(No Model.)

J. E. SIMPSON, Jr., & A. H. SIMPSON.

DRY DOCK.

No. 347,896. Patented Aug. 24, 1886.

Fig. 1.

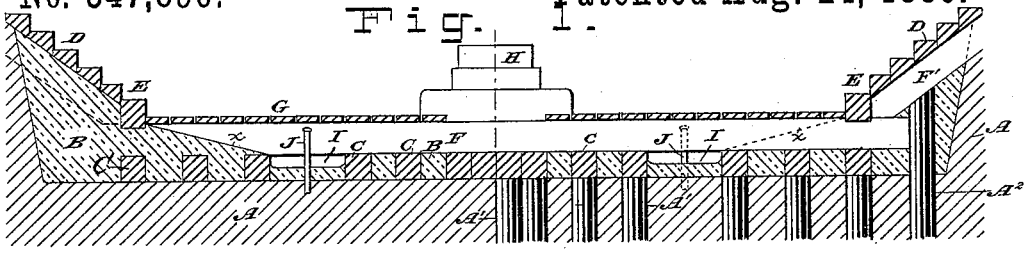

Fig. 2.

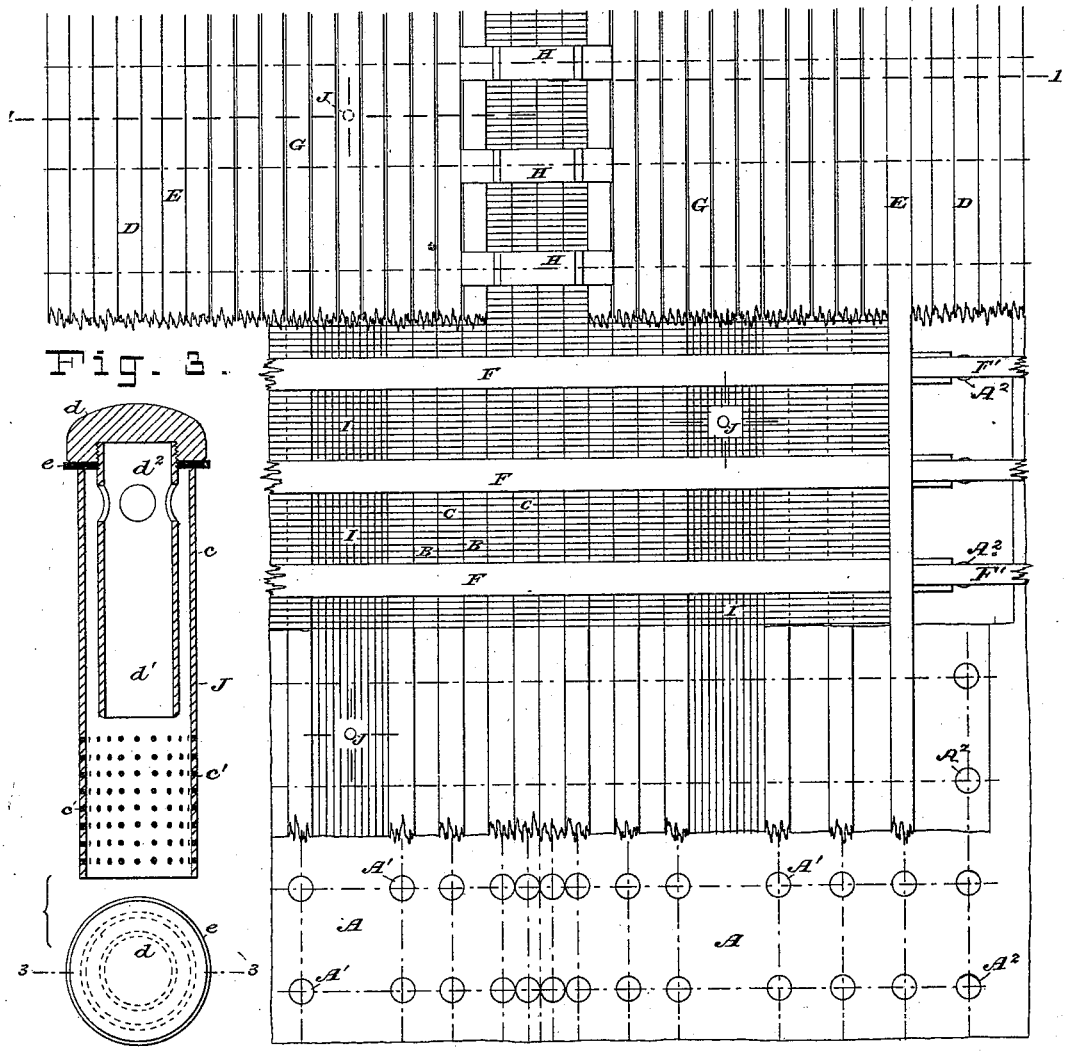

Fig. 3.

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DRY-DOCK.

SPECIFICATION forming part of Letters Patent No. 347,896, dated August 24, 1886.

Application filed January 27, 1886. Serial No. 189,925. (No model.)

To all whom it may concern:

Be it known that we, JAMES E. SIMPSON, Jr., and ALFRED H. SIMPSON, both citizens of the United States, and residents of Brooklyn, Kings county, New York, have jointly invented certain Improvement in Dry-Docks, of which the following is a specification.

Our invention relates to that class of docks known as "permanent dry-docks," which are located at the margins of or in tidal waters. A dry-dock of this general character is shown and described in the Letters Patent of James E. Simpson, No. 204,689, dated June 11, 1878. Where such docks are built upon soft spongy soil it is necessary to drive piles to support the bottom of the dock. In the patent above referred to such foundation-piles were shown driven in transverse rows with projecting heads, and on these were laid cross-beams, upon which were placed the planking forming the floor. Concrete was placed on the soil around the heads of the piles.

Our present invention consists in an improvement upon this construction of the bottom and floor of the dock, and in the peculiar construction of overflow-valves for relieving the bottom of the dock from exterior hydrostatic pressure, all as will be hereinafter described.

In the drawings, which serve to illustrate our invention, Figure 1 is a transverse section of a dry-dock constructed according to our invention, the plane of the section being indicated by line 1 1 in Fig. 2. Fig. 2 is a plan of the bottom of such a dock, drawn in such a manner as to illustrate its construction, as will be readily understood from the description which follows. Fig. 3 illustrates, on a large scale, the construction of the overflow-valve, the upper view showing the whole in longitudinal vertical mid-section and the lower view showing the valve in plan. The line 3 3 in the plan indicates the plane of the section in the upper view.

A represents the native soil, which in this case is supposed to be soft and spongy, such as will often be found at the level of tide-water. In this soil is made an excavation of the proper form and dimensions for the proposed dock. In making the excavation the usual precautions, well known to engineers, will be taken to keep out the water. Rows of foundation-piles A′ A′, as seen in Fig. 1 and at the lower part of Fig. 2, are now driven and their tops leveled off flush with the ground, and on these are laid and firmly bolted, or otherwise fastened down, a series of longitudinal timbers, C C. A bed, B, of concrete, is now laid on the soil and up to the level of the tops of the timbers C, so as to embed the said timbers. On the timbers C are laid and firmly bolted or otherwise fastened thereto the transverse floor-timbers F F, on which are gained and secured the stringers E E at the bases of the sloping sides of the dock. The altars or steps D D are supported on inclined timbers F′ F′, which rest at their lower ends on the cross-beams F and abut against the stringers E. These timbers F′ are supported from below on exterior rows of brace-piles A^2, and the concrete B is carried up the sides to a level with the inclined upper faces of the timbers F′. The surface of the concrete forms a slope at each side at $x\,x$, and at these points the concrete wholly embeds and covers the timbers C at the sides, as clearly shown at the left in Fig. 1. These inclines $x\,x$ extend out to two channels or kennels, I I, formed in the upper surface of the concrete between the timbers C, and extending lengthwise of the bottom of the dock. The inclines and channels serve to drain the bottom of the dock, the channels I leading to a pumping-well. (Not shown.) The floor G is formed of planks laid with open joints on the cross-beams F and spiked firmly thereto.

The above-described construction of the bottom and sides of the dock is exceedingly strong and durable, and besides is inexpensive as compared with granite constructions having reverse arches, as sometimes employed.

In our pending application, Serial No. 189,924, we have described and claimed reliefs or overflow-valves arranged in the bottom of the dock to permit the water from beneath the dock to rise and overflow into the dock, and thus relieve the pressure from the bottom. We employ such overflow-valves in this construction, they being located at suitable points

in the channels I. They are indicated by the letters J J in the drawings. The valve herein shown, and illustrated in Fig. 3, differs from that in our aforesaid pending application in some of its features of construction.

c is a tube provided with perforations *c'* at its lower end. This tube is the same as that in our pending application, and is set in the same manner—that is to say, it passes down through the concrete bed forming the bottom of the channel I, and its apertured or perforated end enters the soil below. The valve *d* is provided with a suitable packing, *e*, and rests on the upper end of tube *c*, which forms the valve-seat. The stem *d'* of the valve is in this case constructed tubular, and has a diameter somewhat less than the interior diameter of the tube *c*. It has apertures d^2 formed in it near its upper end and just below valve *d*, in order that the water which flows up through the hollow stem may have an ample outlet for overflow. The enlarged stem forms a suitable guide for the valve when it rises, and insures the valve coming back properly to its seat.

The object of the valve is to prevent the water when the dock is flooded from flowing down, or being forced down by the head through the overflow-tubes to the soil beneath the dock.

We wish it understood that we do not claim in this application, broadly, the employment of overflow-valves to relieve the bottom of a dock from hydrostatic pressure, as this is embodied in our other application before referred to. In that application we showed a construction of the dock especially adapted to hard or rocky soil. In our present application the construction is modified to suit soils requiring piles as a support for the bottom and sides of the dock.

Having thus described our invention, we claim—

1. A dry-dock wherein the bottom and sides are constructed of the rows of bottom-bearing piles A', cut off level with the bottom of the excavation, the longitudinal timbers C, laid on and firmly secured to said piles, the cross-timbers F, laid on and firmly secured to the timbers C, the string-pieces E, laid on and firmly secured to the cross-timbers F, the inclined timbers F', arranged as shown, the exterior rows of brace-piles A^2, supporting the timbers F', the altars D, laid on the timbers F' and secured thereto, and the concrete bed B, carried up to the tops of the timbers C and F, substantially as set forth.

2. The overflow-valve J, comprising the tube *c*, with openings for the ingress of water at its lower end, and the valve *d*, provided with a packing, and a tubular stem, *d'*, having a diameter a little less than that of the tube *c*, and provided with apertures d^2 at its upper end, substantially as set forth.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

JAMES E. SIMPSON, JR.
ALFRED H. SIMPSON.

Witnesses:
RICHARD S. BOSTWICK,
WILLIAM T. KING.