May 9, 1933. W. J. NEWMAN 1,907,654

FOUNDATION CONSTRUCTION

Filed June 21, 1929 2 Sheets-Sheet 1

Fig. 1.

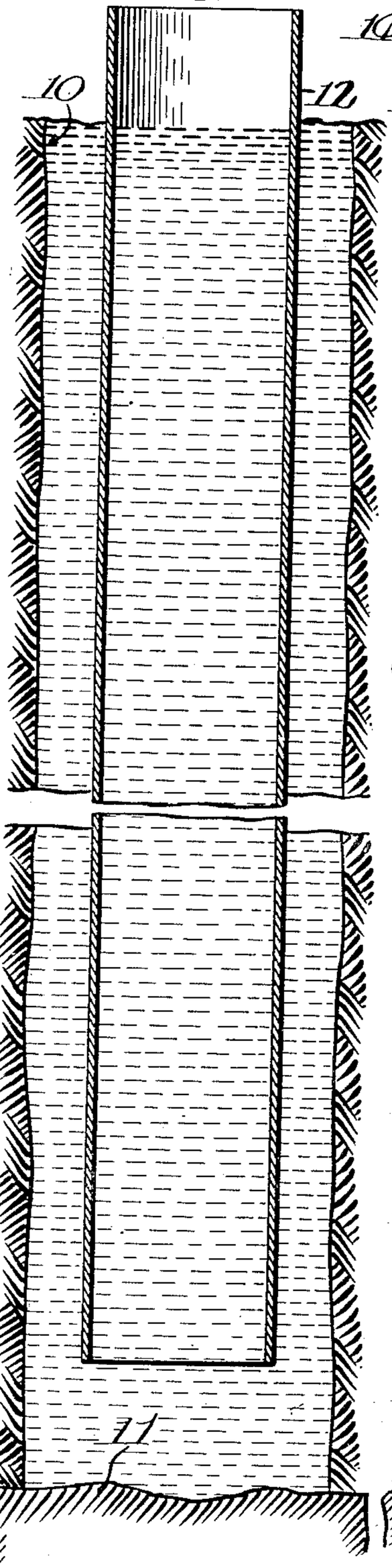

Fig. 2.

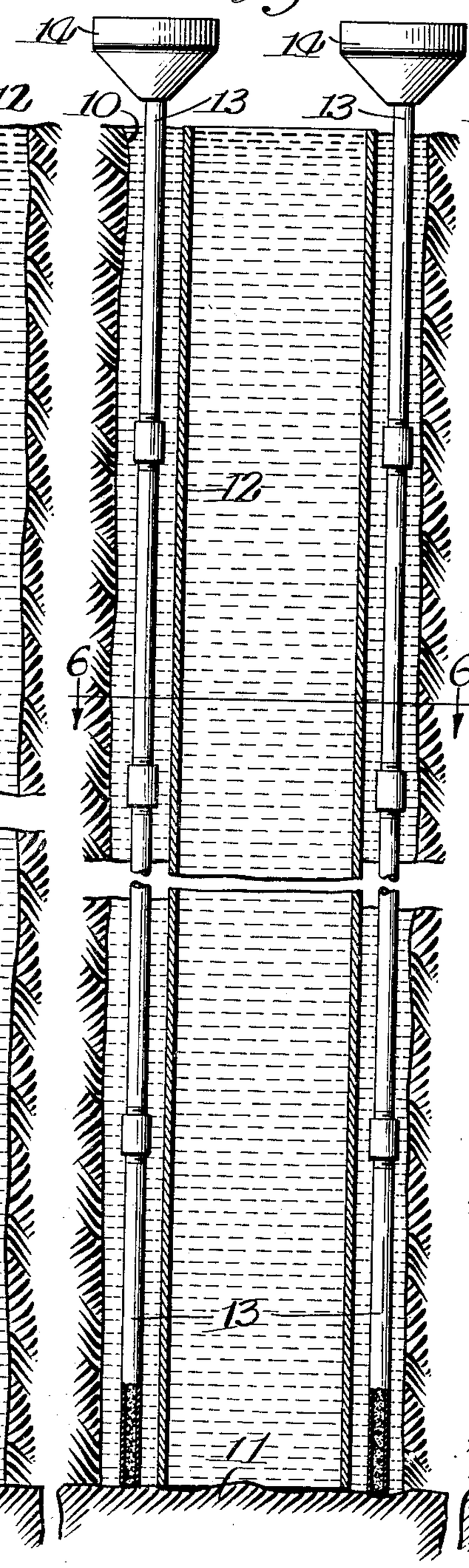

Fig. 3.

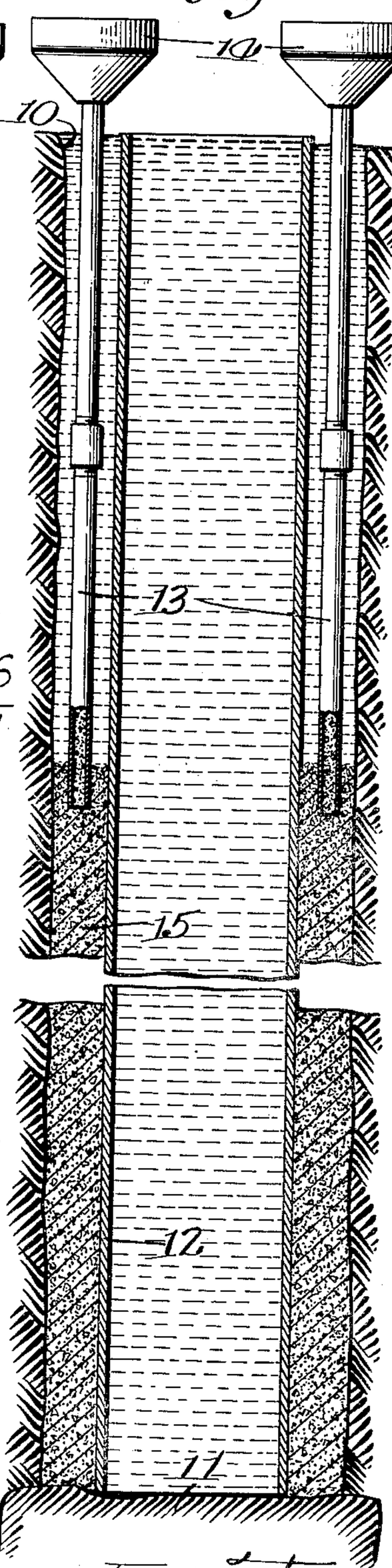

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Fig. 4.

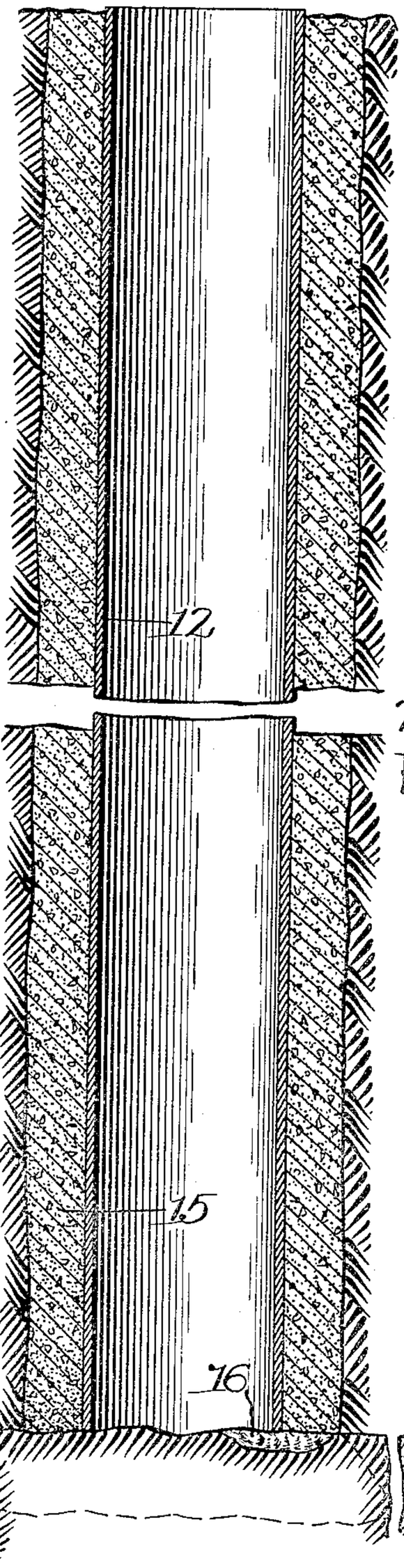


Fig. 5.

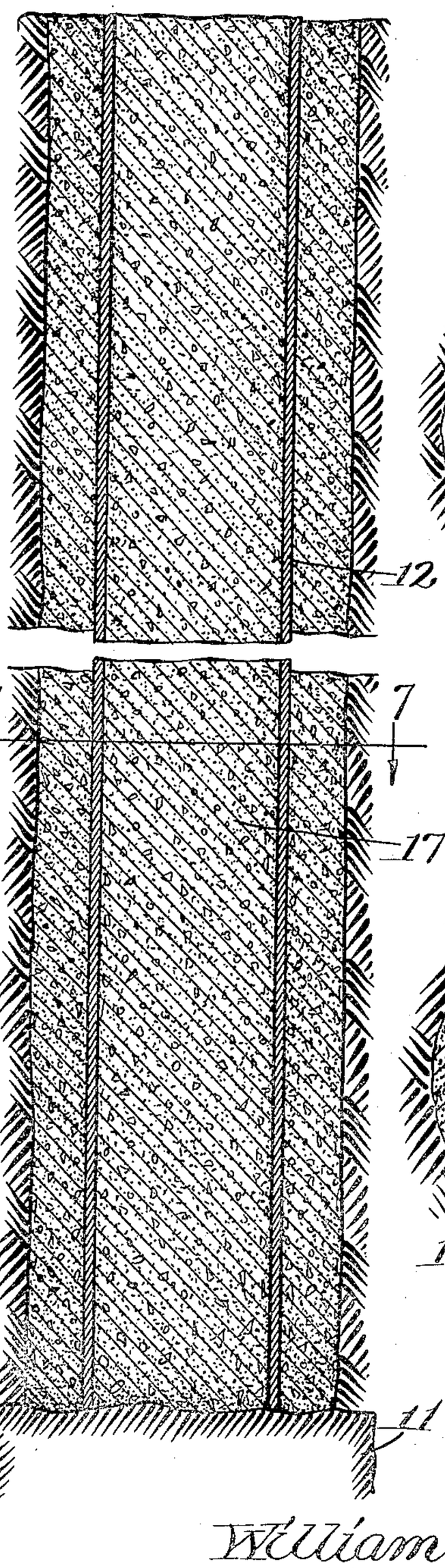


Fig. 6.

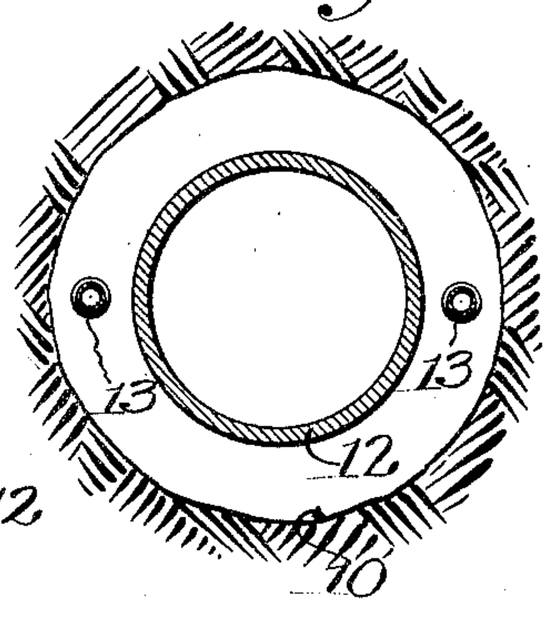
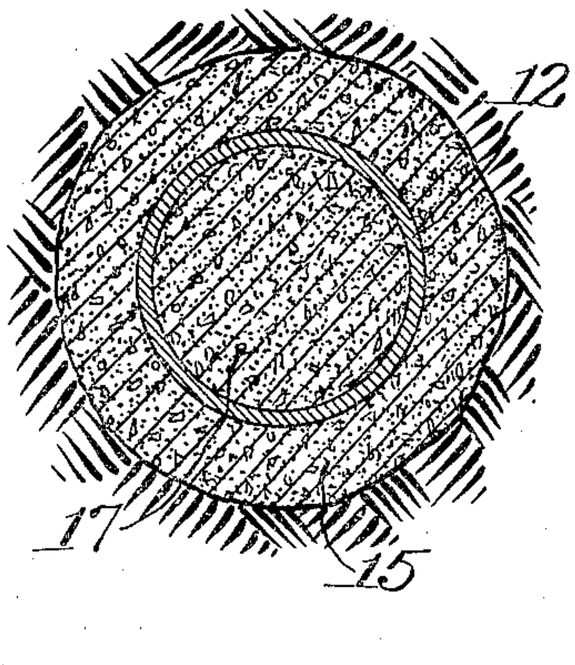


Fig. 7.



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UNITED STATES PATENT OFFICE

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FOUNDATION CONSTRUCTION

Application filed June 21, 1929. Serial No. 372,766.

This invention relates to the construction of concrete posts or pillars such as used for supporting buildings or the like. Such foundations have usually been made by digging wells down to bed rock or a solid stratum, lagging the sides of the wells to prevent them from caving in and finally filling the wells with concrete. These wells are often from four to six or eight feet in diameter and frequently extend down to a depth of one hundred feet or more. If quicksand or the like or other shifting material is encountered, it is often difficult to complete such wells, and the disturbance of such sand or material or even the draining of the water from the surrounding soil may cause subsidence, and if there are any buildings in the immediate vicinity it is usually necessary to shore them up or support the same in order to prevent damage thereto.

In accordance with the present invention I provide a novel method of constructing foundations of this character which will avoid such objectionable features and furthermore provide completed structures which will be more substantial and durable than those heretofore made.

The objects of this invention are to provide an improved method of making foundation pillars or supports which will permit the same to be more readily made than with the previous method and with less danger to workmen; to provide a method of making foundations of this character whereby the adjacent earth will not be disturbed to any objectionable degree; to provide improved foundation pillars for supporting buildings or the like; to provide a lining for deep wells which will permit safe access to the bottom thereof; and to provide such other advantages in the operation and improvements in construction as will be described more fully hereinafter.

In the accompanying drawings illustrating this invention

Figure 1 is a longitudinal sectional view illustrating a well with a tube or form being partially lowered into the same;

Figure 2 is a similar view showing the tube or form in lowered position and showing pipes for conveying concrete to the bottom of the well;

Figure 3 is a view similar to Figure 2 showing the concrete lining or wall partially completed;

Figure 4 illustrates the well with the lining completed and with the water or sludge removed from the tube or form preparatory to cleaning the bottom of the well;

Figure 5 shows the completed structure;

Figure 6 is a cross sectional view taken on the line 6—6 of Figure 2; and

Figure 7 is a cross sectional view taken on the line 7—7 of Figure 5.

In carrying out my improved system of foundation construction, a hole or well 10 is formed in the earth which for example may be considered as being approximately four sheet in diameter and one hundred feet deep. This well is dug without removing any considerable or substantial amount of the earth, although, of course, any boulders or rock would have to be taken out. When the well is completed, it remains full of water and the loosened earth down to the bottom 11 which is preferably bed rock.

When the well has been completed, a tube or form 12, which is preferably cylindrical and water-tight, is lowered into the well, as shown in Figure 1, until it comes to rest on the bottom, as shown in Figure 2. This form or cylinder is preferably of sufficient size or diameter to permit a man to pass therethrough, and in practice I have found that a tube of three feet in diameter is satisfactory.

After the tube 12 has been placed in position, one or more pipes 13 are inserted between the tube and the walls of the well. These pipes are of sufficient diameter, say three inches, to permit concrete to be poured therethrough and are preferably made in sections, as shown, for convenience in removal. I have found that two of such pipes placed on opposite sides of the tube are sufficient. These pipes may be provided with funnels or hoppers 14 for convenience in pouring concrete into the same, and such hoppers should hold sufficient material to

fill the space between the tube and the wall, a distance larger than one section of pipe.

Either wet concrete or dry material may be used. When the dry material for forming the concrete, such as cement and aggregates mixed therewith, is poured down through the pipes 13 and being heavier than the water or muck in the well will fill the space at the bottom between the tube or casing 12 and the sides and gradually force the water or sludge up so that it runs out at the top or may be removed from the surface in any desired manner. The lower ends of the pipes 13 are preferably kept closely against or under the surface of the concrete to prevent undue mixing of the concrete materials with the sludge or water. As the peripheral ring or cylinder between the tube 12 and the walls of the well is gradually filled, for instance as indicated in Figure 3, the pipes 13 are raised and sections removed for convenience in pouring the materials into the funnels. The dry material for the concrete will absorb enough water so that the concrete begins to set as it is put in position and when the space is filled it provides a complete concrete cylinder or lagging or lining 15 for the entire depth of the well. It will also be noted that if there are any irregularities in the walls of the well, they will be filled by the concrete so as to make a homogeneous structure which will be bonded throughout its entire length with the sides of the well.

After the lining 15 has been completed, the water or muck is pumped out of the tube 12 which may be safely done as such lining forms a complete and perfect support for the walls of the well. When all of the material has been removed, it provides a man-hole so that a man may pass down through the tube 12 to the bottom of the well and thoroughly clean the bottom 10 of any dirt or loose material; and if there are any pockets of such material other than stone, as shown at 16, which extend under the lining 15, he may remove the same so that the surface of the rock at the bottom of the tube and surrounding the same will be entirely clean. If the bottom of the well is hard pan, shale or the like, the man may broaden or enlarge the bottom as shown in dotted lines in Figure 4.

When this has been done, the tube 12 is filled with concrete 17, as shown in Figures 5 and 7, which completes the foundation and this central core will be firmly bonded and supported on the clean surface of the bed rock or bottom of the well. This concrete is mixed with water before being placed in position and will fill any crevices around the bottom of the well. Furthermore, as it is put in under usual or favorable conditions, its characteristics are readily determined and its supporting capacity will be known.

Inasmuch as the wells remain filled during the digging operation and until the outer concrete lining or cylinder is completed, the adjacent earth is fully supported at all times so that the ground around the wells is not apt to sink and consequently such wells may be placed adjacent to buildings without the necessity of shoring or supporting the buildings with anything other than their normal foundations.

The completed piers or foundations are particularly efficient and durable inasmuch as the center cores or columns of concrete will at all times be protected by the outer metal and concrete shells so that they are not apt to be affected by any liquids or substances coming in contact therewith. Furthermore, the shells or tubes 12, which are preferably formed of steel, will be thoroughly bonded to the outer and inner concrete walls and will serve as an efficient reinforcement therefor.

While the above description discloses a preferred method of construction, changes may be made in order to adapt the same for different conditions, and therefore I do not wish to be limited to such precise disclosure, except as set forth in the following claims, in which I claim:

1. The method of constructing foundations which consists in forming a hole in the earth and retaining water and excavated material therein, then inserting a tube to the bottom of the hole, then filling the space between the tube and the walls of the hole with concrete, then emptying the tube, and finally filling the tube with concrete.

2. The method of forming foundation piers which consists in excavating a well and keeping the same filled with water and excavated material, then inserting a tube which extends from the top of the well to the bottom thereof, then filling the space between the tube and the sides of the well with concrete, then withdrawing the water and excavated material from the tube and cleaning the surface of the bottom of the well, and finally filling the tube with concrete.

3. The herein described method which consists in driving a well from the surface to bed rock and maintaining the well filled with water and excavated material, placing a tube of sufficient diameter for a man to pass through in the well, depositing dry concrete material in the space around the tube until such space is filled, and the water forced therefrom, pumping the water and excavated material from the tube, and cleaning the bottom of the well, and finally filling the tube with concrete.

4. The process of forming underground columns which consists in excavating a well to the full depth thereof, then lining the well with concrete by applying it in place to support the walls thereof, and finally filling the space within the lining to complete the column.

5. The construction of supporting columns which consists in digging a well and keeping the same filled with water and excavated material, then inserting a cylinder in the well extending from the top to the bottom thereof and of sufficient diameter for a man to pass therethrough, then placing one or more pipes between the cylinder and the wall of the well which extend from the top to the bottom thereof, then pouring concrete material through said pipes and gradually withdrawing the pipes as the space around the cylinder is filled, pumping the water and excavated material from the cylinder, cleaning the bottom of the well, and finally filling the cylinder with concrete.

6. The method of forming foundation posts or the like, comprising the forming of a well or hole filled with soft mud, then inserting a casing in the well which is of less diameter than the well, then filling the space around the casing with plastic material whereby the mud is driven therefrom, then removing the mud from the interior of the casing and cleaning the bottom of the hole, and finally filling the casing with plastic material.

7. The herein described method of foundation construction, which consists in excavating a hole in the ground to the full depth of the structure to be formed, then inserting a tube of relatively large diameter in the hole, which tube is of less diameter than the hole, then filling the space between the tube and the walls of the hole with cementitious material, and then filling the tube to complete the structure.

WILLIAM J. NEWMAN.