

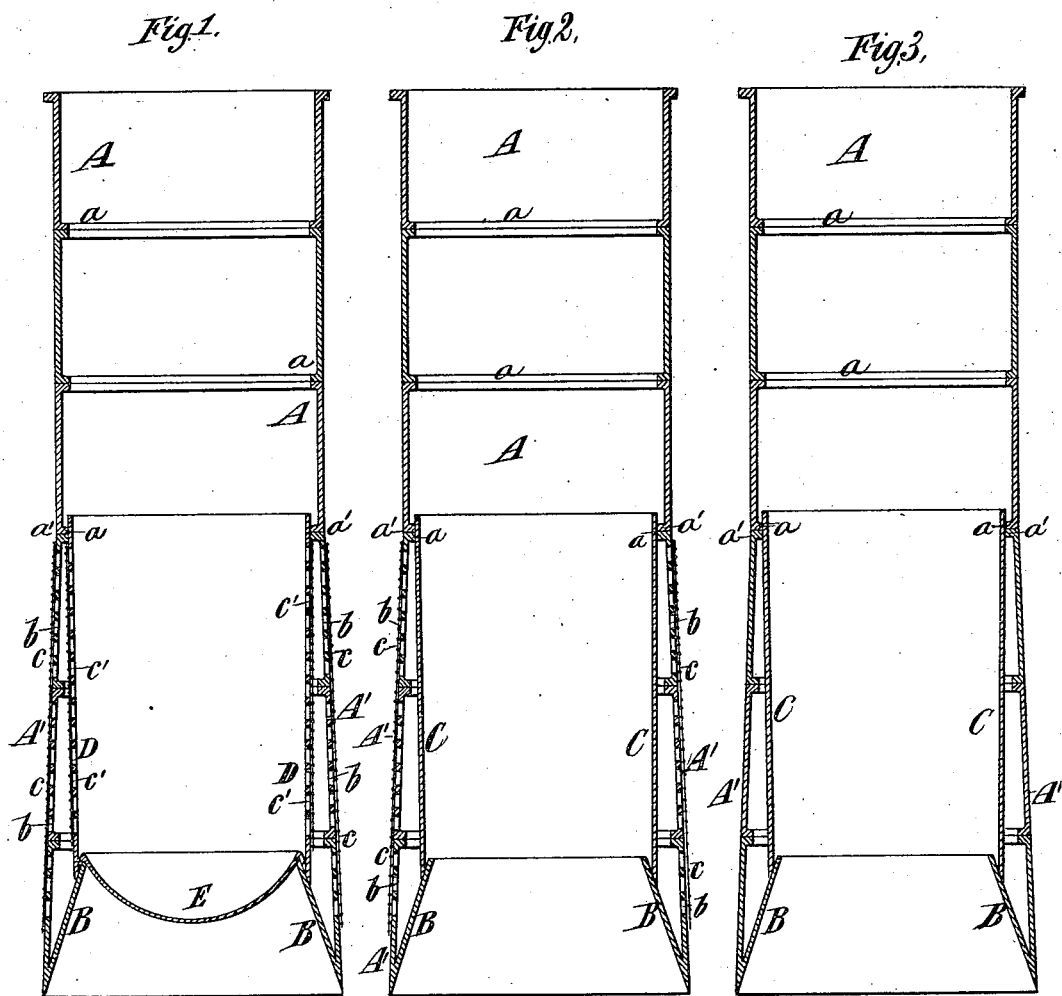
(No Model.)

W. D. ANDREWS.

APPARATUS USED IN SINKING WELLS.

No. 306,799.

Patented Oct. 21, 1884.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## APPARATUS USED IN SINKING WELLS.

SPECIFICATION forming part of Letters Patent No. 306,799, 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 Apparatus Used in Sinking Wells, of which the following is a specification.

My invention relates to means which are to be employed in sinking a tube or drive well such as forms the subject of my application for Letters Patent filed February 25, 1884, and of which the serial number is 122,025, the well being of such size that the water may be taken from it by means of a pump or a pump suction-pipe introduced downward within it to a point below the water-level, instead of by a pump connected with its upper end, as has been done heretofore.

The well described in my aforesaid application consists of a cylinder closed for the greater part of its length, and having openings for the admission of water formed either in the side of the lower section of the cylinder or by small tube or drive wells extending through the closed bottom of the cylinder downward into the earth below. This cylinder is sunk by excavating the earth within it until its lower end is somewhat below the level of water in the earth, and is sunk the remainder of the distance desired by closing its upper end in an air-tight manner and exhausting the air from it, the earth and water which enter through the lower open end of the cylinder being removed from time to time.

The object of my invention presented in this application is to provide means whereby the water will be kept from flowing into the tube or cylinder through the side openings during sinking, and also to afford a smooth throat or passage, through which the cylinder receives earth within it as it is forced down by atmospheric pressure.

In the accompanying drawings, Figure 1 is a vertical section of a well such as is shown and described in my aforesaid application. Fig. 2 is a similar section of such well with my present invention applied and before it is completed; and Fig. 3 is a view similar to Fig. 2, except that there are no openings in the lower section of the cylinder.

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

A designates the cylinder, which may be composed of cast-iron sections united by internal flange-joints, *a*, and the lower portion, *A'*, of which is made flaring from the point *a'* downward.

The wells or cylinders shown in Figs. 1 and 2 have openings *b* in their flaring portions *A'*; but that shown in Fig. 3 has no such openings. The openings *b* in the flaring perforated portion *A'* are protected by a screen, *c*, of brass or other reticulated metal, which prevents earth and sand from closing or entering through said openings. At the lower end of the flaring portion *A'* is a shoe or tip piece, *B*, having a sharp edge, which will enter the ground freely, and which is contracted upward, its diameter at the upper edge or top being less than the internal diameter of the flanges *a*.

The operation of sinking the well and its construction are very fully described in my aforesaid application, Serial No. 122,025, and are not here claimed. I first sink the cylinder by excavating within it until the lower end thereof is below the level of water in the earth, and I then close the upper end of the cylinder in an air-tight manner and exhaust the air therefrom, thus forcing the cylinder downward by atmospheric pressure. From time to time I remove from the cylinder the earth and water which have been received within it through its open lower end, either by a centrifugal pump having its suction-pipe extending through the closed head in an air-tight manner, or by removing the head and then taking out the earth and water in any suitable manner. When the flaring lower portion, *A'*, has water-inlet openings *b*, as shown in Figs. 1 and 2, it is of course desirable, in sinking by atmospheric pressure, to prevent the entrance of water through said openings, and to compel all water and earth which are received in the cylinder to enter through the open lower end thereof; and it is also desirable that there should be a smooth throat through which pass earth and water entering or received within the cylinder. When there are no openings in the flaring portion *A'*, as in Fig. 3, the water cannot enter except at the open lower end; but it is still desirable to afford a smooth throat for the passage of water and earth. To this end I provide a lining-

tube or guard, C, which is shown in Figs. 2 and 3, and which fits at its lower end outside the contracted upper end of the shoe B, and extends therefrom upward to a point above the openings *b*, or thereabout. The exterior of this guard or lining-tube is fitted to the internal flanges, *a*, at the point *a'*, where the downward flare of the cylinder A commences, and said guard or lining-tube forms a smooth throat, which facilitates the passage of the earth in sinking the well. After the cylinder has reached the proper depth, the guard or lining-tube C is removed, and a perforated tube, D, covered and protected by a strainer, *c'*, like the strainer *c*, is inserted downward into its place, as shown in Fig. 1. The guard or lining-tube C has a slight downward taper, which is very desirable for two reasons. When the said guard is to be replaced by a tube and strainer, D *c'*, which are supplemental to the main cylinder and strainer *c*, the said tube and strainer D *c'*, if made with a taper corresponding to the guard or lining-tube C, may be readily inserted downward into place and come to a tight fit without abrasion or injury to the strainer *c'*; and in any case the downwardly-tapering or upwardly-flaring guard or lining-tube affords greater facility for the passage of earth than would a straight cylindrical guard or tube. I do not, however, limit my invention to a tapering guard or lining-tube.

In Fig. 1, which represents a completed well, the lower end is closed by a head, E, which is fitted to the upper end or edge of the shoe B, and secured thereto by bolts or otherwise; but supplemental tube or drive wells may be extended from the lower head or bottom, E, downward into the earth, and this may be done whether there be openings *b* in the flaring portion A', as shown in Fig. 1, or whether the said flaring portion be closed or imperforate, as shown in Fig. 3. Such supplemental tube or drive wells are shown in my application Serial No. 122,025, and as I here make no claim to them, I have not thought it necessary to show them.

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

1. The combination, with a well consisting of a cylinder or tube having a downwardly-flaring lower portion and an upwardly-contracted shoe or tip within said lower portion, of a guard or lining-tube extending upward from said upwardly-contracted shoe or tip, substantially as and for the purpose herein described.

2. The combination, with a well consisting of a cylinder or tube having a downwardly-flaring lower portion and an upwardly-contracted shoe or tip within said lower portion, of an upwardly-flaring guard or lining-tube extending from said upwardly-contracted shoe or tip and fitted to the said cylinder at the top of said flaring lower portion, substantially as and for the purpose herein described.

3. The combination, with a well consisting of a cylinder or tube composed of sections united by internal flange-joints, and having at and within the lower end an upwardly-contracted shoe or tip, the smaller diameter of which is less than the internal diameter of said flange-joints, of an upwardly-flaring guard or lining-tube fitting the exterior of said shoe or tip and the interior of one of said flange-joints, substantially as and for the purpose herein described.

4. The combination, with a well consisting of a cylinder or tube having openings in its lower portion covered by a strainer, of a removable guard or lining-tube extending upward within said cylinder to a point above said openings, and serving to prevent the entrance of water through said openings, substantially as and for the purpose herein described.

5. The combination, with a well consisting of a cylinder or tube having a perforated downwardly-flaring lower portion and an upwardly-contracted shoe or tip within said lower portion, of an upwardly-flaring guard or lining-tube removably fitted to the exterior of said upwardly-contracted shoe or tip, and also removably fitted to the interior of said cylinder or tube above its flaring portion, substantially as and for the purpose herein described.

6. The combination, with a well consisting of the cylinder A, composed of sections united by internal flange-joints, and having the downwardly-flaring perforated and strainer-protected portion A', of the upwardly-contracted shoe or tip B and the upwardly-flaring guard or lining-tube C, removably fitted to the exterior of said shoe or tip and to the interior of one of said flange-joints above the flaring portion A', substantially as and for the purpose herein described.

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Witnesses:

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