily get out of order as there are no valves to wear or choke. My compound siphon has been specially designed for dealing with an intermittent supply of liquid, and is particularly applicable for draining colliery workings which are liable to be flooded after rain as it starts immediately the liquid as the inlet *c* rises above the lever of the edge *k*.

What I claim and desire to secure by Letters Patent is:—

1. A compound siphon comprising the combination of a main siphon having a bend always above the level of the water at the source of supply from which the water is to be drawn, a trap at the inlet of said main siphon, a trap at the outlet from said main siphon, a supplementary siphon, the inlet of said supplementary siphon being connected to the outlet of said main siphon, a trapped vent pipe opening out of the compound siphon at a point between the bend of said supplementary siphon and the outlet trap of said main siphon, said vent pipe having an orifice always open to the atmosphere and extending to a level above the level of the water at the source of supply.

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2. A compound siphon comprising the combination of a main siphon having a bend always above the level of the water at the source of supply from which the water is to be drawn, a trap at the inlet of said main siphon and means formed on the trap for preventing eddying of the liquid in the main siphon, a trap at the outlet of said main siphon, a supplementary siphon, the inlet of which is connected to the outlet end of said main siphon, a trapped vent pipe opening out of the compound siphon at a point between the bend of said supplementary siphon and the outlet trap of said main siphon, said vent pipe having an orifice always open to the atmosphere and extending to a level above the level of the water at the source of supply.

3. A compound siphon comprising the combination of a main siphon having a bend always above the level of the water at the source of supply from which the water is to be drawn, a trap at the inlet of said main siphon, a hood carried by the inlet end of said main siphon, a trap at the outlet of said main siphon, a supplementary siphon at the inlet end of which is connected the outlet end of said main siphon, a trapped vent pipe opening out of the compound siphon at a point between the bend of said supplementary siphon and the outlet trap of said main siphon, said vent pipe having an orifice always open to the atmosphere and extending to a level above the level of the water at the source of supply.

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

GEORGE ROBERT NICHOLSON.

Witnesses:

HERBERT HOWARD,

GEORGE HAROLD APPLETON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."