

(No Model.)

R. FIELD.
INTERMITTENT SIPHON.

No. 485,759.

Patented Nov. 8, 1892.

Fig. 1.

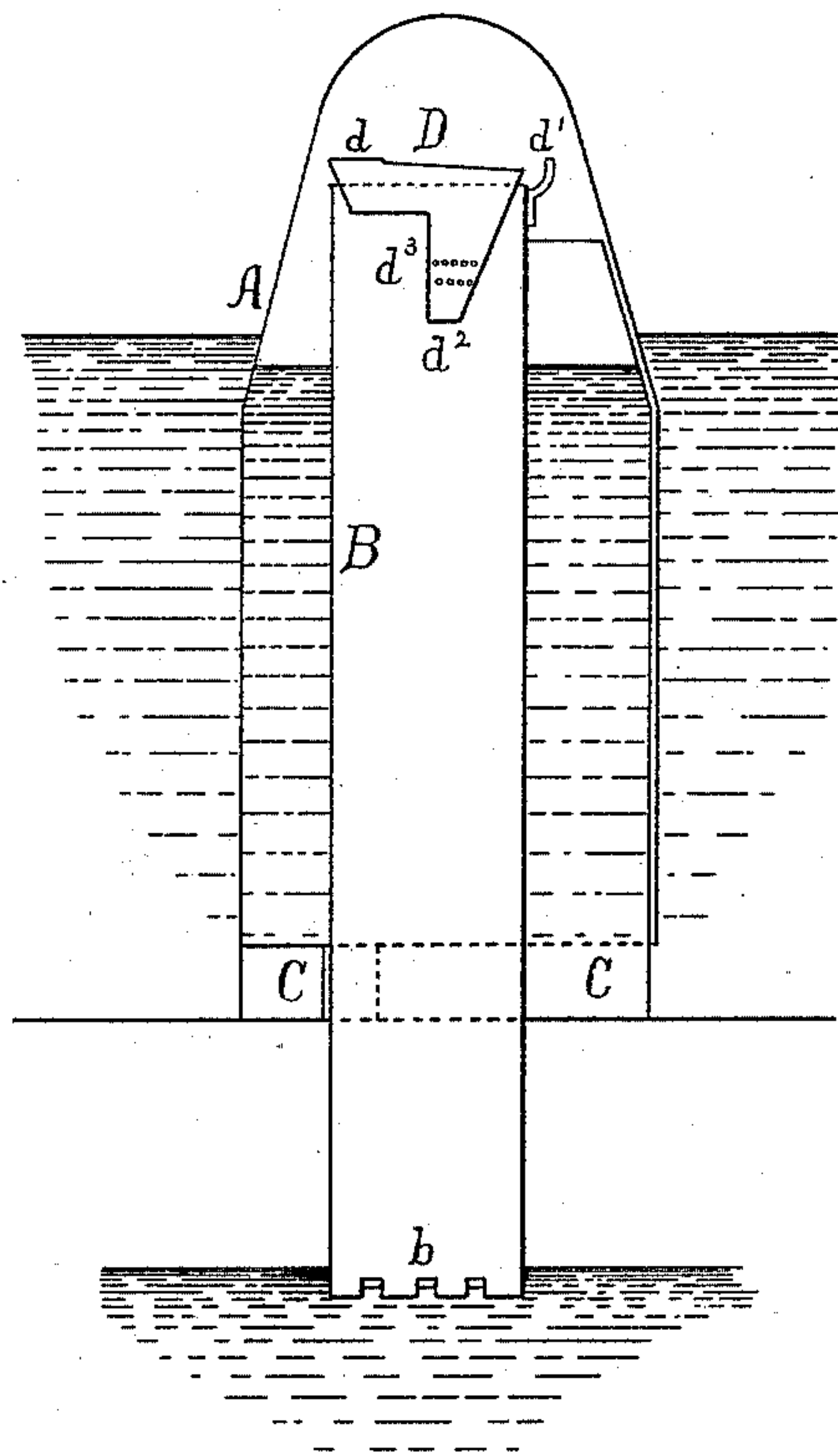


Fig. 2.

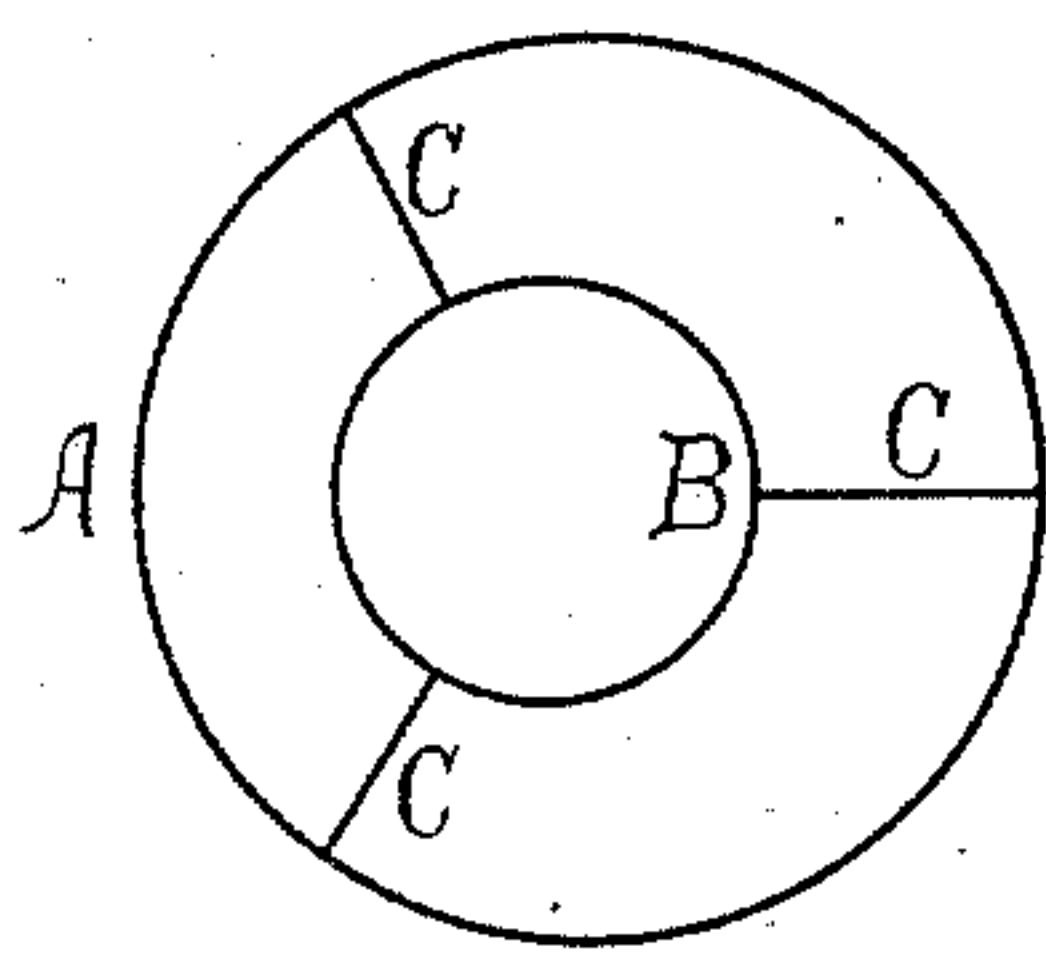


Fig. 3.

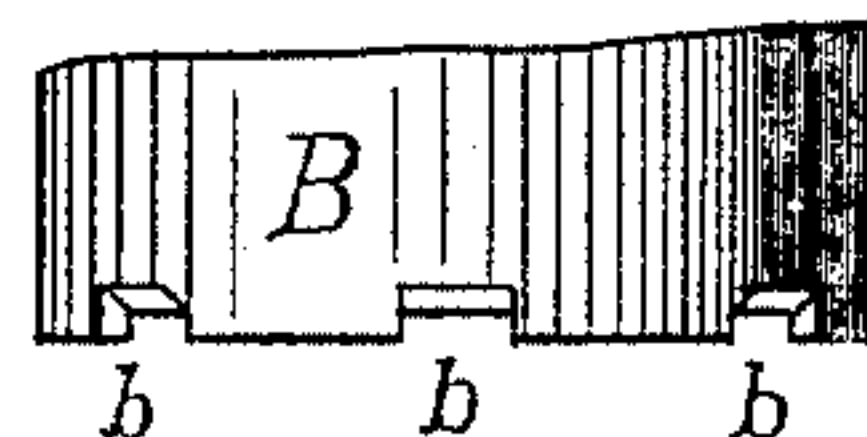
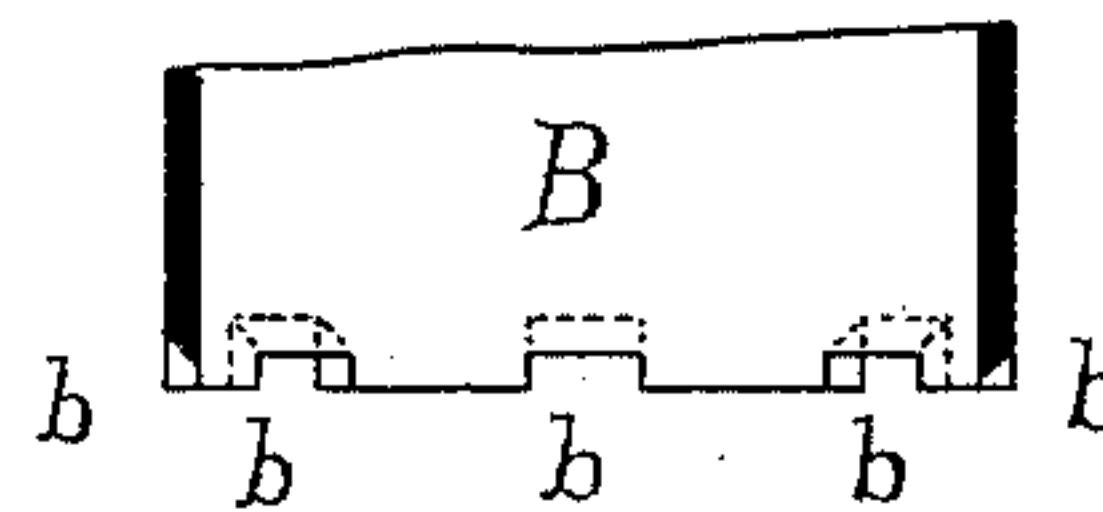


Fig. 4.



WITNESSES.

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UNITED STATES PATENT OFFICE.

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INTERMITTENT SIPHON.

SPECIFICATION forming part of Letters Patent No. 485,759, dated November 8, 1892.

Application filed January 5, 1891. Serial No. 376,806. (No model.) Patented in England August 1, 1888, No. 11,165, and in France June 1, 1889, No. 198,674.

To all whom it may concern:

Be it known that I, ROGERS FIELD, a citizen of England, residing at No. 7 Victoria Street, London, in the county of Middlesex, England, have invented a new and useful Improvement in Intermittent Siphons, (for which I have obtained a patent in Great Britain, dated August 1, 1888, No. 11,165, and in France, dated June 1, 1889, No. 198,674,) of which the following is a specification.

When a siphon is employed to discharge intermittently the contents of a tank which is supplied by a slow flow of liquid into it, there is great difficulty in starting the siphon action, especially if the supply is very small, as the liquid merely flows in a small stream down the longer limb of the siphon without effecting sufficient displacement of the air to bring the siphon into full action.

My invention relates to a construction of siphon whereby this difficulty is overcome—that is to say, when the level of liquid in the tank is raised to a certain point the addition of a very small quantity causes the siphon to start into action. For this purpose I employ a siphon of the annular kind, consisting of a bell or deep basin placed inverted over the discharge-pipe or longer limb of the siphon, so that the liquid flows up the annular passage between the bell and the discharge-pipe and overflows into the latter, the lower end of which is immersed in liquid. I make this bell of a diameter at the bottom considerably greater than the discharge-pipe and taper it upward to a smaller diameter at the level of the upper mouth of the pipe, above which it is completed in the form of a dome, the middle portion of which may be bent down. To the upper mouth of the discharge-pipe I apply an ajutage or mouthpiece of the following description: Internally it has the form of a frustum of a hollow cone having its upper mouth as large as the discharge-pipe and its lower mouth of less diameter. The upper edge of this ajutage is level for about a third or a fourth part of its circumference and for the rest of its circumference is made of a lower level, being about one-eighth of an inch lower at each extremity and sloping down to a depth of about one-fourth of an inch at its middle. In the central line of this deepest part of the

mouth a portion of the conical wall of the ajutage is prolonged downward in the form of a spout, and I prefer to perforate this prolonged part, so that when liquid begins to flow over the lowest part of the edge of the ajutage some of it flows down on the outside as well as on the inside of the spout. The effect of this form of ajutage is that a very small overflow, in fact a mere succession, of drops expels a sufficient quantity of the air contained in the discharge-pipe and bell to cause the level of the liquid within the bell to rise. This rise increases the overflow into the discharge-pipe and expels a further quantity of air, which again causes a still larger rise and overflow, and thus brings the siphon into full action.

I am aware that siphons have been made having for an ajutage a conical shell inverted in the discharging-limb of the siphon. This form is objectionable, in that its action is uncertain or defective unless the siphon be set quite vertically. The lower and smaller rim of the cone must be of sufficient diameter to afford a free water-way. Hence the overflow cannot be delivered at or near the middle of the siphon-limb, but must fall comparatively near to its walls, and if a slight inclination be given to the siphon the overflow will fall upon these walls and will not produce the desired effect. I am also aware that siphons have been made having an ajutage in the shape of a lip projecting from one side of the upper edge of the discharging-limb in such a manner as to deliver the liquid near the middle of the tube. This form is objectionable, because should the siphon be set vertically and the upper edge of its discharging-limb be true the rising liquid will overflow all points of its edge at once and the larger portion of such overflow will trickle down the part of the overflow, that which is delivered inside surface of the tube, while but a small part of the overflow, that which is delivered over the lip, is efficient for the extraction of air. Should the siphon not be set vertically, the liquid will overflow only at the lowest part of the edge of the discharging-limb. This may or may not be the part to which the lip is attached.

In my invention the fixed point of overflow, made by cutting away a portion of the upper

rim of the ajutage, as described, insures the delivery of the overflow through the lip or spout d^2 , which projects the liquid to the middle of the tube B, causing it to fall free of its walls, although the inclination of the siphon be considerable. When the liquid falling from the spout d^2 has partially rarefied the air and has so induced a more copious overflow, the whole of the ajutage D becomes of use in delivering the discharge, so as to cause full siphonic action speedily.

Besides employing a bell and an ajutage such as I have described I find it in many cases advantageous to provide the outlet-mouth of the discharge-pipe with an appliance for facilitating the action of a small overflow in and for regulating the issue of the air. For this purpose I cut at the lower mouth of the discharge-pipe several small notches, the upper and inner edge of each notch being sharp as a chisel, the interior of the pipe representing the straight side of the chisel and the slope from the chisel-edge to the outer circumference of the pipe representing the beveled edge of the chisel. When a little air is expelled by a small overflow of liquid into the discharge-pipe, it finds its way through one or other of these notches and bubbles up through the liquid in which the lower mouth of the pipe is immersed. The air being thus discharged outside the pipe, the pressure within the pipe and bell is so far reduced that the liquid rises within the bell and overflows in larger quantity into the discharge-pipe, thus producing the action above stated. An especial function of these notches is to regulate the issue of air, so that it shall escape frequently in small bubbles rather than occasionally in large bubbles, as would be the case if the lower mouth of the discharge-pipe were not notched. When the air is allowed to escape in large bubbles, it sometimes happens that the sudden issue of a large quantity of air causes the water within the bell of the siphon to rise with a sudden jump, sending a few drops of water over the ajutage before the general level of the water in the bell is at a sufficient height to cause a regular overflow. By this means a false action is started. When the lower end of the discharge-pipe is provided with notches of the form described above, the air escapes in small bubbles and the resultant pulsation of water in the bell is so slight that no false action is set up.

Figure 1 shows a vertical section of a siphon constructed according to my invention. Fig. 2 is a horizontal section. Fig. 3 is a side view of the lower end of the discharge-pipe drawn to a larger scale. Fig. 4 is a vertical section of the same.

The siphon consists of the outer or receiving limb or bell A, which is contracted and domed at the top, and the inner or discharging limb B, which preferably, as shown in Fig. 2, is set somewhat eccentric in A in order to give ample room for upward flow of liquid on the side where it first flows over the lip of the ajutage. The outer limb or bell is kept in position by three wings C, projecting from the inner limb. The ajutage D is of conical form. A portion d of its upper edge, extending through a third or a fourth part of the circumference, is level and the remainder is made somewhat lower, sloping down to a slight extent to its deepest part in the middle opposite the higher portion. In order to set the higher portion d level, a gage-pin d' is provided on the opposite side of the ajutage.

On that side of the ajutage where the edge is lowest a portion of the cone is carried down as a spout d^2 , preferably perforated, as shown at d^3 . At the lower edge of the limb B are cut several notches b , the metal in each notch being cut to chisel shape, so as to present a sharp edge on the inside, as shown more clearly at Figs. 3 and 4.

I do not wish to confine myself to the precise form of apparatus here indicated. The pipe B may stand concentric within the pipe A. The ajutage may be longer or shorter and for different cases may have different angles, and in certain cases the perforation of the ajutage may be dispensed with.

Having thus described the nature of my invention and the best means I know for carrying the same into practical effect, I claim—

1. In combination with the discharging-limb of a siphon, the conical ajutage D, one portion of which is prolonged downward as a spout, constructed and operating substantially as described.

2. An intermittent siphon consisting of an outer or receiving limb or bell A and an inner or discharging limb or pipe B, with its ajutage D and its notches b , arranged and operating substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 12th day of August, A. D. 1890.

ROGERS FIELD.

Witnesses:

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