Sept. 24, 1929. W. J. GLEASNER 1,729,422

METHOD OF CLEARING AND FILLING TUBULAR PILES FOR FOUNDATIONS

Filed Dec. 22, 1927

Fig. 1.

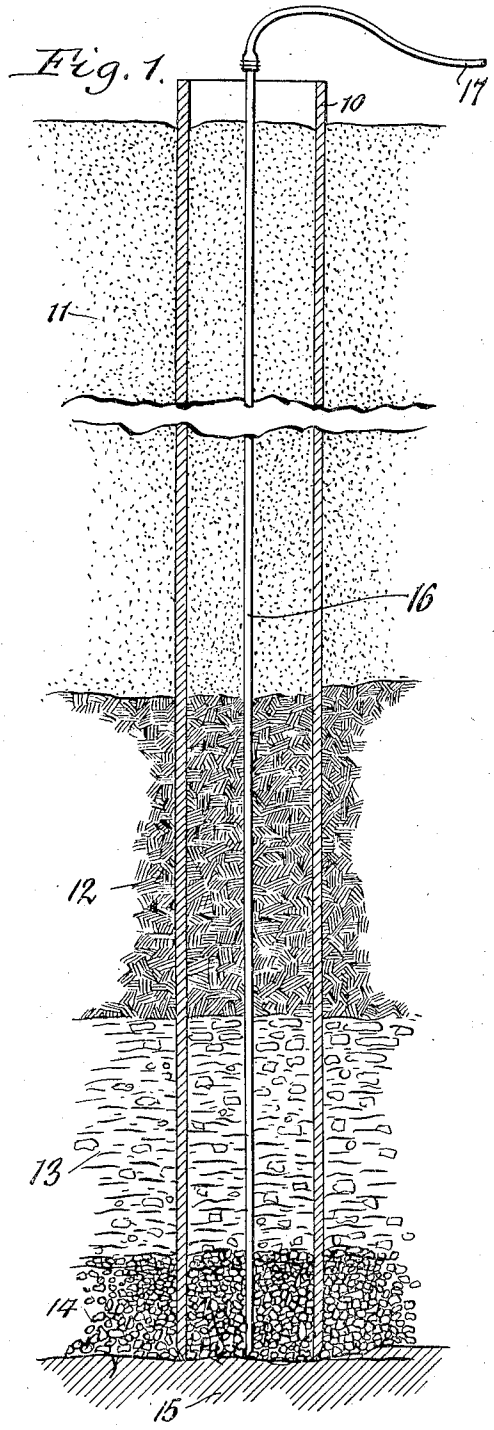
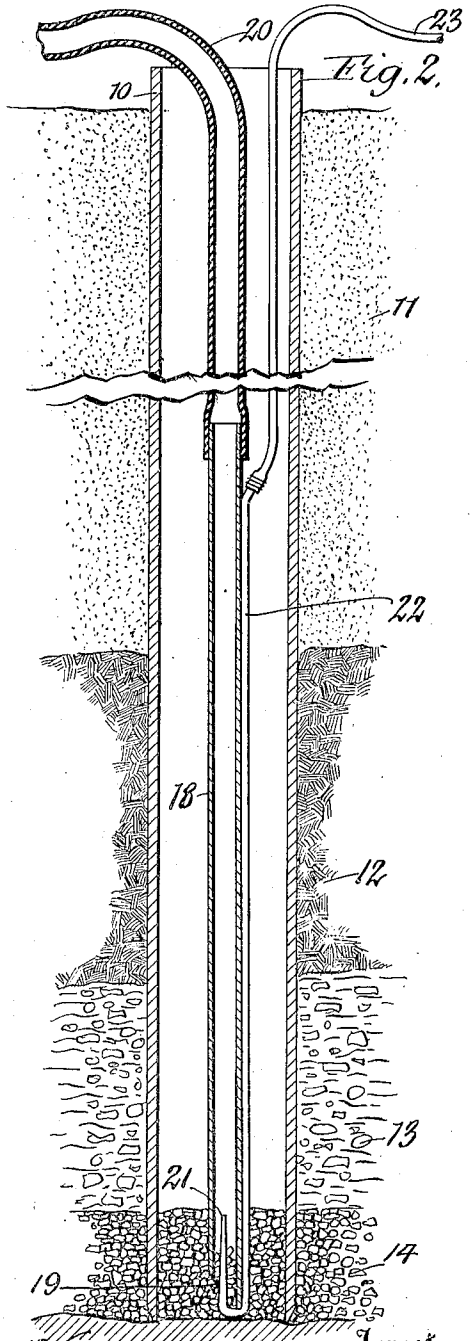


Fig. 2.



Inventor
William J. Gleasner
by Popp & Powers
Attorneys

Patented Sept. 24, 1929 1,729,422

UNITED STATES PATENT OFFICE.

WILLIAM J. GLEASNER, OF BUFFALO, NEW YORK

METHOD OF CLEARING AND FILLING TUBULAR PILES FOR FOUNDATIONS

Application filed December 22, 1927. Serial No. 241,768.

This invention relates to a method of forming foundation piles in ground for greater security in supporting buildings and other structures.

One of the methods heretofore employed for producing foundation piles consisted in driving a tubular casing into the ground the desired extent so as to enclose a core of earthy material which latter was subsequently removed by introducing water into the tube so as to dilute the earth and wash it out from the upper end of the tube.

This method is not only very expensive on account of the large amount of water which is used and the means which had to be provided for carrying away the mud laden water, but it also produced conditions which were very disagreeable and subjected the health of the workman to undue hazard.

It is the object of this invention to provide a process for forming foundation piles which is not only very simple and requires no expensive equipment, but also permits the workmen to perform their duties in the most sanitary manner and in much less time than has been possible heretofore, thereby enabling this work to be done expeditiously and very economically.

In the accompanying drawings:

Figure 1 is a fragmentary vertical section showing my method of removing the solid part of a core of earth within a casing tube which has been driven into the ground.

Figure 2 is a similar view showing my method of removing the loose part of the core within a casing tube which has been driven into the ground.

Referring to Fig. 1, the numeral 10 represents an upright casing tube or shell which has been driven into the ground by any suitable means to the desired extent. The character of the earth into which this tube is driven varies in different localities, but in this instance it is assumed that the tube has penetrated successive layers or strata of sand 11, clay 12, hard pan 13, and gravel 14, and has come to rest against the bed rock 15.

When the casing tube has been thus driven into the ground a core of earthy material is enclosed thereby, which corresponds in cross section and arrangement to the character of this earth through which the tube was driven. In the example of the earth shown in Fig. 1 of the drawings, this core would consist of a comparatively solid upper part composed of the sand, clay and hard pan strata and a loose lower part composed of the gravel immediately above the bed rock.

Following the driving of the casing tube into the ground a gas under pressure, such as air, steam or the like is introduced into the casing tube below the lower end of the solid part of the core, this being preferably accomplished by a pressure supply pipe or conduit 16 which is driven downwardly through the core of earthy material in the casing tube until this pressure conduit engages the bed rock and leaves the upper end of this conduit projecting above the surface of the ground, as shown in Fig 1, so as to permit of conveniently attaching thereto a flexible hose 17 or other means for conducting air from a compressor to the pressure conduit. The pressure pipe or conduit may be easily forced through the core in the casing tube by first forcing the pipe by manual pressure together with its weight into the core as far as possible, then turning on the air pressure to the pipe which has the effect of raising the same part-way, then turning off the air pressure and then pushing down the pipe again with a hammer blow so that it will enter the core or step deeper, this operation being continued until the pressure pipe has reached bed rock or has penetrated the ground the desired extent.

When the pressure pipe or conduit reaches the desired depth, the air pressure is turned on and the air is discharged by this pipe below the solid part of the core within the casing and when sufficient pressure has been set up below the solid part of the core to overcome the friction between the periphery of the latter and the bore of the casing tube, this core will be lifted and be ejected from the upper end of the casing tube. As successive portions of the core issue from the upper end of the casing tube, the workmen remove the same by means of a shovel or other tool and dispose of the same for transporta-

tion elsewhere without the use of any water, thereby leaving the removed material, as well as the vicinity of the tube, in a dry state so that the workmen can operate under the most agreeable and favorable conditions.

If the character of the earth is such that a layer or stratum of gravel or loose material is located at the lower end of the casing tube immediately above the bed rock, this may be removed if desired, by an aspirating action. The preferred form of means for this purpose shown in Fig. 2, consists of a tubular suction head 18 of metal of smaller diameter than the casing tube which is lowered into the tube until its lower end having a beveled face 19 penetrates the gravel and rests on bed rock, the upper end of this suction head being connected with a flexible discharge hose 20 leading to any suitable place. Projecting upwardly into the lower end of the suction head is an air pressure ejector jet 21 which is supplied with compressed air or other pressure gas from any suitable source by a supply line consisting preferably of a lower rigid pipe section 22 mounted on the outside of the section head and connected with the jet 21, and an upper flexible hose section 23 connecting the rigid section 22 with the air compressor. When the air is turned on, the jet 21 delivers an upward stream of air or the like into the suction head at a great velocity, whereby the loose gravel and other loose material at the bottom of the casing tube is raised and discharged therefrom through the delivery conduit 20 to the place of deposit above the ground. If no gravel or other loose material is present in the casing tube, no operation, other than the removal of the solid part of the core is necessary in preparation for completing the formation of the pile for use as a foundation.

After the core has been removed from the casing tube, be it either wholly solid material, wholly loose material or partly solid and partly loose material the tools for ejecting the core therefrom are removed and then the space within the casing is filled with any suitable material for the purpose of completing the construction of the pile. This filling preferably consists of concrete which is introduced while in a plastic state and which upon hardening produces a metal encased monolithic post or column which is strong and durable and forms a direct support on bed rock for the building which rests on this pile.

The construction of piles in accordance with this method is not only more comfortable and healthy for the workmen, but the removal of the cores from the casing tubes can be effected more rapidly and also by less equipment than heretofore, thereby effecting a substantial saving in the cost of doing work of this character.

I claim as my invention:

1. The hereindescribed method of removing the contents of a tube which has been driven into the ground consisting in introducing air or the like under pressure at the lower end of said contents and lifting the latter so that the same discharges from the upper end of said tube.

2. The hereindescribed method of clearing the contents of a tube driven into the ground which consists in passing a conduit through the contents of said tube and introducing air or the like under pressure into said conduit so as to issue under said contents and discharge the same from the top of said tube.

3. The hereindescribed method of producing a foundation pile which consists in driving a tube into the ground so as to enclose a core of earthy materials, then introducing air or the like under pressure at the lower end of said core and forcing the latter upwardly out of said tube, and then filling said tube with foundation material.

4. The hereindescribed method of producing a foundation pile which consists in driving a tube into the ground and enclosing a core of earthy material, then driving a pressure conduit of smaller diameter than said tube downwardly through the core in the latter, then introducing air or the like under pressure into said conduit and discharging the same at the lower end of said core and thereby lifting said core and discharging the same from the upper end of said tube, and then filling said tube with concrete.

5. The hereindescribed method of removing the contents of a tube which has been driven into the ground which includes introducing air or the like under pressure at the lower end of said contents and lifting the latter.

In testimony whereof I affix my signature.

WILLIAM J. GLEASNER.