Nov. 21, 1939. W. G. WINDING 2,180,842

FORM FOR CONCRETE CURB AND GUTTER WORK

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Fig. 1.

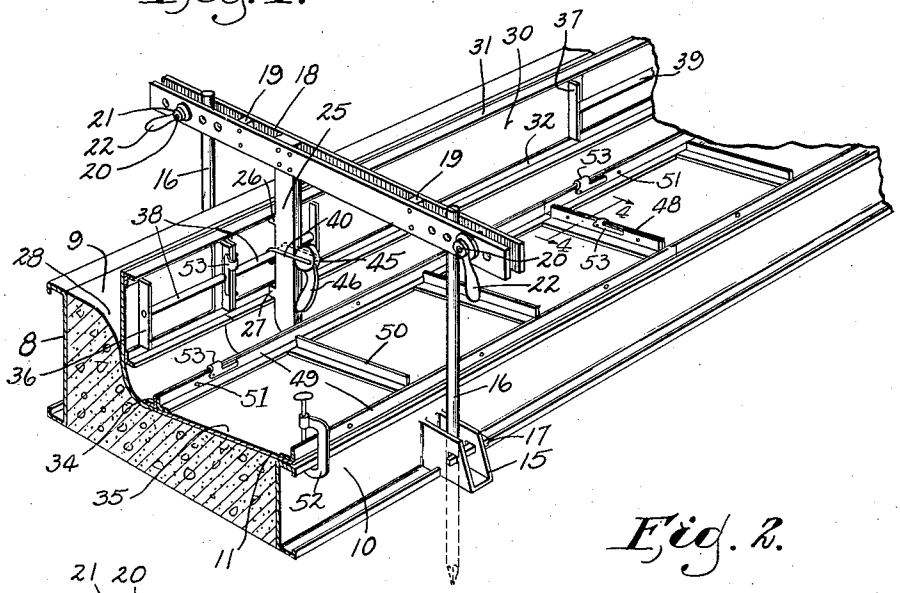
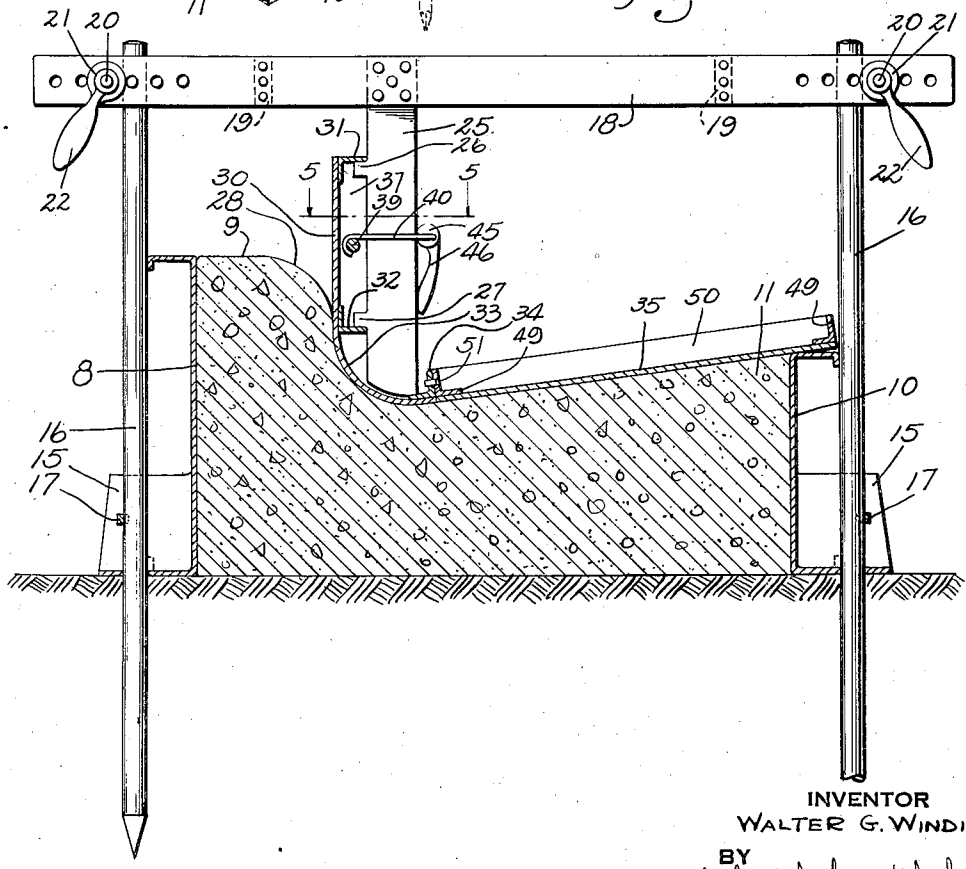


Fig. 2.



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Fig. 6.

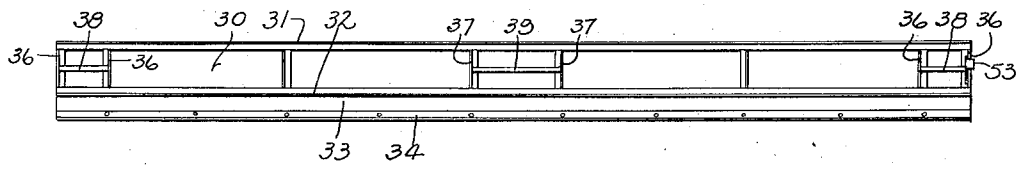


Fig. 7.

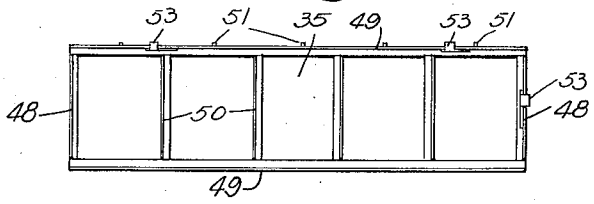


Fig. 4.

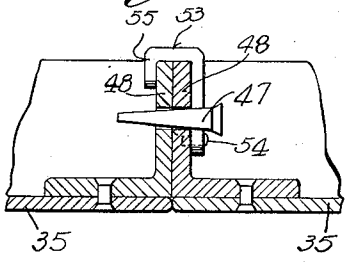
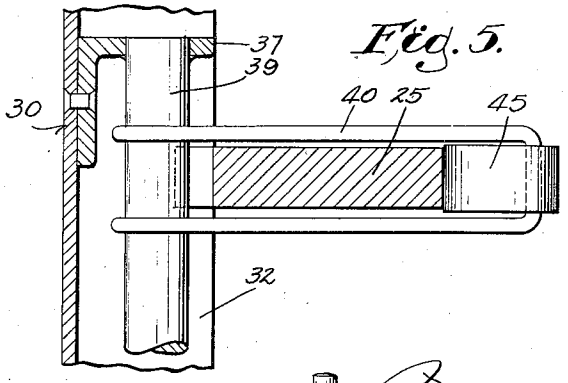


Fig. 5.



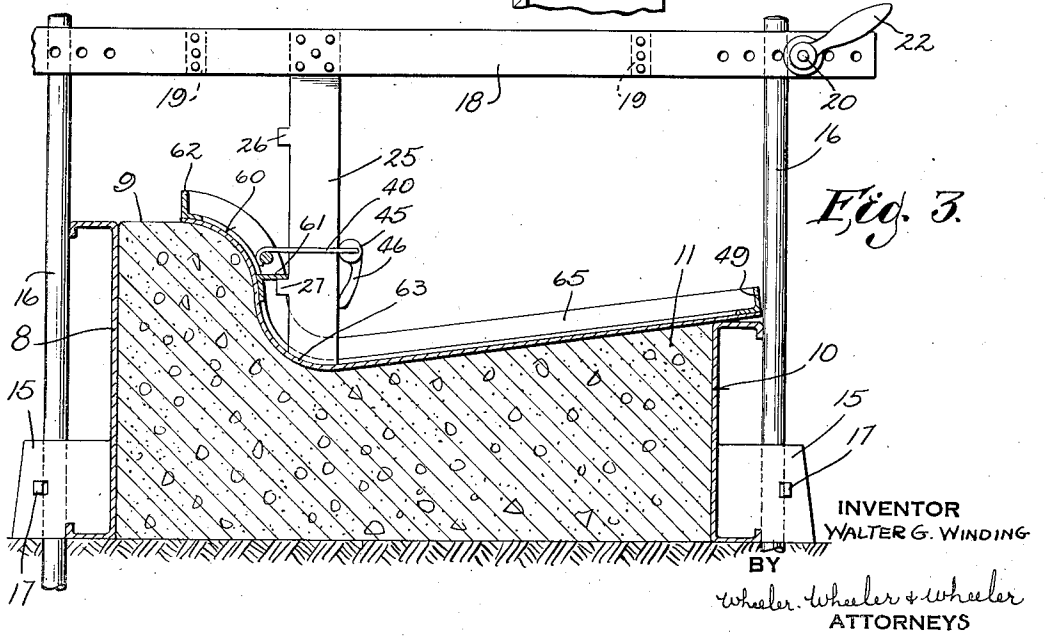


Fig. 3.

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FORM FOR CONCRETE CURB AND GUTTER WORK

Walter G. Winding, Milwaukee, Wis.

Application October 25, 1937, Serial No. 170,863

10 Claims. (Cl. 25—118)

This invention relates to improvements in forms for concrete curb and gutter work.

It is the primary object of the invention to provide an improved form structure capable of producing perfectly aligned and uniform curbs in indefinite lengths without joints.

The integral construction of a curb and gutter has offered considerable difficulty in the past due to the different levels and angles of surfaces required. The forms used have commonly included dividing plates about six feet apart, but it is now regarded as undesirable to have expansion joints in the curb at less than thirty feet. The requirements as to alignment and uniformity have become increasingly rigid. Consequently the methods formerly used are no longer available.

More specifically, it is the purpose of the present invention to provide means easily set and easily aligned and easily demountable, by which all the forms necessary for the construction of a variety of curbs and gutters can be assembled to any desired length to produce a smooth, accurately aligned and continuous integral curb and gutter requiring little or no hand finishing and readily adapted to the use of a vibrator by means of which the amount of form material required can be reduced to a minimum.

Other objects will appear from the following disclosure.

In the drawings:

Figure 1 is a view in perspective of a section of assembled form in which a conventional type of integral curb and gutter has been fastened.

Figure 2 is a view on an enlarged scale in transverse section through the form, the concrete and the gutter.

Figure 3 is a view similar to Fig. 2 showing a modified embodiment of the invention.

Figure 4 is an enlarged detail view taken in section on the line 4—4 of Figure 1.

Figure 5 is an enlarged detail view taken in section on the line 5—5 of Figure 2.

Figure 6 is a detail view on the scale of Figure 1 showing in front elevation a length of the curb molding form.

Figure 7 is a view showing in plan a length of the gutter molding form.

Like parts are identified by the same reference characters throughout the several views.

The rear of my improved form comprises a channel 8 which stands on edge as shown in Figs. 1, 2 and 3 to extend to the top of the finished curb 9.

The front of my improved form comprises a similar channel 10 likewise standing on edge as shown in Figs. 1, 2 and 3 to extend to the upper surface of the inner margin of the desired gutter 11.

Both of the channels 8 and 10 are provided at intervals with anchorage arms 15 extending in pairs at right angles to the inner face of the channel web. The anchorage arms 15 may conveniently comprise the flanges of a short length of channel of deep section as best shown in Fig. 1. The forms 8 and 10 are preferably provided in corresponding length with the arms 15 in corresponding locations thereon to receive the front and rear stakes 16 which extend between elements 15 and are driven into the earth in carefully aligned rows. The arms 15 are preferably apertured to receive the tapered wedges 17 by means of which each of the channel forms 8 and 10 is drawn rigidly to the anchorage stake 16, the upper flanges of the anchorage channels 8 and 10 being held tightly to the stakes.

Spanning the gap between the stakes comprising each pair is a bridge member 18 which may conveniently comprise a pair of arm straps held apart by spacers at 19 beyond which the ends of the straps are free to be sprung toward each other into clamping engagement with the tops of the respective stakes 16. Corresponding apertures near the ends of the straps adjustably receive clamping devices comprising the bolts 20 and the nuts 21, each nut having an operating handle attached as shown at 22. The clamping devices will be adjusted to holes corresponding in spacing to the spacing between the stakes 16 so that the tightening of the nuts 21 by means of the hand levers 22 will not merely clamp the props or stakes 16 between the ends of the straps comprising the bridge member 18, but also enable the clamping devices to positively prevent either stake from tilting outwardly with reference to the other. Thus the form channels 8 and 10 are positively secured against relative displacement under pressure of the contained cement mix.

The forms for shaping the concrete surface at which the gutter joins the curb are suspended from the bridge member 18.

Each bridge member 18 carries an upright suspension bar 25 with lugs projecting from its margin at two different levels as shown at 26 and 27 in Figs. 1, 2 and 3. These lugs, or either of them, are used to support the desired form structure, it being understood that this will vary according to the requirements of the work.

In the construction shown in Figs. 1 and 2 it is intended that the curb 9 be provided with a front surface 28 finished by hand with an edging

tool. Accordingly the form board 30 is extended straight upwardly and provided at its top margin with a flange 31 engageable over lug 26 to receive support therefrom. At a lower level form board 30 carries another flange 32 which is engaged beneath lug 27. Thus co-action of flanges 31 and 32 with lugs 26 and 27 prevents any displacement of form board 30 in either vertical direction with respect to the supporting bar 25.

Below flange 32 the form board 30 has a curvilinear portion at 33 which defines the shape of the concave surface joining the curb with the integral gutter. At its margin the form board has another flange 34 which not only stiffens the edge but provides a means by which form board 30 is connected to form board 35, the latter comprising a means for shaping the top surface of the gutter as hereinafter to be described. All of the several flanges 31, 32 and 34 may conveniently be provided by riveting or welding angular strips to the face of the sheet metal form board 30.

At intervals along the length of the form board 30, and preferably adjacent each end and at the middle thereof, I provide upright flanges 36 and 37 joined by rods 38 and 39. U-shaped tension members 40 extend around each of the supporting bars 25 and are hooked at their ends to be engaged over the rods 38 and 39, as clearly shown in Figs. 1, 2 and 3 and illustrated in detail in Fig. 5. The central part of each of the U-shaped tension elements 40 carries a cam 45 having a handle 46 for its manipulation, the arrangement being such that when the cam is turned to present its longest eccentric radius to the supporting bar 25, the margins of the flanges 31 and 32 will be drawn into tight engagement with the edge of the supporting bar.

Where the ends of two consecutive form boards 30 abut, either or both may be supported in the manner above described. If only one is supported the other may be connected in registry therewith by means of the pins or keys used at various parts of the device and illustrated in detail in Fig. 4 at 47, as hereinafter described.

The form element 35 comprises an elongated shallow pan made by applying the reinforcing angles 48 and 49 to the margins of a piece of sheet steel with transverse reinforcing angles at 50 where needed. The marginal flange of angle 49 lying nearest the angle 34 may conveniently be held thereto by a series of dowel pins 51 projecting rearwardly from angle 49 (Fig. 7) and receivable into correspondingly spaced apertures in the angle 34 of form element 30 (Fig. 6). Each of the flat pan-shaped form elements 35 may simply be detachably interlocked in its proper position respecting form element 30 by pushing the dowel pins into place. The reverse movement will release form 35.

Interlocking engagement between contiguous ends of successive form elements 35 is achieved conveniently by means of the taper pins 47 releasably driven through registering apertures in the adjacent flanges 48. The pins merely hold the forms in horizontal registry without securing them against longitudinal displacement. To perform this latter function the flange of an angle 48 at one end of each of the form elements 35 is provided with a locking clip 53 pivoted thereto upon a rivet or other fulcrum means at 54 (Fig. 4) and having an overhanging ear at 55 engageable with the adjacent flange when the clip is pivoted into locking position. Similar locking clips 53 are used to secure together the ends of form elements 30 (Figs. 1 and 6) and they may also be used to prevent the dowel pins 51 from becoming withdrawn by connecting flanges 34 and 49 as shown in Fig. 1.

One edge of the form 35 rests on the top of the inner channel 10 and may conveniently be held thereto at any desired intervals by means of a simple C-clamp 52 as shown in Fig. 1.

Where the surface 28 of the curb is not to be finished by hand, I may dispense with the upright portion of the form 30 and substitute a form of the shape shown in Fig. 3 at 60. In this case the supporting lug 26 on bar 25 is not used. The flange 61 on the form plate 60 rests on lug 27. The flange 62 performs no supporting function but is used merely for stiffening. In either instance it is possible for the form plate 60 to be continuous along the curve at 63 clear to the inner side of the concrete work, thereby replacing the form 35 as well as the form 30 shown in Figs. 1 and 2. In the event that the construction shown in Fig. 3 is adopted, the angles 49 will correspond to those already discussed, and the angles 65 will be substituted for those shown at 50 in Figs. 1, 2 and 7, being curved to correspond to the curvature of the form sheet in passing about the curves at 63 and at the upper face of the curb.

It is, obviously, possible to use wooden parts as substitutes for the metal parts shown. The use of metal, however, makes the construction more adaptable and better suited to standardized production, and it is therefore somewhat to be preferred.

In any case it is preferred to use vibration in positioning the packing and insuring the speedy set of the cement mix introduced into the form. A long narrow funnel may be used to introduce the mix through the relatively narrow slot left in the Fig. 3 construction between the back form 8 and the flange 62 of the top form 60. In the construction shown in Figs. 1 and 2 no funnel is necessary, but obviously one may be used if desired. In either event the top form 35 or 60 may be completely assembled on the other forms before the cement mix is introduced. When the vibrator is inserted it will speedily distribute the cement mix to fill any voids beneath the top form and additional cement mix may be introduced as desired. The use of the vibrator compacts the mix and brings it into intimate contact with the top form to give a perfectly finished surface requiring no hand work at any point where the mix is shaped by the form.

With the construction illustrated, the form units may be assembled to any desired length without any gaps of any kind except where expansion joints are desired. The form is entirely assembled from the stakes 16 which are outside of the course of the work and hence do not penetrate the work at any point. If the stakes are carefully aligned, the completed job will necessarily be in perfect alignment from end to end. Where a vibrator is used, the cement will set with such rapidity as to enable the forms to be moved very shortly after being used. Thus a comparatively small number of forms will serve the purposes of a continuous job of any desired length.

I claim:

1. In a device of the character described, the combination with a pair of spaced anchorage stakes, of side forms positioned within the respective stakes, a bridge member removably connecting said stakes above said side forms, and a top form extending from one of said side forms across at least a part of the space intervening be-

tween said side forms, and means suspending a portion of the top form from said bridge member.

2. In a device of the character described, the combination with a pair of spaced anchorage stakes, of side forms within the respective stakes, means for drawing each side form into rigid connection with its adjacent stake, a bridge member removably connecting the stakes above the side forms, a suspension device hanging from the bridge member between the stakes, a top form extending from one of said side forms beneath said suspension member and thence upwardly along said suspension member, and means connecting the top form with the suspension member to receive support and position therefrom.

3. In a device of the character described, the combination with a pair of spaced stakes, of a form structure therebetween and a bridge member provided with means connecting it with a portion of said form structure for the support thereof, said bridge member comprising two spaced elements having relatively yieldable portions, and clamping means for drawing said portions together upon at least one of said stakes.

4. In a device of the character described, the combination with side forms and side stakes therefor, of a form support comprising a pair of straps, means including a suspension member for spacing the intermediate portions of the straps, their respective ends being free to yield with respect to each other and being engaged with the respective stakes, and clamping means extending across the space between the yieldable end portions of the respective straps and including mechanism for drawing said end portions toward each other into clamping engagement with the stake engaged therebetween, together with a form element carried by said member.

5. In a device of the character described, a form structure for the integral casting of monolithic curb and gutters, said form structure comprising spaced front and rear side forms and a top form extending continuously from said front-side form inwardly at a downward angle toward the rear form and thence extending in a curve in an upright direction in open spaced relation to said rear form.

6. In a device of the character described, a form structure for the integral casting of monolithic curb and gutters, said form structure comprising spaced front and rear side forms and a top form connected wtih one of said side forms and extending inwardly at a downward angle toward the other and thence extending in a curve in an upright direction in spaced relation to said other form, together with a supporting and anchorage structure comprising stakes embracing said front and rear side forms, a bridge member connecting said stakes, and a support connected with the bridge member and provided with means engaging the upwardly extending portion of the top form for the support and positioning thereof.

7. In a device of the character described, the combination with a bridge member and spaced supporting means therefor, of a suspension bar depending from said bridge member and provided with at least one lug projecting toward one of said supports, side forms adjacent the respective supports, and a top form provided with means engaging said lug, said top form being extended from said bar to one of said side forms, and means holding said top form to said bar against the disengagement of said top form from said lug.

8. In a device of the character described, the combination with a bridge member and means for the support thereof, of a bar depending from said bridge member and provided with a shoulder, a top form having shoulder means in interlocking engagement with said bar shoulder for the support of a portion of said top form therefrom, and separate means for detachably connecting said top form with said bar to maintain said shoulders in interlocking engagement against release.

9. In a form structure of the character described, the combination with means providing front and rear side forms, of a top form comprising a continuous closure upon the front side form and extending thence at a downward inclination toward the rear side form to a point between said side forms, then in a concave curve upwardly, and finally in a convex curve toward the rear side form and terminating closely adjacent thereto, anchorage means for fixing the positions of the side forms, a bridge member supported on said anchorage means, and a suspension device carried by the bridge member and connected with the top form for the support and positioning thereof.

10. In a device of the character described, the combination with side forms provided with means on their respective outside portions for stake engagement, of stakes engaged by said means and projecting below said forms to receive support directly from the earth and thereby to confine and position said forms, bridge means connecting said stakes, and a third form suspended on said bridge means between said side forms and in spaced relation to at least one thereof.

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