

(No Model.)

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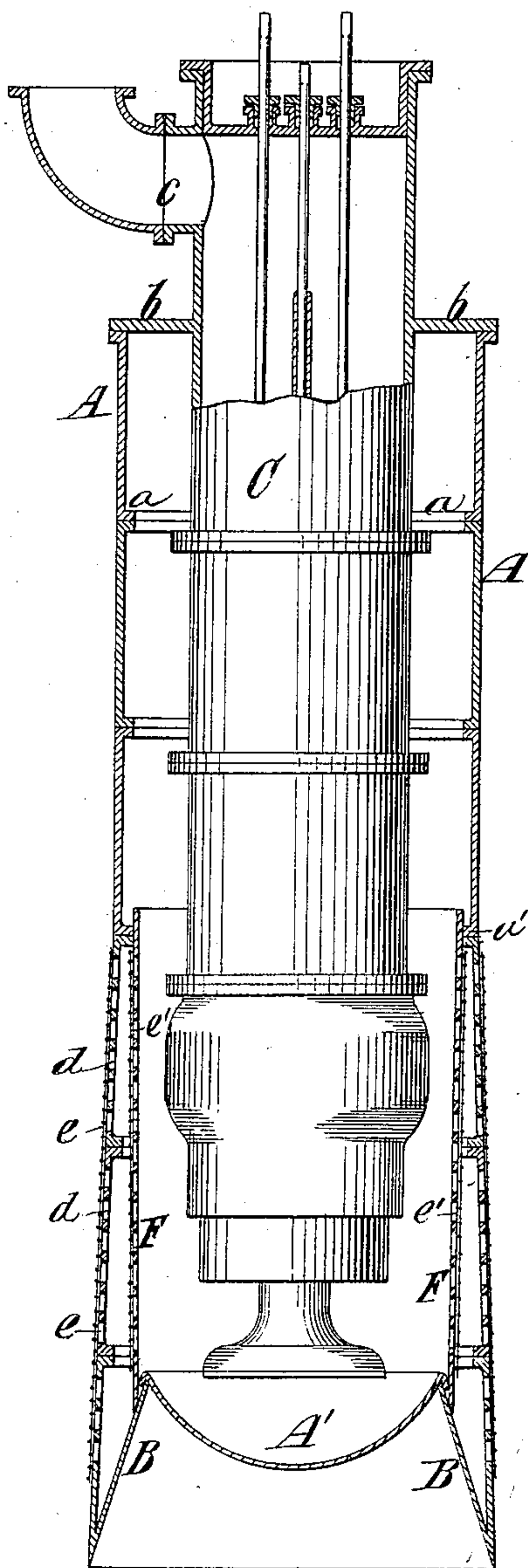
W. D. ANDREWS.

WELL AND RESERVOIR FOR PROCURING WATER FROM THE EARTH.

No. 306,801.

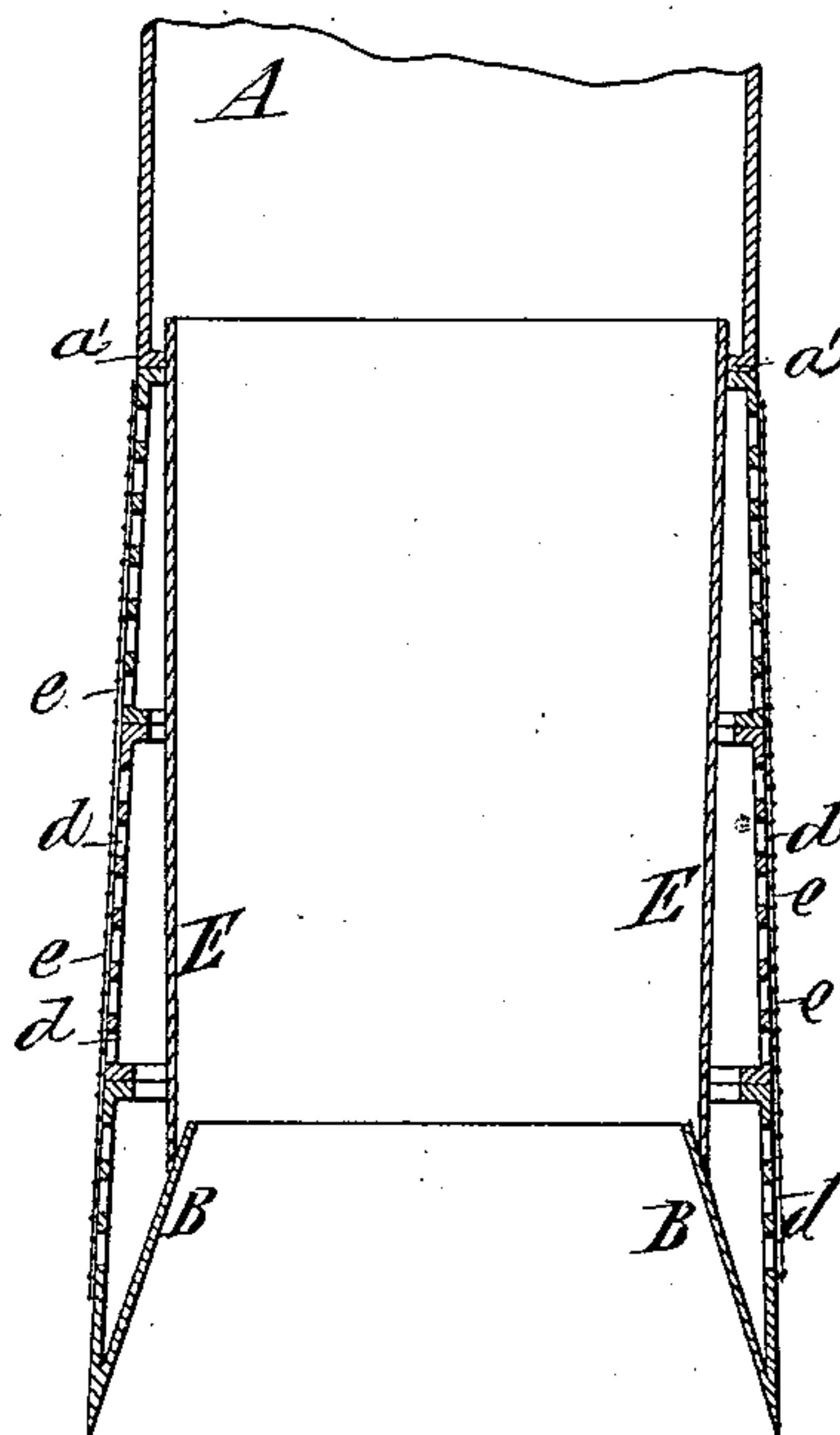
Patented Oct. 21, 1884.

*Fig. 1.*



Witnesses:  
*Louis H. Whitehead*  
*Edw. W. Taylor*

*Fig. 2.*



Inventor:  
*Wm. D. Andrews*  
*By his Attys*  
*Brown & Hall*

(No Model.)

2 Sheets—Sheet 2.

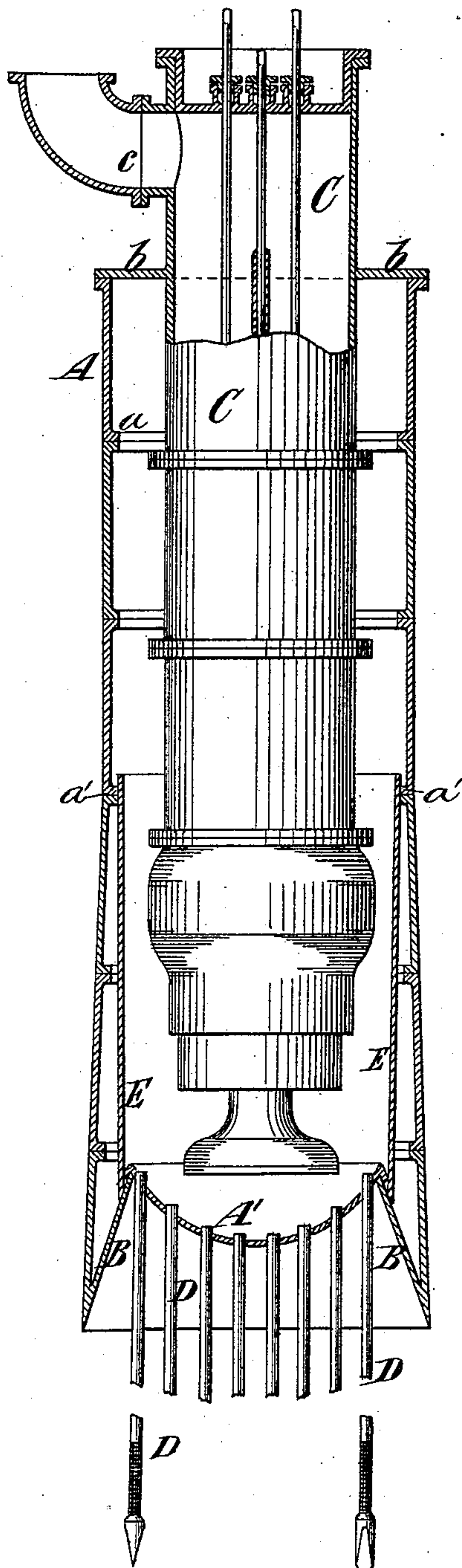
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*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

WILLIAM D. ANDREWS, OF BROOKHAVEN, NEW YORK.

WELL AND RESERVOIR FOR PROCURING WATER FROM THE EARTH.

SPECIFICATION forming part of Letters Patent No. 306,801, dated October 21, 1884.

Application filed February 25, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM D. ANDREWS, of Brookhaven, in the county of Suffolk, in the State of New York, have invented a new and useful Improvement in Wells and Reservoirs for Procuring Water from the Earth, of which the following is a specification.

My invention relates to a well or reservoir consisting of a metal cylinder or tube which is to be sunk in the earth until its lower end is somewhat below the water-level and within which a pump is placed or through which the suction-pipe of a pump may be extended downward to or below the water-level. The openings whereby water is admitted to the well may be formed in the lower section or portion of the cylinder or tube itself, or the cylinder or tube may have its lower portion imperforate, and have a closed bottom, which is put in place after the cylinder or tube has been sunk to the depth desired, and from which extend a number of small tube or drive wells, through which the water flows upward into the main well or chamber, to be from thence taken by the pump.

My invention is applicable to wells of the kind described, whether the water is supplied to them through openings in their sides or through supplemental tube-wells extending downward from their bottoms; and certain features of the invention are also applicable to air-tight reservoirs which are sunk into the earth and are supplied with water from tube or driven wells connected in gangs or series, as shown and described in my application for Letters Patent filed February 28, 1884, and of which the serial number is 122,277, or from underground galleries or other sources, the pump for raising the water being arranged within the reservoir and extending through the upper closed end thereof. The upper end of the pump may be closed by a head and the water delivered through a discharge-pipe, *e*, or it may be delivered directly from the open upper end of the pump, as may be desired.

The invention will be first described in detail, and then pointed out in my claims.

In the accompanying drawings, Figure 1 represents a vertical section of a well embodying my invention, and in which the water-supply is through openings in the lower sec-

tion or portion of the well, also including a partly sectional elevation of a pump arranged in the well. Fig. 2 is a sectional view of the lower portion or section of the well as it is adapted to be sunk into the earth; and Fig. 3 is a sectional elevation similar to Fig. 1, except that the water is supplied to the well through the bottom thereof by means of a number of supplemental tube or drive wells.

Similar letters of reference designate corresponding parts in all the figures.

I provide an open-ended cylinder or tube, A, which may with advantage be composed of cast-iron sections secured together by flange-joints *a*. This cylinder flares slightly from about the point *a'* downward to the lower end, where it is provided with an inwardly and upwardly tapering tip-piece or shoe, B, the upper and smaller end of which should be somewhat smaller in diameter than the internal diameter of the flange-joints *a*. The tip-piece or shoe B forms a sharp edge which will readily sink into the earth. I sink this cylinder or well into the earth by excavating within it or other means until its lower end is somewhat below the surface of water in the earth. I then secure a head in any suitable manner to the upper end of the cylinder, thereby rendering it perfectly air-tight except at the open lower end, from which air is excluded by the surrounding water. I then proceed to sink the well to a suitable depth by exhausting the air within it, thus causing it to descend by atmospheric pressure on its closed upper end, the earth being received inside as the cylinder sinks. I remove the earth and incoming water received within the cylinder as it descends by a centrifugal pump having its suction-pipe inserted in an air-tight manner through the upper head or by first removing the said head, and in the latter case the head is replaced, if desired, after removing the earth, and the operation of exhausting air is continued until the cylinder reaches the desired depth. After the desired depth is reached, the lower end is closed by a head or bottom, A', which may be bolted or otherwise secured to the top of the tip-piece or shoe B, and the pump C is placed therein, the cylinder or casing of the pump having a flange, *b*, which forms a head or air-tight cover to the top of



the well-cylinder A. The water raised by the pump is discharged through a pipe, C, or through the open upper end of cylinder *e*, as may be most convenient.

5 A pump of any suitable construction may be employed to raise the water from the well, but I prefer to use one in which two valvular pistons are moved simultaneously toward and from each other. Such a pump is shown and  
10 described in my application for Letters Patent filed February 25, 1884, and of which the serial number is 122,023.

To admit the surrounding water to the well, I provide openings *d* in the flaring lower portion of the cylinder A, such openings being  
15 covered and protected from the inflow of earth and sand by perforated or reticulated brass or other strainers, *e*; or I insert a number of supplemental drive-wells D downward through  
20 the lower head or bottom, A', of the cylinder A, as shown in Fig. 3; or I may connect a number of tube or drive wells in an air-tight manner with the upper portion of the cylinder A, as is shown in my application No.  
25 122,277, hereinabove first referred to, the cylinder A in the latter case serving simply as a reservoir, into which water is delivered from the surrounding drive-wells and having no openings whatever in its lower portion for the  
30 inflow of water.

In soils where water may be procured from different earth strata at varying depths, I insert the supplemental drive or tube wells to different depths, for the purpose of controlling a horizontal supply of water through a  
35 greater depth of soil, and decreasing the rapidity of its flow through the earth. This is particularly desirable when the supplemental wells are extended through the bottom of the cylinder and near to each other, as shown in Fig. 3. It is desirable to give the lower portion or section of the cylinder A a slight flare downward, as shown, because in the sinking of the cylinder there will be left above the  
45 lower end as it descends a surrounding space or a ring of loose earth, through which the cylinder will descend with little friction. The flaring portion is particularly desirable where the cylinder has openings *d* in the sides, which  
50 are covered and protected by a perforated or reticulated strainer, as forcible rubbing contact of the strainer with the surrounding earth is prevented, the movement of the strainer being away from the earth. By making the lower portion flaring the chances of injury to the strainer by abrasion when the cylinder is being forced down to its place are greatly lessened. When the cylinder A has openings *d*  
60 in the lower portion, it becomes necessary while sinking the cylinder by exhausting the air within it to prevent the inflow of water through its sides, and to compel its entrance through the open lower end. To accomplish this result, I provide a lining cylinder or guard, E, of proper length and size to fit outside the upper portion of the shoe

B and inside the internal flanges, *a*, at the top of the flaring portion of the cylinder A. This lining cylinder or guard is shown in Fig. 2, and is preferably slightly smaller at the bottom than at the top, so the earth received in the cylinder A as it descends will rise easily through the upwardly-flaring lining or guard E. When the cylinder A has openings *d* in its sides, the lining or guard E is removed after sinking the well, and is replaced by a perforated tube, F, of the same size and form, covered and protected by a brass or other perforated or reticulated strainer *e'*, which acts in conjunction with an auxiliary to the strainer *e* and serves as an additional preventive to the entrance of earth or sand into the well in consequence of any defect in the outer strainer by reason of abrasion, decay, wear, or otherwise. Should the inner strainer and tube, F, become defective by reason of being clogged, worn, or damaged, it may be readily taken out, repaired, and reinserted or replaced by another when the pump is removed. It is very advantageous to have the lining or guard E taper downward, because then the strainer-tube F, which is identical in pattern therewith and is substituted therefor, may be slipped readily into place without abrading the strainer *e'*.

When the water is supplied to the well A through supplemental wells D passing through the bottom A', as shown in Fig. 3, the lining or guard E may be used, if desired, while sinking the cylinder A, to prevent the earth received in the cylinder from depositing in the interior of the shoe B, and to afford a cylindrical throat destitute of projections to receive the earth as the cylinder descends. It may afterward be left in the well, as shown in Fig. 3, in order to prevent sand and earth which may enter through the drive-wells from depositing behind or around the shoe B.

Inasmuch as the lining or guard E is not necessarily a part of the well, it being always removed when the water is received through openings *d* in the side of the well, I do not here claim it, but make it the subject of a separate application for Letters Patent for improvement in apparatus for sinking wells. Neither do I here make any claim to a well having openings for the inflow of water near or at the lower end, or a reservoir having a water-supply into its upper end in the combination with a pump arranged within the said well or reservoir for delivering water therefrom.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A well or reservoir to be sunk in the earth, having a downwardly-flaring lower portion and inwardly-contracted tip piece or shoe connected thereto, substantially as and for the purpose herein described.

2. A well or reservoir to be sunk in the earth, consisting of a cylinder composed of internally-flanged sections, and having a down-



wardly-flaring lower portion and a downwardly-flaring tip piece or shoe within the lower portion, substantially as herein described.

5 3. A well or reservoir to be sunk in the earth, consisting of the cylinder A, composed of sections united by internal flange-joints, *a*, and having a downwardly-flaring or upwardly-contracted shoe, B, adapted to receive the lining-guard E or perforated tube F, the upper  
10 end of which shoe B is smaller in diameter than the internal diameter of the flange-joints *a*, substantially as and for the purpose herein described.

15 4. A well to be sunk in the earth, consisting of a cylinder having a downwardly-flaring lower portion in which are inlet-openings protected by a perforated or reticulated strainer, substantially as and for the purpose herein described.

20 5. A well to be sunk in the earth, consisting of a cylinder composed of internally-flanged sections having a downwardly-flaring and perforated lower portion protected by a strainer, and also having an upwardly-contracted shoe

within the said lower portion, substantially 25 as herein described.

6. The combination, with a well consisting of a cylinder having a downwardly-flaring and perforated lower portion protected by a strainer, and having an upwardly-contracted shoe 30 within said lower portion, of a supplemental strainer extending from said shoe to the interior of the cylinder at a point above the openings in said downwardly-flaring portion, substantially as and for the purpose herein de- 35 scribed.

7. The combination, with the cylinder A, having a downwardly-flaring and perforated lower portion, and the upwardly-contracted shoe B, of the removable tube F and its strainer 40 fitting upon the exterior of said shoe and extending therefrom upward to a point above the perforated and flaring lower portion, substantially as herein described.

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Witnesses:

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FREDK. HAYNES.