

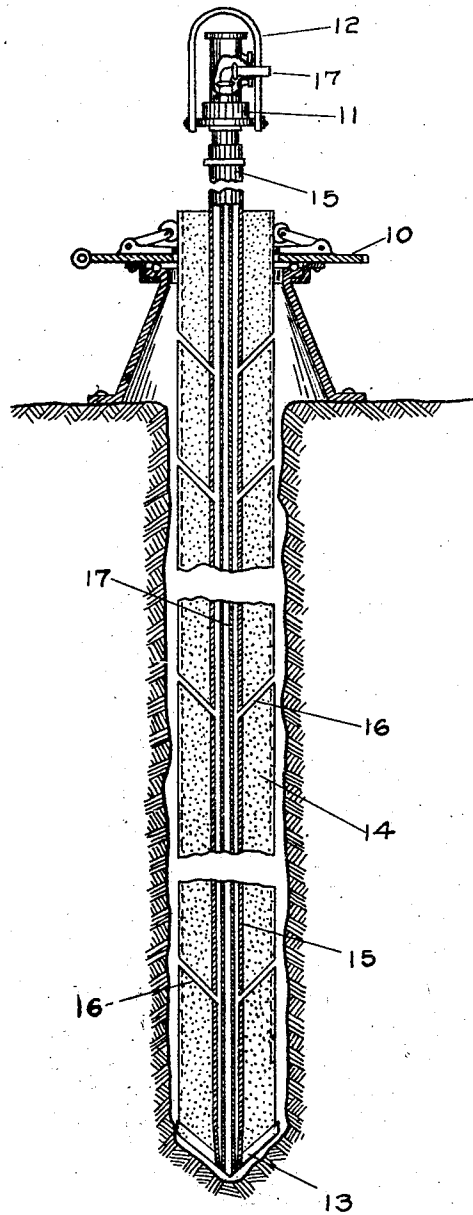
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J. BURNS

CONCRETE PILE

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JOSEPH BURNS INVENTOR.

BY
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CONCRETE PILE.

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To all whom it may concern:

Be it known that I, JOSEPH BURNS, a citizen of the United States, residing at Lincoln, in the county of Lancaster and State of Nebraska, have invented certain new and useful Improvements in Concrete Piles, of which the following is a specification.

My invention relates to concrete piles, and more particularly to concrete piles of the kind wherein provision is made for clearing a path in advance of the pile as it is being sunk.

Piles are often provided with a central vertical channel for the passage of water under pressure, the jet of water emerging from the bottom of the pile to tear away the soil to permit the pile to sink. Sometimes lateral jets are added to supplement the bottom jet, the lateral jets of water functioning to enlarge the hole and to lubricate the pile in its descent. Such piles sink rapidly in some kinds of soils, but in others the water is absorbed so rapidly by the soil that it can perform no cutting or clearing action.

The object of my invention is the provision of a pile having a plurality of conduits through which air and water may be forced either separately or in combination, the pile being further provided with means for rotating it in its descent and with knives for loosening the soil in advance of the nose of the pile so that the action of the water or air or both will carry the loosened soil to the top of the cavity.

Having in view this object and others which will appear in the description, I will now refer to the drawing, in which the figure shows a vertical view of the pile and of a portion of the operating mechanism, parts being shown in section and parts being broken away.

The structure herein described and claimed is in the nature of an improvement on the concrete pile shown and described in my prior Patent #1,293,693, February 11, 1919. It is my purpose here to employ the same mechanism for rotating and for lowering the pile that I use in connection with my prior invention, and to change only the structure of the pile itself to facilitate its use in any kind of soil that may be encountered.

The mechanism which I employ in sinking the pile includes means 10 for rotating the pile, a swivel 11 for permitting rotation, and a shackle 12 whereby the pile may be

suspended in vertical position while being sunk. These parts are merely referred to here because of their relation to the pile, but they are fully described in the patent above referred to. The cutter blades 13 secured to the pile at its bottom are also similar to those shown in my prior patent, but in the present instance they project slightly beyond the sides of the pile in order to cut a cavity which is somewhat larger in diameter than the diameter of the pile.

The pile 14 is provided with a central cavity extending from end to end thereof, the lower end of the cavity being constricted to form a nozzle. The cavity or channel may be unlined, or it may be partly lined as in my prior patent, or it may be lined as at 15 throughout its entire length, with its upper end projecting beyond the upper end of the pile. Upwardly and laterally inclined branch conduits 16 register at their inner ends with openings of the central channel. The air or water which is forced under pressure through the channel passes out through the nozzle end and through the branch conduits 16, thus tearing and carrying away the soil both from the bottom of the pile and from its sides. If the central channel is lined or partly lined, the lining is cast into the pile at the time of casting the pile. The channel being part of the pile, rotates therewith, thus giving the air or water a circular motion before it emerges.

Inside the central channel is a pipe or tube 17. The pipe 17 extends from the bottom of the pile through the central channel, thence through the swivel 11, and finally out through a T-coupling above the swivel. The pipe 17 being secured to a stationary portion of the mechanism, does not rotate with the pile.

The inlet ends of the pipes 15 and 17 are thus above the swivel for convenient access and in proximity to each other. The pipe 15 rotates with the pile but the pipe 17 remains stationary, thus giving the operator considerable latitude in the method of applying the air or water. In some kinds of soils the use of water alone gives the best results. With such soils the water may be forced through either pipe 15 or 17, depending on whether it is desired to impart a circular motion to the water and depending also on the desirability of a bottom jet alone or of combined bottom and side jets.

In some cases it will be desirable to force the water through both pipes.

Some soils do not respond to the action of water because they absorb the water so rapidly that the water is not given the opportunity of scouring either the bottom or the sides of the cavity. In some such cases air under pressure has been found to be very effective, since the upward pressure of the air in the cavity is powerful enough to dislodge and to carry to the top the clay, sand and even large rocks that may be encountered in the descent of the pile. When it is desired to use air alone, it may be forced through either the pipe 15 or the pipe 17 or through both pipes, depending on the character of the soils encountered.

In many instances the use of water and air together gives the best results, and my pile is admirably adapted for situations of this kind. Either pipe 15 or 17 may serve as the water conduit while the other serves as the air conduit. The choice of the arrangement must rest with the operator, and it depends on the character of the soils at the time of making the connections. In making the choice, consideration should be given the fact that the pipe 17 delivers a single non-whirling jet at the bottom of the pile while the pipe 15 delivers a plurality of whirling jets at the bottom and sides of the pile. In most cases where the character of the soil changes at different levels, it becomes desirable that the connections be changed in order to secure the most effective results.

From the foregoing description it will be seen that I have designed a concrete pile which can be sunk in any of a great variety of soils, my pile having greater latitude in this respect than any of the piles heretofore known. This great latitude is attained by making provision for the choice of either water or air or both combined, and also by providing considerable choice in the use of direct and whirling jets, either alone or in

combination. The piles at present in use are each adapted for an extremely small range of variation in soils and they are consequently useless in other soils than those for which they are designed. My pile will also be found to possess marked advantages in regions having layers of soils of varying character, as, for example a layer of sand immediately underneath or above a layer of clay. In such situations it is necessary only to change the connections and to proceed with the sinking of the pile without appreciable loss of time. It will also be noted that my pile is simple in construction, and that it can be produced at a cost no greater than that of the piles at present in use. After the sinking of the pile to the desired depth, the inner pipe 17 may be recovered to be used again as often as desired.

Having described my invention in terms which will be readily understood by others skilled in the art to which it pertains, what I believe to be new and desire to secure by Letters Patent of the United States is:

A rotatable pile having a conical lower end with cutter knives secured radially thereto, said cutter knives projecting beyond the sides of the pile and being adapted by the rotation of the pile to form a cylindrical cavity having a diameter which is greater than that of the pile, means for rotating said pile, said pile being provided with a central channel extending from end to end thereof, the channel having a restricted nozzle outlet at the lower extremity of the pile, said pile being also provided with upwardly and laterally inclined channels extending from the central channel to the lateral surface of the pile, and a non-rotatable pipe within the central channel and spaced from the walls of the channel and having a single outlet at the lower extremity of the pile.

In testimony whereof I affix my signature.
JOSEPH BURNS.