(No Model.) 2 Sheets—Sheet 1.

D. H. VALENTINE.

SUBTERRANEAN WATER COLLECTING DAM.

No. 354,276. Patented Dec. 14, 1886.

Fig. 1.

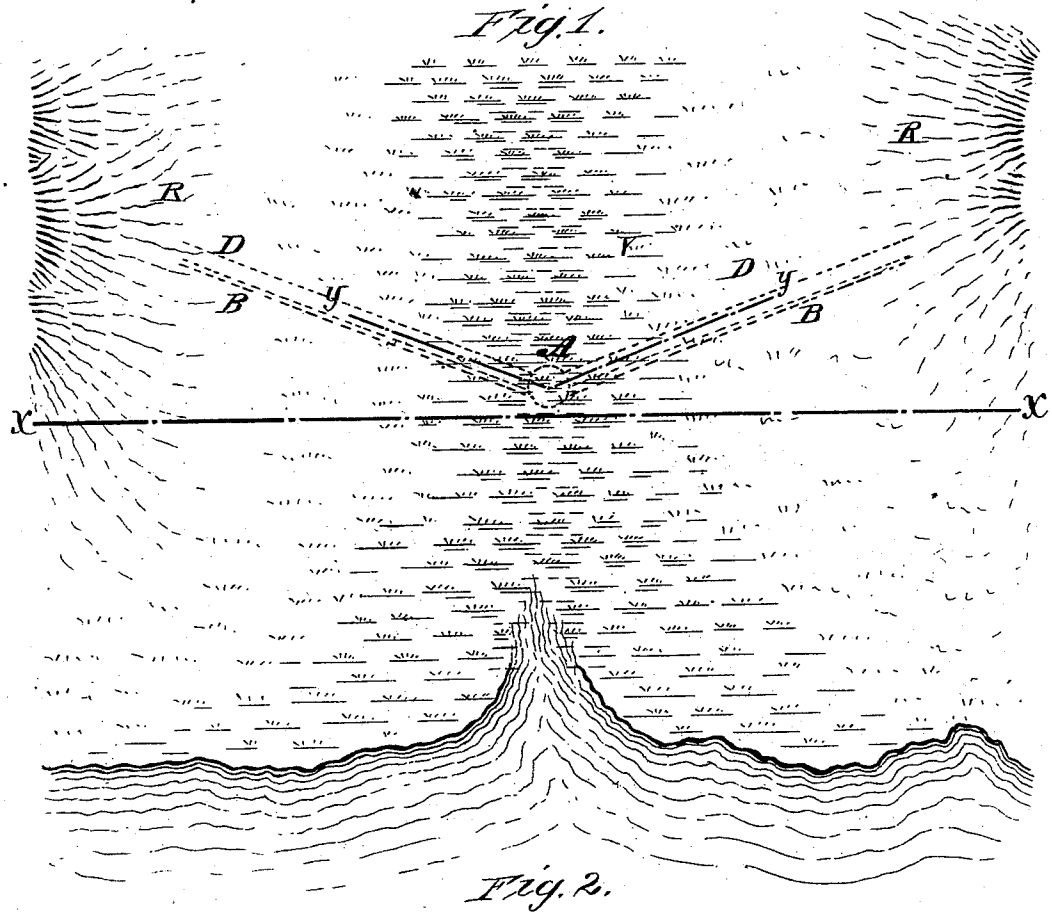
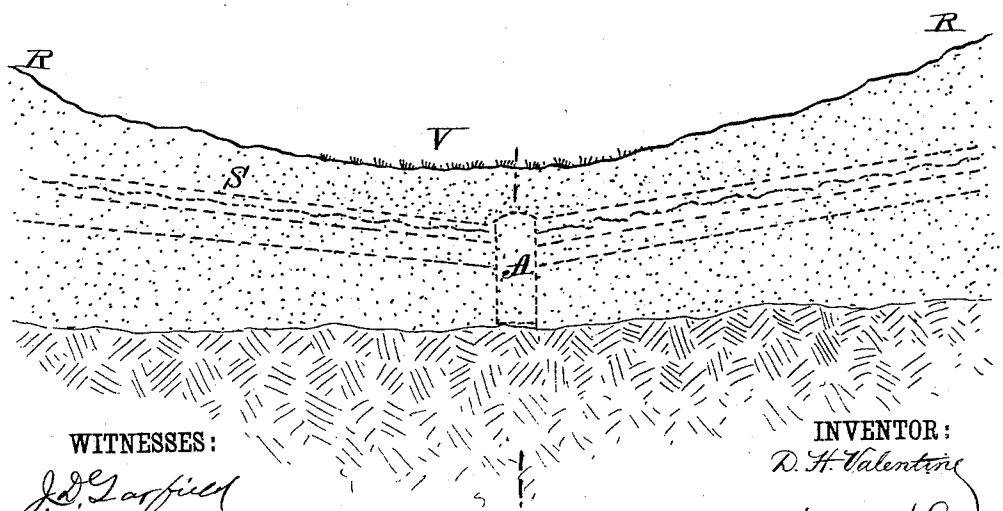


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

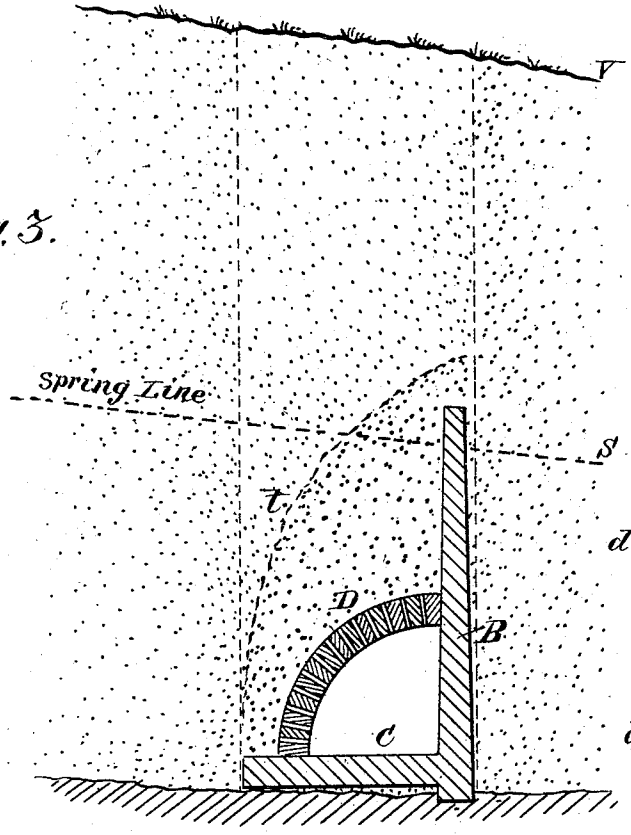


Fig. 5.

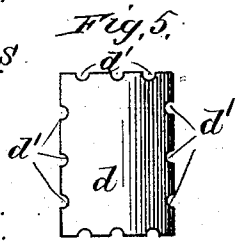


Fig. 6.

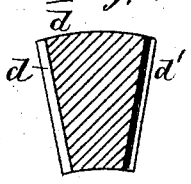
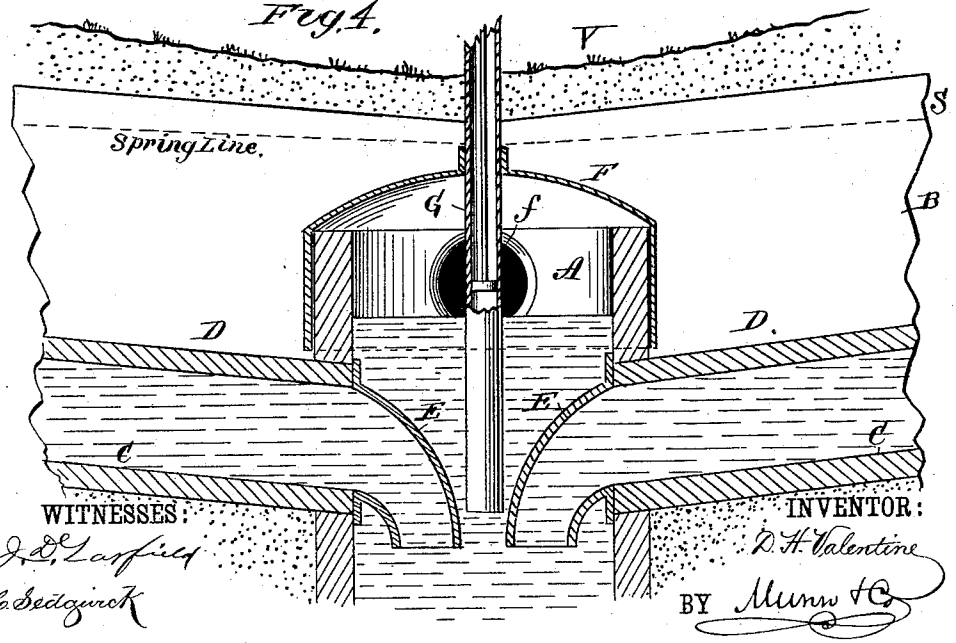


Fig. 4.



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UNITED STATES PATENT OFFICE.

DAVID H. VALENTINE, OF BROOKLYN, NEW YORK.

SUBTERRANEAN WATER-COLLECTING DAM.

SPECIFICATION forming part of Letters Patent No. 354,276, dated December 14, 1886.

Application filed July 10, 1886. Serial No. 207,361. (No model.)

To all whom it may concern.

Be it known that I, DAVID H. VALENTINE, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Subterranean Water-Collecting Dam, of which the following is a full, clear, and exact description.

My invention is designed for the collection and saving of water that flows through gravelly soil to the ocean or any water-course, and the prevention of its adulteration with salt when near the ocean-level.

The intention is also to use my invention as wing walls to large reservoirs for the purpose of collecting and saving the water that flows through the sides of the reservoir and around the dam at any time that the reservoir is above its average level.

This dam should be constructed across the opening of valleys from the ridge on each side to a central low point or lowest level in the valley where the pumping-well or conduit-connection may be located. The direction of the dam from the center each way should incline toward the source of the water, so that the angle made by the sides shall not be more than one hundred and sixty degrees.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a bird's-eye view showing the trend of the dam and its location with reference to a valley or water-shed. Fig. 2 is a sectional elevation on line *x x* of Fig. 1, illustrating the line of the dam with reference to the surface of the ground and the spring-line. Fig. 3 is an enlarged transverse section of the same. Fig. 4 is an enlarged sectional view of the pumping well or reservoir and conduit, taken on line *y y* of Fig. 1. Fig. 5 is an end view of one of the bricks used in constructing the percolating-wall, and Fig. 6 is a sectional elevation of the same.

The dam should be constructed in the following manner: Commencing at the pump-well, conduit, or reservoir A, excavate a trench each way across the valley V toward the ridge R on each side, following, by preference, a slant toward the source of water-flow not to exceed one hundred and sixty degrees, the width of trench to suit the size of conduit intended, ordinarily not more than six or eight feet. Carry this excavation to a depth that will discover the nearest stratum of fine or hard impervious material to a point twenty feet, or thereabout, below the spring-line S in the valley, which will generally be found to be from ten to twenty inches above the level of any brook that flows through the valley toward the ocean. When the desirable stratum to build upon has been found, care must be taken to follow it as a foundation. If it does not rise with the sides of the valley, (as it generally does,) the dam must be kept down to it, or tongued and grooved piling must be driven to it as the work progresses up the hillsides. On the bottom and side of these trenches nearest the salt-water build a tight wall, B, Fig. 3, of masonry or timber; if masonry, the lower course to be well grouted with cement-mortar. Carry this wall hard against the side of the excavation, being careful to pour grout into all openings between the wall and the bank or sheathing. At the starting-point (the lowest level in the valley) the height of this wall should be one foot above the spring-line, and from this point each way the grade from the top of dam should only rise six inches in one hundred feet, whatever the inclination of the valley's side may be. This wall having been constructed, commence at the central point again and put a water-tight bottom, C, of masonry across the whole width of trench, the grade each way from the center or well A being such as to give the water easy conduct to the central point, A. On this water-tight bottom construct a lean-to arch, D, commencing at four feet or six feet (or any other distance proportioned to amount of water) from the foot of the perpendicular wall B, and coming in contact with said wall at an equal height above its foot. This arch must be so constructed as to allow the water to percolate through it over its entire area, and for this purpose I build it preferably of arch or key-stone shaped brick *d*, having grooves *d'* formed in their inclined sides, so the wall D will be perforated throughout for the free passage of water into the conduit, or it may be built of dry stone or timber. The lean-to wall D being completed, fill the excavation with screened

and washed gravel to a height of ten feet above the arch, as indicated by dotted line *t*, Fig. 3, and above that point fill with any clean filling free from vegetable matter.

To get a most successful result from this plan, the lines of the dam across the valley should be laid out, and at the extreme point on each hillside an excavation should be made to find the spring-level at those points. Doing this will show how far up the hillside it will pay to go. Then comparing these spring-levels found with the spring-level at the central low point in the valley, fix the level of bottom of the conduit on the hillside, so that it shall have a descending grade to the central point of not more than three inches to one hundred feet. This being done, the water flowing through the conduit with so much less friction than through gravel will draw on the water above and on the water side of the percolating-chamber with a power equal to the difference between the two spring-levels. To insure this result, the outlets of the percolating-chambers at the central point, well, or reservoir, A, should be either sheet or cast iron hoods E E, built on and turned down into a well or reservoir, A, out of which an overflow, *f*, could be provided for the water to flow into a conduit, if the valley should be high enough. If not, then inclose the well with a dome, F, of iron or mason work, with a pump-suction, G, passing through the dome down to within two feet of the bottom. Make everything air-tight, and the pump, when operated, will hasten the action of the percolating-chamber throughout the whole length of the dam.

Where no more water is needed than the valley naturally supplies, no pump should be needed; but with sufficient pumping power this plan should get as much water from the valley as could be had if the valley were dug out to the width of the wing walls, and made as deep as the bottom of this dam and percolating conduit.

As a matter of fact, the valley will yield much more water into the conduit by the adoption of this plan than would be possible if it were excavated into an open reservoir, because it saves nearly the whole of the loss by evaporation. By this plan the water is stored in the cool earth, with no possibility of its being contaminated by vegetable or other growth from exposure to the heat of the sun.

The perpendicular wall B being tight and of sufficient height, prevents sea-water that may set back through the soil from entering the conduit; hence by this method perfectly fresh water may be obtained from the soil near the sea-level.

The details as to the strength of the walls, necessary size of the conduits and reservoir, chambers, gradients, &c., will vary with different localities, and should be decided in each case by competent engineering authority.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The herein-described means of procuring fresh water from the earth, which consists of a subterranean dam, combined with a conduit upon the source side of said dam, the dam and conduit being built from a central point or reservoir in a valley, up an elevation or hillside, the dam serving to intercept the earth-flow of spring-water and cause its collection in the conduit, substantially as described.

2. The subterranean conduit composed of the dam B and bottom C, and the arch-wall joining the bottom and dam, substantially as described.

3. The reservoir A, built in a valley and covered, combined with the subterranean conduit having connections or extensions E that dip into the reservoir A, substantially as described.

4. The subterranean dam B and bottom C, made water-tight, combined with the percolating lean-to wall D, substantially as described.

5. The subterranean dam B and bottom C, made water-tight, combined with the lean-to wall D, made of arch-brick having grooves *d* formed in them, substantially as described.

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Witnesses:
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C. SEDGWICK.