

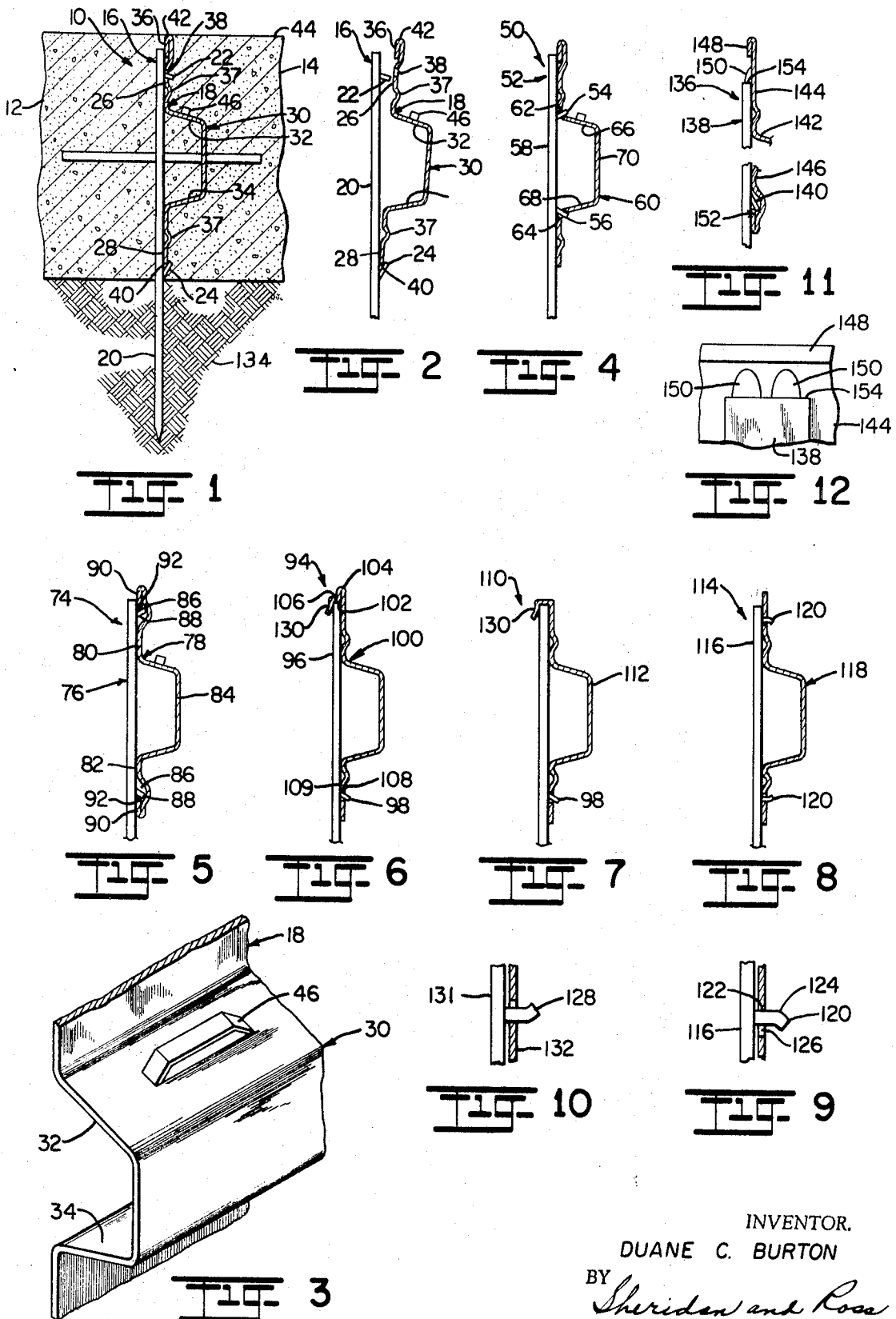
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CONCRETE FORM

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1

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CONCRETE FORM

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ABSTRACT OF THE DISCLOSURE

A concrete form used in forming a contraction joint between adjacent concrete slabs. The concrete form comprises a plurality of aligned stakes and an elongated relatively rigid sheet member. Each of the stakes has a generally vertically disposed body portion and at least a pair of said stakes has vertically spaced-apart support means disposed generally transversely to said body portion. The sheet member has an upper, longitudinally extending, generally planar portion and a longitudinally extending key deformation portion depending from said upper planar portion, said key deformation portion having first and second parts. The sheet member has vertically spaced-apart means engaging the support means of said stakes wherein the vertical distance separating the vertically spaced-apart means of said member is, prior to the mounting of said member upon said stakes, slightly different from the vertical distance separating the support means of said stakes whereby said first part of said key deformation is biasedly mounted relative to the second part and the means of said member cooperate with the support means of said stakes to prevent vertical movement of said member relative to said stakes.

BACKGROUND OF THE INVENTION

Heretofore, many concrete forms of the type used in forming a key contraction joint between adjacent concrete slabs have been proposed, especially for monolithically poured concrete slabs. Many of these forms have had useful application. However, each of these forms has suffered from one or more disadvantages. For example, many of the prior art forms were disadvantageous in that a considerable amount of expense and time was required to install same. Additionally, prior art concrete forms were disadvantageous due to the fact that they could not be used in concrete slabs subjected to relatively large loads without spalling occurring. A serious disadvantage of many prior art concrete forms was due to the fact that no inexpensive means was available to prevent a joint member used within a concrete form from floating upwardly within the mass of concrete following pouring thereof. For example, it has been and continues to remain the practice of securing the joint member to the supporting stakes upon which same is mounted by the use of screws, wire or other suitable fastening devices.

SUMMARY OF THE INVENTION

This invention overcomes the disadvantages of the prior art form by providing a concrete form comprising a plurality of aligned vertical stakes at least a pair of which have spaced-apart means disposed generally transversely to the body portion of said stakes and an elongated relatively rigid sheet member having a key deformation portion, including first and second parts, and vertically spaced-apart means engaging the support means of said stakes, the vertical distance separating the vertically spaced-apart means of said member, prior to mounting said member upon said stakes, being slightly larger or smaller than the vertical distance separating the support means of said stake whereby a first part of said key de-

2

formation portion is biasedly mounted relative to said second part to prevent vertical movement of said member relative to said stakes.

Accordingly a principal object of this invention is to provide a concrete form wherein the joint forming member thereof is quickly and easily mounted upon a plurality of aligned vertical stakes by a single person in a manner to prevent vertical movement of said member relative to said stakes and without the use of such fastening means as screws, wire or the like.

Another object of this invention is to provide an improved concrete form of the type used in forming a key contraction joint between adjacent concrete slabs which may be installed in the field more rapidly than prior art concrete forms.

Another object of this invention is to provide a concrete form which may be easily and quickly installed and which at the same time the joint forming member thereof resists any tendency to float upwardly under the influence of the pressure existing within the concrete following pouring thereof.

Another object of this invention is to provide a concrete form of the type used in forming a key contraction joint between adjacent concrete slabs, said joint comprising a plurality of aligned stakes, each of said stakes having a generally vertically disposed body portion and at least a pair of said stakes having vertically spaced-apart support means disposed generally transversely to said body portion; and an elongated relatively rigid sheet member having an upper, longitudinally extending, generally planar portion and a longitudinally extending key deformation portion depending from said upper planar portion, said key deformation portion having first and second parts, said member having vertically spaced-apart means engaging the support means of said stakes, the vertical distance separating the vertically spaced-apart means of said member, prior to mounting said member upon said stakes, being slightly different from the vertical distance separating the support means of said stakes whereby said first part of said key deformation portion is biased toward or away from said second part, and said means of said member and the support means of said stakes cooperate to prevent vertical movement of said member relative to said stakes.

Another object of this invention is to provide a concrete form of the type as aforescribed in which said member also includes a lower, longitudinally extending, generally planar portion depending from the lowest part of said key deformation portion and disposed generally coplanarly with said upper planar portion.

Another object of this invention is to provide a concrete form of the type as aforescribed in which one of said transversely disposed support means of said stakes comprises the top of said stakes.

Another object of this invention is to provide a concrete form of the type as aforescribed in which said upper planar portion includes a folded-over portion which is disposed against at least a part of the upper portion thereof with the upper edge of said folded-over portion which is disposed against at least a part of the upper portion thereof with the upper edge of said folded-over portion being disposed along a predetermined grade level.

Another object of this invention is to provide a concrete form of the type as aforescribed in which the support means of said stakes comprises a pair of tabs one of which is convergently disposed with respect to the other in a direction proceeding toward the body of said stakes.

Another object of this invention is to provide a concrete form of the type as aforescribed in which the support means of said stakes include a pair of tabs, one

of which is divergently disposed with respect to the other in a direction proceeding toward the body portion of said stakes.

Another object of this invention is to provide a concrete form of the type as aforescribed in which said member includes handle means formed thereon.

Another object of this invention is to provide a concrete form of the type as aforescribed in which said vertically spaced-apart means of said member includes apertures formed adjacent the upper and lower portions of said key deformation portion.

Another object of this invention is to provide a concrete form of the type as aforescribed in which the vertically spaced-apart means of said member includes apertures formed in the upper and lower planar portions thereof.

DESCRIPTION OF THE DRAWINGS

Further objects and advantages of the invention will become apparent from the following description and claims and from the accompanying drawings, wherein:

FIG. 1 is a vertical section through adjoining concrete slabs of a concrete section showing one embodiment of a concrete form constructed in accordance with the subject invention;

FIG. 2 is a vertical section of the concrete form shown in FIG. 1 illustrating the joint forming member immediately prior to mounting the top portion thereof upon said stakes;

FIG. 3 is a perspective view of a portion of a joint forming member useful in the concrete form of this invention;

FIGS. 4-8 and 11 are vertical sections each of which illustrate additional embodiments of concrete forms constructed in accordance with the subject invention;

FIG. 9 is an enlarged view of the upper support means of the stakes shown in FIG. 8;

FIG. 10 is an enlarged view similar to FIG. 9 showing a modification of an upper support means of a stake upon which is mounted a joint forming member; and

FIG. 12 is a left-end elevational view of the upper portion of the concrete form shown in FIG. 11.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, in FIG. 1 is shown a vertical section through adjoining concrete slabs of a concrete section showing the preferred embodiment of a concrete form 10 constructed in accordance with the subject invention. The concrete form 10 is of the type used in forming a key contraction joint between adjacent concrete slabs 12 and 14 and comprises a plurality of aligned stakes 16 (only one of which is shown) and an elongated relatively rigid sheet material member 18. Each of the stakes 16 has a generally vertically disposed body portion 20. At least a pair of said stakes 16 has vertically spaced-apart support means 22 and 24 disposed generally transversely to said body portion 20. Preferably, at least one of said support means is formed divergently with respect to the other of said support means in a direction proceeding toward said body portion 20.

The sheet member 18 has upper and lower longitudinally extending, generally planar portions 26 and 28 and a longitudinally extending, key deformation portion 30 disposed intermediate said upper and lower planar portions 26 and 28. The key deformation portion has first and second parts 32 and 34. The upper planar portion 26 includes a folded-over portion 36 which is disposed against at least a part of the upper planar portion 26. Each planar portion also includes a longitudinally extending rib 37 to provide additional overall rigidity to the sheet member. The sheet member 18 has vertically spaced-apart means 38 and 40 engaging, respectively, the support means 22 and 24 of the stake 16 as shown in FIG. 2. The vertical distance separating the vertically

spaced-apart means 38 and 40 of said member 18, prior to installation of said member 18 upon said stakes 16, is slightly different from the vertical distance separating the support means 22 and 24 of said stakes 16. Thus, as illustrated in FIG. 2, it will be apparent that the first part 32 of the key deformation 30 must be urged or biased toward the second part 34 of said key deformation portion 30 in order to install said member 18 upon said stakes 16. Consequently, the support means 22 and 24 of the stakes 16 cooperate with the means 38 and 40 of the member 18 to prevent vertical movement of the member relative to the stakes thereby maintaining the upper edge of 42 along a predetermined grade level such as the upper surface 44 of the concrete slabs 12 and 14. The sheet member 18 includes handle means 46 (see also FIG. 3). The purpose for the handle means 46 is to facilitate the installation of the sheet member 18 upon the stakes 16.

In FIG. 4 is shown another embodiment of a concrete form 50 constructed in accordance with the subject invention. The concrete form 50 is similar in many respects to the concrete form 10 shown in FIGS. 1 and 2; however, the concrete form 50 utilizes a plurality of stakes 52 (only one of which is shown) wherein at least a pair of said stakes 52 have vertically spaced-apart support means 54 and 56 one of which is convergently formed with respect to the other one in a direction proceeding toward the body portion of 58 of the stakes 52. The sheet member 60 of the concrete form 50 is similar to the sheet member 18 except that the vertically spaced-apart means 30 formed in said member 60 includes apertures 62 and 64 formed in the first and second parts 66 and 68 of the key deformation portion 70. Thus, it will now be readily apparent that the first part 66 of the key deformation 70 will be biased away from the second part 68 of said key deformation portion 70 rather than toward said second part as is the case with the first and second parts 32 and 34 of the sheet member 18 shown in FIGS. 1 and 2. However, as is the case with the concrete form 10 shown in FIGS. 1 and 2, the sheet member 60 of the concrete form 50 will be precluded from vertical movement relative to the stakes 52 by the cooperation of the spaced-apart support means 54 and 56 and the vertically spaced-apart means 62 and 64 formed in the member 60.

In FIG. 5 is shown another embodiment of a concrete form 74 constructed in accordance with the subject invention. The concrete form 74 includes a plurality of stakes 76 (only one of which is shown) which, except for the vertical distance separating the spaced-apart support means, are similar to stakes 52 shown in FIG. 4. Thus, further discussion of stakes 76 is not deemed warranted. The concrete form 74 includes a sheet member 78 having upper and lower planar portions 80 and 82 and a key deformation portion 84 disposed intermediate said planar portions 80 and 82. Formed within each of the planar portions 82 and 80 is a generally horizontally disposed recess 86. Within each recess portion 86 is disposed one of the vertically spaced-apart support means 88 of said stakes 76. It will be noted that each recess portion 86 is disposed to open in the same direction as the key deformation portion 84. The upper and lower planar portions 80 and 82 each have a folded-over portion 90. A part 92 of each folded-over portion extends across a portion of each recess 86.

In FIG. 6 is shown yet another embodiment of a concrete form 94 constructed in accordance with the subject invention. The concrete form 94 comprises a plurality of vertically aligned stakes 96 (only one of which is shown) at least a pair of which is formed with transversely disposed tabs 98. The sheet member 100 of concrete form 94 has a longitudinally extending, inverted U-shaped socket 102 formed adjacent the upper portion thereof. A longitudinally extending rib 104 is formed extending vertically upwardly from said socket 102. Thus, it will be readily obvious that the vertically spaced-apart support means of a stake 96 include the tab 98 and the top 106 of the stake. The vertically spaced-apart means of the sheet mem-

5

ber 100 includes the bight portion of the socket 102 and the apertures 108 (only one of which is shown) formed in the lower planar portion 109 of the sheet member 100.

In FIG. 7 is shown yet another embodiment of a concrete form 110 constructed in accordance with the subject invention. The concrete form 110 is similar to the concrete form 94 except that the sheet member 112 thereof does not have a rib extending vertically upwardly from the socket as is the case with the rib 104 shown in the concrete form 94.

In FIG. 8 is shown yet another embodiment of a concrete form 114 constructed in accordance with the subject invention. The concrete form 114 includes a plurality of stakes 116 (only one of which is shown) and a longitudinally extending sheet member 118. At least a pair of the stakes 116 include vertically spaced-apart support means 120. As shown in FIG. 9, each support means 120 includes a generally horizontally disposed surface 122 and an arcuately formed surface 124. The height of the aperture 126 formed in the adjacent planar portion of the sheet member 118 slightly exceeds the cross-sectional height of the tab 120. The purpose of this is to permit the lower surface of the aperture 126 to clear the lower edge of the tab 120 while, at the same time, the upper surface of the aperture 126, upon mounting of the member 118 upon the stake 116, moves first along the arcuately formed surface portion 124 and then onto the horizontally disposed surface portion 122.

FIG. 10 is an enlarged view similar to FIG. 9 showing a modification of an upper support means 128 of a stake 131 upon which is mounted a joint forming member 132. The upper support means 128 is similar to the upper support means 120 shown in FIG. 9 except that same has been inverted. It will be understood that the sheet member 132 is installed upon the stakes 130 with the first part (not shown) of a key deformation portion thereof biased toward the second part (not shown) of the key deformation portion rather than being biased away from said second part as is the case with the sheet member 118 as shown in FIG. 8.

In FIGS. 11 and 12 is shown yet another embodiment of a concrete form 136 constructed in accordance with the subject invention. The concrete form 136 comprises a plurality of vertically aligned stakes 138 (only one of which is shown) at least a pair of which is formed with transversely disposed tabs 140. The sheet member 142 has upper and lower longitudinally extending, generally planar portions 144 and 146 and a longitudinally extending key deformation portion (not shown) disposed intermediate said upper and lower planar portions 144 and 146. The upper planar portion 144 includes a folded-over portion 148 which is disposed against at least a part of the upper planar portion 144. The sheet member 142 has vertically spaced apart means 150 and 152 engaging, respectively, the top 154 of the stake and the tab 140. The means 150 includes a plurality of boss portions extending outwardly from one surface of the planar portion 144 and forming an inverted ledge means, each boss portion including an arcuately shaped lower surface which upon installation securely engages the top of the stake frictionally thereby resisting inadvertent disengagement. The vertical distance separating the vertically spaced apart means 150 and 152 of said member 142 is, prior to installation of said member 142 upon the stakes 138, slightly smaller than the vertical distance separating the top 154 of the stake and the tab 152. Thus, it will be apparent that a part of the key deformation portion (not shown) must be urged or biased away from another part of such key deformation portion in order to install said member 142 upon the stakes 138. Consequently, the tabs 152 and the tops 154 of the stakes 138 cooperate, respectively, with the means 150 and 152 of the member 142 to prevent vertical movement of the member 142 relative to the stakes 138 thereby maintaining the upper edge of the member 142 along a predetermined grade level.

6

Referring now to FIGS. 1-3, the installation of the concrete form 10 as shown in FIG. 1 is now described. After the sub-grade or sub-base 134 has been formed and suitable side forming (not shown) has been installed, a string or line (not shown) is extended from one side of the sub-base 134 to the other side thereof at a predetermined grade level, preferably, the grade level represented by the top of the stake 16. Next, a section or sections of joint forming members 18 are laid adjacent the line established by said string. The purpose for this is to facilitate the spacing of the stakes along the line established by such string, i.e., to insure that the horizontal spacing of the stakes and the apertures 38 coincide approximately. However, it will be appreciated that such horizontal spacing may be determined in any of several ways since the spacing between the means 38 of sheet member 18 will admit some variation in installation thereby precluding an exact, precise spacing of the stakes. For example, where a two-foot spacing is desired or required, the length of the means 38 is made sufficiently long to permit center to center spacing between the means 38 to vary up to approximately 4 to 5 inches. After the sheet member or members 18, depending on the width of the concrete slabs, are positioned upon the subgrade 128 as described, the stakes 16 are installed in a vertical position along the line established by the string at the desired spacing interval. Each stake 16 is driven into the sub-grade 128 until the top thereof coincides with the level of the string. Next, each sheet member 18 is mounted upon the stakes 16 by positioning the lower edge thereof in supporting engagement upon the tabs 24 of the stakes 16. The person installing the member 18 then grips the handles 46 and exerts a downward force upon the first part 32 of the key deformation portion 30 of the sheet member 18 until the lower surface of the aperture 38 passes beneath the lower edge of the upper tab 22. The person then urges the lower surface of the aperture 38 against the adjacent surface of the stake 16 until same is securely positioned under the lower surface of the upper tab 22.

Referring now to the concrete form 50 shown in FIG. 4, the stakes 52 are mounted similarly as described above in connection with the stakes 16. Next, the second part 68 of the key deformation portion 70 is positioned adjacent one side of the stakes 52 with the lower support means 56 disposed within the apertures 64. The person installing the sheet member 68 then urges the first part 66 of the key deformation portion 70 away from the second part 70 until the upper surface of the apertures 62 clear and pass over the upper surface of the upper tab 54. The person then urges the upper part of sheet member 60 toward the adjacent surface of the stakes 52 until the sheet member 60 is securely mounted upon said stakes 52. It will be noted that the first part 66 is biased outwardly or away from the second part 70 of the sheet member 60 in installation thereof whereas the first part 32 of the sheet member 18 is biased toward the second part 34 during installation thereof. Due to the fact that it is normally easier to pull an installed stake upwardly than drive same downwardly and since it is desirable that the vertical position of the stakes remain unchanged following installation thereof in the sub-grade, it is preferred that the first part be biased toward the second part rather than away from said second part.

Installation of the concrete form 74 shown in FIG. 5 is similar to installation of the concrete form 50 and, accordingly, further discussion thereof is not deemed warranted except merely to state that it is not necessary to space the stakes 76 horizontally as accurately as is normally required for the stakes used in the concrete forms shown in FIGS. 1 and 4 above.

The sheet members 100 and 112 shown in FIGS. 6 and 7 may be mounted in one of two ways depending upon the length of the arm or portion 130 forming a part of the inverted U-shaped socket. Where the length of the arm 130 is relatively short, the lower portion of

7

each of the sheet is first installed with the tabs **98** extending through the apertures **108**. Then, the key deformation portion of each sheet member is spread sufficiently, often with the aid of the knee of the person installing same, to permit the free end of the portion **130** to pass over the top of the stake **102**. In this connection, it will be appreciated that the arm **130** itself may be flexed to facilitate the installation of each sheet member upon the stakes. Where the arm **130** is relatively long, the inverted U-shaped socket is first installed over the top of each of the stakes and then the key deformation portion is spread sufficiently to permit the lower surface of the aperture **108** to slide over the lower surface of the tab **98**. It will be understood that the sheet members **100** and **112** of the concrete forms **94** and **110** will be supported upon the stakes even though the portion or arm **130** is entirely omitted from the respective sheet members.

The description furnished above in connection with FIGS. 8 and 9 coupled with the description of the installation of the other concrete forms shown in FIGS. 1-7 should render obvious the method and manner of installing the sheet member **118** of the concrete form **114** shown in FIG. 8 and the sheet member **142** of the concrete **136** shown in FIGS. 11 and 12.

Although several embodiments of the herein invention have been shown and described, at the present time the concrete form **10** shown in FIGS. 1 and 2 is the preferred concrete form of this invention while the concrete form **74** shown in FIG. 5 is the next preferred form.

In view of the foregoing, it will now be readily apparent that a vastly improved concrete form has been described. For example, it will be readily appreciated that a concrete form has been described which may be quickly and easily installed in the field by a single individual and that same may be used for monolithically poured concrete slabs without resort to "checker board" pouring. Further, concrete forms constructed in accordance with the subject invention may be used for a wide variety of applications and slab depths. Additionally, concrete forms constructed in accordance with the subject invention eliminate the problem heretofore encountered in the field of preventing the sheet member from moving vertically upwardly relative to the stakes without the time and expense involved in fastening the lower portion of such sheet member to the stake by conventional fastening means.

It is to be understood that this invention is not limited to the exact embodiments of the concrete forms shown, which are merely by way of illustration and not limitation, as various other forms and modifications will be apparent to those skilled in the art. For example, the longitudinally extending rib **104** formed along the upper part of the sheet member **100** of FIG. 6, said rib including a folded-over portion, may be disposed above the middle of the top of the stake **96** as well as adjacent one side thereof and, thus, the aforescribed construction is contemplated by and included within the concept of using a folded-over portion adjacent the upper portion of the sheet member. Therefore, it is intended that the appended claims cover all such changes and modifications.

I claim:

1. A concrete form of the type used in forming a key contraction joint between adjacent concrete slabs, said joint comprising: a plurality of aligned stakes, each of said stakes having a generally vertically disposed body portion and at least a pair of said stakes having vertically spaced apart support means disposed generally transversely to said body portion; and an elongated, relatively rigid sheet member having upper and lower longitudinally extending, generally planar portions and a longitudinally extending, key deformation portion disposed intermediate said upper and lower planar portions, said key deformation portion having first and second parts, said upper planar portion including a folded-over portion which is disposed against at least a part of the upper portion there-

8

of, said member having vertically spaced apart means engaging the support means of said stakes, at least some of said spaced apart means including means formed in one of said planar portions for receiving therein at least some of said support means of said stakes, the vertical distance separating the vertically spaced apart means of said member, prior to mounting said member upon said stakes, being slightly different from the vertical distance separating the support means of said stakes whereby said first part of said key deformation portion is biasedly mounted relative to said second part and said means of said member for engaging the support means of said stakes and the support means of said stakes cooperate to prevent vertical movement of said member relative to said stakes whereby the upper edge of said folded-over portion is maintained along a predetermined grade level.

2. A concrete form of the type described in claim 1 in which said member also includes handle means formed thereon.

3. A concrete form of the type used in forming a key contraction joint between adjacent concrete slabs, said joint comprising: a plurality of aligned stakes, each of said stakes having a generally vertically disposed body portion and at least a pair of said stakes having vertically spaced apart support means disposed generally transversely to said body portion; and an elongated relatively rigid sheet member having an upper, longitudinally extending, generally planar portion and a longitudinally extending key deformation portion depending from said upper planar portion, said key deformation portion having first and second parts, said member having vertically spaced apart means engaging the support means of said stakes, the vertical distance separating the vertically spaced apart means of said member, prior to installation of said member upon said stakes, being slightly different from the vertical distance separating the support means of said stakes whereby said first part is biased toward or away from said second part and said means of said member and the support means of said stakes cooperate to prevent vertical movement of said member relative to said stakes.

4. A concrete form of the type described in claim 3 in which said member also includes a lower, longitudinally extending, generally planar portion, said lower planar portion depending generally from the lower part of said key deformation portion and disposed generally coplanarly with said upper planar portion.

5. A concrete form of the type described in claim 4 in which one of said transversely disposed support means of said stakes comprises the top of said stakes.

6. A concrete form of the type described in claim 4 in which said upper planar portion includes a fold-over portion which is disposed against at least a part of the upper portion thereof, the upper edge of said folded-over portion being disposed along a predetermined grade level.

7. A concrete form of the type described in claim 4 in which the support means of said stakes comprises a pair of tabs one of which is convergently disposed with respect to the other in a direction proceeding toward the body portion of said stakes.

8. A concrete form of the type described in claim 4 in which the support means of said stakes includes a pair of tabs one of which is divergently disposed with respect to the other in a direction proceeding toward the body portion of said stakes.

9. A concrete form of the type described in claim 4 in which said member includes handle means formed thereon.

10. A concrete form of the type described in claim 4 in which said vertically spaced apart means of said member includes apertures formed adjacent the upper and lower portions of said key deformation portion.

11. A concrete form of the type described in claim 4 in which said vertically spaced apart means of said member includes apertures formed in the upper and lower planar portions thereof.

9

12. A concrete form of the type described in claim 4 in which said vertically spaced apart means includes a pair of longitudinally extending recesses.

13. A concrete form of the type described in claim 4 in which one of the spaced apart means of said sheet member includes inverted ledge means formed extending generally transversely to the upper planar portion and one of the spaced apart support means of said stakes includes the top of said stakes.

14. A concrete form of the type described in claim 13 in which the lower planar portion includes a folded over portion which is disposed against at least a part of the lower portion thereof, and in which the other spaced apart means of said sheet member includes a longitudinal-

10

ly extending recess formed in said lower planar portion and the upper edge of said folded over portion.

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15