United States Patent [19]

Davis

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[54] **SECTIONAL INTERIOR CONCRETE FORM**

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[52] **U.S. Cl.** **249/186**

[51] **Int. Cl.** **B28b 7/30**

[58] **Field of Search** ..... 249/178, 184, 163, 249/165, 166, 167, 168, 155, 156, 157, 160, 249/186, 152, 142, 48, 12, 11, 119, 175, 1, 33, 249/179, 185, 219 R

[56] **References Cited**

UNITED STATES PATENTS

1,245,477	11/1917	Loxterman	249/11 X
850,667	4/1907	Mitchell	249/11 X
853,954	5/1907	Blaw	249/179
1,171,176	2/1916	Craig	249/1
1,233,509	7/1917	Rogalske	249/184
1,294,239	2/1919	Compton	249/11 X
1,365,124	1/1921	Persson	249/178 X
1,535,023	4/1925	Kelley	249/1
1,560,811	11/1925	LaMare	249/11
2,843,912	7/1958	Benson	249/168 X

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[57] **ABSTRACT**

Sectional interior concrete form having a plurality of sections. Two lower side sections have an upper longitudinal flange and are vertical members. Two upper parts of the form are corner sections, one of which is a key section. Flanges on each of its longitudinal edges, coact with one of the lower side pieces, and the other corner section. The other corner section also has a lower longitudinal flange complementing the flange on the other side section. Cross bars are included for spacing and adding rigidity between two side sections and between the two corner sections. Angle brace means are provided in each of the corner sections for strength and rigidity. Clamping means hold the mating flange edges together.

14 Claims, 5 Drawing Figures

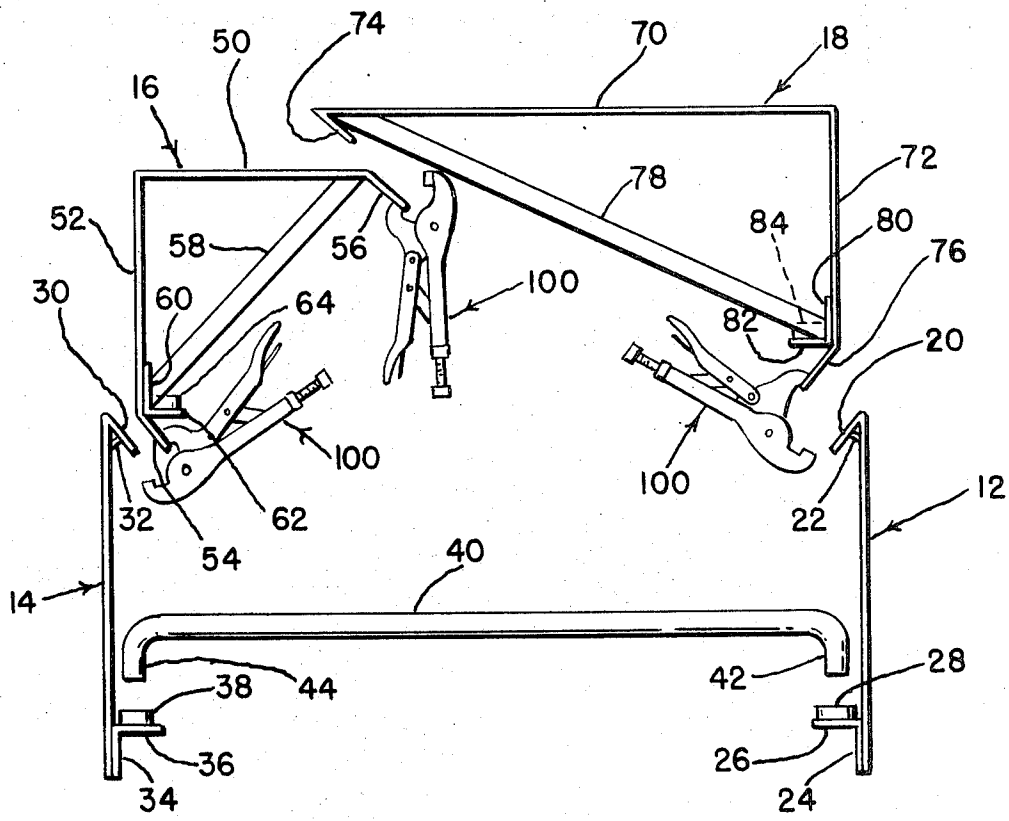
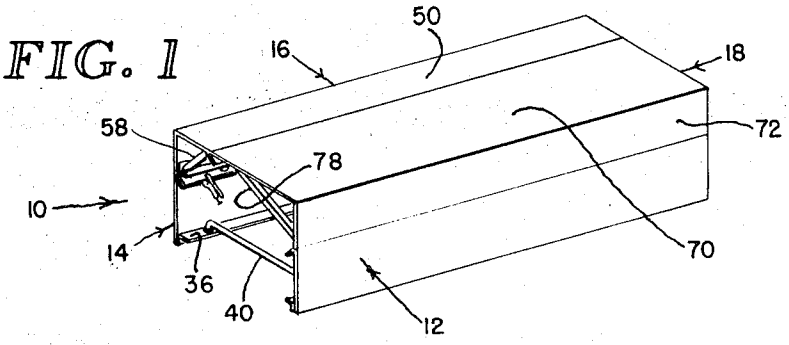


FIG. 1



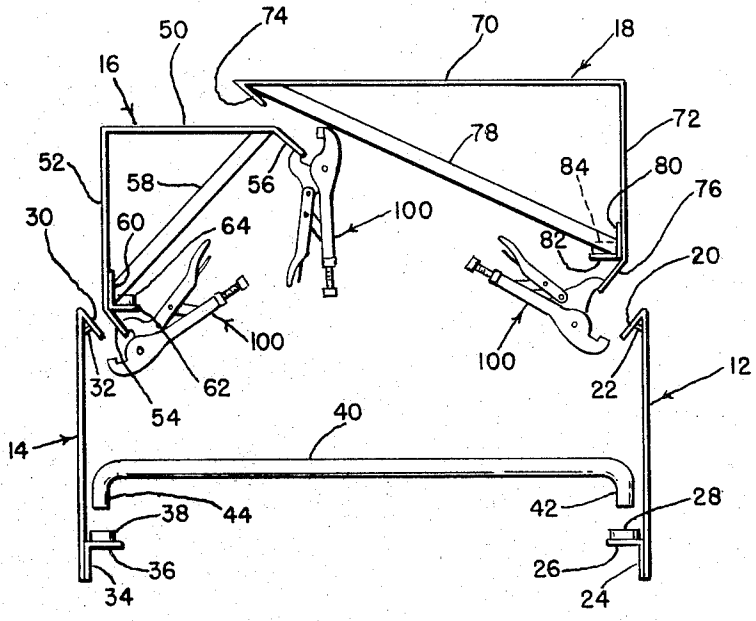


FIG. 2

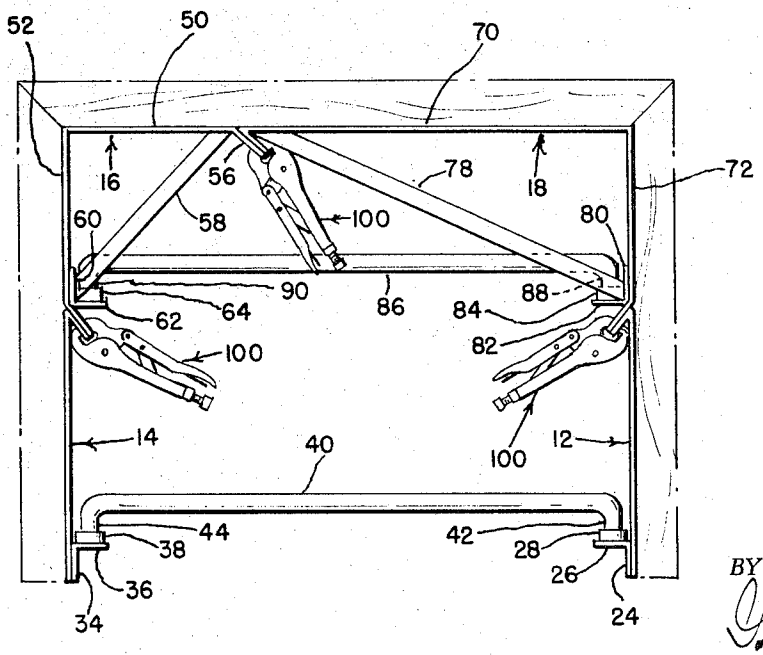


FIG. 3

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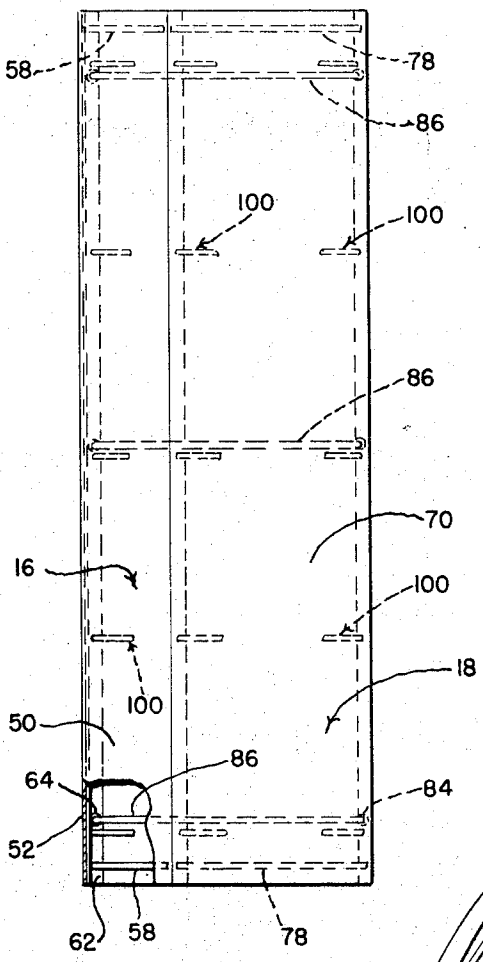


FIG. 4

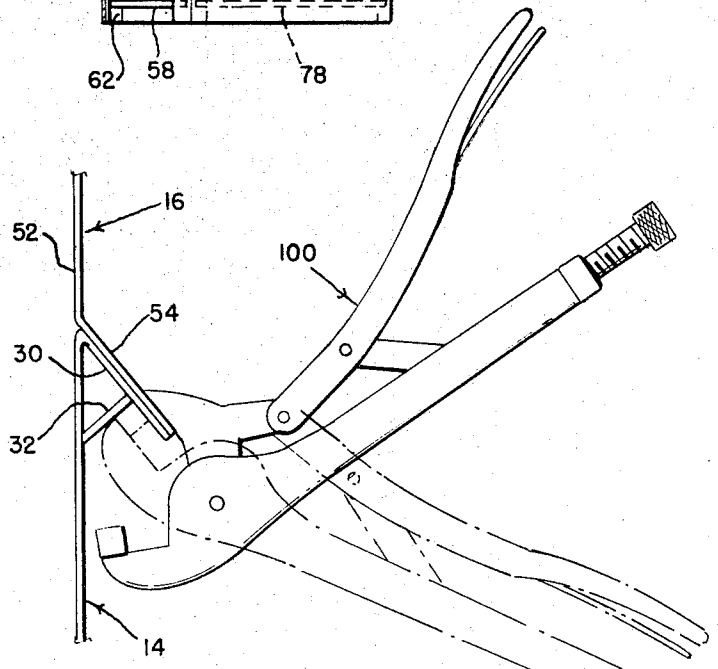


FIG. 5

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SECTIONAL INTERIOR CONCRETE FORM

BACKGROUND OF INVENTION

The invention relates generally to the area of forms for pouring concrete and more particularly to a sectional concrete form such as for pouring culverts and crypts.

As those skilled in the art are aware, present methods for erecting internal concrete forms are time consuming and expensive. This is so primarily because the forms are made of wood and the labor time involved in assembling and removing the forms is substantial. A particularly large problem is removal of the forms after they have been used, since the workmen must get inside and remove the pieces one by one. Additionally, the normal life of wood forms is about five uses, after which the pieces are sufficiently damaged so that they cannot be reused. Most all square forms require special shims and shoring or other special pieces which must be removed first before the forms themselves can be removed.

SUMMARY OF INVENTION

The forms are comprised of elongated sections of metal, such as aluminum or steel sheet. The two lower side sections are essentially flat vertical pieces, the top edge of each of which is flanged inwardly at an acute angle. One corner section is the key or primary section. It has a lower flange along its lower longitudinal edge for mating or coacting with the flange of one side member. It has another flange on the upper edge which mates with a flange on the other corner section. The lower longitudinal edge of the other corner section has a flange complementing the flange on the other side member. Rigidizing or cross bar members interconnect both side pieces and both corner sections when the form is assembled. Clamping means hold the respective coacting flange edges together so that a rigid internal structure is defined around which concrete may be poured.

It is among the many features, advantages and objects of this invention to provide a self-contained sectional concrete form for internal forming such as for crypts and culverts. The forms are rapidly assembled and disassembled and removed after a pour has set. There are no hinges to be filled with concrete and the forms are usable over a long life compared to conventional wood type forms. The forms can be disassembled without the workman having to crawl inside. The disassembly can be done in a manner of seconds by simultaneous release of the clamping means so that each seam can be released quickly. Cross bracing lends rigidity and keeps the side members from being pushed in or pushing the corner pieces up. By breaking the two seams on the key section, it falls out of the locked position by its own weight. It can then be easily grasped and slid out allowing the other sections of the form to fall for easy slide-out removal.

BRIEF DESCRIPTION OF DRAWING

FIG. 1 is a perspective view showing the form assembled;

FIG. 2 is an end elevational view showing the parts exploded to further illustrate details of the construction of the form;

FIG. 3 is an end elevational view showing the form sections assembled and clamped together with rigidizing and cross brace members in position;

FIG. 4 is a top plan view to further illustrate details of construction and placement and positioning of various subparts; and

FIG. 5 is an enlarged view of one form of clamping means which may be used to hold the flange edges together.

DESCRIPTION OF PREFERRED EMBODIMENT

The concrete form, generally designated by the number **10**, has four sections. They are a side section generally designated **12**, an opposite side section generally designated **14**, a key corner section generally designated **16**, and another corner section generally designated **18**. The sheet material out of which the sections are formed is preferably steel, although it should be recognized that plastic, fiberglass or aluminum could also be employed. For purposes of illustration only, the preferred steel sheet would be of about 10 gauge thickness.

Side section **12** has an upper longitudinal flange **20**, which extends from the front to the back of the section. All sections are of the same length, leaving the ends of the form open. Flange **20** is bent to an acute angle of approximately 35° to 40° to the main section. Flange brace members **22** are placed on the inside of the angle at spaced intervals along the length of the section to brace the flange and to maintain it in such a way that it will not be pulled out or bent closer to the main body of the form. Along the lower edge of the vertical side section **12** is an angle member stiffener having a vertical side **24** welded or otherwise securely connected to the inside surface of the section and a horizontal leg **26**. On the top of the horizontal leg **26** at predetermined spaced points are secured cross bar retainers **28**. Reference can be had to FIG. **4** showing that three retainers **28** are placed along the length of the stiffener with one near each end and one located approximately in the center.

Opposite side section **14** has longitudinal flange **30** with flange brace members **32** on the interior of the angle which similarly to flange **20** is at approximately 35° to 40° to the main part of the section. A stiffener having vertical leg **34** rigidly secured to the lower inside surface of the section as by welding also has horizontal leg **36** on which are located cross-bar retainers **38**. It will be appreciated that the cross-bar retainers **28** and **38** are located directly across from each other to receive lower cross bars **40**. Bars **40** are straight bar means with depending end sections **42** and **44** which are received in the cross-bar retainers **28** and **38**.

Primary or key section **16** is designed to form one upper corner of the form and has top panel **50** and side panel **52**. Side panel **52** has flange **54** extending along the entire lower edge thereof and is at an angle of approximately 140° to 145° to complement the obtuse angle of flange **30** on the side section. Top panel **50** has edge flange **56** also at an obtuse angle of about 140° to 145° from the main panel piece. Key section **16** is supplied with cross braces **58** at spaced intervals along the length of the section as determined necessary by strength requirements. An angle stiffener member is provided on the inner surface of side panel **52** near flange **54** comparable to the stiffeners on the side sections below. The stiffener has vertical leg **60** which is

rigidly secured to the panel as by welding and a horizontal leg **62**. Additionally, cross-bar retainers **64** are located along horizontal leg **62** at desired locations.

Corner section **18** has top panel **70** and side panel **72**. It has top flange **74** at an acute angle complementary to flange **56** on key section **16**. It has lower flange **76** at an obtuse angle on the side panel to mate with flange **20** on side section **12**. Cross braces **78** are provided to maintain structural rigidity of the section. The inside surface of said panel **72** has a stiffener with vertical leg **80**, horizontal leg **82**, and cross-bar retainer members **84**. Again, as with side sections **14** and **12**, the cross-bar retainers **64** and **84** are directly across from each other to receive rigidizing cross bar **86** having depending end portions **88** and **90**.

The cooperating sections are provided with a series of quickly secured and releasable clamping means which for purposes of illustration are shown to be conventional vise grips **100**. In this instance one jaw of the vise grip is welded to the inside surface of the obtuse angled flanges. Both flanges **56** and **54** of key section **16** will have a plurality of clamps **100** welded by one jaw to the inside surface of said flanges. When the sections are joined together, as seen in FIG. **5**, the unattached jaw engages the rear surface of the complementary acute angle of the adjoining form section. A series of five clamps generally equally spaced along the length of each flange have been shown in FIG. **4** although this number may vary depending on the type of clamp employed. A series of clamps **100** are also attached to obtuse angled flange **76** on section **18** so that they securely hold it together with complementary flange **20** of side section **12**. In like manner clamps **100** have been attached to the flange **56** of key section **16** to secure the upper edge of the two upper sections together by securely holding flanges **56** and **74** together.

In the pouring of crypts, for instance, there may be several assembled forms in spaced side-by-side relationship. As shown in FIG. **3**, wood facing would be placed at both the front and rear ends of the form on both the top and side and the concrete poured to the desired thickness of, for instance, three inches. Prior to the pour, however, the seams in the assembled form can be either taped or greased. After the concrete is set the top cross bars **86** are knocked out and the two rows of vise grips released. The particular type of clamp shown is easily released by the use of a small dimension board being inserted between the handles and twisted to separate the handles. By releasing the two rows of clamps on the flanges of key section **16**, it will either fall out of its own accord or with slight urging and will drop away from the corner. It can then be slid out without the operator having to crawl inside. Next the row of clamps holding corner section **18** to section **12** are released and it too will fall away and can be slid out. The bottom cross bars **40** are left in while the top sections **16** and **18** are removed to keep the side sections **12** and **14** from falling in with the key section. Thus, it will be seen that the angles of the flanges on key section **16** are such that once released it is free to fall away. The same is true, of course, of the flange **76** on section **18** so that it is not impeded from dropping when the clamps are released.

What is claimed is:

1. A sectional internal concrete form for crypts, culverts, tunnels and the like, comprising:

a. first and second spaced apart generally vertically disposed side sections each of which has an inwardly acutely angled flange along the upper edge thereof,

b. a corner third section having top and depending side panels each with an inwardly angled flange along the edge thereof,

c. a corner fourth section also having top and depending side panels each with an inwardly angled flange along the edge thereof,

d. the top panel flanges of said third and fourth sections complementarily coacting, and the side panel flange of said fourth section complementarily coacting with one of the flanges of said first and second side sections so that the angles of said flanges do not impede movement of said fourth section,

e. the side panel flange of said third section complementarily coacting with the flange of the other of said first and second side section, and

f. a plurality of releasable clamping means holding the coacting flanges of the form sections together when the form is in its assembled state, said coacting flanges being so angled with respect to each other that upon release of clamping means engaging the flanges of said fourth section it is free to drop away and be removed.

2. The sectional concrete form according to claim **1** and wherein each of said third and fourth sections is provided with longitudinal stiffener means on the inside surface of its side panel.

3. The sectional concrete form according to claim **2** and wherein both of said stiffener means are detachably interconnected by a plurality of cross bar bracing members when the form is in its assembled state.

4. The sectional concrete form according to claim **3** and wherein said stiffener means include cross bar retainers for receiving and detachably holding the ends of said cross bar bracing members.

5. The sectional concrete form according to claim **1** and wherein each of said first and second side sections is provided with longitudinal stiffener means on the inside surface thereof.

6. The sectional concrete form according to claim **5** and wherein both of said stiffener means are detachably interconnected by a plurality of cross bar bracing members when the form is in its assembled state.

7. The sectional concrete form according to claim **6** and wherein said stiffener means include cross bar retainers for receiving and detachably holding the ends of said cross bar bracing members.

8. A sectional internal concrete form for crypts, culverts, tunnels and the like, comprising:

a. first and second spaced apart generally vertically disposed side sections each of which has an inwardly angled flange along the upper edge thereof, each of said flanges forming an acute angle to its respective panel,

b. a corner third section having top and depending side panels each with an inwardly angled flange along the edge thereof, the flange on said top panel forming an acute angle to its panel and the flange on said side panel forming an obtuse angle to its panel,

c. a corner fourth section also having top and depending side panels each with an inwardly angled flange along the edge thereof, each of said flanges forming an obtuse angle to its respective panel,

d. the top panel flanges of said third and fourth sections complementarily coacting, and the side panel flange of said fourth section complementarily coacting with one of the flanges of said first and second side sections so that the angles of said flanges do not impede movement of said fourth section,

e. the side panel flange of said third section complementarily coacting with the flange of the other of said first and second side section, and

f. a plurality of releasable clamping means holding the coacting flanges of the form sections together when the form is in its assembled state.

9. The sectional concrete form according to claim **8** and wherein each of said third and fourth sections is provided with longitudinal stiffener means on the inside surface of its side panel.

10. The sectional concrete form according to claim **9** and wherein both of said stiffener means are detachably interconnected by a plurality of cross bar bracing members when the form is in its assembled state.

11. The sectional concrete form according to claim **10** and wherein said stiffener means include cross bar retainers for receiving and detachably holding the ends of said cross bar bracing members.

12. The sectional concrete form according to claim **8** and wherein each of said first and second side sections is provided with longitudinal stiffener means on the inside surface thereof.

13. The sectional concrete form according to claim **12** and wherein both of said stiffener means are detachably interconnected by a plurality of cross bar bracing members when the form is in its assembled state.

14. The sectional concrete form according to claim **13** and wherein said stiffener means include cross bar retainers for receiving and detachably holding the ends of said cross bar bracing members.

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