No. 849,043. PATENTED APR. 2, 1907.

E. F. BRADT.

METHOD OF AND APPARATUS FOR SINKING WELLS.

APPLICATION FILED JULY 21, 1906.

Fig. 1.

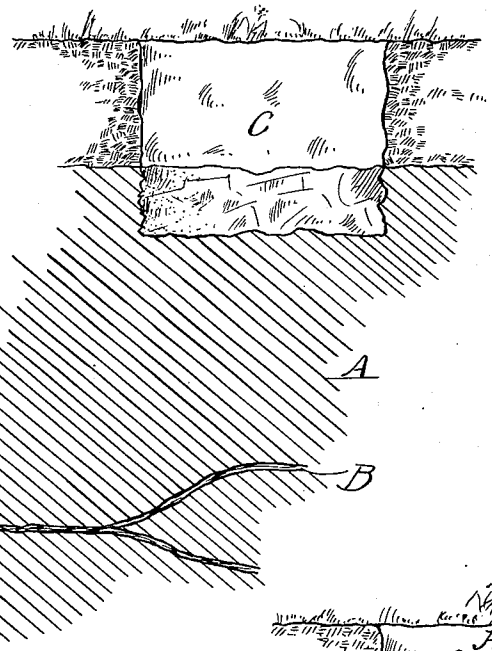
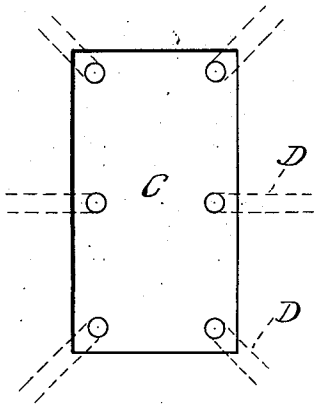


Fig. 3.



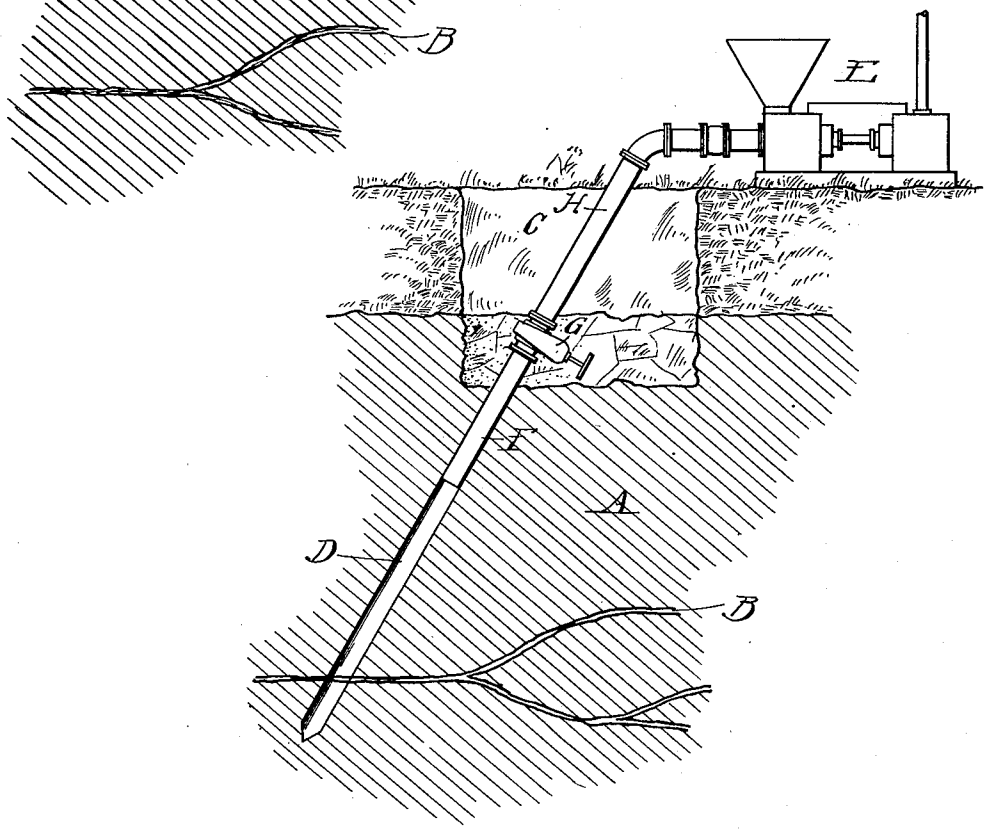


Fig. 2.

WITNESSES.
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METHOD OF AND APPARATUS FOR SINKING WELLS.

No. 849,043. Specification of Letters Patent. Patented April 2, 1907.

Application filed July 21, 1906. Serial No. 327,169.

To all whom it may concern:

Be it known that I, EUGENE F. BRADT, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Methods of and Apparatus for Sinking Wells, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates particularly to shaft or well excavating in ground, such as rock or similar material, where water in courses or fissures is generally encountered, requiring in the ordinary operation of shaft-sinking constant pumping to keep the shaft dry and in many instances (where large channels are broken into) abandonment of the shaft.

The present invention consists in a novel method of drilling, whereby the watercoures are closed in advance of the work, thus allowing the shaft to be sunk in dry ground and dispensing with the necessity of pumping.

In the drawings, Figure 1 is a sectional view illustrating a strata of rock with water courses and a shaft partially sunk therein. Fig. 2 is a similar view illustrating the preferable form of apparatus employed for closing the courses, and Fig. 3 is a plan view.

The method consists primarily in testing in advance of the work a section of ground corresponding in area to that of the shaft to be sunk for watercourses and where a fissure is encountered the forcing of cementitious material under pressure within the watercourse to form a column or section of dry ground, through which the shaft is subsequently sunk.

In the drawings referred to, A represents a strata of rock, B water courses or fissures, and C the shaft. In practice the shaft may usually be sunk to and partially within the rock before any appreciable quantity of water that cannot readily be handled is encountered and before any test of the ground is necessary. Thereafter the testing is carried on, as hereinafter set forth, in advance of the work by sinking preferably a plurality of test-bores, such as D, usually to a depth of twenty to twenty-five feet, to determine the existence of any water-channels in the ground through which the shaft is to pass. In the event that the test shows that no water is present the shaft is sunk in the ordinary manner through the tested ground. Where a water-channel, however, is encountered during the testing, the drill is withdrawn from the bore, a connection formed between the latter and a suitable pump, as E, and cement forced into the channel and retained therein under pressure until it sets. As previously set forth, a number of these test-bores are usually sunk, they being arranged about the section of ground to be tested in the manner indicated in Fig. 3, so that the operator may know to a certainty that the ground through which the shaft is to be sunk is free from water.

In carrying out the method it is found advisable to provide means present at all times during the operation of testing to close the bore as soon as the water-channel is encountered, so as to prevent the flow of water into the well while the connections are being made between the bore and the pump located outside of the shaft. The means preferably employed for attaining this end consists of a conduit F in the form of a short length of pipe, which is first driven within the ground in the direction which the test-bore is to extend, and a valve, preferably of the gate type, as G, threaded upon the conduit F, as indicated in Fig. 2. The drill, (not herein shown,) being of ordinary construction, extends through the valve and conduit F, and the bore D is formed in the usual manner. Upon communication with the water fissure or channel the drill is immediately withdrawn and the valve shut, thereby closing the bore for the purpose set forth. A pipe connection, as H, is then formed between the valve G and the pump E, and upon the starting of the pump in operation the valve is opened and the cement injected, the cement being forced laterally within the ground until all the water crevices or fissures are filled, the pumping continuing until the back pressure prevents further operation of the pump. The valve is then closed and the cement allowed to set.

In drilling other test-bores the operation just described is repeated, and a section of prepared ground is formed, through which the shaft can be sunk without encountering water.

What I claim as my invention is—

1. The herein-described method of sinking shafts, consisting first in drilling a test-bore, in then forcing cementitious material within the bore and communicating channels, and maintaining the material therein under pressure in excess of the opposing pressure until set, and finally sinking the shaft.

2. The method of sinking shafts, consisting in driving in a section of ground through which the shaft is to be sunk a test-bore into communication with the channel to be closed, and in then forcing cementitious material under pressure into the bore and channel, and maintaining the pressure therein by closing the bore.

3. In apparatus for sinking shafts, the combination with a conduit adapted to be inserted and held within the ground, a valve-controlled closure for the conduit, a pump, and a pipe connection between said pump and closure.

4. The herein-described method of sinking shafts, consisting first in forming a closable conduit in the ground, and in then driving a test-bore through said conduit.

In testimony whereof I affix my signature in presence of two witnesses.

EUGENE F. BRADT.

Witnesses:

JAMES P. BARRY,

NELLIE KINSELLA.