J. VUKOVICH.

WATERPROOF CAISSON FOR CONCRETE FORMS.

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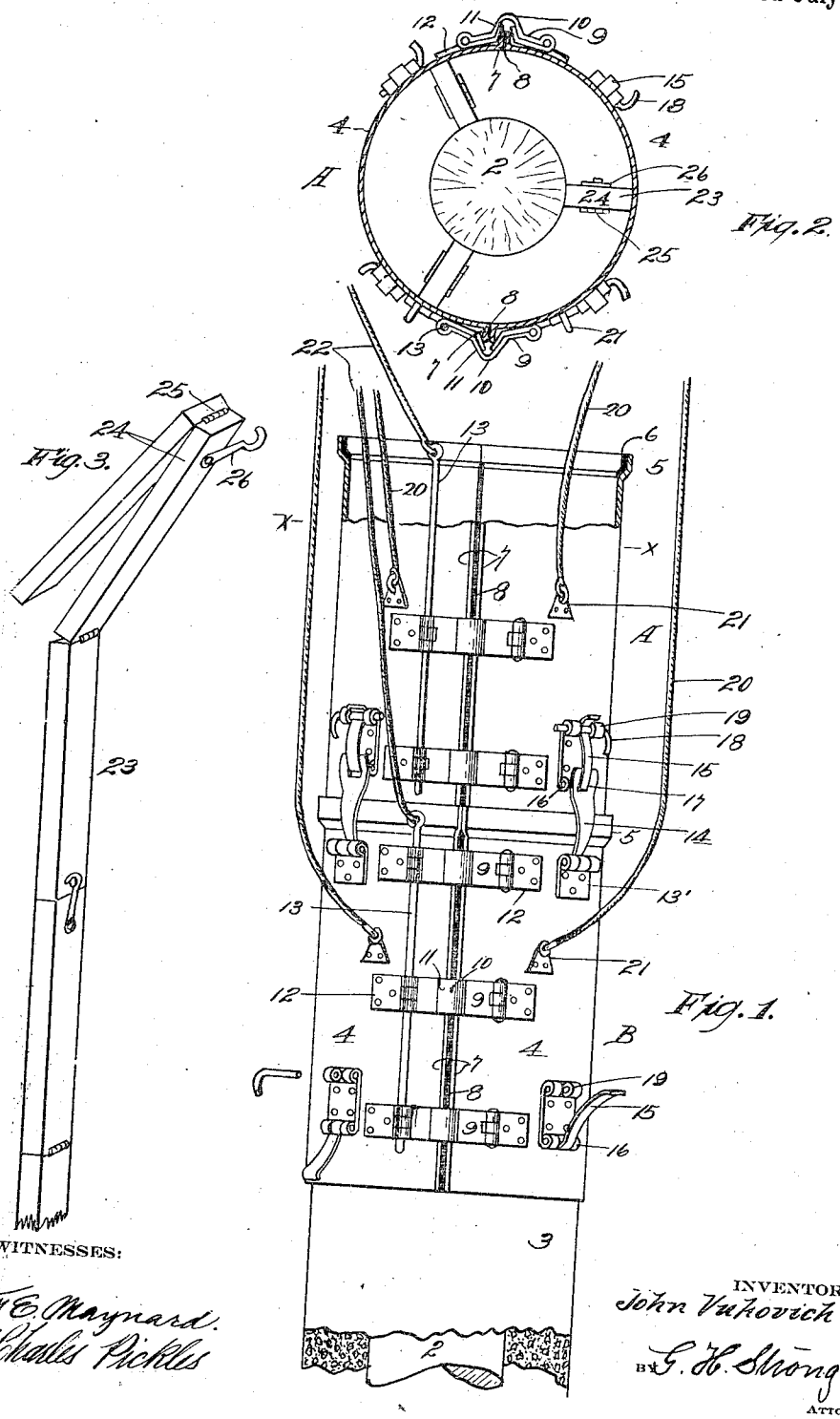


Fig. 2.

Fig. 3.

Fig. 1.

WITNESSES:

H. E. Maynard.

Charles Pickles

INVENTOR

John Vukovich

BY G. H. Strong.

ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN VUKOVICH, OF OAKLAND, CALIFORNIA.

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Application filed April 7, 1913. Serial No. 759,337.

To all whom it may concern:

Be it known that I, JOHN VUKOVICH, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented new and useful Improvements in Waterproof Caissons for Concrete-Forms, of which the following is a specification.

This invention relates to submarine concrete forms or caissons.

One of the objects of the present invention is to provide a sectional, detachable, water-proof, jointed caisson or concrete form by which piles or superstructures of docks, wharves, or other buildings adjacent water fronts can be readily jacketed or incased with cement to protect the same from animal growths and attacks, and it is a particular object of the present invention to provide a sectional caisson or mold capable of being readily assembled around permanently, previously driven piles, said device being readily assembled and positioned, and having means for forming water-tight joints, the device consisting of a plurality of longitudinal sections of suitable transverse contour, and each section being longitudinally divided and jointed for readily assembling and disassembling.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a side elevation of superposed sections in jointed relation, arranged for and forming a mold about a pile. Fig. 2 is a transverse section on the line X—X of Fig. 1. Fig. 3 shows a detail view of the form spacing device.

In the present embodiment of my invention there is illustrated a cylindrical caisson or mold comprising superposed sections A and B, of which sections there may be a suitable number so that a complete assembled caisson may be arranged about a previously implanted pile 2 which it is desired to protect by incasing it in a jacket of concrete 3, which is tamped in the form or caisson surrounding the pile 2 after the form has been assembled and rests upon the subsoil to a sufficient depth to form a footing for the concrete jacket.

The sections may be, or are each shown, as comprising a plurality of hingedly connected coöperative members or parts 4—4, here shown as each of semi-cylindrical form with their upper ends flared laterally slightly, as at 5, to form seats for packing members 6, for the reception of superposed sections of the caisson, the opposite end of each section being left smooth and adapted for insertion into snug engagement with the packed seats 5 for forming tight circumferential joints.

The coördinate parts 4—4 of each caisson section are here shown as having their longitudinal edges outwardly flanged, as at 7, these edges being adapted to be brought into juxtaposition and tightly clamped upon an inserted packing strip 8. The section parts 4—4, the number of each in each section will be determined and proportioned according to the diameter of the caisson, are connected by peculiar clamps or hinge members 9, here shown as of flat stock centrally hipped or ridged, as at 10, to form inclined jamb or wedge walls 11 capable of bearing firmly down upon the outwardly projecting joint forming flanges 7 when the section parts 4—4 are closed circumferentially. The clamp or hinge leaves 9 are connected to pin plates 12, secured on each of the parts 4 adjacent the joint flanges 7, the distance between the hinge plates on the common set being such that when the form parts 4 are drawn together circumferentially to make a complete section, the wedged surfaces 11 of the hinge members 9 will bear firmly against the flange 7 to tightly close the joint.

In Fig. 2 the clamp hinges 9 are shown as diametrically oppositely arranged, and one set of the clamp plates 9 is shown as attachable to the coördinate pin plates 12 by a through-pin 13 of sufficient length to pass through all of a series of clamp plates 9 arranged longitudinally upon one side of the concrete form section, the pin being insertible readily through the alined ends of the clamp plates 9 when moved into registration with their coördinate pin plates 12; this being done as the workmen assemble the sections A—B, one upon the other, and lower them away downwardly about the pile to be incased.

For the purpose of obtaining a tight water-proof joint between the abutted ends of the form sections A—B as they are arranged in superposed order on one end of the parts 4 of each section, pivot plates 13′

are arranged, to which are pivotally connected arms 14 which may be turned upwardly over the end of its correlative section and be engaged by a stirrup or tongue 15, pivotally connected at 16 to the lower end of the contiguous section as A, the tongue 15 being adapted to pass through a perforation 17 in the swinging end of the link 14; and when the tongue 15 of each section is turned upwardly and rearwardly toward the surface of the section upon which it is pivoted, it will tightly draw up the arm 14, thus pulling a superposed section down upon its contiguous lower section with sufficient pressure to make a tight joint at the packing rings 6, the tongues 15 being readily and firmly locked in their binding position by removable keys 18 insertible through keepers or eyes 19 secured for their reception upon the sections A; the keys 19 passing over the outer surfaces of the upper ends of the tongues 15 which are under the swinging pressure of the connecting arms 14.

In operation the workmen having a given size pile, as 2, to incase, will select a size and form of caisson as will produce a jacket of concrete of the desired proportions about the pile, and then the first or lowermost section will be assembled by the workmen at the surface of the water, this frequently having to be done under wharves, piers, and other structures, the horizontal beams of which are comparatively close to the surface of the water at high-tide; and, therefore, it is one of the objects of the present invention to provide a sectional caisson or concrete form, the sections of which are of such proportions that they may be readily handled by one or two workmen with ease and rapidity at the surface of the water in very cramped positions. Thus one of the relatively short sections, as A, will be brought into position about the pile 2, the parts 4—4 of the section being permanently and flexibly connected by sets of hinged devices, as 9, arranged longitudinally along one side of the parts 4—4 of a section, these parts moving with considerable freedom at the hinged longitudinal edges, and the broken joint at the opposite side of the section where the through-pin 13 has been removed can be separated for the passing around the pile 2 to be incased, and then the broken joint of the parts 4—4 is completed and the free swinging hinge plates 9 are closed over their respective pin-plates 12, and the through-pin 13 inserted through the alined eyes of the hinge leaves 9 and pin plates 12. The hipped portions 10 of the several hinge plates 9 acting wedgewise upon the adjacent outwardly projecting flanges 7 to form a tight joint upon the gasket strips 8. Having closed one section of the mold or caisson about a pile, this is lowered somewhat and another section interposed thereon and firmly connected thereto by the lock-up arms 14, which will be drawn up tightly by the tension tongues 15, as these will pass through the perforations 17 on the tongues or arms 14 and be keyed as at 18. After the sections are circumferentially assembled about the pile, and then longitudinally firmly connected upon one another by the connecting arms 14, the whole is lowered gradually by means of haul ropes 20, of which there are a suitable number connected as at 21 to the hingedly connected parts 4—4 of each section A and B, these ropes extending upwardly being controlled at the surface of the water by the workmen in charge.

After a complete form or caisson has been assembled about a pile to be incased and concentrically positioned thereabout, the plastic material adjacent the lower portion of the pipe at the sub-soil may be removed a sufficient depth by exhausting or otherwise removing the same through the chamber formed between the pile 2 and the inner surface of the mold which will be maintained water-tight by reason of the packed circumferential and longitudinal joints; and when the chamber has been properly prepared the plastic concrete is charged into it and allowed to set, after which the form sections A—B are removed by successively withdrawing the through-pins 13 of each, which pins are connected by ropes or other suitable connections 22 extending upwardly to the surface of the water, and which an operator hauls on to release the respective pin-plates 10 from a casing section, the haul ropes 22 being provided with any suitable identification mark, so that the operator can select the pins in successive vertical order downwardly to disconnect the swinging hinge plates 9 at one side of the caisson sections A from their correlative hinge plates 12, by the removal of the pin 13, whereupon when the lift or haul ropes 20 are pulled the disconnected longitudinal edges of the unpinned section will swing open freely, thus clearing and exposing the concrete jacket 3.

For the purpose of properly circumferentially spacing the caisson about the pile to be incased until it is embedded or partly embedded in plastic cement, I provide a spacer 23, comprising a plurality of sections 24, and transversely hinged at their ends, as at 25, the sections being adapted to be folded successively and alternately one upon the other as they are withdrawn from spacing position in the chamber of the caisson.

For the purpose of keeping the flexible space rod or device 23 in vertical alined order one upon the other at their abutted ends, suitable latches 26 are provided, whereby the contiguous folding ends are temporarily latched together when in vertical position.

Having thus described my invention, what

I claim and desire to secure by Letters Patent is:

1. A water-proof caisson or concrete form for forming a chamber about a previously implanted pile, comprising caisson sections adapted to be abutted end to end with a water-tight joint, and each being adapted for longitudinal separation on one side and pivotally connected on the other and interlocking tension members pivoted upon said sections for holding the abutted ends in position.

2. A water-proof caisson or concrete form, comprising sections adapted to be abutted end to end, the ends of said sections being provided with a packing means, interlocking devices for drawing the abutting ends and sections together for making a tight joint at the packings, said sections being hingedly connected at one side and separable longitudinally at the opposite side and having joint-forming means at their longitudinal seams, and clamps pivotally connected to said sections for clamping said joint-forming means.

3. A water-proof caisson or concrete form, comprising sections adapted to be superposed upon one another, one end of each section having seat forming portions for the reception of the contiguous abutting end of a superposed section, said sections being divided into a plurality of separable parts, hinge plates flexibly connected at one side of said parts, flanges projecting outwardly from the contiguous longitudinal edges of said parts, said hinges being adapted to engage the contiguous portions of said flanges for clamping the same together to form a tight joint longitudinally, and swinging clamp plates connected to said parts of a section for clamping the adjacent edges of the same together, permanent hinge plates connected to said sections and coördinate with said swinging plates and removable through pins extending through a series of the alined ends of the hinged plates on each section, and having pull ropes.

4. A water-proof caisson or concrete form, comprising sections adapted to be superposed upon one another, one end of each section having seat forming portions for the reception of the contiguous abutting end of a superposed section, said sections being divided into a plurality of separable parts, hinge plates flexibly connected at one side of said parts, flanges projecting outwardly from the contiguous longitudinal edges of said parts, said hinges being adapted to engage the contiguous portions of said flanges for clamping the same together to form a tight joint longitudinally, swinging clamp plates connected to said parts of a section for clamping the adjacent edges of the same together permanent hinge plates connected to said sections and coördinate with said swinging plates and removable through pins extending through a series of the alined ends of the hinged plates on each section, and having pull ropes, and tension devices connecting abutting ends of each of the sections for holding same together and forming a water-tight joint.

5. A water-proof caisson or concrete form, comprising sections adapted to be superposed upon one another, one end of each section having seat forming portions for the reception of the contiguous abutting end of a superposed section, said sections being divided into a plurality of separable parts, hinge plates flexibly connected at one side of said parts, flanges projecting outwardly from the contiguous longitudinal edges of said parts, said hinges being adapted to engage the contiguous portions of said flanges for clamping the same together to form a tight joint longitudinally, swinging clamp plates connected to said parts of a section for clamping the adjacent edges of the same together, permanent hinge plates connected to said sections and coördinate with said swinging plates and removable through-pins extending through a series of the alined ends of the hinged plates on each section, having pull ropes, tension devices connecting abutting ends of each of the sections for holding same together forming a water-tight joint, and haul ropes connected to the parts of said sections for opening the same about their hinges after the withdrawal of the through-pins of the sections.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN VUKOVICH.

Witnesses:
DAVID SIMINOFF,
T. M. ANDVICH.