(No Model.)

J. A. WAGNER.

STEAM EXCAVATING PROCESS OF SINKING WELLS, &c.

No. 342,274. Patented May 18, 1886.

Fig. 1.

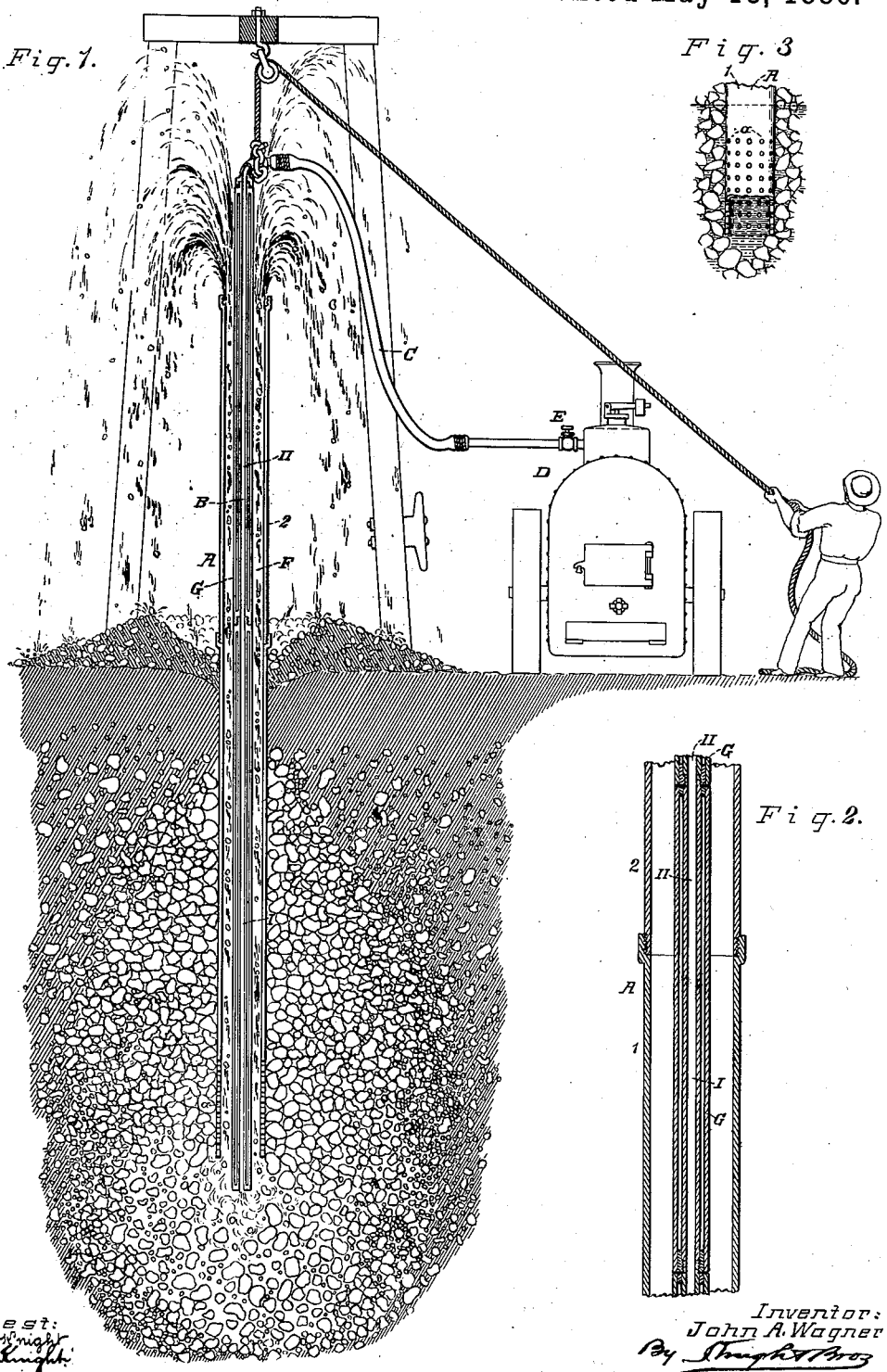

Fig. 3

Fig. 2.

Attest:
A. P. Knight
S. H. Knight

Inventor:
John A. Wagner
By Knight Bros
Attys

UNITED STATES PATENT OFFICE.

JOHN A. WAGNER, OF MIDDLETOWN, OHIO.

STEAM-EXCAVATING PROCESS OF SINKING WELLS, &c.

SPECIFICATION forming part of Letters Patent No. 342,274, dated May 18, 1886.

Application filed September 10, 1885. Serial No. 176,754. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. WAGNER, of Middletown, Butler county, Ohio, have invented a new and useful Steam-Excavating Process, of which the following is a specification.

My invention relates to a method of and means for sinking or excavating wells, shafts, adits, and other like deep and narrow perforations in the ground or crust of the earth by the use of a steam-jet within a tube or pipe, one of whose ends rests for that purpose on the point of ground to be excavated.

In the accompanying drawings, Figure 1 is an axial section of a well in process of formation by my method. Fig. 2 is an axial section, to a larger scale, of a portion of my jacketed steam-conduit and of the inclosing wall-tube. Fig. 3 is a partly sectional elevation of the foot of the wall-tube in position.

A represents a tube, which is preferably composed of cylindrical lengths or sections 1, 2, &c., of wrought-iron, the lowest section, 1, having numerous perforations, *a*.

I, II, &c., are sections of a smaller iron tube or pipe, B, which, having been connected at one end by flexible hose or pipe C, with a steam-generator, D, and having its other end inserted within the tube A, and the cock E, which admits steam to hose from generator, being opened, a blast or jet of steam is discharged through the open foot of the tube A, so as to disintegrate and loosen earth, sand, clay, fine gravel, and other fine, mobile, and soluble matters in and about the line of excavation, and to expel said matters by driving the same upward through the annular passage F between the pipe B and the tube A.

For the double purpose of strengthening and of conserving the heat of the steam-pipe, each section is preferably inclosed in a sleeve or jacket, G, of slightly greater diameter. The steam within the generator is brought to a pressure of one hundred pounds to the inch and upward, according to the depth and diameter of the excavation and the more or less refractory character of the deposit. As the excavation progresses, additional lengths are from time to time added to both wall-tube and steam-pipe. The work having reached its completion by the sinking of the wall-tube to the desired depth, the steam-conduit is withdrawn and said tube is left *in situ*, to serve as the permanent lining wall of the excavation. The continual removal from the desired path of the wall-tube of portions of the obstructing material operates with little or no mechanical assistance to sink said wall-tube to the permanent position by virtue of its own weight. A derrick, H, or other simple device may be employed to hold the pipe to its proper level within the wall-tube and to permit its descent as the work progresses. The removal from the path of excavation of the finer, more mobile, and more soluble particles—such as earth, clay, fine sand, and organic matters—permits more easy filtration and escape of the water or other liquid desired to be reached. The wall-tube having reached the desired depth, and the steam-pipe having been withdrawn, any suitable pump may, if necessary, be placed within the well.

I am aware of the practice of "steaming oil-wells," which consists in discharging a jet of steam thereinto for the purpose of increasing the flow of oil; but this is not the equivalent of my invention.

I claim as new and of my invention—

1. The process of excavating or sinking wells, shafts, adits, or other perforations in the earth's crust, which consists in directing a jet of steam against the earth to be removed, and gradually inserting into the excavation thus formed the pipe or tube through which the steam is conveyed, until the desired depth is reached, substantially as set forth.

2. The process of excavating or sinking wells, shafts, adits, or other perforations in the earth's crust, which consists in directing a jet of steam against the earth to be removed, gradually inserting in the excavation thus formed the pipe or tube by which said steam is conveyed, and sinking in said excavation as its formation progresses a tube or casing which surrounds the steam-pipe and forms a wall, substantially as set forth.

In testimony of which invention I hereunto set my hand.

JOHN A. WAGNER.

Witnesses:

W. H. TODHUNTER,

L. D. DOTY.