Sept. 7, 1954 E. E. HOGAN 2,688,174

APPARATUS FOR MOLDING CONCRETE CURBS

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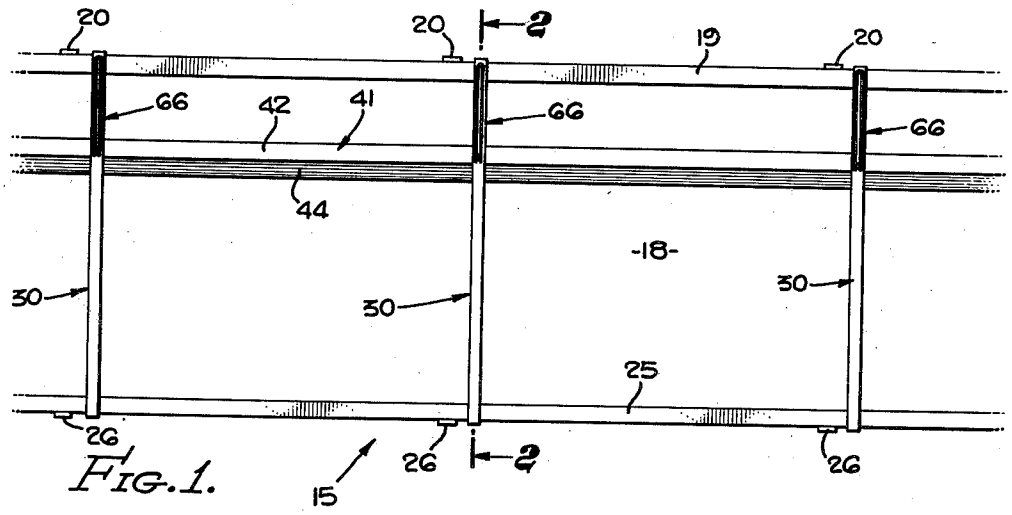
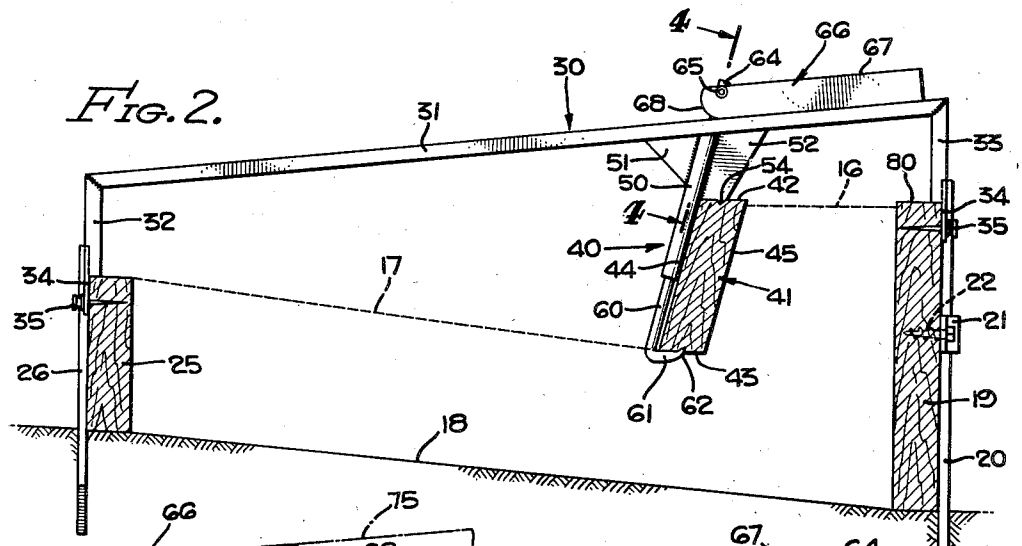


FIG. 1.

FIG. 2.



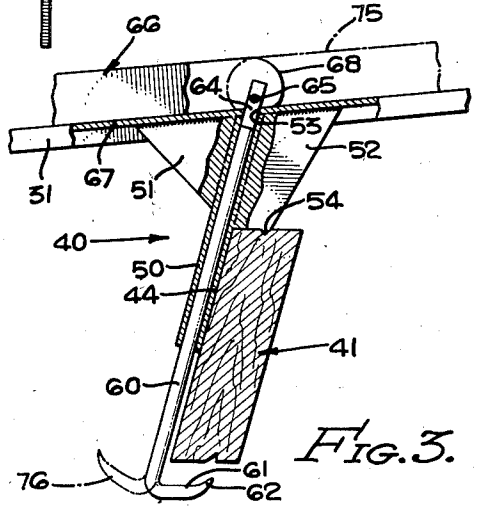


FIG. 3.

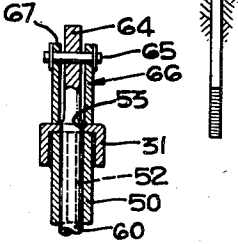


FIG. 4.

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APPARATUS FOR MOLDING CONCRETE CURBS

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Application September 5, 1950, Serial No. 183,171

5 Claims. (Cl. 25—118)

1

This invention relates to concrete construction forms and particularly to a form adapted to be set up and dismantled repeatedly in the casting of unitary concrete curbs and gutters bordering a street or highway.

It is an object of this invention to provide such a form which may be assembled rapidly with relatively unskilled labor to constitute an accurate mold for a concrete curb and gutter.

In a co-pending application, Serial No. 183,172, filed herewith I disclose a method and apparatus for continuously finishing concrete curbs by which curbs may be finished at a small fraction of the cost previously necessary. That method is applicable before the rough concrete, with which the body of the curb and gutter are cast, has fully set and it is capable of such a high rate of production, in comparison with the fastest method hitherto available for finishing concrete curbs, that the speeding up of the production of the rough curb and gutter and then exposing the face of the curb for finishing as soon as the curb has set sufficiently to permit this, becomes highly desirable.

It is, therefore, another object of this invention to provide a form for molding a unitary concrete curb and gutter which will provide the necessary supporting surfaces to give the required shape thereto but which can be partially dismantled rapidly without unduly disturbing the green cement, and so as to expose the front face and the top of the curb for finishing this while continuing to support the back of the curb and the front of the gutter thereby enabling the green cement in the curb and gutter to hold together during the finishing of the curb.

Curb and gutter molds are made up of a back board, a face board and a gutter board. These must be accurately and rigidly held in proper relation in order to properly form the curb and gutter.

It is a yet further object of this invention to provide a spacer for the back board and gutter board which is mounted upon and supported by said boards and which embodies means for engaging and supporting the face board in the proper relation it must have with the back board and the gutter board.

Still another object of the invention is to provide such a spacer which can be detached from the three boards of the form without unduly disturbing the green concrete, whereby the face board may be lifted from the rough curb while the latter is still quite green, leaving the curb unencumbered on the top and front face thereof

2

and thus accessible for finishing by said continuous method.

The manner of accomplishing the foregoing objects as well as further objects and advantages will be made manifest in the following description taken in connection with the accompanying drawings in which

Fig. 1 is a diagrammatic plan view of a series of spacer clamps of the present invention as these appear when applied to a gutter board, back board and face board in order to assemble these boards in a curb-and-gutter mold.

Fig. 2 is an enlarged cross sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is an enlarged view of the face board clamp shown in Fig. 2 with portions of this broken away to illustrate details of the structure.

Fig. 4 is an enlarged sectional view taken on the line 4—4 of Fig. 2 and illustrates details of the structure of the clamp actuating arm.

Referring specifically to the drawings, the invention is there shown as embodied in a timber form 15 which is provided and set up for the purpose of molding a unitary curb 16 and gutter 17 on a tamped and graded earthen surface 18 underlying the same. Form 15 includes a back board 19 which is set up vertically on the earthen surface 18 and rigidly held in proper position by steel stakes 20 which are driven into the earth and secured to the board 19 in any desired manner as by clamps 21 applied to the board 19 by screws 22.

The form also includes a gutter board 25 which is located vertically on the earthen surface 18 and retained in its proper position by steel stakes 26 driven into the earth while disposed flat against the outer face of the gutter board 25.

At suitable intervals along the form 15, spacers 30 are provided which overlie the back board 19 and gutter board 25 and are secured to these boards so as to be supported on the latter and at the same time hold these in proper spaced relation. The spacers 30 are preferably formed of metal to include a relatively stiff member 31 formed with an inverted channel cross section, the member 31 lying, when in use, at a slight inclination from horizontal as shown in Fig. 2 and having vertical legs 32 and 33 exdending downwardly from its opposite ends, these legs resting respectively on top of the gutter board 25 and the back board 19 and having apertured tongues 34 which lay flat against the outer faces of said boards, and are secured to said boards by doubleheaded nails 35. It is to be noted that a rectangular recess is thus provided

between the lower ends of each of the legs 32 and 33 and the tongues 34 extending downwardly therefrom into which the upper outer corners of the form boards 19 and 25 may be placed to properly space these boards for producing the timber form 15.

Provided on the spacer member 31 and extending downwardly therefrom is a jig 40 for engaging and gripping and properly supporting a face board 41 on the spacers 30. It is to be noted (Fig. 2) that the upper and lower faces 42 and 43 on face board 41 are out of perpendicular with the side faces 44 and 45 thereof so that the upper and lower faces 42 and 43 are disposed horizontally when the form 15 is made up for the casting of a curb 16 and gutter 17.

The jig 40 includes a tubular bearing 50 and gussets 51 and 52 which are welded to said bearing and to the member 31 as shown in Figs. 2, 3, and 4, there being a hole 53 in the member 31 of the same diameter as and aligned with the bore of the tubular bearing 50.

Gusset 52 comprises a jaw having a tooth 54 for engaging and biting into the upper edge 42 of the curb face board 41 as shown in Fig. 2.

The tubular bearing 50 provides a jig surface for engaging the outer surface 44 of the face board 41 as shown in Fig. 2 to determine the proper vertical alignment of the board 41 and its horizontal spacing from the board 19.

Shiftably and rotatably mounted in the tubular bearing 50 is a rod 60 carrying on the lower end thereof a lower jig jaw 61 which is adapted to be brought into clamping engagement with the lower edge 43 of the face board 41 and has a tooth 62 which penetrates said edge 43 when said board is clamped between the jaw 61 and the gusset jaw 52.

The upper end 64 of the rod 60 extends upwardly through the hole 53 in the member 31 and is slightly flattened to receive a pivot pin 65 which pivotally unites this rod with a narrow U-shaped cam lever 66 near one end and one side 67 of said lever. Formed on the bifurcated ends of said lever is a pair of cam faces 68. Thus, when said lever 66 is turned with the edge 67 thereof downwardly, as shown in full lines in Fig. 3, the jaw 61 is lowered away from the lower face of a curb face board 41 disposed between said jaw and the gusset jaw 52. When the lever 66 is then swung about the axis of the rod 60 while the edge 67 of the lever 66 is disposed downwardly as shown in Fig. 3 thereby bringing the lever 66 into its broken line position 75 shown in this view, this will swing the jaw 61 into its broken line position 76 shown in Fig. 3 which, in substance, shifts this jaw out from under the face board 41 of the form 15.

On the other hand, when the cam lever 66 is swung to the left as shown in full lines in Fig. 3, bringing the jaw 61 under the face board 41, and the lever 66 then rotated about pivot pin 65 into the position in which it is shown in Fig. 2, the jaw 61 is lifted against the bottom edge 43 of the board 41 so as to cause this jaw to tightly compress the board 41 between it and the gusset jaw 52 to cause the teeth on these jaws to penetrate this board and securely hold it in place. When assembling the form 15, the face board 41 is first placed with its outer face 44 against the tubular bearings 50 of the spacers 30 and the jigs 40 are then actuated to clamp the face board in these jigs.

With the form 15 thus set up, it is ready for the casting of the curb 16 and gutter 17, which is done by pouring rough concrete in the form to fill this up to the broken line in Fig. 2 indicating the desired upper surface of the curb 16 and the gutter 17. It is to be noted that the upper surface of the curb 16 is located slightly below the upper edge 80 of the back board 19. This results from tamping or puddling the concrete between boards 19 and 41 and is left this way for the purpose of providing room below the level of the edge 80 for applying fine finishing grout to the top of the curb 16 in the continuous curb finishing method disclosed in my co-pending application aforementioned.

After the form 15 of my invention has been set up as above described and the curb 16 and gutter 17 are cast therein from coarse concrete, these are allowed to set for an hour or two, whereupon, while the concrete is still green, the spacers 30 are removed from the form 15 in the folowing manner. The doubleheaded nails 35 are withdrawn gently by a claw hammer or wrecking bar and the cam levers 66 are swung 180 degrees on their pivots 65, then rotated a similar angle about the axes of the rods 60. As above described, this lowers the jaws 61 downwardly out of contact with the board 41 and shifts these jaws outwardly from under said board thereby permitting the spacers 30 and the jigs 40 embodied therewith to be lifted upward and removed from the form 15.

The rotation of the jaws 61 to shift these out from under the board 41 disturbs the concrete directly adjacent to these jaws but in view of the fact that this concrete is still quite green and not fully set, the concrete readily yields out of the way of the jaws 61, permitting the rotation of these out from under the face board 41.

The back board 19 and gutter board 25 of the form 15 are allowed to remain in place during the curb finishing operation but before this can be started the face board 41, which is now entirely free from the form, is tapped lightly to break the adherence between this and the green concrete of the curb 16 and is lifted out of the way, thereby clearing the top edge 80 of the back board 19 and the top and front face of the curb 16 for the performance of the aforesaid method in finishing the top and the front face of the curb 16.

After the finishing of the curb 16, the curb and gutter 17 are allowed to set until adequately hardened for the removal of the back board 19 and gutter board 25, whereupon these boards are tapped to break the adhesion between these and the concrete, the clamps 21 are relaxed, the stakes 20 and 26 are pulled up and all of the various elements assembled in making up the form 15 are removed to be assembled at a new station in forming another section of the curb 16 and gutter 17, or else these forms are returned to storage.

While I have shown and described but a single embodiment of the invention, this was for illustrative purposes only and it is to be understood that various changes may be made in the embodiment disclosed without departing from the spirit of the invention or the scope of the appended claims.

The claims are:

1. A form spacer-clamp for correctly relating a timber face board with a timber gutter board and a timber back board of a timber mold for casting a unitary curb and gutter, said spacer-clamp comprising: a rigid board-spacer having downwardly extending legs at its opposite ends,

lower ends of which legs are shaped to fit adjacent angle faces of upper edges of said gutter board and back board to support said spacer on said edges and gauge the spacing of said boards; an upper jaw fixed on said spacer and extending downwardly therefrom; a tubular guide provided on said spacer adjacent said jaw and extending therebelow at a fixed inclination relative to said spacer and on the opposite side of said fixed jaw from the back board end of said spacer; a rod slidable in said guide; a jaw formed on the lower end of said rod and movable therewith, said rod extending upwardly through said guide and above the upper face of said spacer; and a cam handle pivotally connected near one end thereof with the upwardly extending end of said rod on an axis closer to one longitudinal edge of said handle than to the opposite edge thereof, there being a cam face formed on the end of said handle adjacent said axis, said cam face operating when said handle is rotated 180° vertically in one direction to lower said lower jaw to provide room between said jaws to receive said face board with the latter engaging and guided by said tubular guide, rotation of said handle 180° vertically in the opposite direction operating to lift said lower jaw to clamp and retain said face board as so positioned.

2. A combination as in claim 1 in which said cam handle, when located in a position placing said lower jaw in its lowered position and with said lower jaw disposed opposite said upper jaw, may be swung horizontally to rotate said rod and thus swing said lower jaw out of opposition to said upper jaw.

3. A form spacer-clamp for correctly relating a face board, gutter board, and back board in assembling said boards to form a mold for a unitary curb-and-gutter, said spacer-clamp comprising, a rigid board spacer, support means on opposite ends of said spacer which rest respectively upon upper edges of said gutter board and back board whereby said spacer is supported in a uniform vertical relationship with said edges at the respective opposite ends of said spacer, angled gauge means on the opposite ends of said spacer for fitting correspondingly angled faces on the upper edges of said gutter board and back board thereby gauging the spacing of said upper edges, jig means provided on said spacer and including an upper jaw which rests against the upper edge of said face board to determine the vertical position of said edge, a guide member which rests against the outer face of said face board to determine the proper slope of said face board and its spacing horizontally from said back board, a lower jaw, and means for manipulating said lower jaw to optionally present the latter beneath the bottom edge of said face board and elevate the same against said bottom edge to clamp said face board between said upper jaw and said lower jaw in its proper position aforesaid, or to move said lower jaw downwardly and out from beneath the bottom edge of said face board, after said unitary curb-and-gutter have been cast in said mold.

4. A combination as in claim 3 in which the guide member of said jig means comprises a tube which is parallel with the face board when the latter is secured in its position by said jig means, and in which said lower jaw actuating means includes a rod rotatably mounted in said tube and having said jaw mounted on the lower end thereof and having a handle pivotally mounted on a horizontal axis, near one end of said handle, upon the upper end of said rod, said handle having a cam face on the end thereof adjacent said axis so that rotation of said handle about said axis raises and lowers said lower jaw while rotation of said handle substantially about the axis of said rod rotates said lower jaw between a position in which it is disposed under said face board and a position in which said jaw is disposed outwardly from beneath said face board.

5. A form spacer-clamp for correctly relating a gutter board, a face board and a back board in assembling said boards to form a mold for a unitary curb-and-gutter, said spacer clamp comprising a rigid board-spacer, opposite ends of which rest upon, are supported by and fit angled faces on upper edges of said gutter board and back board so as to horizontally space said upper edges of said boards a predetermined distance apart when said clamp is in use, a jig formed downwardly on said board spacer and shaped to accurately locate said face board in a predetermined relation with said other boards when said face board is moved upwardly to fit into said jig, and quickly releasable clamp means provided on said board spacer, said means including a rod, bearing means provided on said board spacer for rotatably and slidably mounting said rod close to and approximately transversely parallel with said face board, a jaw extending laterally from the lower end of said rod, and a handle pivotally connected near one end thereof on a horizontal axis to the upper end of said rod, said handle being adapted, when swung about said horizontal axis to raise or lower said jaw and, when rotated substantially about the axis of said rod, to rotate said rod and thus swing said jaw beneath or outwardly from beneath the bottom edge of said face board, actuation of said clamp means with said jaw disposed beneath said face board shifting said jaw upwardly against the bottom edge of said face board to clamp the latter in said jig.

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