(No Model.)

T. G. CHAPMAN.

WELL SINKING APPARATUS.

No. 405,200. Patented June 11, 1889.

Fig. 1.

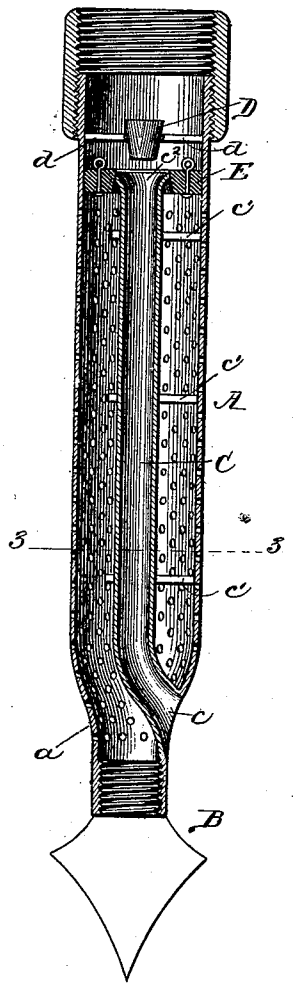


Fig. 2.

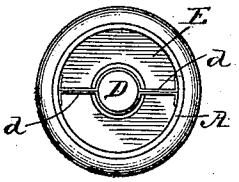
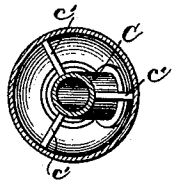


Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS G. CHAPMAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO FREDERICK C. AUSTIN, OF SAME PLACE.

WELL-SINKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 405,200, dated June 11, 1889.

Application filed April 9, 1888. Serial No. 270,120. (No model.)

To all whom it may concern:

Be it known that I, THOMAS G. CHAPMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Well-Sinking Apparatus, of which the following is a specification.

This invention relates to well-sinking apparatus of that class in which the well-tubing is provided at its lower end with a strainer-tube to which a drilling-tool is attached, so that upon rotating the well-tubing by suitably-applied power the cutter may operate to bore into the earth and thus permit the well-tubing to be sunk to the required depth. In connection with such devices it has been proposed to direct a supply of water to the drilling-tool during the well-sinking operation, the object being to moisten and loosen the earth, so as to permit the drilling-tool to work with greater ease. In one instance it has been proposed to provide, in connection with the strainer-tube, a hollow drilling-tool constructed with an annular set of cutting-teeth, and having its bore adapted to constitute a downward prolongation of the strainer-tube, and as a means for directing a supply of water under pressure to the drilling-tool it has been proposed to temporarily employ, in connection with said strainer-tube and hollow drilling-tool, a couple of annular washers fitted within the strainer-tube and adapted to temporarily hold and center therein a tube substantially the length of but smaller in diameter than the bore of the strainer-tube, the purpose of such arrangement being to temporarily close the strainer-tube at points adjacent to its ends by the washers and to permit water forced down the main well-tubing to pass through the tube that is thus centered in the strainer-tube, in order to discharge the supply of water into the bore of the hollow drilling-tool. Said arrangement involves the following conditions, to wit: First, the drilling-tool is necessarily and undesirably limited to a hollow or tubular drilling-tool; secondly, the small tube within the strainer-tube must be drawn entirely out of the well-tubing, in order to permit the upward flow of the well-water or oil, and hence while the strainer may so far as it goes serve as a strainer its construction is incomplete for the reason that no means are provided for closing the lower end of its bore, which, as hereinbefore stated, is continued by the bore of the hollow drilling-tool; thirdly, after a removal of the small tube from the strainer-tube much labor and difficulty must be experienced in attempting to grapple and tear out the washers. In another instance it has been proposed to dispense with the aforesaid washers and small tube within the strainer-tube and to provide the latter with externally-arranged tubes. This last arrangement is, however, objectionable, since it is desirable, first, to provide an externally-cylindric strainer-tube to insure easy working, and next to provide, in connection with the strainer-tube, a separate passage which can be readily closed as soon as the well has been sunk.

The object of my invention is to overcome all of the foregoing objectionable features in well-sinking apparatus, wherein water is to be supplied to the drill during the well-sinking operation, and to further provide certain improved details, all tending to the general efficiency and serviceability of the apparatus.

To the attainment of the foregoing and other useful ends my invention consists in matters hereinafter described, and particularly pointed out in the claims.

In a well-sinking device or apparatus characterized by my invention the strainer-tube contains a small tube, which is held therein as a fixture and arranged to discharge at a point adjacent to the drilling-tool. The portion of the bore of the strainer-tube that is unoccupied by said smaller tube is at a point adjacent to the upper end of the latter temporarily closed by a stopper, so that during the well-sinking operation water forced down through the well-tubing may pass through the said small tube to the drill. After the well-tubing has been sunk to the required depth the aforesaid small tube can be closed by dislodging a stopper held temporarily in position over the upper end of the small tube and driving such stopper into said tube, after which the stopper of the strainer-tube can be readily drawn up by a cord, wire, or the like.

Certain details constituting further features of improvement in this connection are hereinafter particularly set forth.

In the drawings, Figure 1 represents a longitudinal central section through the strainer-tube with the matters of my invention applied thereto. Fig. 2 is a transverse section on the line 2 2 of Fig. 1, and Fig. 3 is a like section on line 3 3.

The perforated strainer-tube A can be coupled at its upper end in any suitable way with an appropriate length or section of well-tubing, and at its lower end can be provided with any suitable form or construction of drilling-tool, the form of drilling-tool B herein shown being simply to illustrate one of the various constructions of cutters or drilling-tools that can be employed.

The tube C for directing water to the drill during the operation of sinking the well-tubing is made somewhat smaller in diameter than the bore or passage of the strainer-tube, and is confined therein as a permanent fixture. The tube C can, if desired, be made separate from the strainer-tube, but permanently secured thereto by soldering, riveting, or other like means, the preferred way being, however, to make said tube integral with the strainer-tube, as by casting the strainer-tube and its said inclosed tube in one piece, whereby the device can be economically produced and a strong and simple construction afforded. The tube C herein shown has its lower end portion bent or deflected somewhat to one side, so that it may discharge at one side of the lower end portion of the strainer-tube. In connection with this arrangement of tube C said lower end portion of the strainer-tube is preferably made somewhat tapering or contracted, as at *a*, in which way the discharge end of the tube C can be located in such position relatively to the drilling-tool as to permit it to properly direct the current of water to the drilling-tool without enlarging the general diameter of the strainer-tube. The tube C can also be braced by laterally-arranged arms *c'*, which, however, can be dispensed with where said tube is cast integral with the strainer-tube; but even in the last-mentioned instance said arms can readily be provided and will when present serve to insure the necessary rigidity and permanency in position of the tube C, and particularly at a time when it becomes desirable to drive a plug or stopper into its upper end. The upper end of the tube C extends somewhat higher than the perforated portion of the strainer-tube and is desirably made somewhat flaring, as at c^2, in order that it may readily receive a plug or stopper D, that is temporarily suspended above the upper flared end of the tube, but so held that by means of the downstroke of a rod or weight upon a cord or wire or other suitable tool let down into the well-tubing said stopper can be dislodged from its temporarily-suspended position and driven into the tube C. The stopper D can be temporarily held over and in alignment with the bore of tube C in various ways, a simple arrangement being to engage the stopper by one or more comparatively-light metal strips *d*, which can be soldered or otherwise secured to the inner wall of the strainer-tube, so as to hold the stopper in position over the tube. When thus arranged, a blow upon the stopper will bend the strip or strips *d* and tear them from the strainer-tube, so as to permit the stopper to be driven into the tube C. During the operation of sinking the well-tubing the tube C is to be left open, so that water forced down into the well-tubing—for example, from a suitable pump—may pass through the tube C. At such time the bore of the strainer-tube can be closed at a point above its perforated portion, but below the upper end of tube C, by a stopper E, wedged into the annular space between the tube C and the inner wall of the strainer-tube. At a proper time, however, the stopper E can be withdrawn from the tubing either by a cord or wire or by any suitable device let down into the well-tubing and adapted to engage eyes, hooks, or the like on the said stopper.

It is herein understood that should it be desired to provide the tube C with two outlets arranged to discharge, respectively, at opposite sides of the lower end portion of the strainer-tube, said tube C can at its lower end portion be divided or provided with a lateral branch somewhat similar to the lateral branch described in connection with a passage in a strainer-tube in an application of even date herewith made by me for an improvement in well-sinking apparatus, in which said application one or more passages for supplying water to the drill are formed by webs or partitions within the strainer-tube.

The arrangement herein shown permits any construction of drilling-tool having, if desired, a solid shank, to be attached to the strainer-tube, although, should for any reason it be desired to use a hollow drill, the tube C could have its lower end united to the strainer-tube at a point within the contracted lower end portion of the strainer-tube, it being observed, however, that such arrangement, while not so desirable as the one herein shown, involves in common with said illustrated arrangement the feature of a tube permanently secured within the strainer-tube and adapted to be closed by the stopper D.

What I claim as my invention is—

1. The combination, substantially as hereinbefore set forth, with the strainer-tube, of a smaller tube arranged within and at its lower end, permanently and rigidly secured to the strainer-tube as a part thereof, and adapted for conducting a supply of water to a drilling-tool below the strainer-tube, and a removable stopper arranged to close the space between said smaller tube and the inner wall of the strainer-tube at a point adjacent to the upper end of the smaller tube, for the purpose described.

2. The strainer-tube provided with an internally and centrally arranged smaller tube detached from the strainer-tube, except at its lowest end, and adapted for conducting a supply of water to a drill below the strainer-tube, substantially as set forth.

3. The combination, substantially as hereinbefore set forth, with the strainer-tube having a contracted lower end portion, of the smaller tube C, arranged within and separated from the inner wall of the strainer-tube, except at its lower end, which said end of said smaller tube opens at the contracted portion of the strainer-tube, for the purpose described.

4. The combination, substantially as hereinbefore set forth, with the strainer-tube, of a smaller tube arranged within and separated from the strainer-tube, and a stopper temporarily suspended within the strainer-tube at a point over the upper end of the said smaller tube, for the purpose described.

5. The combination, substantially as hereinbefore set forth, with the strainer-tube, of an inclosed smaller tube arranged centrally within the strainer-tube, for the purpose described, a stopper temporarily suspended over the upper end of said smaller tube, and a stopper E, adapted to fit within the space between the smaller tube and the inner wall of the strainer-tube.

6. The combination, substantially as hereinbefore described, with the strainer-tube and the smaller tube arranged centrally therein, for the purpose described, of the stopper D, temporarily held over the upper end of the smaller tube by one or more strips *d*.

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Witnesses:
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