

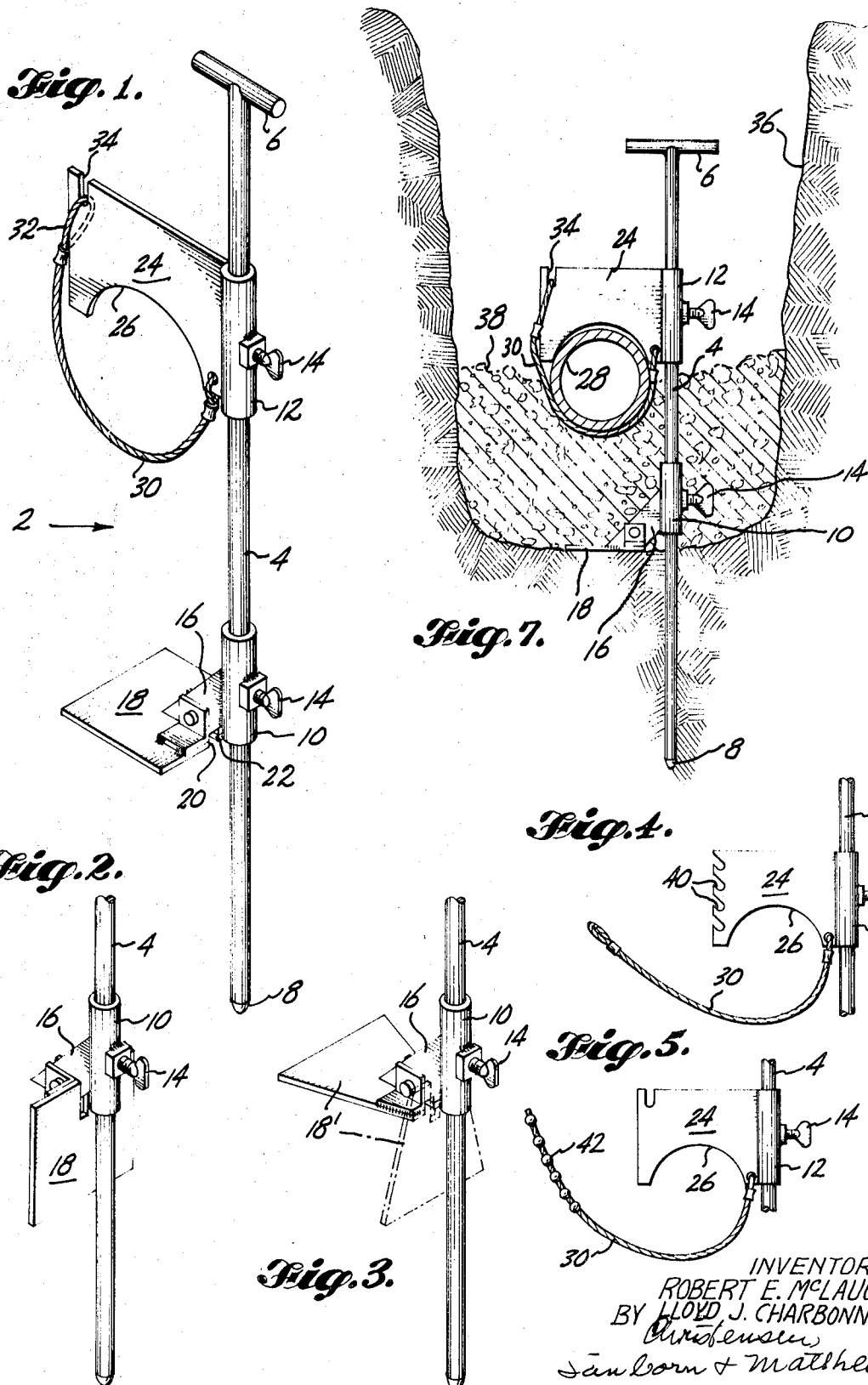
March 9, 1971

R. E. McLAUGHLIN ET AL
METHOD OF LAYING PIPE IN OR ON A BED OF PARTICLE
MATERIAL OR IN A TRENCH

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2 Sheets-Sheet 1



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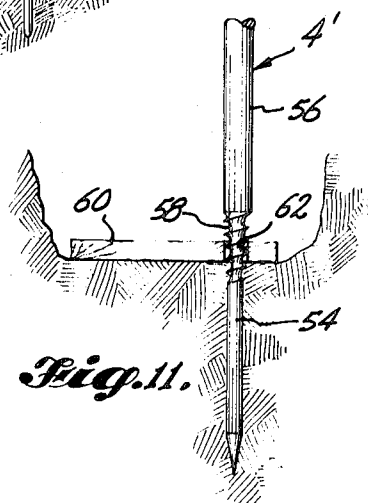
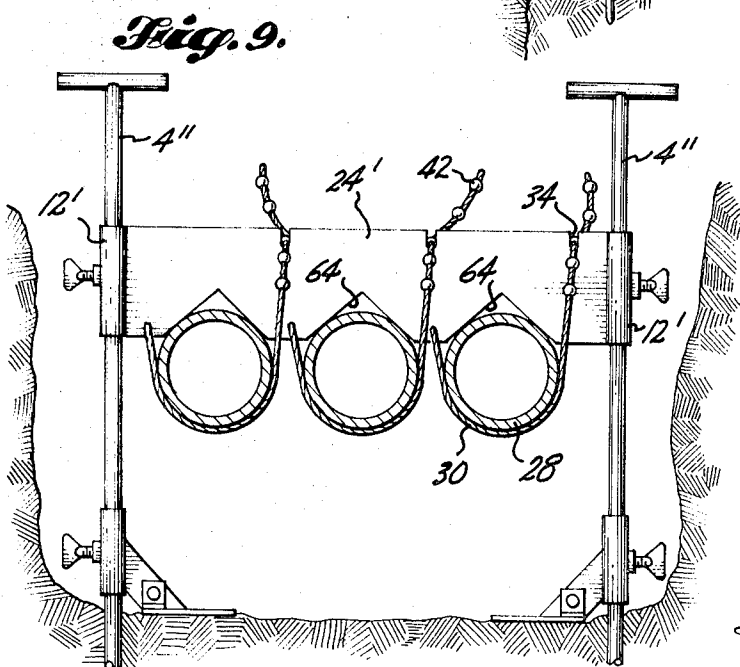
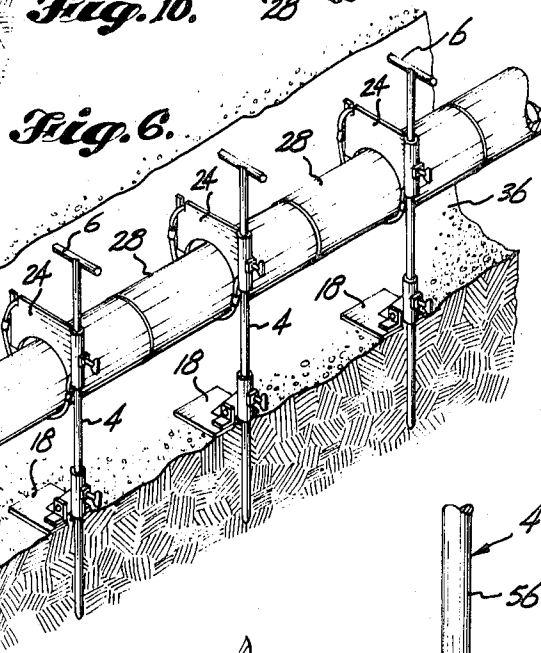
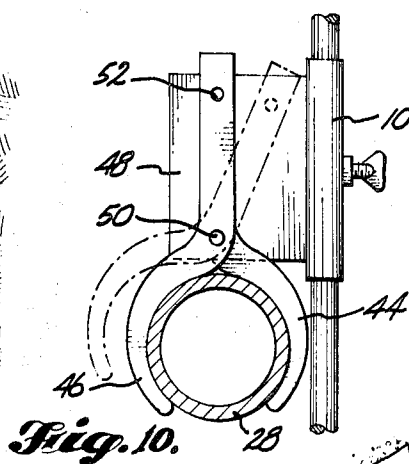
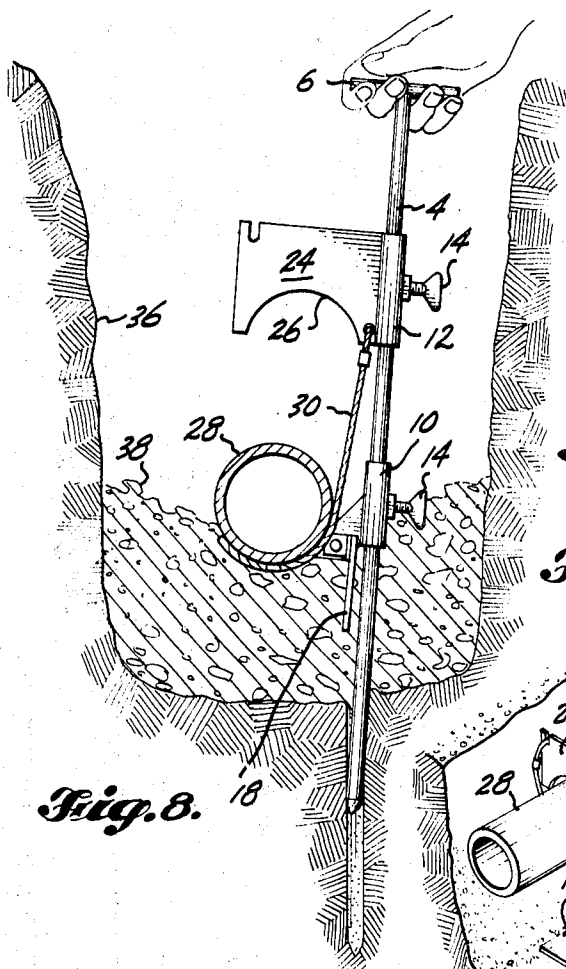
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3,568,455

METHOD OF LAYING PIPE IN OR ON A BED OF PARTICLE MATERIAL OR IN A TRENCH

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5 Claims

ABSTRACT OF THE DISCLOSURE

A method and apparatus are disclosed for laying pipe, and particularly sectional pipe such as sewer and drain tile, in or on a bed of particle material such as gravel or crushed rock. According to the method, a series of posts are removably mounted at spaced positions on the ground along the course of the pipe, and the pipe is releasably supported on the posts in a raised condition above the ground, while the particle material is deposited under the pipe to at least a depth at which the deposit can sustain the pipe in its raised condition. Then the pipe is released from the support of the posts, and the posts are removed from the deposit while the deposit sustains the condition of the pipe. Where the pipe is divided into sections, as in the case of sewer and drain tile, each section is supported on a single post so that the sections can be quickly aligned with one another along the desired slope.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to the laying of pipe, and in particular to the laying of pipe in or on a bed of particle material. The invention is especially applicable to the laying of sectional pipe such as sewer pipe and drain tile, in a trench containing a water pervious medium such as drain rock, gravel or crushed rock.

Description of the prior art

When laying such sectional pipe, the individual sections or "tiles" must be aligned with one another on a slope to assure that liquid will flow therein. The pipes or tiles vary widely in length and may be of fiber, plastic, steel or concrete, and in most operations, a run of at least 40 feet of the pipe or tiles is laid in a trench which can conveniently accommodate only one or two laborers at a time. The present practice is to lay the run in segments of four or five pipes or tiles at a time, and to align each segment on the desired slope before another is added to the run. Alignment of the tile is accomplished by pressing individual tiles into the backfill material where necessary, and/or by adding more backfill under certain tiles until they all assume a condition of alignment. Understandably, the overall procedure is highly inefficient since a laborer no sooner picks up his shovel to spread more backfill material, then he must lay it down again to procure more tile, or to align the tile, or to check the slope of the run; and a great deal of time is lost in shifting from one step to another, and from one segment of the run to the next.

OBJECTS OF THE INVENTION

One object of the present invention is to devise a more efficient procedure for laying such pipe in or on a bed of particle material; and in particular to devise a method and apparatus whereby the pipe can be placed and aligned with one another in a raised condition above the ground, without there first being a deposit of back-

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fill material therebelow, and in fact, before the backfill material is deposited under the pipe. Another object is to devise a method and apparatus of this nature whereby the pipe laying and backfilling operations can be separated from one another into independent operations, which is desired, can be carried out by different laborers operating in different parts of the trench and at different points in time. A further object is to devise a method and apparatus of this nature whereby the pipe laying operation can be conducted in one continuous step over a relatively large distance, such as forty feet or more, before the backfill material is deposited under the pipe. A still further object is to devise a method and apparatus of this nature wherein the pipe laying operation is conducted with a temporary pipe support, and more particularly with a plurality of the same, which can be removed after the backfilling operation and reemployed at another point in the trench. Other objects include the provision of a method and apparatus of this nature wherein the pipe laying operation is quickly and easily effected, whether the run is open jointed or close jointed; wherein the temporary pipe support used in the operation is durable and reliable, is inexpensive to manufacture, and is capable of adapting to pipe of different diameters; and wherein a plurality of runs can be juxtaposed with one another on the ground, and/or stacked in successive tiers above one another. Still further objects will be apparent from a description of the invention which follows hereafter.

SUMMARY OF THE INVENTION

These objects and advantages are realized by a pipe laying method and apparatus of our invention wherein generally speaking we removably mount a series of posts at spaced positions on the ground along the course of the pipe, and releasably support the pipe on the posts in a raised condition above the ground, while the particle material is deposited under the pipe to at least a depth at which the deposit can sustain the pipe in its raised condition. Then we release the pipe from the support of the posts and remove the posts from the deposit while the deposit sustains the condition of the pipe. In most instances the posts are thereafter carried over into another segment of the operation and/or reused in a subsequent operation. If the pipe is divided into relatively short sections such as in the case of sewer and drain tile, usually each section is supported on a single post so that the sections can be quickly aligned with one another along the desired slope.

When the posts are mounted on the ground, there are means for adjusting the elevation of the pipe above the ground. For example, the posts may be adapted to be driven into the ground, and may have vertically adjustable brackets thereon which about the surface of the ground as stops. Or the pipe may be supported on vertically adjustable brackets elevated on the posts. In preferred embodiments of the invention, the posts take the form of stakes having pairs of vertically adjustable brackets at spaced elevations thereon. The pipe is supported on the upper brackets of the stakes and the stakes are driven into the ground until the lower brackets about the surface of the same. The spacings between the brackets thus determines the elevation of the pipe as well as its slope. If necessary, the elevations of the upper brackets can be adjusted to make a closer determination.

When the posts are removed from their mounted positions on the ground, the lower brackets and their respective posts are displaceable in relation to one another. For example, the lower brackets may be shifted into substantial alignment with the posts by the application of a vertical force thereto, as where each bracket is swung

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downwardly against its post by the weight of the deposit when the post is lifted therefrom. Or the lower brackets may be detached from the posts by the application of a rotational force thereto, as where each post is unscrewed from its bracket as it is lifted from the deposit.

The posts may have clamping devices thereon for releasably suspending the pipe from the upper brackets. For example, each upper bracket may have a pair of tongs depending therefrom which assumes a pliers-like grip on the pipe in the operative position thereof. Or the upper bracket may have a sling depending therefrom which is passed under the pipe and attached to the bracket to clamp the pipe against the bracket in the operative position thereof. Preferably, each clamping device is adjustable to different pipe diameters.

If a plurality of pipes are to be stacked on top of one another in the bed of particle material, the upper bracket may be adjusted to a higher elevation after the first pipe has been released therefrom, and another pipe may be supported from the bracket while additional particle material is deposited thereunder. If more than one pipe is to be laid at each level, then the upper bracket may have a plurality of clamping devices depending therefrom, at laterally offset positions thereon, to support the pipes in juxtaposition with one another while the particle material is deposited thereunder.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features of the invention will be better understood by reference to the accompanying drawings wherein:

FIG. 1 is a perspective view of one of the preferred embodiments of the invention as it appears in operative condition;

FIG. 2 is a part perspective view of the embodiment as the lower bracket or stop thereon appears in inoperative condition;

FIG. 3 is a part perspective view of another embodiment having an alternative form of stop thereon;

FIG. 4 is a part elevational view of a third embodiment having an adjustable clamping device thereon;

FIG. 5 is a part elevational view of a fourth embodiment having a different form of adjustable clamping device thereon;

FIG. 6 is an operational perspective view illustrating the tile laying operation in a trench before the backfill material is deposited therein;

FIG. 7 is an operational cross-sectional view of the trench after the backfill material has been added;

FIG. 8 is another operational cross-sectional view of the trench illustrating the manner in which each stake is removed from the trench;

FIG. 9 is an operational elevational view illustrating an embodiment of the invention which can lay several runs of tile at one level in a trench;

FIG. 10 is a part elevational view of an embodiment of the invention employing a different form of clamping device; and

FIG. 11 is an operational cross-sectional view of a trench illustrating a still further embodiment of the invention employing a detachable stop which is left under the deposit when the stake is removed.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings, it will be seen that the tile laying operation is conducted with a plurality of temporary tile supports each designated generally at 2. Each tile support 2 comprises an elongated steel spike or stake 4 which has a handle 6 welded to the upper end thereof, and a pointed tip 8 on the lower end thereof adapted to be driven into the ground. The stake is rounded in cross section and has a pair of sleeves 10 and 12 slidably engaged thereon to be fixed at variable elevations on the stake by means of setscrews 14 provided therewith. The lower sleeve 10 has a vertically disposed gusset plate

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16 welded thereon which slopes downwardly along its upper edge. A rectangularly shaped stop plate 18 is hinged to the gusset plate to swing between a substantially horizontal position abutting the lower edge of the gusset plate, and a substantially vertical position abutting the lower end of the stake. Corresponding notches 20 and 22 in the gusset and stop plates allow for the swing of the latter.

The upper sleeve 12 has a vertically disposed bracket plate 24 welded thereto, and the lower edge of the bracket plate has an arcuate indentation 26 therein adapted to mate with the cylindrical surface of various diameters of fiber, plastic, steel or concrete pipe or tiles 28. A flexible cable 30 is hingedly secured to the lower edge portion of the bracket plate 24 at a point adjacent the stake, and a loop 32 is formed on the loose end thereof to be dropped into a notch 34 on the outer upper edge of the plate, after the cable is passed under the tile.

When the stake 4 is driven into the bottom of the trench 36, the stop plate 18 abuts the surface of the ground and limits the penetration of the stake. Thus, by adjusting the vertical spacing between the sleeves 10 and 12, the above-ground elevation of the tile 28 can be determined at the time the stake is driven into the ground. Final adjustment of its elevation is accomplished with the upper sleeve 12.

In a typical tile laying operation, each tile is clamped under the bracket 24 of a stake, and the stakes are driven into the bottom of the trench on the intended course of the run. See FIG. 6. After a considerable number of tiles have been stationed in place, such as 40 or 50 feet of the same, they are aligned with one another on a slight slope by adjusting the upper sleeves, and a crushed rock or gravel backfill material 38 is deposited at each side of the run. When the deposit 38 reaches an elevation at which it can assume the weight of the tiles, the backfilling operation is usually terminated, although additional backfill material can be added if desired, depending on the results sought. Normally enough is deposited along the sides of the tile to assure that each tile is fully and immediately supported by the deposit when the stakes are removed. If necessary, a final adjustment in elevation can be made with the upper sleeves at this time, although no further adjustment is ordinarily needed. Also, slips of building paper (not shown) are added over the joints between tiles, if they were not previously added. Thereafter, the next step is to progressively unsling each tile, and to lift or pull the corresponding stake until the full run of tiles has been released onto the bed of material. See FIG. 8. The installation is now complete and ready for an earth backfill. Usually a blanket cover such as a newspaper cover (not shown), is added in advance of the earth.

As each stake is lifted, the weight of the deposit displaces the stop plate 18 into the vertical position illustrated in FIGS. 2 and 8. The result is to produce a stake which offers little resistance to being disengaged from the deposit, so that there is little risk of dislodging the tile.

Preferably, the stop plate has the inverted spade-shaped configuration 18' illustrated in FIG. 3, so as to reduce the resistance still further.

Also, we prefer to equip the bracket plate with a plurality of inclined notches 40 along the outside upright edge thereof, to allow for different diameter pipe. See FIG. 4. Alternatively, the cable may have a plurality of knots or other enlargements 42 thereon (FIG. 5), to allow for an adjustment when a different diameter pipe is used.

In the embodiment of FIG. 10, a different clamping device is employed. The clamping device comprises a pair of arcuate tongs 44 and 46 which are mounted in depending relationship on a bracket plate 48. One of the tongs 44 is permanently positioned on the plate; while the other tong 46 is pivotally articulated with respect to the first at 50. When closed about a tile, the latter tong can be pinned to the plate at 52 to clamp the tile

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in position. Removal of the pin (not shown) releases the tile onto the deposit.

In FIG. 11, an alternative form of stop is illustrated. In this case, the tip of the stake 4' has a reduced diameter shank 54 which is joined with the shank 56 of the upper portion by a threaded intermediate section 58 of tapered length. In use a block of scrap wood material 60 with a boring 62 therein, is screwed onto the intermediate section of the shank to form a stop. When the stake 4' is lifted from the ground, it is simultaneously rotated in the reverse direction so as to disengage it from the bore of the block which is restrained against rotation by the backfill material (not shown).

FIG. 9 illustrates a temporary pipe support which is adapted to lay a plurality of juxtaposed runs. The support comprises a pair of stakes 4" each of which is equipped with a stop such as was previously described. In addition, the stakes are joined by a common bracket plate 24' which extends between the upper sleeves 12' thereon. The lower edge of the plate has a plurality of inverted V-shaped indentations 64 therein to receive the pipe sections. The V-shape of each indentation allows for a greater degree of adjustability with respect to pipe size, than that permitted by the series of enlargements 42 alone.

Preferably, the shanks of the stakes in all embodiments are notched at regular intervals to allow for more positive engagement of the setscrews therewith.

What is claimed is:

1. A method of laying pipe in or on a bed of particle material, comprising installing a series of posts along the course of the pipe by driving each post into the ground until a relatively rotatable stop thereon abuts the surface of the ground, releasably supporting the pipe on the posts in a raised condition above the stops, while the particle material is deposited on the ground in the space adjacent the posts between the pipe and the stops, and to a depth such that the deposit can sustain the pipe in its

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raised condition, releasing the pipe from the support of the posts, and removing the posts from the ground, while rotating the stops and posts in relation to one another so as to free the posts from the deposited material in the space between the pipe and the ground.

2. The method according to claim 1 wherein the stops are pivotally mounted on the posts, and are rotated into substantial parallelism with the posts when the posts are removed from the ground.

3. The method according to claim 1 wherein the posts are threadably engaged with the stops, and are unscrewed from the stops as they are removed from the ground.

4. The method according to claim 1 wherein the pipe is suspended from brackets at raised positions on the posts.

5. The method according to claim 1 wherein there is a trench in the ground along the course of the pipe, into the bottom of which the posts are driven, and the particle material is deposited in the trench, substantially across the bottom thereof, between the pipe and the stops.

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JACOB SHAPIRO, Primary Examiner

U.S. Cl. X.R.

61—11, 72.5; 138—105; 248—49