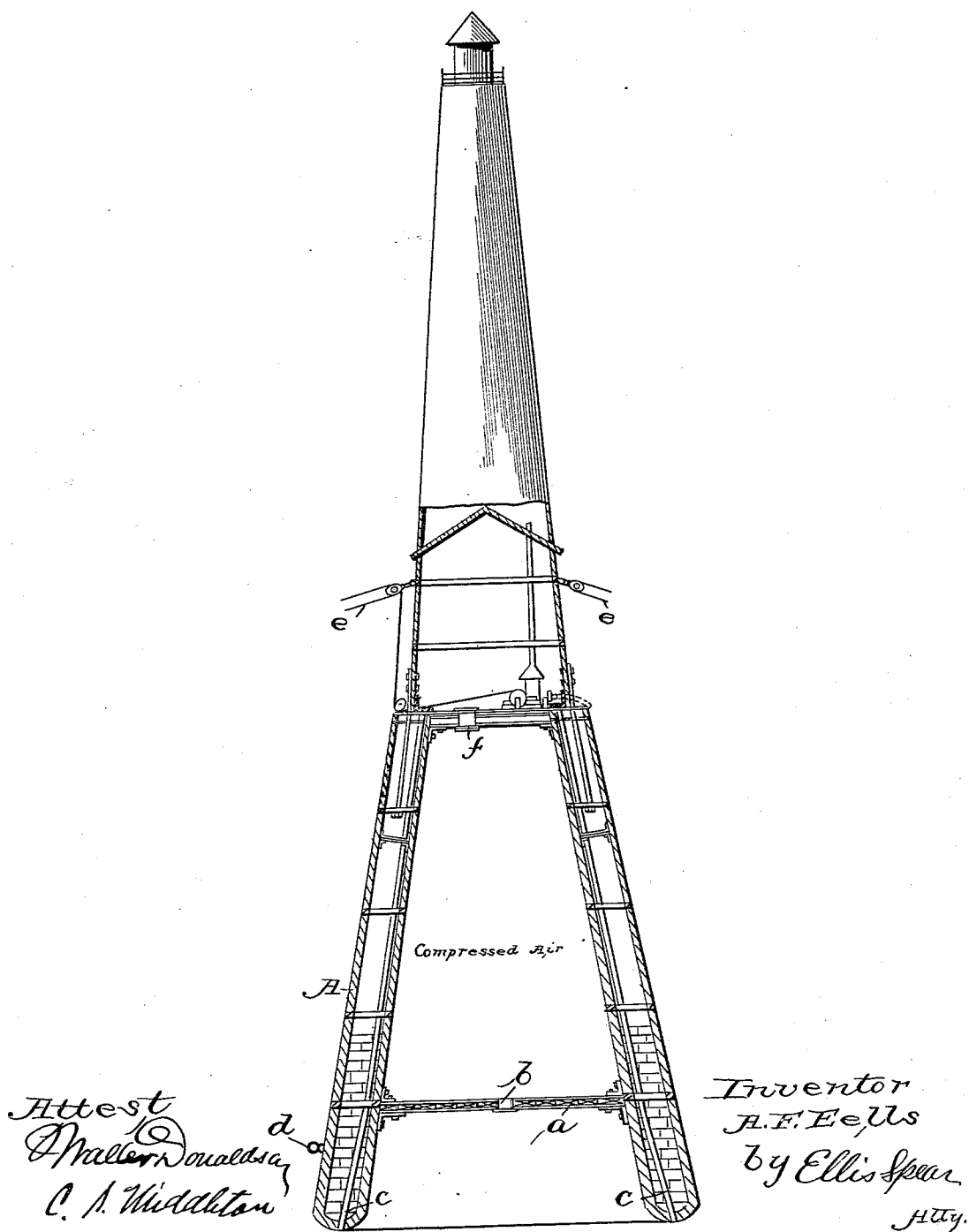


(No Model.)

A. F. EELLS.
FOUNDATION FOR LIGHTHOUSES.

No. 560,088.

Patented May 12, 1896.



UNITED STATES PATENT OFFICE.

ALBERT FRANKLIN EELLS, OF BROOKSVILLE, MAINE.

FOUNDATION FOR LIGHTHOUSES.

SPECIFICATION forming part of Letters Patent No. 560,088, dated May 12, 1896.

Application filed August 29, 1895. Serial No. 560,945. (No model.)

To all whom it may concern:

Be it known that I, ALBERT FRANKLIN EELLS, a citizen of the United States, residing at Brooksville, in the county of Hancock and State of Maine, have invented certain new and useful Improvements in Foundations for Lighthouses, Piers, &c., of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to the construction of foundations for lighthouses, piers, &c., and is intended to provide means by which such structures can be located at points ordinarily inaccessible and where such structures cannot be built in the ordinary way by reason of storms, tides, currents, and the character of the foundation, and by reason of deep water, sand, or mud, and because of the difficulty in transporting the material and holding it in readiness for use in the building up of such structures as ordinarily practiced. I have overcome the serious difficulties above enumerated by building the lower part of the structure in some port adjacent to the land and secure from the destructive operation of the waves, and this lower part I build as a floating caisson, preferably of a flaring cylindrical shape, having double walls and with an air-chamber arranged centrally of the structure with means for letting in the water and discharging the air in the sinking of the structure and with means for removing the water when it is desirable to make it more buoyant by compressing the air in the central chamber.

My invention includes special constructions and special methods of use and manipulation, as hereinafter set forth.

I have illustrated the construction for my improvement in the accompanying drawing, which shows a sectional view of the foundation, with the lighthouse or upper structure shown as secured thereto.

In carrying out my invention I construct the foundation part shown at A of suitable material, preferably metal, and make it very strong, of any desired shape in cross-section, though I prefer to make it of a circular cross-section, tapering from the bottom upward, and this structure is made with double walls suitably braced, with an interior space adapt-

ed to be filled with masonry, part of which is to be laid while the structure is in the harbor, for the purpose of ballast. An air-tight top having a manhole *f* is provided for covering the upper part of the caisson, and this has an air-tight door opening and closing from below. A temporary diaphragm or floor *a* is provided near the bottom of the structure within the lines of the walls, and this has a similar door or water-gate at *b*, the chamber between the temporary floor and the upper part of the structure, together with the space below, preferably being filled with compressed air while the caisson is being towed to the place of the grounding, with the passage *g*, of course, open. A series of pipes *c* extend down between the double walls of the outer casing to the bottom thereof, and these pipes are connected with a suitable pump for pumping away the sand and thus permitting the sinking of the structure to a solid or rock foundation.

Suitable connections *d* are provided for the attachment of the towing-ropes for carrying the caisson to the place of sinking. The caisson may be made buoyant or made to sink low in the water by manipulating the water-gate in the temporary bottom, and by thus sinking it is protected from storms while in transit from the place of construction to the place of sinking. When the proper location has been reached, it is sunk to the bottom by permitting escape of air, and the pumps are set to work to pump out the sand through the series of pipes *c*, which causes the caisson to settle, and while this operation is going on water may be pumped into the interior chamber, which will give stability to the structure while it is being anchored. After the caisson has grounded the filling of the space in the walls is completed with masonry. This renders the structure solid on its foundation and secure against disturbance by the swells or waves while the main masonry structure is building in the body of the caisson. The temporary bottom is then removed and the interior space is also filled up with concrete or masonry, this forming a combined metal and masonry foundation, and the masonry foundation will be permanent even after the outer metal has been worn away. During the

sinking operation the structure is suitably anchored by guy-ropes *e*, running off to stationary anchors. During the operation should the central chamber become obstructed by the sand in the bottom thereof a branch pipe from the sand-pump can be extended through the hatch *f* and the sand or mud at the bottom removed.

It will be noticed that with this structure absolute control is provided, and in sinking the caisson, should one side sink faster than the other, it is only necessary to stop the pumps, from working on one side and keep those at work on the other side until the structure begins to sink on a level.

In case the location is shown to be impracticable, then air may be pumped in sufficient to float the structure to another location.

The superstructure may be of any desired kind. I have shown a tower or lighthouse the bottom of which is found by the top of the caisson.

I claim—

1. A floating caisson having double walls, a temporary bottom, a central closed air-chamber formed by the walls of the caisson above said bottom and means for flooding said chamber, substantially as described.

2. The floating caisson having double walls and a central air-chamber and a series of pipes extending downwardly between the double walls to points directly beneath the bottom of the caisson whereby the material below the

edges of the caisson may be removed, substantially as described.

3. In combination, the upper shell having the closed bottom, the support therefor, comprising the truncated conical double shell and the temporary floor secured near the bottom of said conical shell whereby an inclosed space is formed between said temporary floor and the floor of the upper shell, substantially as described.

4. In combination, the upper shell provided with pumping appliances, the base comprising the double conical shell and the pipes extending between said walls of said double shell, the upper end of said pipes being in communication with a pumping appliance, substantially as described.

5. The method of constructing a subaqueous foundation, consisting in the use of a double-walled caisson, having a covered interior, in weighting the caisson by partially filling the space in the double walls, sinking the caisson in place, then completing the filling of the interior of the wall-space and finally filling the center of the caisson, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ALBERT FRANKLIN EELLS.

Witnesses:

M. D. CHATTO,

RODNEY WITHERSPOON.