Oct. 19, 1971 F. J. HREHA 3,613,323

FORM AND DRAIN TILE

Filed March 10, 1970 2 Sheets-Sheet 1

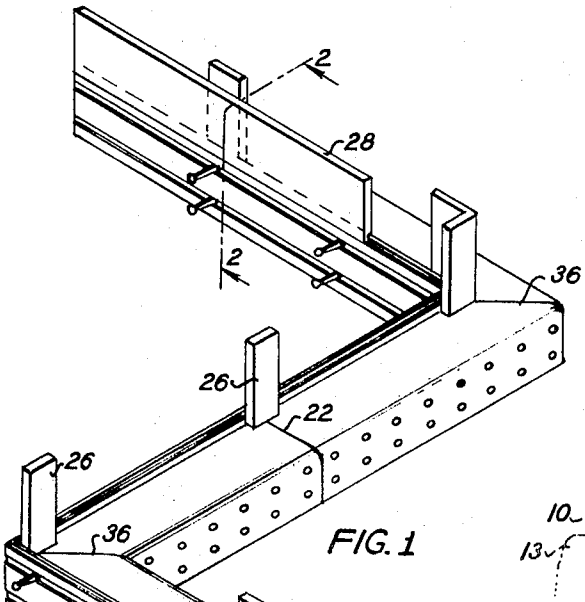


FIG. 1

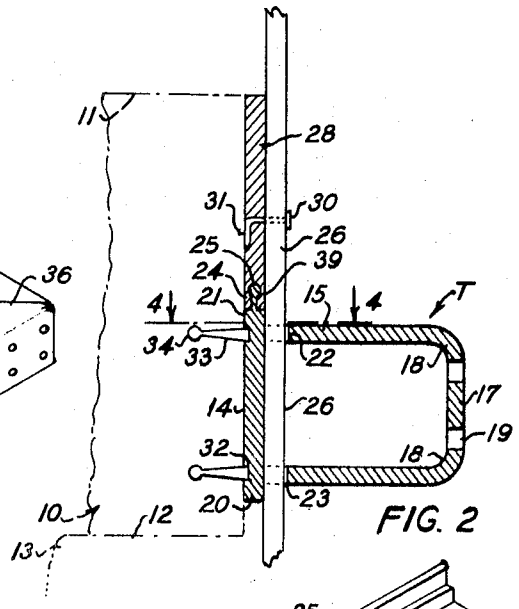


FIG. 2

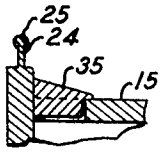


FIG. 7

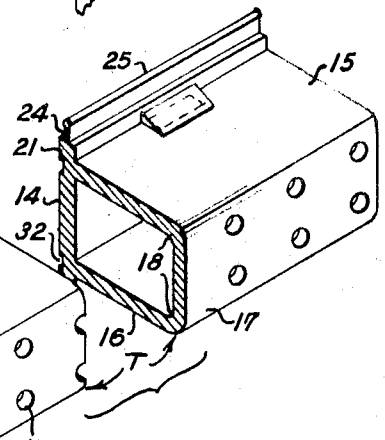


FIG. 3

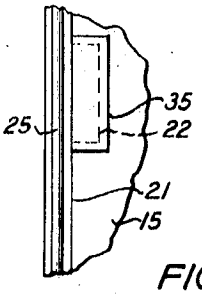


FIG. 4

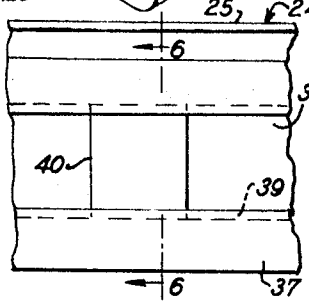


FIG. 5

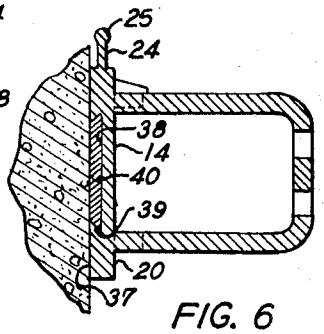


FIG. 6

INVENTOR.
FRED J. HREHA
BY
Kimmel, Crowell & Weaver
ATTORNEYS

Oct. 19, 1971 F. J. HREHA 3,613,323

FORM AND DRAIN TILE

Filed March 10, 1970 2 Sheets-Sheet 2

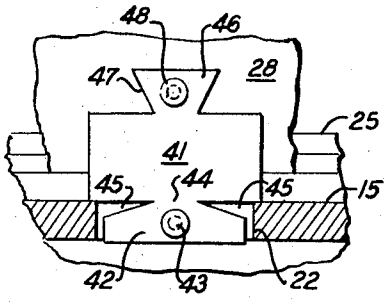


FIG. 8

FIG. 9

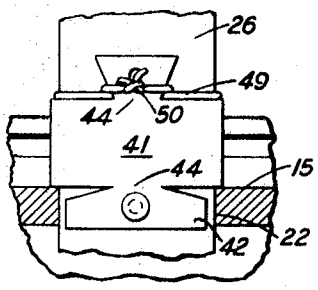


FIG. 10

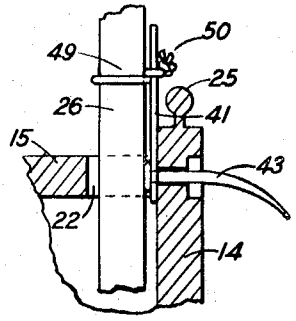


FIG. 11

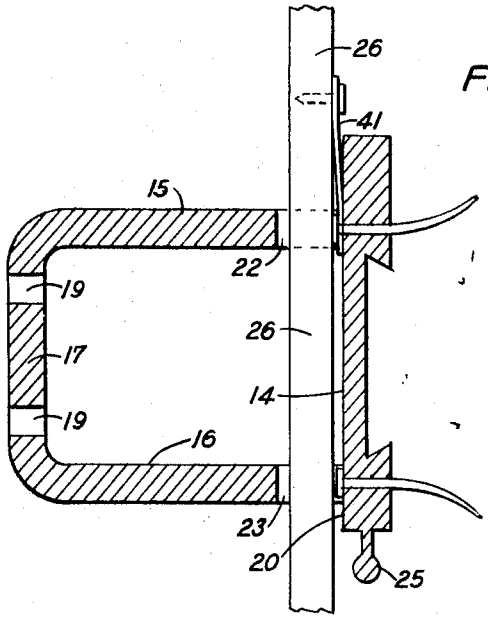


FIG. 12

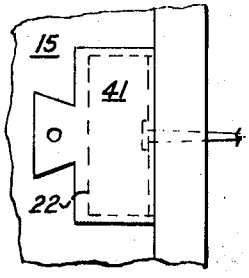


FIG. 14

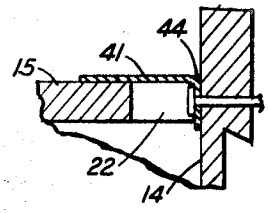


FIG. 13

INVENTOR
FRED J. HREHA
BY
Kimmel, Crowell & Weaver
ATTORNEYS

United States Patent Office 3,613,323 Patented Oct. 19, 1971

3,613,323

FORM AND DRAIN TILE

Fred J. Hreha, 226 Sullivan St., Exeter, Pa. 18644

Filed Mar. 10, 1970, Ser. No. 18,230
Int. Cl. E02d 27/04; E04b 1/70
U.S. Cl. 52—169 15 Claims

ABSTRACT OF THE DISCLOSURE

This specification discloses a form intended for use in the casting of concrete or cement foundations and which has a drain tile integral with an element thereof. The form comprises two flat wall sections detachably connected. A drain tile is integrally formed on the lower wall section and is of rectangular cross section presenting spaced horizontal walls and a side wall. The latter is formed wtih a plurality of spaced drainage openings and the horizontal walls are formed at spaced intervals with aligned slot-like apertures adjacent to the wall section from which they extend. Stakes are driven through these apertures and nailed to the upper wall section of the form. A mechanical interlock between the lower wall section and the material cast is provided and may take different forms.

The present invention relates to the forms used in casting foundations of cement or concrete and is concerned primarily with a form having a drain tile or duct integral therewith which is left in position after other elements of the forms are removed.

BACKGROUND OF THE INVENTION

In the construction of buildings it is now common practice to cast the base or foundation of cement or concrete. This operation requires a form about the periphery of the base. This periphery ordinarily is defined by a plurality of straight edges.

After the foundation sets and the forms are withdrawn, it is the usual practice to fill the space thereabout with earth or gravel. Water drains through these formations and it is necessary to provide a tile or duct for conducting such drainage water away from the foundation to a desired disposal point.

At the present time the art is lacking in a drain tile that is capable of being incorporated into a form for a base or foundation.

OBJECTS OF THE INVENTION

With the foregoing conditions in mind, the present invention has in view the following objects:

(1) To provide a form for use in the casting of foundations which comprises a plurality of units, each intended for use at a straight peripheral edge of the base and each consisting of two wall sections, an upper section and a lower section, with a drain tile formed integrally with the lower wall section.

(2) To provide, in a form and drain tile of the type noted, means for detachably securing the wall sections together whereby the upper wall section may be removed after the foundation has set.

(3) To provide means for securing a form of the character indicated in position in the environmental earth and/or gravel in which the foundation is cast. This means ordinarily takes the form of stakes which are nailed to the upper wall section and are removed coincidental with the removal of the upper wall section after setting.

(4) To provide, in a form and drain tile of the kind aforesaid, a tile or duct of rectangular cross section defined by the lower wall section, spaced horizontal walls integral therewith and extending therefrom, and a side wall formed with drainage openings. The horizontal walls are formed with apertures immediately adjacent to the lower wall section and which accommodate the stakes.

(5) To provide, in a form and drain tile of the type indicated, means for establishing a mechanical interlock between the lower wall section and the cast foundation.

(6) To provide closures for the apertures in the upper horizontal wall after the stakes are removed, and

(7) To provide means for attaching together adjacent units of the type noted.

Various other more detailed objects and advantages of the invention such as arise in connection with carrying out the above noted ideas in a practical embodiment will in part become apparent and in part be hereinafter stated as the description of the invention proceeds.

SUMMARY OF THE INVENTION

The foregoing objects are achieved by providing a form and drain tile made up of a plurality of units each of which is intended to cast a peripheral straight edge portion of a base or foundation. Each unit comprises an upper wall section and a lower wall section which are secured in an aligned position by a detachable connection. A drain tile or duct is formed integrally with the lower wall section and is of substantially rectangular cross section being defined by the wall section, upper and lower horizontal walls and a side wall. The latter is formed with a plurality of drainage openings.

The horizontal walls are formed with slot-like apertures at the wall section. The apertures in the upper wall align with those in the lower wall and a stake is driven through each pair of aligned apertures and is nailed to the outer face of the upper wall section. At the ends of adjacent units each aperture is of a size to receive only one half of a stake. Thus, certain of the stakes constitute means for securing adjacent units together.

After the stakes are nailed to the upper wall section, the projecting portions of the nails are bent over or clinched so as to permit removal of the upper wall section and the stakes together after foundation has set. When this is done the apertures in the upper horizontal walls are sealed by applying closures thereto.

A mechanical interlock between the lower wall section and the cast foundation is provided in the form of members which are attached to the lower wall section and project into the cement. These members are contoured to prevent their withdrawal.

For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawing wherein:

FIG. 1 is a perspective of a portion of a form and drain tile designed in accordance with the precepts of this invention in a partially erected condition.

FIG. 2 is a vertical section, on an enlarged scale taken about on the plane represented by the line 2—2 of FIG. 1.

FIG. 3 is a perspective on an enlarged scale of a drain tile per se which is broken away, with the parts thereof and a closure for an aperture depicted in exploded relation.

FIG. 4 is a detailed section on an enlarged scale looking down on the drain tile at one of the apertures, being taken about on the plane represented by the line 4—4 of FIG. 2.

FIG. 5 is a fragmentary elevation looking at the inside of the form including a modification of the interlocking means.

FIG. 6 is a vertical section taken about on the plane represented by the line 6—6 of FIG. 5.

FIG. 7 is a detailed section through the upper portion of the lower wall section.

FIG. 8 is a detail on an enlarged scale of a modified form of the device used to close an opening in the upper horizontal wall of the drain tile.

FIG. 9 is a sectional view through the tile with the device of FIG. 8 in the position it assumes before the stake is removed.

FIG. 10 is a detail of a further modification in which the upper wooden form is omitted and the device of FIG. 8 secured to a stake by wire.

FIG. 11 is a detail taken normal to the showing of FIG. 10.

FIG. 12 is a vertical section through a tile of another modification in which the upper form is omitted.

FIG. 13 is a detail section showing the device of FIG. 8 in hole closing position; and

FIG. 14 is a top plan view of the device of FIG. 8 in hole closing position.

Referring now to the drawings, wherein like reference characters denote corresponding parts, a base or foundation is shown in FIG. 2 in phantom at **10**. It will have a top surface **11** and a bottom face **12** which is determined by the top surface of a ground formation **13**. While foundation **10** is not illustrated in FIG. 1, it will be understood that it has a periphery made up of a plurality of straight side edges, portions of which are illustrated.

A tile or duct is identified in its entirety by the reference character T. While it may be any material having the required properties, the invention contemplates the use of wood or cellulose fibers impregnated and bonded together with a bitumen such as coal tar pitch. Tile T is of rectangular cross section and comprises an inner wall that is a part of a lower wall section of a form. This wall section is designated **14**. Integral with wall section **14** and extending outwardly therefrom are an upper horizontal wall **15** and a lower horizontal wall **16**. The outer ends of walls **15** and **16** are spanned by a side wall **17** which is integral with the walls to which it is joined. It is notable that there are rounded corners **18** where side wall **17** joins walls **15** and **16**. Side wall **17** is formed with a plurality of drainage openings **19**.

Formed as a continuation of wall section **14** is a bottom flange or skirt **20** which extends below wall **16**. Extending above wall **15** is another flange or web **21**. It will be understood that flanges **20** and **21** are coplanar with wall section **14**.

Immediately adjacent to wall section **14** upper horizontal wall **15** is formed with one or more slot-like apertures **22** (FIG. 3). The inner edge of aperture **22** is constituted by wall section **14** as illustrated in FIGS. 2 and 3. Lower horizontal wall **16** is also formed with slot-like apertures **23** (FIG. 2) which are of the same size and shape as apertures **22** and in alignment therewith.

Formed integral with web **21**, and upstanding therefrom midway of its faces is a rib **24** which terminates at its upper edge in an enlarged bead **25**. This rib and bead constitute one element of a detachable connection as will be later described.

A plain wooden stake is shown at **26** in FIGS. 1 and 2. It comprises a main body portion of a size and shape closely corresponding to that of apertures **22** and **23** through an aligned pair which it passes with a snug fit. It also has a pointed end **27** (FIG. 1) which is driven into ground formation **13**.

An upper wall section **28** which constitutes a part of the form is shown in FIGS. 1 and 2. It may be of the same material as tile T but it is believed entirely practical to make it of wood. The lower edge of wall section **28** abuts the upper edge of flange **21** on wall section **14** and opening thereinto is a groove **29** of key hole shape dimensioned to snugly receive rib **24** and bead **25** with a snap fit. Thus, after tile T is positioned by stakes **26** upper wall section **28** is connected to wall section **14** by first forcing the key hole groove **29** over and about rib **24** and bead **25**. Nails **30** are then driven through the upper portions of stakes **26** and wall section **28** as shown in FIG. 2. The inner ends

of these nails are then bent over or clinched as depicted at **31** to avoid any projection entering the material of base **10** which might interfere with removal of wall section **28** and stakes **26** after the cement has set.

In the embodiment of FIGS. 2 and 3 the inner face of wall section **14** is formed with undercut recesses **32**. A locking pin **33** has an enlargement at one end tightly fitted lock recess **33** to connect it to wall section **14**. It also has an enlargement **34** that is embedded in foundation **10** to securely attach tile T thereto.

A closure for an aperture **22** is shown at **35** in FIG. 3. After stakes **26** are withdrawn, closures **35** are applied to apertures **22** to seal them against the entry of earth or gravel.

Where units of a form and tile meet at a corner, the ends of horizontal walls **15** and **16** are mitered as shown at **36** in FIG. 1. The end edges of side walls **17** are also mitered.

It is contemplated that where adjacent units meet apertures similar to apertures **22** and **23** be formed with one half of each apertures in the wall of one unit and the other half in the wall of the other unit. Thus, when a stake **26** is passed through a pair of such aligned apertures and then nailed to both the upper wall sections **28** of two adjacent units the latter are connected by the stakes.

Referring now to FIGS. 4, 5 and 6, a modified form of interlock with the tile and foundation will be described.

The inner face of wall section **14** is designated **37**. Opening onto face **37** is a recess **38** defined by parallel undercut side edges **39**. It is contemplated that a sufficiently strong interlock might be provided by merely the concrete entering this dovetail groove. However, a more secure interlock is provided by a plate **40** which is anchored in the recess.

Referring now to FIGS. 8 to 13 inclusive, certain modifications in which the closure **35** is replaced by a plate which not only performs the hole closing function after a stake is removed but is also used to connect the lower form **14** either to an upper form **28** or a stake **26**.

Thus, a plate **41** of galvanized metal (to prevent rusting) having a lateral extension **42** that is secured to lower form **14** by being received in a slot **22** and nailed to a long wall of the slot by a nail **43**. Extension **42** is joined to plate **41** by a neck **44** which is defined by V-shaped slots **45**. Neck **44** is bendable for a purpose to be later explained.

A tab **46** having undercut side edges **47** extends from the edge of plate **41** opposite to extension **42**. In the embodiment of FIG. 9 tab **46** is secured to upper form **28** by a nail **48**. Thus, in this position plate **41** functions to supplement the connection between forms **14** and **28**.

Referring now momentarily to FIGS. 13 and 14, it will be noted that after stake **26** is removed from hole **72** plate **41** is readily bent along neck **44** into the position illustrated in which it functions as a closure for opening **22**.

Referring now to FIGS. 10 and 11, an arrangement in which upper form **28** is omitted will be described. Plate **41** is nailed to form **14** in the manner above described. Also stake **26** is in position in the aligned holes of the tile walls, one of which is shown at **22**. Plate **41** is secured to stake **26** by a wire **49** which is wrapped about stake **26** and the throat of tab **46** defined by undercut side edges **47**. The ends of this wire are twisted together in a well-known manner as shown at **50**.

FIG. 12 illustrates another arrangement in which the upper form is omitted. In FIG. 12 lower form **14** is inverted so that rib **25** is disposed downwardly. Plate **41** is secured to form **14** and stake **26** by nails corresponding to nails **43** and **48** of FIG. 8.

In both instances where the upper form is omitted, as in FIGS. 10 and 11 and also FIG. 12, after the stake is removed, plate **41** is bent into the position of FIGS. 13 and 14.

While preferred specific embodiments of the invention are hereinbefore set forth, it is to be clearly understood that this invention is not to be limited to the exact constructions, mechanisms and materials illustrated and described because various modifications of these details may be provided in putting the invention into practice.

What is claimed is:

1. For use in casting in a ground formation, a foundation of a cementitious material, a form and drain tile comprising:
   (a) an upper flat wall section having a lower edge surface,
   (b) a lower flat wall section having an upper edge surface in abutting engagement with said lower edge surface,
   (c) a detachable connection between said wall sections,
   (d) a tile formed integral with said lower wall section and projecting from one face thereof, said tile including upper and lower horizontal walls and a side wall,
   (e) drainage openings in said side wall,
   (f) apertures in said horizontal walls immediately adjacent to said lower wall section with the apertures in the upper wall in alignment with the apertures in the lower wall,
   (g) a stake passing through each pair of aligned apertures and drivable into said ground formation,
   (h) means for attaching said stakes to said upper wall section; and
   (i) means for establishing a mechanical interlock between said lower wall section and said foundation.

2. The form and drain tile of claim 1 which the lower wall section and tile are of cellulosic fibers impregnated with a bitumen.

3. The form and drain tile of claim 1 in which the detachable connection comprises a rib and bead on one wall section and a key hole groove in the other wall section with the groove receiving the rib and bead.

4. The form and drain tile of claim 1 in which the means for attaching the stakes to the upper wall section comprises nails driven through the stakes and wall section and having projecting end portions bent against the wall section.

5. The form and drain tile of claim 1 in which the means for establishing the interlock comprises a plurality of members each having one end anchored to said lower wall section and an enlargement at the other end spaced from said wall section and embedded in said foundation.

6. The form and drain tile of claim 1 in which each horizontal wall terminates in an end edge and there is an aperture opening into each end edge and which aperture is of a size to receive one half of a stake.

7. The form and drain tile of claim 1 in which the edges of the horizontal walls at one end of the tile are mitered.

8. The form and drain tile of claim 1 in which the means for establishing the interlock takes the form of a recess with undercut sides on the lower wall section.

9. The form and drain tile of claim 8 together with a plate anchored in said recess and members having ends secured to said plate and portions deformed from a straight condition which are embedded in said foundation.

10. The form and drain tile of claim 1 together with a closure for each aperture in the upper horizontal wall which is applied after the stake passing therethrough is removed therefrom.

11. The form and drain tile of claim 2 in which the closure takes the form of a plate having a lateral extension secured to said tile in one of the apertures in a horizontal tile wall with the connection of the extension to the plate being bendable, a tab on said plate, and a connection of said tab to said upper wall section, said plate being bendable into a position closing the aperture in which it is mounted when said connections are broken.

12. The form and drain tile of claim 11 in which the connections of said extension and tab are nails driven into said wall sections.

13. For use in casting in a ground formation a foundation of a cementitious material, a form and drain tile comprising:
   (a) a flat wall section;
   (b) a tile formed integrally with said wall section and projecting from one face thereof, said tile including upper and lower horizontal walls and a side wall;
   (c) drainage openings in said side wall;
   (d) apertures in said horizontal walls immediately adjacent to said wall section with the apertures in the upper wall in alignment with the apertures in the lower wall;
   (e) a stake passing through each pair of aligned apertures and drivable into said ground formation;
   (f) a plate associated with each aperture in the upper wall and having an extension secured to said tile in that aperture, and a tab on the side of the plate opposite to that having the extension, said plates having bendable into positions closing the apertures when the stakes are removed therefrom;
   (g) means for attaching the tab of each of said plates to a stake; and
   (h) means for establishing a mechanical interlock between said wall section and said foundation.

14. The form and drain tile of claim 13 in which the side edges of the tab are undercut, and the attaching means takes the form of a wire wrapped about a stake and the tab connected thereto.

15. The form and drain tile of claim 2 in which the attaching means comprises a nail driven through each tab and into a stake.

References Cited

UNITED STATES PATENTS

707,815	8/1902	Anderson	52—611
741,993	10/1903	Anderson	52—607
750,790	2/1904	Anderson	52—607
3,017,722	1/1962	Smith	52—169

FRANK L. ABBOTT, Primary Examiner

J. L. RIDGILL, JR., Assistant Examiner

U.S. Cl. X.R.

52—303, 607; 61—10; 248—156