May 1, 1951 R. FULLER 2,551,110

PORTABLE FORM FOR LINING IRRIGATION DITCHES

Filed Dec. 26, 1947

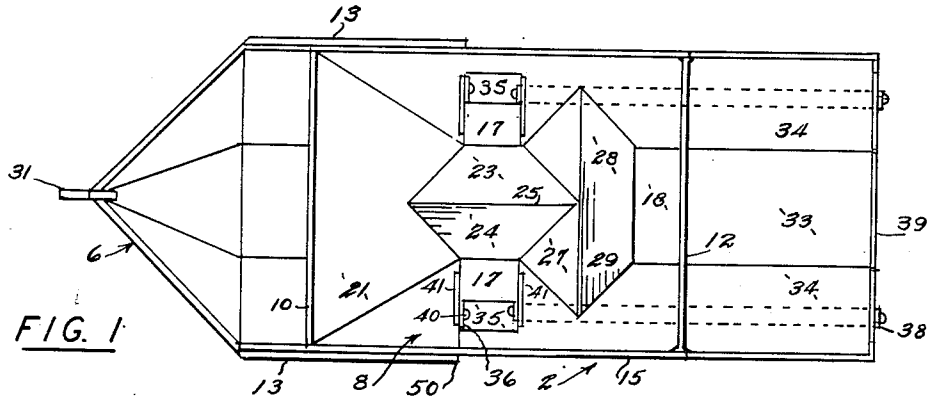


FIG. 1

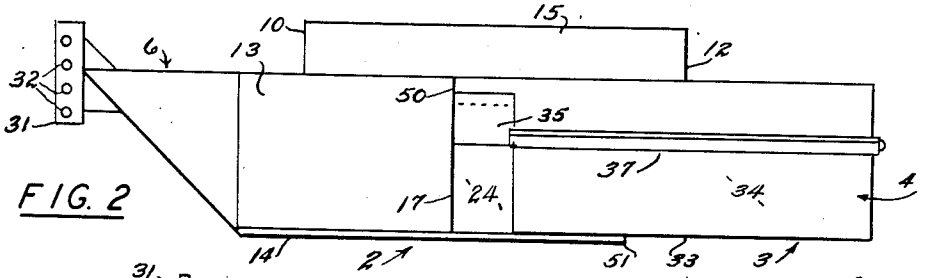


FIG. 2

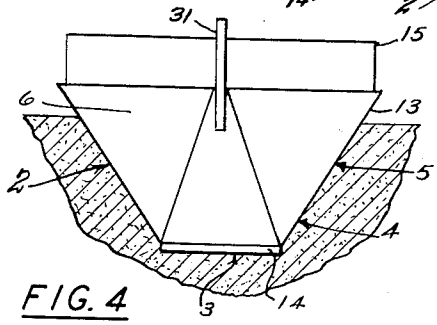


FIG. 4

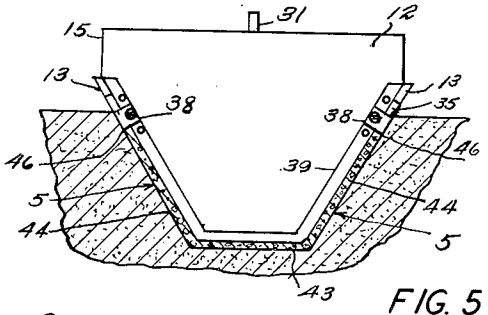


FIG. 5

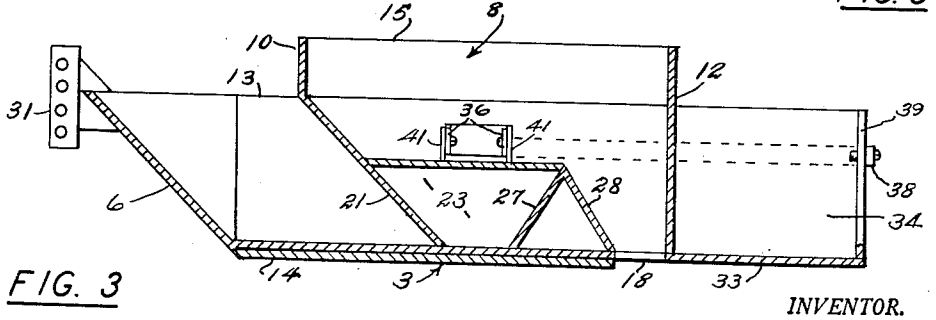


FIG. 3

INVENTOR.

Revilo Fuller

BY

Scott L. Norviel

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PORTABLE FORM FOR LINING IRRIGATION DITCHES

Revilo Fuller, Maricopa, Ariz.

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11 Claims. (Cl. 61—63)

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This invention pertains to movable forms for lining irrigation ditches with concrete.

One of the objects of this invention is to provide a form, having a hopper with side and bottom portions arranged so that concrete placed therein will be deposited to a pre-determined desired depth along the side and bottom portions of a prepared earth ditch;

A second object is to provide a sliding form which can be easily and cheaply constructed of metal, shaped to slide along a prepared earth ditch, with the parts arranged to provide a hopper, chute portions adjoining the bottom thereof leading to vents arranged to deposit a layer of concrete on the bottom and sides of said ditch as said form is drawn there along; certain forward parts of said form being arranged to ride on the bottom and side portions of said ditch and gain support therefrom while rear outer portions act as trowling elements to position, settle and smooth the concrete poured;

A third object is to provide a form, as above stated, wherein the ditch to be lined has a flat bottom and slanting sides, provided with adjustable edging runners or bars adapted to finish the top outer edges of the concrete lining of the ditch to various heights;

A fourth object is to provide a slidable concrete ditch lining form as above stated, with side placement vents having plates for closing the upper portions thereof to prevent deposit of concrete above a pre-determined level, and with edging trowels or runners attached to said closing plates and operable therewith adapted to smooth and finish the upper edges of the slanting sides of said concrete ditch lining.

Other objects will appear hereinafter.

I attain the foregoing objects by means of the device and construction shown in the accompanying drawings in which—

Figure 1 is a plan view of my movable form;

Figure 2, a side elevation thereof;

Figure 3, a vertical center sectional elevation;

Figure 4, a front end view; and

Figure 5, a rear end elevational view.

Similar numerals refer to similar parts in the several views.

This sliding form, as exemplified here, is made with a boat shaped body 2 having its bottom 3 and outwardly slanting sides 4 conformable to the corresponding parts of a prepared earth ditch 5. At the forward end of this body, the bottom plate 14 and side plates 13 converge to form a prow 6. To the rear of this prow a hopper 8 is formed by a front plate 21, and a rear transverse

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plate 12, and by upwardly extending plates 10 and 15 projecting above the upper edges of the slanting side plates 14 and front hopper plate 21.

Rectangular concrete deposit vents 17 are formed in the side plates 14 intermediate the plates 10 and 12 of the hopper 8 and extending from the juncture of the side plates 13 with the bottom plate 14. A rectangular bottom discharge vent 18 is formed in bottom plate 14 just ahead of rear transverse plate 12. The bottom of the hopper is provided with slanting bottom baffle plates to direct concrete deposited therein toward the three deposit vents. Thus plate 21 extends downwardly and rearwardly from top transverse hopper plate 10 toward vents 17, and plates 23 and 24 diverge from a longitudinal ridge 25 toward the inner edges of these vents. To the rear of plates 23 and 24 a second pair of plates 27 and 28 diverge from a transverse ridge 29; forward plate 27 tends toward vents 17, and rear plate 28 tends toward the forward edge of bottom vent 18. These plates form directive baffles to prevent the formation of pockets of cement in corners of the hopper and to insure prompt feeding action of the concrete from the hopper to the vents.

The outer surfaces of forward plates 13 and 14 conform to the bottom and sides of the preformed ditch 5 the rearward side plates 34 extend from the front edges of vents 17 and are set in a distance equivalent to the thickness of the concrete lining desired. The rear bottom plate 33 extends from the rear edge of vent 18 and is set above the surface of forward plate 13 a similar distance. The outer faces of these rear plates form trowling surfaces and may be termed trowling plates. They extend rearward of plates 13 and 14 a sufficient distance to afford adequate weight and balance for the entire body 2 and to provide sufficient trowling area to compact, smooth, and finish the concrete after it has flowed out thru the several vents. In this regard it is important to note that the bottom plate 14 extends substantially completely under the hopper 15 so that the center of gravity of the load of concrete placed in the hopper lies intermediate the end portions of the bottom plate 14. In this manner the body 2 is accurately held and guided by the preformed ditch, independent of the rate of flow or plastic consistency of the cement being utilized, to provide the proper thickness and uniformity for the finished ditch lining.

Side vent blocking plates 35, having inwardly extending flanges 36, are supported by screws 40 threaded into inwardly extending flanges 41 along the sides of vents 17 and positioned to close the

upper portions of these vents to limit the upper extent of the sides of the ditch lining as desired. Edging bars 37 are attached to the outside of these plates at their forward ends, and by inwardly bent tabs 38 at the rear held by screws threaded into flanges 39 attached to the rear edges of the plates 35 and 34. These edging bars act as trowels to smooth the upper edges 46 of the layer of concrete 44 which is formed as concrete flows from vents 17 and 18 to form the side wall lining for ditch 5.

In use the land over which the ditch is to extend is first leveled and a raised burm formed. The ditch is then formed in the burm, to the shape required by a suitable ditching machine so that the earth in the bottom, sides, and edges is firm and compacted. With the earth ditch 5 shaped, as stated, the body or form 2 is placed therein and the hitch 31 attached to a tractor. The vertical position of attachment is made thru one of the hitch holes 32 so that the line of traction tends to slightly elevate prow 6. It is not actually elevated, in practice, since the load in the hopper 15 acting intermediate the bottom plate 14 maintains the form in proper alignment with the preformed ditch, but with the draw in this direction, the prow does not tend to hog into the ditch. A portable cement mixer is then brought alongside of the form and arranged to deposit mix into hopper 8, and the two advanced along the ditch at the same speed. The mixer is arranged to supply concrete to hopper 8 as fast as it is fed out of vents 17 and 18 at the speed of travel along the ditch. If, for any reason, it is necesary to stop the flow of concrete from the mixer, the movement along the ditch is halted. The result is that the concrete is uniformly fed out of hopper 8 and evenly deposited as a lining at the bottom 43, and sides 44 of the earth ditch. The rear bottom and side plates 33 and 34 smooth and trowel the layer of concrete deposited, while the forward bottom plate 14 and side plates 13 provide support and act as accurate guides for the entire form body 2 relative to the preformed ditch. As the earth ditch is thus lined with a layer of concrete, the edging bars 37 smooth and finish the upper edges 46 of the sides 44 of the lining. In practice, where the ditch as lined is to be used directly for irrigation, the lower bank of the ditch is cut at intervals and the concrete lining likewise removed before it hardens. Suitable lateral gates and outlets are then installed in these cuts.

I have found that the device is useless unless the outer surfaces of rear trowling plates 33 and 34 are sufficient to sustain, compact, and place the concrete mix after it has flowed from the deposit vents.

As a matter of practice, I have found that a prepared ditch, as described, can be lined at the rate of one-fourth mile in twenty minutes. The speed of advancement is controlled mainly by the available supply of mix.

While I have illustrated the device as having the trowling plates extend the full length of the body, and the riding plates 13 and 14 added to the outside thereof at the forward end, it is conceivable that the entire lengths of the side and bottom can be made on one plate properly folded to form the necessary off-set at 50 on the sides and 51 on the bottom. This should be considered a matter of choice. The metal plates from which the device is made can be of any thickness desired concomitant with the weight and size of the entire structure.

Many other changes and modifications may be made all of which, however, may well be within the spirit and intendments of the invention. Therefore, I wish to be limited only by the following claims.

I claim:

1. A portable form for lining irrigation ditches, comprising a boat-like body having a horizontal bottom and upwardly and outwardly slanting sides, a hopper formed in the middle thereof, deposit vents formed in said sides of said hopper and a bottom opening disposed to the rear of said side vents and opening from said hopper; the forward portions of said side and bottom plates being set out from the rear portions thereof forward of the forward edges of said vents.

2. A portable sliding form for lining prepared earth ditches comprising a body having a prow at its forward end, a flat bottom, and outwardly and upwardly slanting side plates, a hopper formed within said body by longitudinally spaced transverse partition plates, side deposit vents formed in the side plates of said hopper portion; riding plates set out from said sides extending forward from the forward edges of said side deposit vents; a bottom deposit vent formed in said body bottom to the rear of said side deposit vents, a set out bottom riding plate extending under said hopper and forward from the forward edge of said bottom vent; the rear portion of said bottom plate and the rear portion of said side plates constituting trowling surfaces; a draw bar connection at the forward end of said prow; and directive baffles in the bottom of said hopper portion, positioned to chute concrete from said hopper to said deposit vents.

3. A portable sliding form for lining prepared earth ditches having a boat-shaped body formed of flat plates to provide a flat bottom, outwardly slanting sides, a prow at the forward end and a square stern, a hopper formed in the middle portion of said body by forward and rear transverse plates and upwardly extending side plates, rectangular concrete deposit vents cut in each of said side plates, a rectangular deposit vent cut in said bottom plate and positioned adjacent the rear transverse hopper forming plate; out set riding plates extending forward from the forward edges of said vents to said prow, said body plates forming trowling surfaces extending rearward therefrom, directive baffle plates in the bottom of said hopper portion adapted to direct concrete to said vents; removable blocking plates adapted to close upper portions of said side deposit vents and movable edging bars extending horizontally rearwardly therefrom.

4. A portable sliding form for lining prepared earth ditches having slanting sides of predetermined sectional shape with cement, incuding in combination, a boat shaped body formed of flat plates to provide a flat bottom, and outwardly slanting sides conforming to the sectional shape of said prepared ditch, said plates converging at the forward end to form a prow, and terminating at the rear to provide a square stem; a hopper formed in the middle of said body by transverse upwardly extending plates and upwardly extending laterally disposed plates; rectangular cement deposit vents cut in the side plates of said body at approximately midway of the length of said hopper, a rectangular bottom, cement deposit vent cut in the bottom of said body to the rear of said side vents; riding plates secured to the forward portion of said body set out from the forward edges of said

vents the thickness of the desired pour, the rear portion of said body plates constituting trowling surfaces for the poured cement, after placement; directive baffle plates within said hopper slanting toward said vents including a centrally positioned longitudinal ridge baffle slanting laterally toward each of said side vents and rearwardly toward said rearwardly disposed bottom vent.

5. A portable sliding form for lining prepared earth ditches having slanting sides of predetermined sectional shape with cement, including in combination, a boat shaped body formed of flat plates to provide a flat bottom, and outwardly slanting sides conforming to the sectional shape of said prepared ditch, said plates converging at the forward end to form a prow, and terminating at the rear to provide a square stem; a hopper formed in the middle of said body by transverse upwardly extending plates and upwardly extending laterally disposed plates; rectangular cement deposit vents cut in the side plates of said body at approximately midway of the length of said hopper, a rectangular bottom, cement deposit vent cut in the bottom of said body to the rear of said side vents; riding plates secured to the forward portion of said body set out from the forward edges of said vents the thickness of the desired pour, the rear portion of said body plates constituting trowling surfaces for the poured cement, after placement; directive baffle plates within said hopper slanting toward said vents including a centrally positioned longitudinal ridge baffle slanting laterally toward each of said side vents and rearwardly toward said rearwardly disposed bottom vent, and combination side vent blocking plates and side pour edges removably attached to the sides of said body, adapted to close portions of the upper part of said side vents and trowel the upper edge of cement poured from said side vents.

6. In a concrete form for progressively lining ditches with concrete, a bottom and angularly disposed sides connected therewith conforming to and engaging the bottom and side surfaces of a preformed ditch to be lined, inset bottom and side portions formed on the rear portions of said bottom and sides, concrete discharge vents in the forward portions of said inset bottom and side portions, and a concrete supply hopper connected to said discharge vents and supported on said form above the said bottom and sides portions engaging said preformed ditch surfaces.

7. In a ditch lining form for continuously applying a concrete lining to an irrigation ditch, a boat-shaped form member having supporting and guiding surfaces conforming to the cross-section of and engaging the bottom and side surfaces of a preformed ditch to be lined, rearwardly disposed inset surfaces in said first mentioned supporting and guiding surfaces, concrete discharge vents located in said inset surfaces adjacent the rear edges of said supporting and guiding surfaces, and a concrete supply hopper connected to said discharge vents and located on said form member so that a load of cement placed in said hopper is supported on said supporting and guiding surfaces engaging said preformed ditch surfaces.

8. In a ditch lining apparatus comprising a form to be towed along a preformed ditch, a supporting bottom portion and angularly disposed side guiding portions connected to said bottom portion adapted to conform to and engage the bottom and sides of a preformed ditch, inset

bottom and side portions extending rearwardly from said supporting and guiding portions, a concrete discharge vent in the bottom of said form located between said supporting bottom portion and said inset bottom portion, further concrete discharge vents in said form between said side guiding portions and said inset side portions and located toward the front of said form intermediate the length of said supporting bottom portion, and a concrete supply hopper connected to said vents and located on said form above said supporting bottom portion and said side guiding portions.

9. In a ditch lining device comprising a boat shaped form having a hopper, a supporting bottom under said hopper adapted to engage the bottom of a preformed ditch to be lined, side guiding portions connected to said bottom extending partially under the front portion of said hopper, a prow formed on the front end of said bottom and sides, means for connecting a hitch to said prow, and inset bottom portion extending rearwardly from said supporting bottom portion, a concrete discharge vent located between said supporting bottom and said inset bottom and connected into the rear portion of said hopper, inset side portions extending rearwardly from said side guiding portions, and side concrete discharge vents located between said side guiding portions and said inset side portions connected into said hopper intermediate the front and rear of said hopper.

10. In a movable form for continuously applying concrete to line a preformed ditch, a boat shaped body member having a bottom and sides engaging a preformed ditch to be lined, a stepped bottom and stepped sides toward the stern end of said body member, the step in said bottom being located toward the stern from the steps in said sides, concrete supply vents located adjacent to said steps and toward the stern end of said body member, and concrete hopper means for supplying concrete to said vents supported on and located above the bottom and sides of said body portion.

11. In a movable form for continuously applying concrete to line a preformed ditch, a boat shaped body member having a bottom and sides engaging a preformed ditch to be lined, a stepped bottom and stepped sides toward the stern end of said body member, the step in said bottom being located toward the stern from the steps in said sides, concrete supply vents located adjacent to said steps and toward the stern end of said body member, and means for supplying concrete to said vents comprising a concrete hopper located on said body member above the bottom of said body member and the steps on said sides toward the bow of the step in said bottom.

REVILO FULLER.

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The following references are of record in the file of this patent:

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