

## [54] METHOD OF LAYING DRAINAGE TUBING

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61/72.7, 41 A

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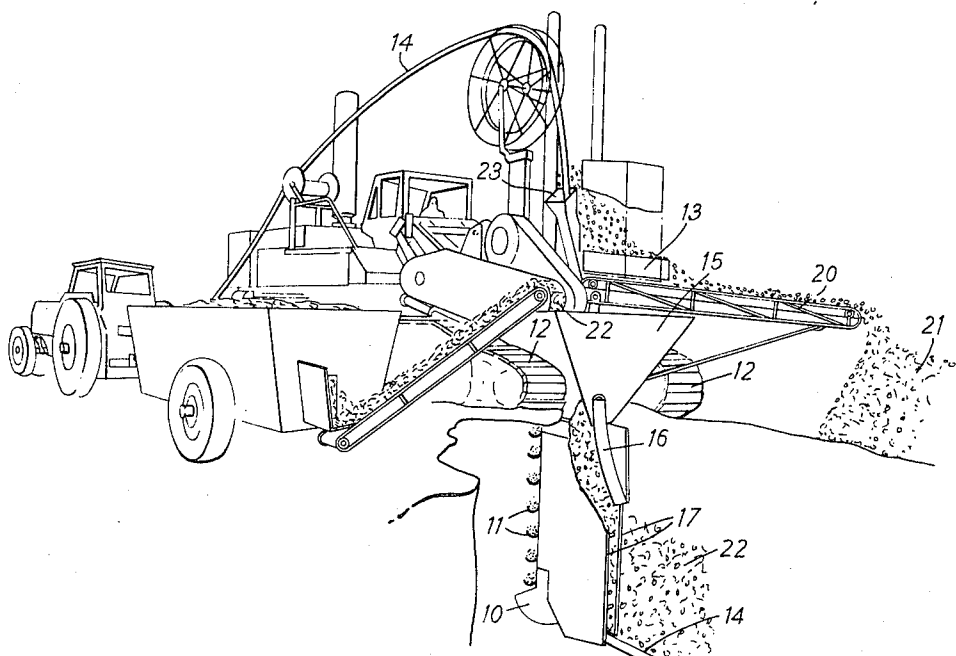
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## [57] ABSTRACT

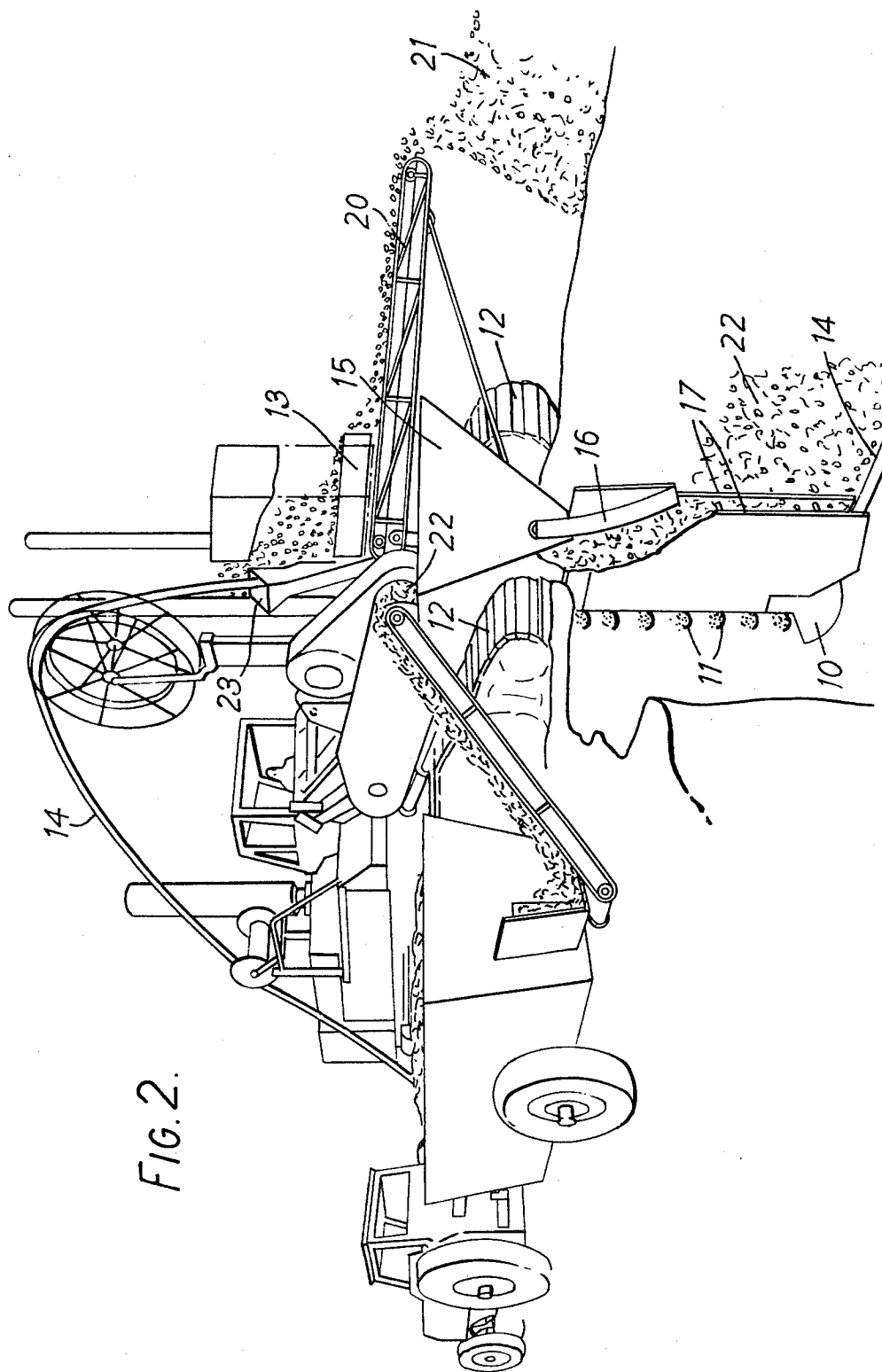
A method of laying generally horizontal wellpoint/-drainage tubing, comprising excavating a trench by mechanically digging out spoil which is then directed away from said trench, laying wellpoint/drainage tubing at the bottom of said trench, and backfilling the trench wholly or partially with water-pervious material other than said spoil, so as to promote a flow of ground water to the tubing.

A mobile machine for digging and backfilling trenches comprises digging means for excavating spoil to form a trench along a predetermined route at a predetermined depth, directing means arranged to direct the spoil excavated by said digging means away from the trench, and backfilling means associated with the digging means for backfilling the trench with material different from the spoil.

2 Claims, 2 Drawing Figures







## METHOD OF LAYING DRAINAGE TUBING

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

This invention relates to the forming of trenches, particularly for use in dewatering or drainage of ground.

#### 2. Description of the Prior Art

It is already well known to dewater ground by means of vertical wellpoints which are, essentially, perforated tubes inserted at a suitable depth into the ground and then connected to a suction pump to extract water from the ground. It has also been proposed to lay horizontal wellpoint tubing at the bottom of a trench, the wellpoint tubing being covered by the soil or the like produced in the excavation of the trench. Known methods of drainage usually involve non-continuous excavation and back-fill either by mechanical means or manually.

### SUMMARY OF THE INVENTION

It is an object of the present invention to provide improvements in these aforementioned processes and, in accordance with the present invention, there is provided a method of laying generally horizontal wellpoint/drainage tubing comprising excavating a more or less continuous trench by mechanically digging out soil or the like which is then directed away from said trench, laying a length of flexible or semi-rigid wellpoint/drainage tubing at the bottom of said trench, and back-filling the trench either wholly or partially with suitably pervious material which promotes flow of water to the tubing. An open end of the length of wellpoint/drainage tubing may then be connected to a suction pump to draw water from the ground. Alternatively, if the trench is constructed to a suitable fall, gravity drainage may be achievable.

Said suitably pervious material may be gravel, aggregate, or other material with similar properties.

Further according to the present invention there is provided a mobile machine for forming trenches, comprising a cutter or digger arm arranged to excavate a relatively narrow trench along a predetermined route at a predetermined depth, means to direct the excavated soil or the like away from the trench, and means for back-filling the trench with material other than said excavated soil or the like or a minor proportion thereof. The machine may also be provided with means for laying a length of wellpoint/drainage tubing in the trench as the machine excavates and back-fills.

### SHORT DESCRIPTION OF THE DRAWINGS

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, in which

FIG. 1 is a perspective schematic view showing a mobile machine for forming trenches, and

FIG. 2 is a perspective view of the machine of FIG. 1, with some modifications, in operation.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawing, the machine comprises a digger arm 10 which is formed with a series of self-cleaning cutters 11 mounted on an endless chain. The machine may be mounted on self-laying tracks 12 of well-known form so that, when advancing along the line of the trench to be dug, the cutter arm 10 operates

as a chain saw to excavate a slot-like trench of the order of one foot wide and up to 15 or possibly 20 feet deep.

As the chain rotates at relatively high speed, the excavated spoil 21 is thrown upwardly and a deflector plate 13 or similar device may be provided to direct the flying spoil to one side of the trench being dug. Alternatively or additionally, a conveyor (20 — FIG. 2) may be provided to carry the spoil to other means of disposal.

The machine may also carry a coil of flexible or semi-rigid plastics tubing 14 which is preferably corrugated and is formed with suction openings along its length. The suction openings may be formed as a series of axial slits which also operate as filter openings, but an additional filter, for example in the form of a woven nylon sleeve, may also be provided around the tubing. The tubing is fed through a guide 23 into the newly excavated trench to lie along the bottom of the trench.

The machine is also provided with a hopper 15 containing suitably pervious material such as gravel or aggregate 22, and a chute 16 extends into the trench so that, as the tubing is being laid at the bottom of the trench, the trench is back-filled over the tubing with the gravel, aggregate or the like, which is pervious to water. The chute 16 is provided with removable plates at the rear so that the level to which back-filling is effected can be varied.

A pair of metal tongues 17 may be provided along the working length of the digger arm 10 to hold the possibly unstable trench walls apart during laying of the tubing and also during the subsequent back-filling.

The machine described above can be employed to lay horizontal tubing at relatively high speeds, and the back-fill of gravel or aggregate accelerates draining of ground water towards the tubing and may also act as a wick to carry water past any lenses of lower permeability (e.g. of clay) which might be present in the area in question. The tubing may be connected to a pump to act as horizontal wellpoint tubing or may feed to a suitable lower-level outlet to act as drainage tubing.

In a modification of the machine described above, for use in the formation of drainage channels, the trench is back-filled as described above but the wellpoint/drainage tubing 14 will not be laid.

We claim:

1. A method of laying generally horizontal wellpoint/drainage tubing for use in the dewatering of ground, comprising progressively excavating a slot-like trench having a width which is small in comparison with the depth of said trench by advancing a digging mechanism along a predetermined route to mechanically dig out spoil, said digging mechanism including a substantially vertically oriented endless chain having a series of cutters thereon, said endless chain and its cutters being driven along a closed path while said digging mechanism is advanced along said predetermined route thereby to bring said spoil to the top of said trench, said closed path having a length along said trench which is substantially smaller than the depth of said trench, supporting the sides of said trench as said excavating step proceeds by positioning a pair of vertically oriented horizontally spaced plates adjacent the sides of said trench and by advancing said plates along said trench together with said digging mechanism, directing the spoil brought to the top of said trench in a lateral direction away from and to one side of the trench being dug to prevent at least the majority of the spoil removed

from the trench from being returned to the trench, laying a continuous length of flexible, perforated tubing along the bottom of the trench by advancing a coil of said tubing along said predetermined route together with said digging mechanism and supporting plates and by progressively feeding said continuous length off said coil and through a substantially vertically oriented guide structure which is located between said supporting plates at a position rearward of said digging mechanism, said guide structure extending into said trench to a position adjacent to but spaced from the bottom of said trench and said guide structure being advanced along said trench together with said supporting plates to direct said tubing in a substantially vertical direction toward the bottom of said trench whereafter, at a location between said supporting plates and adjacent the bottom of said trench, the tubing bends to lie along the bottom of said trench, thereafter immediately and substantially completely backfilling the region of the trench between said supporting plates with a water-pervious material different from the spoil, said backfilling step being effected concurrent with the laying of

said tubing by advancing a hopper containing said water-pervious material along said predetermined route together with said digging mechanism, supporting plates, coil of tubing, and guide structure and by discharging said water-pervious material from said hopper, into said trench and over and around the length of tubing emerging from said guide structure, through a discharge chute which extends from the hopper into the trench at a location between said supporting plates and rearward of said guide structure, and connecting the flexible tubing to suction pumping means, said digging mechanism, supporting plates, coil of tubing, guide structure, hopper, and discharge chute all being mounted in fixed position relative to one another on a common structure which is advanced as a unit along said predetermined route.

2. The method of claim 1, wherein the water-pervious material is selected from the group comprising gravel, aggregate and other materials with similar properties.

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