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DEVICE FOR INSTALLING CESSPOOLS IN A SINGLE OPERATION

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FIG. 1

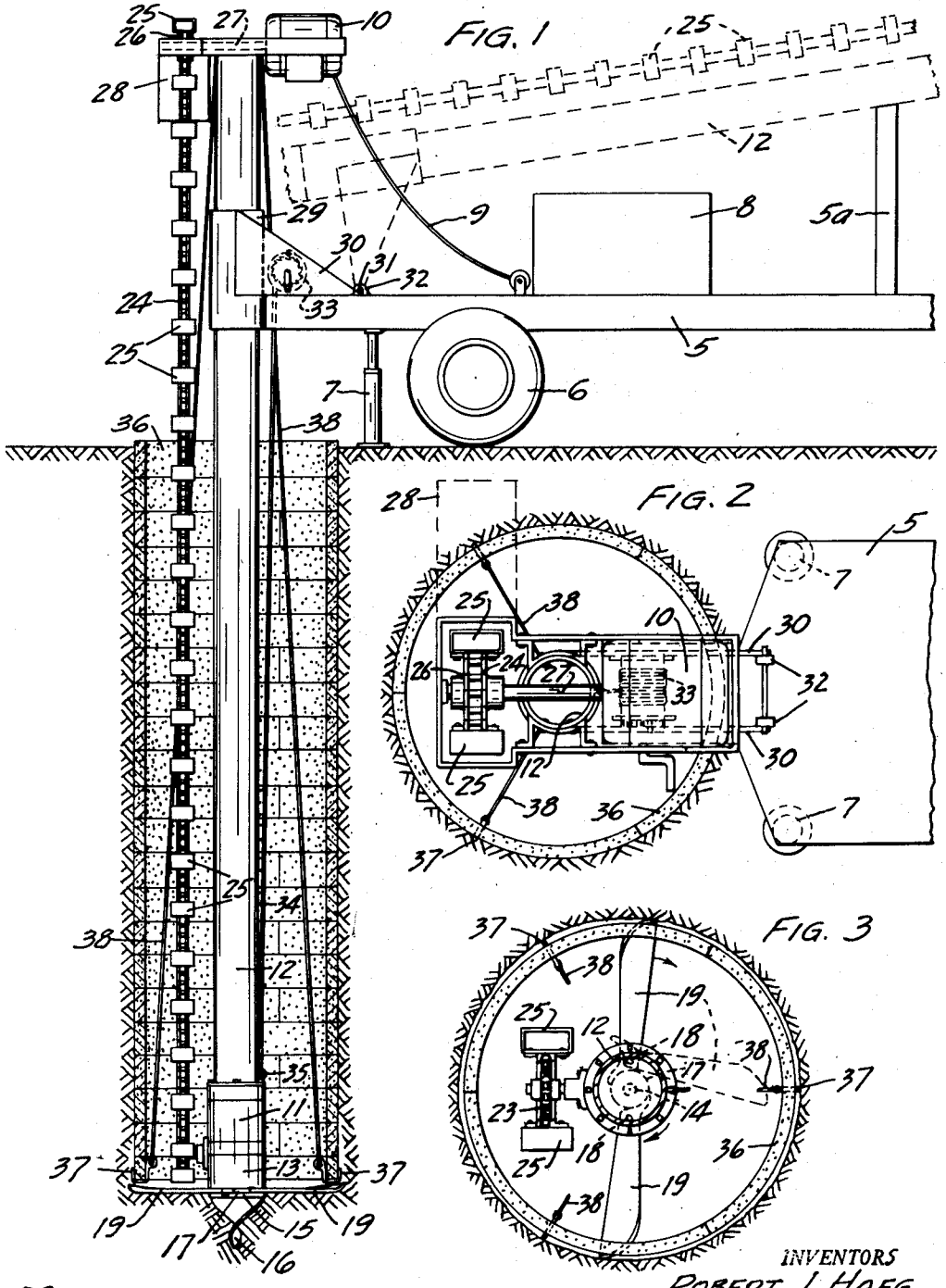
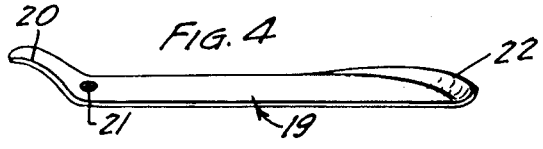


FIG. 2

FIG. 3

FIG. 4



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DEVICE FOR INSTALLING CESSPOOLS IN A SINGLE OPERATION

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8 Claims. (Cl. 61—41)

1

This invention relates to devices for installing beneath the surface of the earth tubular members such as cesspools and the like. More particularly, it relates to a device for installing a cesspool or the like in a single continuous operation.

The installation of cesspools in areas where the earth is loosely packed such as where it consists of sand and/or gravel presents a special type of problem to the individual attempting to install a cesspool in that area. Cesspools are commonly comprised of arcuately shaped sections of concrete which when properly arranged with respect to each other form a concrete tubular element. This tubular element is intended to be installed beneath the surface of the earth to receive the sewage therein. In order to install such a cesspool it is necessary of course to remove the earth from within the area to be occupied by the cesspool. In such areas where the earth is very loosely packed it is impossible to dig a hole having vertical walls because the loosely packed material continuously slides inwardly as the digging of the hole progresses so that by the time the desired depth is attained, the circumference of the upper portion of the hole is a great deal greater than desired. Up to the present time the problem has been partially solved by first digging a shallow hole of the desired diameter, then placing what are to be the bottom sections of the cresspool in place and thereafter digging within these sections and removing the dirt from therebetween. It is obvious that such a digging operation is necessarily both slow and inconvenient because of the limited space available for the digging operation.

Our invention is directed toward the successful solution of this problem.

It is a general object of our invention to provide a novel and improved device for installing cesspools and the like of cheap and simple construction and capable of rapid, easy, and efficient operation.

A more specific object is to provide a novel and improved device for installing beneath the ground surface cesspools and the like in a single, simple and continuous operation.

Another object is to provide a novel and improved device constructed to facilitate the installation of cesspools and the like in areas where the earth is loose and the walls of a hole dug therein have a tendency to cave in.

Another object is to provide a device for installing cesspools which will permit the hole therefor to be dug and the cesspool to be installed

2

simultaneously so that the installation operation is completed by the time the hole has been formed.

Another object is to provide a device through the use of which the time and cost of installing a cesspool is substantially reduced.

These and other objects and advantages of our invention will be more apparent from the following description made in connection with the accompanying drawings, wherein like reference characters refer to similar parts throughout the several views and in which

Fig. 1 is a side elevational view of one embodiment of our invention in operation with the cesspool installation operation substantially completed and the cesspool itself being shown in section.

Fig. 2 is a top plan view of the device.

Fig. 3 is a horizontal sectional view taken along line 3—3 of Fig. 1.

Fig. 4 is a detailed elevational view of one of the blades which loosen the earth and move the same centrally.

One embodiment of our invention may include, as shown in Figs. 1–4, a frame 5 made ambulant by wheels 6 and having a bracing device 7 associated therewith for positioning beneath the rear end portion of the frame when desired. This bracing device 7 may be a jack or any similar device. A supporting cradle 5a is mounted on the forward end of the frame shown in Fig. 1. Mounted on the frame 5 is a generator 8 which is connected by a feed wire 9 to an electric motor 10 and to a second but two-direction electric motor 11 which is secured to the lower end portion of an elongated rigid tubular member 12.

A gear box 13 is connected to the motor 11 directly therebelow to receive a shaft 14 which extends downwardly from the motor and is rigidly secured to a horizontal disc 15. The disc 15 and shaft 14 are connected in a manner to prevent relative rotation. Rigidly secured to the lower side of the disc 15 is a screw type finder 16. Encircling the shaft 14 between the gear box 13 and the disc 15 is a collar 17 which is keyed to the shaft. A pair of pivot pins 18 extend upwardly through the disc 15.

Mounted on each of the pivot pins 18 is a blade 19 which has an arcuately shaped abutment shoulder 20 at one of its ends. Adjacent the abutment shoulder 20 is an aperture 21 adapted to receive the pivot pin 18. The outer end portion of the blade 19 and its rear peripheral edge portion is curved upwardly and forwardly as best shown in Fig. 4 at 22. The length of each

of the blades 19 is such that the outer end portion extends outwardly to a point slightly beyond the outer circumference of the cesspool to be installed. This is best shown in Fig. 3, as is the manner of mounting of the blades on the pivot pins 18 for free but limited pivotal movement in a horizontal plane.

A freely rotating gear 23 is mounted upon one side of the gear box 13, as best shown in Fig. 1, to receive, guide and carry a chain drive conveyer 24 having a plurality of earth engaging cups 25 mounted thereon. The conveyer 24 is also carried by a gear 26 mounted on one end of a shaft 27 which is mounted for rotation across the top of the tubular member 12 and which is driven by the motor 10. The gear 23 is positioned so that the cups 25 pass slightly above the plane of movement of the blades 19. A chute 28 is provided in position to receive the earth carried upwardly by the conveyer cups 25 and to carry the same to a point a sufficient distance from the operation.

The tubular member 12 is normally maintained in an upright position by a sleeve 29 which is made of relatively heavy metal material. This sleeve 29 is supported by a pair of laterally spaced triangularly shaped support plates 30 which are likewise made of heavy metal material. These support plates 30 are hinged at their apex as at 31 to a heavy metal cross plate 32. A winch 33 which is hand operated is mounted between the support plates 30 and is connected to the lower end portion of the tubular member 12 by a cable 34 secured to an ear 35 provided for that purpose on the tubular member.

While in operation the cesspool sections 36 are supported by a pair of hooks 37 which in turn are supported by cables 38 attached to the upper end of the tubular member 12. A two-way winch (not shown) is also connected to the tubular member 12 to guide the same in moving it to the inclined position shown in broken lines in Fig. 1.

In operation, the tubular member 12 is first adjusted in elevation so that the blades engage the upper surface of the earth and the motor 11 is then caused to rotate the shaft 14. This motor 11 will drive the blades 19 in the direction shown in Fig. 3 to cause the blades to engage the earth and move it inwardly to a central position where the conveyer 25 will engage the same and carry it upwardly and deposit it in the chute 28. The conveyer, of course, is simultaneously driven by the motor 10.

As the earth is loosened by the blades 19 and withdrawn by the conveyer cups 25, the winch 33 is operated to lower the tubular member 12 and maintain the blades in contact with the earth. When sufficient earth has been removed to permit the first sections of the cesspool 36 to be put in place, this is done with the sections 36 resting within the hooks 37 to maintain the cesspool sections slightly elevated above the blades as they revolve. As the device is lowered by means of the winch 33, the hooks 37 move downwardly therewith and additional sections 36 of the cesspool are placed in position so that when the desired depth has been attained the entire cesspool is in position for its desired use and nothing further remains to be done but to remove the device.

To remove the device the motor 11 is operated to turn the shaft 14 in the opposite direction from that shown in Fig. 3 whereupon the blades 19 will pivot upon the pivot pins 18 to a position inwardly of the cesspool sections 36, as best shown in broken lines in Fig. 3. As soon as this has been accomplished, the winch 33 may be operated to cause the entire device to be lifted upwardly and clear of the cesspool. When this has been completed, if desired, the entire device may be tilted forwardly by operating the two-way winch 38 to cause the upper portion to rest within the cradle 5a. In this manner the entire mechanism may be readily transported to a new location for additional digging operations.

Thus it can be seen that we have provided a device for installing cesspools and the like in the ground in a single, continuous operation which substantially reduces the time required therefor and also the expense involved. Our device is easy to operate and is capable of rapidly and efficiently installing a cesspool with a minimum of inconvenience. Moreover, it effectively prevents the caving in of the walls which define the hole formed to receive the cesspool and thus substantially reduces the amount of earth which must be moved in order to accomplish such an installation.

It is contemplated that an auger type conveyer mounted vertically within the tubular member 12 could be utilized as a substitute for the conveyer 24 but it is believed that the embodiment shown is to be preferred.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts without departing from the scope of our invention.

What we hereby claim is:

1. A device for installing in the ground, tubular members such as cesspools and the like comprising a frame, ground loosening mechanism supported by said frame and movable vertically with respect thereto, said mechanism being adapted to loosen the earth within an area substantially concentric to and at least equal to the cross-sectional area of such a tubular member and to positively move said earth toward a central location, said mechanism being adapted to be power-driven, earth engaging and conveying mechanism supported by said frame and arranged to engage and convey the loosened earth away from said central location and adapted to be power driven, and support mechanism for positively supporting such a tubular member, said support mechanism being positively connected to said earth loosening mechanism and movable vertically therewith to support the lower end portion of such a tubular member at all times slightly above the level at which said earth loosening operation takes place whereby the tubular member may be installed gradually and continuously while such earth loosening and removing operations take place to effectively prevent caveins and the like of the earth forming the side walls of the hole made by such operations.

2. A device for installing in the ground tubular members such as cesspools and the like comprising a frame, ground loosening mechanism supported by said frame and controllably movable vertically with respect thereto, said mechanism having ground agitating elements adapted to loosen the earth within an area substantially concentric to and at least equal to the cross-sectional area of such a tubular member, said elements being adapted to positively move the earth loosened thereby toward a central location when rotated, said mechanism being adapted to be connected to a source of power to cause said elements to be rotated, earth engaging and con-

veying mechanism supported by said frame and arranged in position to engage and convey the loosened earth away from said central location and adapted to be connected with a source of power for the operation thereof, and support mechanism for positively supporting such a tubular member during such ground loosening and conveying operations, said support mechanism being in turn positively supported by said earth loosening and conveying mechanism and movable vertically therewith to support the lower end portion of the tubular member at all times slightly above the level at which such earth loosening operation takes place whereby the tubular member may be installed gradually and continuously while such earth loosening and removing operations take place to effectively prevent cave-ins and the like of the earth forming the side walls of the hole made by such operations.

3. A device for installing in the ground tubular members such as cesspools and the like comprising a frame, ground loosening mechanism supported by said frame and controllably movable vertically with respect thereto, said mechanism including ground loosening members mounted for rotation about a vertical axis and being of dimensions sufficient to positively loosen the earth within an area substantially concentric to and slightly greater in diameter than the diameter of such a tubular member and adapted to move said loosened earth toward a central location, said mechanism being adapted to be connected to a source of rotary power to cause said members to be rotated in a substantially horizontal plane, earth engaging and conveying mechanism supported by said frame and arranged to engage and convey the loosened earth away from said central location, said earth engaging and conveying mechanism being adapted to be connected to a source of rotary power for operation thereof, and support mechanism for positively supporting such a tubular member, said support mechanism being in turn positively supported by said earth loosening mechanism and movable upwardly and downwardly therewith to support the tubular member at all times slightly above the level at which said earth loosening operation takes place whereby the tubular member may be installed gradually and continuously while each earth loosening and removing operations take place to effectively prevent cave-ins and the like of the earth forming the side walls of the hole by such operation.

4. A device for installing in the ground tubular members such as cesspools and the like comprising a frame, ground loosening mechanism supported by said frame and controllably movable vertically with respect thereto, said mechanism including at least a pair of retractably mounted blades extending outwardly from each other a combined distance slightly greater than the diameter of such a tubular member and mounted for rotation about a vertical axis, said blades being adapted to positively loosen the earth engaged thereby and to move the same toward a central location, said mechanism being adapted to be connected with a source of rotary power to rotate said blades, earth engaging and conveying mechanism supported by said frame and arranged to engage and convey the loosened earth away from said central location and adapted to be connected with a source of power for the operation thereof, and support mechanism for positively supporting such tubular member in upright position, said support mechanism being in turn positively supported by said earth loosening and conveying mechanism and movable upwardly and downwardly therewith to positively support the lower end portion of the tubular member at all times slightly above the level at which said earth loosening operation takes place whereby the tubular member may be installed gradually and continuously while said earth loosening and removing operations take place to effectively prevent cave-ins and the like of the earth forming the side walls of the hole made by such operations.

5. The structure defined in claim 4, said blades being swingably mounted on a vertical axis and swingable in a horizontal plane to retracted position.

6. A device for installing in the ground tubular members such as cesspools and the like comprising a frame, ground loosening mechanism supported by said frame and movable vertically with respect thereto, said mechanism including an upright shaft, at least one retractably mounted ground engaging element extending laterally from the lower end portion of said shaft, said ground engaging element being mounted for rotation on a substantially vertical axis and extending outwardly from said shaft a distance sufficient so that when rotated it will positively loosen dirt within an area substantially concentric and at least equal to the cross-sectional area of the tubular member, and mechanism for connecting said element with a source of rotary power, earth engaging and conveying mechanism supported by said frame and arranged to engage and convey the loosened earth away from said central location and adapted to be connected with a source of power for the operation thereof, and support mechanism being positively supported by said earth loosening and conveying mechanism and being movable upwardly and downwardly therewith to positively support the lower end portion of the upright tubular member at all times slightly above the level at which said earth loosening operation takes place whereby the tubular member may be installed gradually and continuously while such earth loosening and removing operations take place to effectively prevent cave-ins and the like of the earth forming the side walls of the hole made by such operations.

7. The structure defined in claim 6 said upright shaft being movable upwardly and then tiltable forwardly to a substantially horizontal and reclined position on said frame to facilitate the transportation thereof from one location to another.

8. The structure defined in claim 6 said support mechanism including engaging elements for engaging the lower end portion of such a tubular member, and cable structure extending between such engaging elements and the upper end portion of said shaft.

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