March 6, 1951 J. H. ROSENBLATT 2,544,110

CONCRETE FORM

Filed May 24, 1949 2 Sheets-Sheet 1

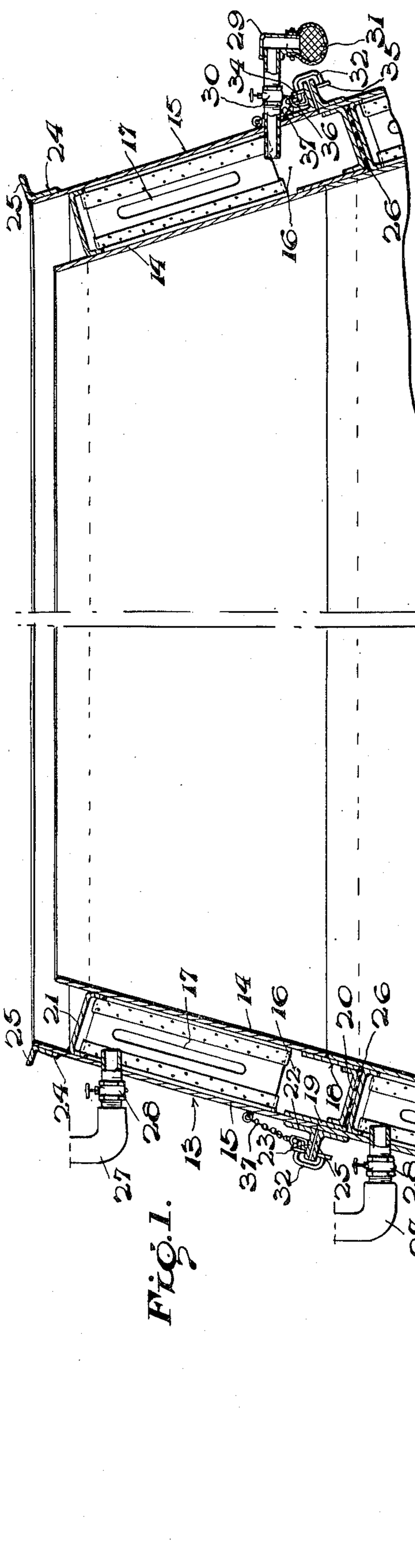


Fig. 1.

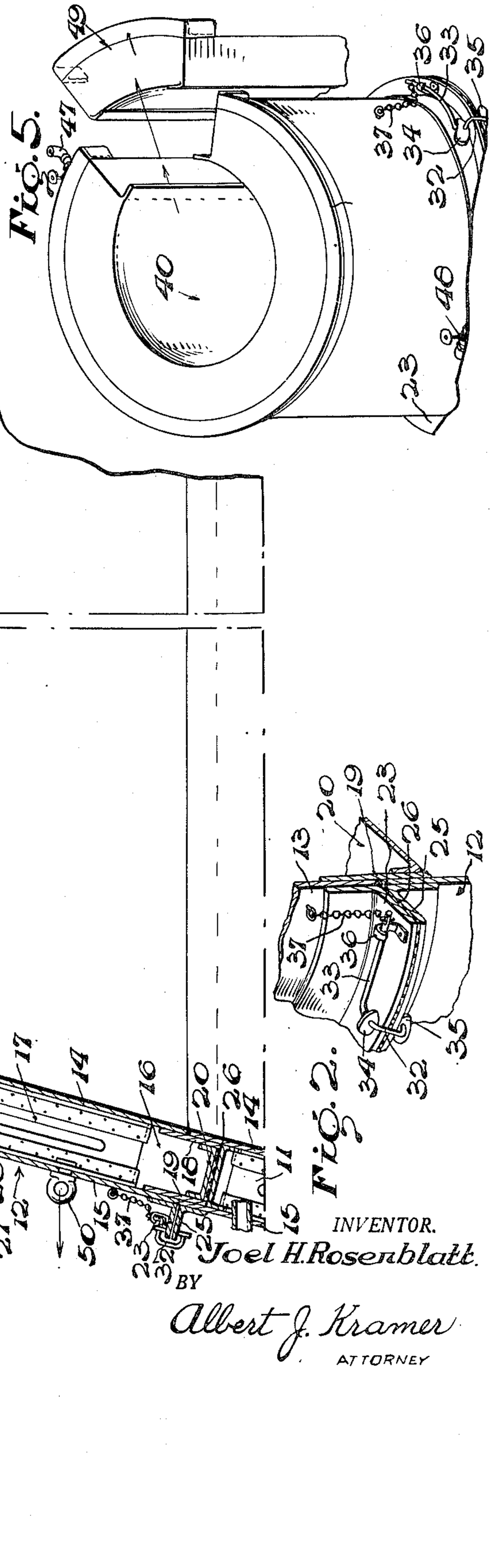


Fig. 5.




Fig. 2.

INVENTOR.
Joel H. Rosenblatt.
BY
Albert J. Kramer
ATTORNEY

March 6, 1951

J. H. ROSENBLATT

CONCRETE FORM

2,544,110

Filed May 24, 1949

2 Sheets-Sheet 2

Fig. 3.

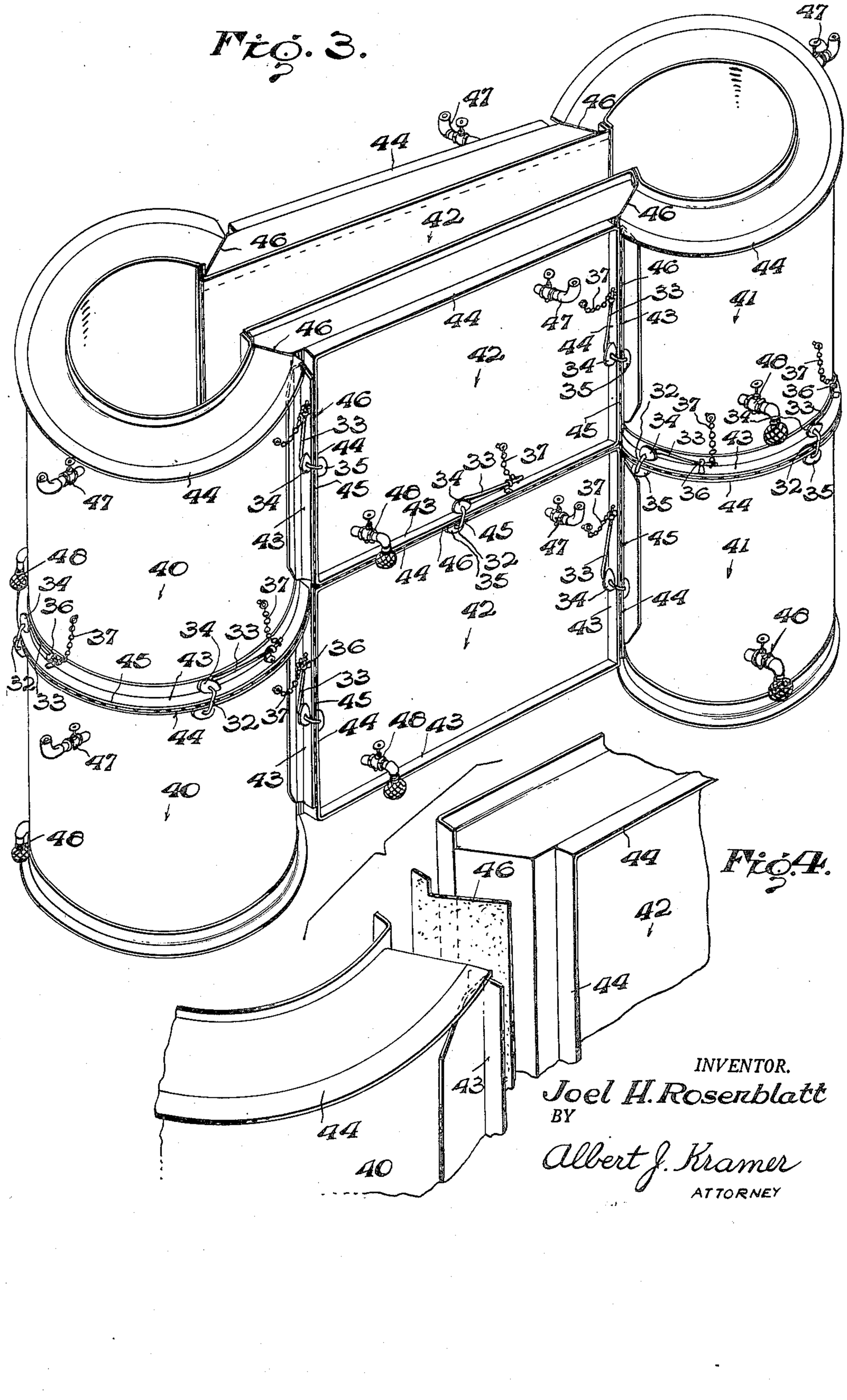


Fig. 4.




INVENTOR.
Joel H. Rosenblatt
BY
Albert J. Kramer
ATTORNEY

Patented Mar. 6, 1951 2,544,110

# UNITED STATES PATENT OFFICE

2,544,110

## CONCRETE FORM

Joel H. Rosenblatt, Baltimore, Md.

Application May 24, 1949, Serial No. 95,065

10 Claims. (Cl. 25—118)

1

This invention relates to concrete forms and is more particularly concerned with the provision of forms for use in constructing concrete structures, such as bridge piers, dams, causeways, etc.

A particular application of the invention is in the construction of underwater concrete structures which are usually accomplished either by the prefabrication of forms in units which are then transported to the structure site and set in place or by actually constructing the forms at the site. These forms are expensive to fabricate and costly to set in place. They are generally not recoverable, particularly in underwater constructions and are left in place after the concrete is poured and set due to the high cost of dismantling them as well as the impracticability thereof.

In many concrete construction projects, a number of units of the project are similar. For example, in bridge projects, a number of piers may be of the same size and design or contain elements such as cylinders, trapezoids, cones, etc., of a common size and shape. In conventional practice, each pier has its own individual form and one form is not used more than once.

One of the objects of this invention is the provision of concrete forms which are removable after having been used once and capable of being used over and over again for constructing an identical unit or a different unit containing common sections or parts thereof.

Another object of the invention is the provision of pneumatic concrete forms which may be sectionally assembled and disassembled in water or on land.

A further object of the invention is the provision of double-walled forms which may be floated into position and sunk below the surface of a body of water and refloated after being used.

A still further object of the invention is the provision of sectional forms of the type mentioned in combination with simplified means for securing them together and readily disassembling them.

Still another object is the provision of a form for underwater concrete construction which requires no auxiliary means for withholding water from the interior work area.

These and other objects and advantages of the invention will be apparent from the following description considered together with the accompanying drawing, in which drawing:

Fig. 1 is a vertical cross sectional view of a series of form sections constructed and connected together in accordance with this invention.

2

Fig. 2 is a fragmentary isometric view of a portion of the joint between two of the sections illustrating details of the securing means.

Fig. 3 is a schematic isometric view of a form constructed and assembled in accordance with this invention illustrating the manner in which a type of bridge pier may be constructed by the use of only two different types of form sections.

Fig. 4 is an enlarged isometric view of a part of Fig. 3 showing by way of illustration, the vertical joint between two different types of section.

Fig. 5 is an isometric view of one of the partially cylindrical units of Fig. 3 illustrating the manner in which it may be used to prepare a fully cylindrical form.

Referring with more particularity to the drawing in which like numerals designate like parts, the embodiment illustrated in Figs. 1 and 2 comprises a plurality of water-tight sections 11, 12 and 13, one above the other. Each section comprises an inner wall 14 and an outer wall 15 with a substantial space 16 therebetween to furnish buoyancy when filled with air. The two walls 14 and 15 are held together by means of internal bracing members 17 of any suitable type. The bracing construction should be foraminous or of open work to permit the free passage of air and water throughout the space 16.

The lower ends of the inner and outer walls of each section are provided with extension plates 18 and 19, respectively, secured to the inside of the walls. A channel 20 is disposed between the lower end of the plates 18 and 19, as shown, to form a footing. An inverted channel 21 is disposed between the inner and outer walls near the top thereof at a distance below the top substantially equal to the distance between the bottom of the walls and the bottom of the channel 20.

At the bottom of the outer wall 15 an angle 22 is secured to provide an outwardly extending abutment flange 23. A similar angle 24 is secured to the top of the outer wall 15 to provide an outwardly extending flange 25. By these means, the bottom of one section fits or is nested into the top of another like section with the flanges 23 and 25 in juxtaposition relative to each other and the upper end of the inner wall of the bottom section abutting the lower end of the inner wall of the upper section, thus providing a secure support and at the same time a smooth surface for the concrete to set against.

To provide a water-tight connection, sealing material 26, such as cork, rubber, fiber, or other gasket material, preferably premolded to fit the

contours of the joint, is inserted in the joint between the sections before they are fitted together

Each section is also provided with an air pipe 27 through the top of the outer wall carrying a suitable valve 28 and a water pipe 29 through the bottom of the same wall carrying also a suitable valve 30. The open end of the pipe 29 is covered with a screen guard 31 to prevent clogging of the pipe with foreign matter.

By these means, the space in each section may be filled with air for floating or with water for sinking. Also water may be driven out by forcing compressed air through the air pipe 27, with the valve 30 open.

The sections are held together by a clamping device 32 consisting of a bar 33 one end of which is provided with a pair of spaced upper and lower offset abutments 34 and 35 adapted to straddle the flanges 23 and 25 in one position and to bear against them when the bar is rotated thereby forcing the flanges together and providing a water-tight joint. In this position the other end of the bar is removably held in a hook member 36 attached to one of the sections, such as on top of the flange 23. Conversely, the bar clamping device may be removed by disengaging the bar from the hook 36. The clamping devices are preferably attached by chains 37 or other flexible means to the sections to prevent losing them and to avoid the necessity of the rigger carrying them about with him when attaching and detaching them.

In Fig. 3 there is shown a plurality of sections of the type described assembled to form a complete unit for a bridge pier. The unit is for a common type of pier consisting of two vertical spaced cylinders connected by a web. The assembled form illustrated comprises a tier of cylindrical sections 40 at one end and a tier of similar sections 41 at the other end. Each section is provided with outwardly projecting flanges 43 and 44 adapted to register with corresponding flanges of adjacent sections and being secured together by the clamping devices 32 with gaskets 46 between the section joints. Each section is also provided with an air pipe 47 and a water pipe 48 for the purposes indicated above.

Should it be desired to provide a fully cylindrical structure, the sections 40 may be fitted with an insert section 49 (see Fig. 5) to bridge the gap therein. It is obvious that geometrical forms of other types and shapes may be used to form any design or composite design desired.

In setting the forms in place, the lowermost section of the unit is filled with air and sealed by closing the valves of the pipes. It is then floated to the site. Any suitable means for towing the sections to the site may be employed, such as boats, barges, cables, etc., and eyes 50 are provided on each section for attaching crane hooks or other connecting devices. When the section is over the site, water is gradually let in by opening the valves, which causes the section to sink gradually. While the water is being let in, the section is guided into position by a derrick, divers, or other suitable means. When the section has sunk to a suitable depth for mounting the next section, which may be at, slightly above, or slightly below the water line, the next section is floated out to the site and set in place on the first section. The sections are then fitted together and secured by the clamping devices and additional water let in to sink the combined units to the depth desired for securing the next section. This procedure is repeated until all sections are in place. In this manner, securing of the sections together may be accomplished without the use of divers. If it is desired to withdraw water from the work area at the interior of the assembled sections, tremie concrete is first poured in to provide a seal at the bottom. When the tremie concrete has set, the water is pumped out of the area and ordinary concrete poured on top of the tremie concrete to complete the filling in.



After all the concrete has set, the clamping devices are removed from the flanges which is quickly done by releasing the bars from their holding hooks. This may be done by a diver or other rigger. The clamping devices are prevented from being lost by virtue of their attachment to the sections with the holding chains.

Compressed air is then pumped into the sections, and the sections are released from the set concrete. They are then floated and towed away, whereupon they are ready to be reused at another location.

To facilitate freeing the forms from the concrete after it is set, the inside walls of the forms may be coated with any of the usual lubricants, such as grease, etc.

Although this invention has been described with reference to concrete, it is to be understood that it may also be used for other setting materials, such as plastics. For example, a thermosetting resin may be used instead of concrete and steam or hot water circulated through the sections to elevate the temperature. Such fluids may also be circulated in the forms for other purposes, such as for maintaining optimum temperatures for placing concrete.

It is also to be understood that the invention is not limited to underwater construction projects and may be used as well on land and on construction work above water.

Having thus described my invention, I claim:

1. A concrete form comprising water-tight sections each having inner and outer walls spaced apart, foraminous means for securing said walls in fixed spaced relation, the upper end of one section being complementary to the lower end of an adjacent section, whereby said ends may be nested together to form a joint between the sections, and means for removably securing said sections together.

2. A concrete form comprising water-tight sections each having inner and outer walls spaced apart, foraminous means for securing said walls in fixed spaced relation, the upper end of one section being complementary to the lower end of an adjacent section, whereby said ends may be nested together to form a joint between the sections, means for removably securing said sections together, and pipes through said outer wall at the top and bottom thereof.

3. A concrete form as defined by claim 2 wherein the pipe at the bottom of the outer wall is provided with a screen guard about its opening.

4. A concrete form comprising water-tight sections each having inner and outer walls spaced apart, foraminous means for securing said walls in fixed spaced relation, the upper end of one section being complementary to the lower end of an adjacent section, whereby said ends may be nested together to form a joint between the said ends, means for sealing said joints, and means for removably securing said sections together.

5. A concrete form comprising water-tight sections each having inner and outer walls spaced apart, foraminous means for securing said walls in fixed spaced relation, the upper end of one sec-

tion being complementary to the lower end of an adjacent section, whereby said ends may be nested together to form a joint between said ends, a preformed gasket for said joint, and means for removably securing said sections together.

6. A concrete form comprising water-tight sections each having inner and outer walls spaced apart, foraminous means for securing said walls in fixed spaced relation, the upper end of one section being complementary to the lower end of an adjacent section, whereby said ends may be nested together to form a joint between the sections, a flange carried by each of said sections, the flanges of said adjacent sections being juxtaposed when their said ends are in nested relation, and removable means for urging said flanges toward each other.

7. A concrete form comprising water-tight sections having inner and outer walls spaced apart, foraminous means for securing said walls in fixed spaced relation, the upper end of one section being complementary to the lower end of an adjacent section, whereby said ends may be nested together to form a joint between the sections, a flange carried by each of said sections, the flanges of said adjacent sections being juxtaposed when their said ends are in nested relation, a bar having a pair of offset abutments adapted to straddle said flanges, and means for removably holding said bar in a fixed position relative to said flanges.

8. A concrete form as defined by claim 5 having flexible means for securing the bar to one of the sections.

9. A concrete form comprising water-tight sections having inner and outer walls spaced apart, foraminous means for securing said walls in fixed spaced relation, the upper end of one section being complementary to the lower end of an adjacent section, whereby said ends may be nested together to form a joint between the sections, a flange carried by each of said sections, the flanges of said adjacent sections being juxtaposed when said ends are in nested relation, removable means for urging said flanges together, and pipes through said outer wall at the top and bottom thereof.



10. A concrete form comprising water-tight sections having inner and outer walls in fixed spaced relation, the upper end of one section being complementary to the lower end of an adjacent section, whereby said ends may be nested together to form a joint between the sections, a flange carried by each of said sections, the flanges of said adjacent sections being juxtaposed when said ends are in nested relation, water sealing means for said joint, and removable means for urging said flanges together to apply pressure against said sealing means.

JOEL H. ROSENBLATT.

## REFERENCES CITED

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

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 2,029,004 | Varni | Jan. 28, 1936 |
| 2,334,804 | Atterbury | Nov. 23, 1943 |