

(No Model.)

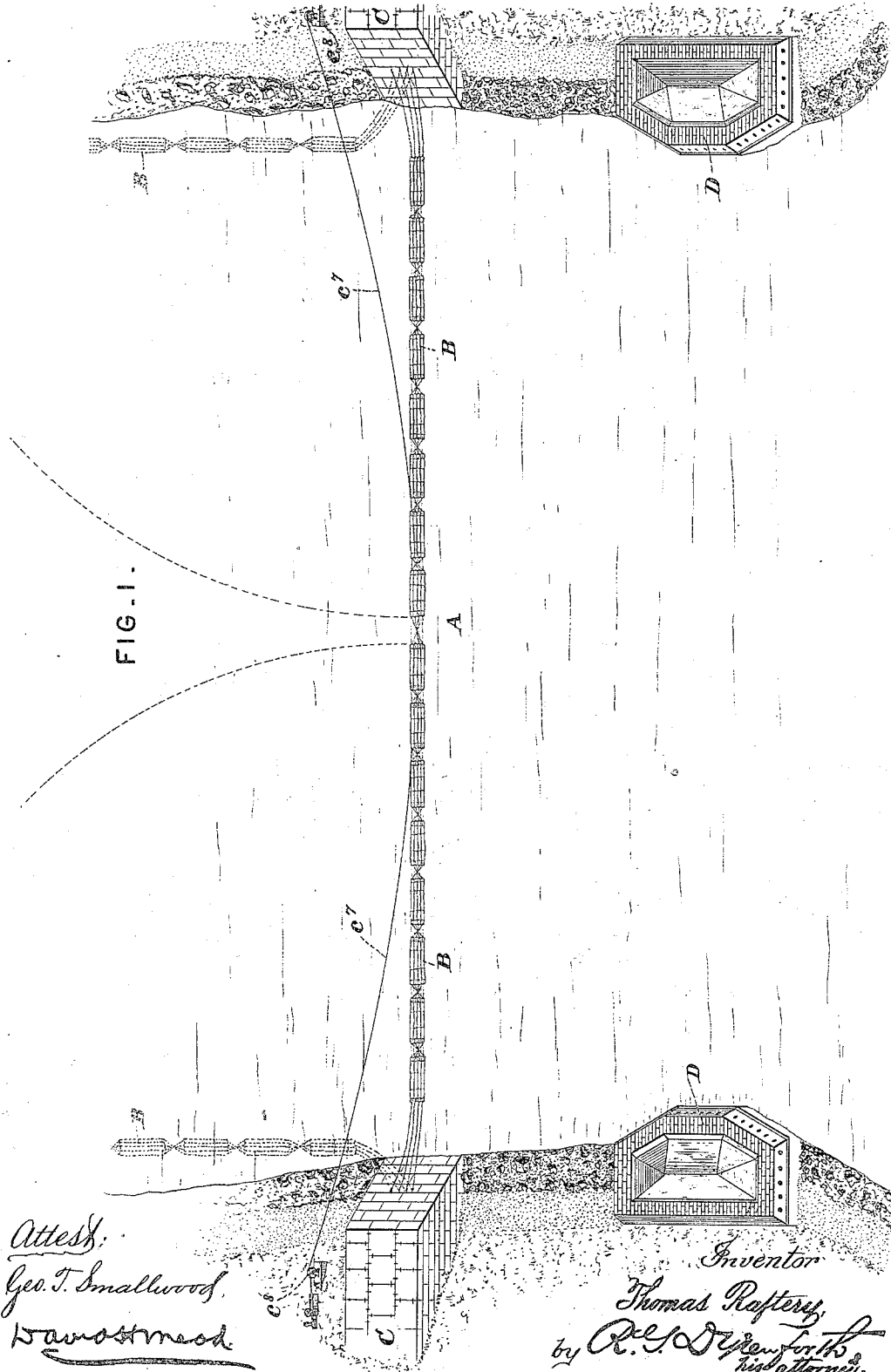
3 Sheets—Sheet 1.

T. RAFTERY.
BOOM.

No. 405,597.

Patented June 18, 1889.

FIG. 1.



Attest:
Geo. T. Smallwood,
Witness

Inventor
Thomas Raftery,
by *R. S. Dyre* for his
attorney

(No Model.)

3 Sheets—Sheet 2.

T. RAFTERY.
BOOM.

No. 405,597.

Patented June 18, 1889.

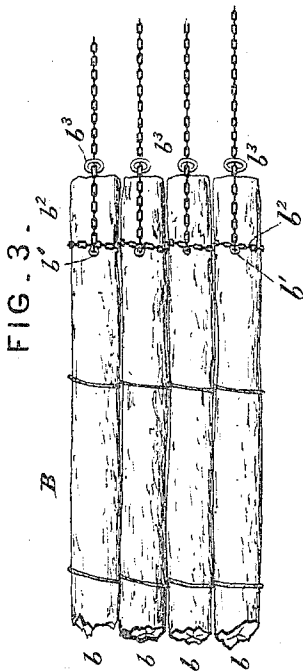
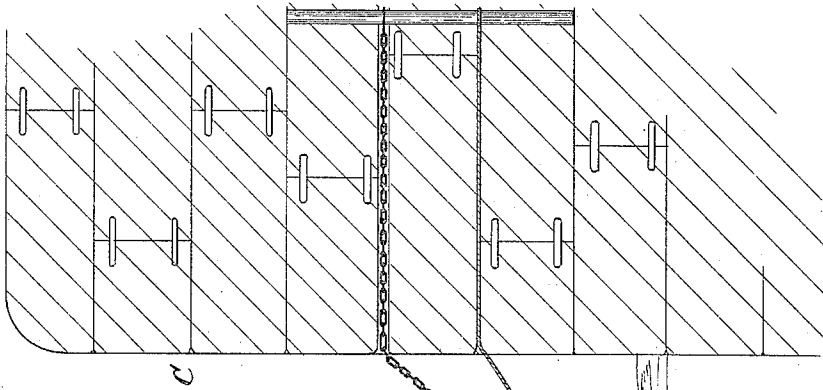


FIG. 2 -

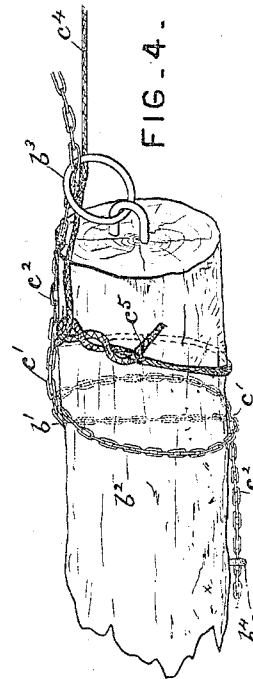
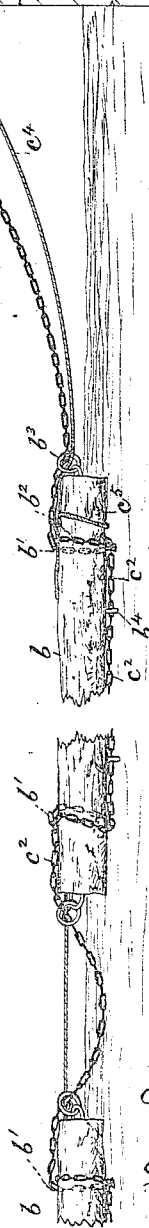


FIG. 4 -

Attest:
Geo. T. Smallwood.
Lawyer & Counselor

Inventor
Thomas Raftery,
by R. G. Dykesworth,
his attorney.

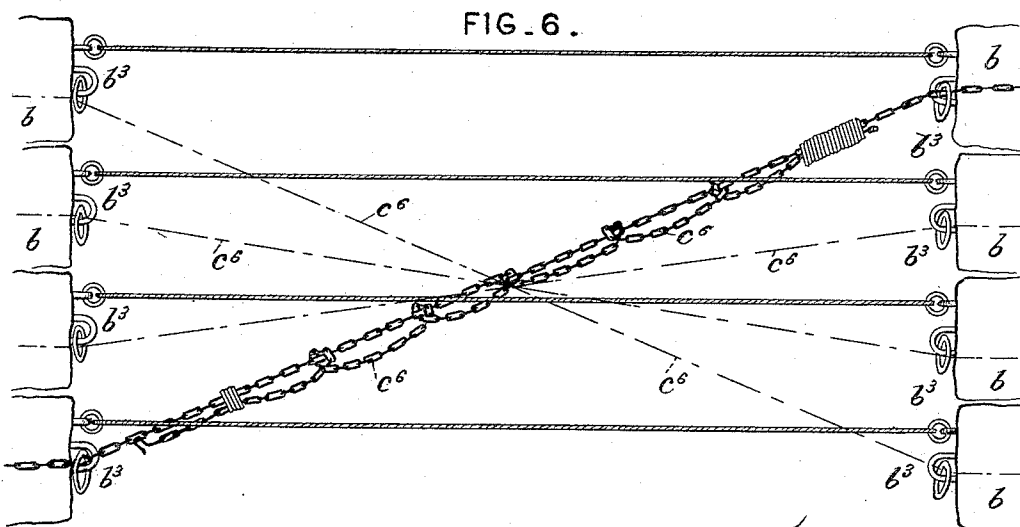
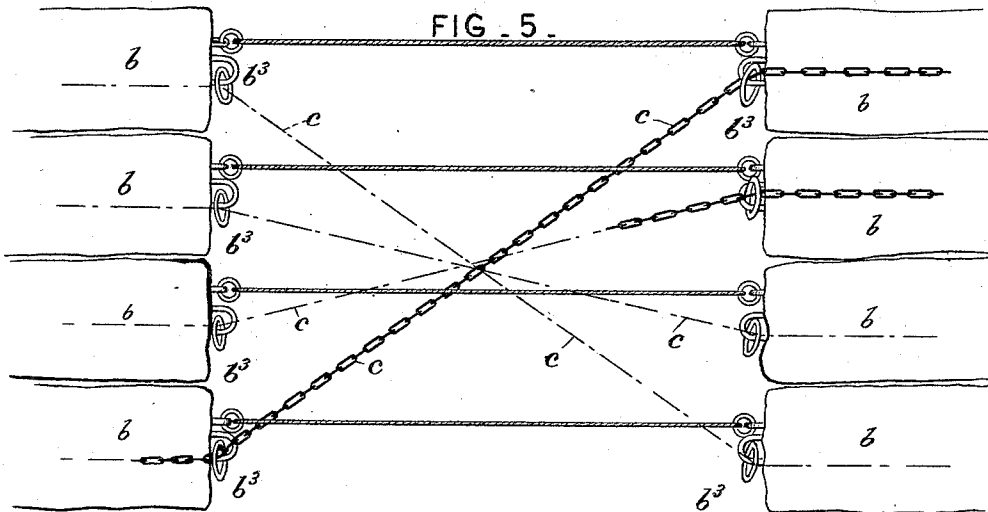
(No Model.)

3 Sheets—Sheet 3.

T. RAFTERY.
BOOM.

No. 405,597.

Patented June 18, 1889.



attest:
Geo. T. Smallwood.
David H. Mead.

Inventor:
Thomas Raftery,
by A. E. Dyrenforth,
his attorney.

UNITED STATES PATENT OFFICE.

THOMAS RAFTERY, OF NEW YORK, N. Y.

BOOM.

SPECIFICATION forming part of Letters Patent No. 405,597, dated June 18, 1889.

Application filed September 26, 1888. Serial No. 286,411. (No model.)

To all whom it may concern:

Be it known that I, THOMAS RAFTERY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Booms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to coast, river, and harbor defenses.

The object of the invention is to produce a defense in the nature of an obstruction in navigable waters, which, while in the highest degree efficient against any attempt on the part of those opposed to it to pass it, shall at the same time be capable on the part of those employing it both of being readily opened or put out of position when it is desired not to impede navigation and of being readily shut, replaced, or put into position when it is desirable to obstruct.

With these objects in view the invention consists in a boom capable of being readily opened and closed, constructed in sections and attachable and detachable, whereby it may readily be moved into or out of position, the whole constituting what may be termed a "harbor-gate," "raft-gate," or "gate-boom," substantially as hereinafter set forth and claimed.

In the accompanying drawings, forming part of this specification, and in which like letters of reference indicate corresponding parts, Figure 1 is a plan view of the entire boom and surroundings, showing the general arrangement of my invention, the boom in full lines being shown closed and in broken lines open. Fig. 2 is a view in side elevation of one abutment and parts of two sections of the boom with one section broken away intermediately and the other broken off to reduce the illustrative length, showing the mode of attachment of the chains and cables from the abutment to the sections in succession below. Fig. 3 is a plan view of a portion of one section showing the chains parallel attaching a section to an abutment and the cables there. Fig. 4 is a view in side elevation showing in detail the mode of attachment of a chain to a log—that is, by a half-hitch. Fig. 5 is a

plan view, with one of the chains and part of another fully drawn and the position of the others indicated, showing the course of the chains below from section to section and the cables attaching the sections together. Fig. 6 is a plan view, with two joining chains fully drawn and the position of the others indicated, showing the mode of attachment together of two sections where the boom is to be opened, also showing the cables between the two sections.

There are three methods of guarding harbors now in vogue. One is to sink hulks and other obstructions in the channel-way, but this usually permanently injures the harbor. The second is to extend strong chains across the narrowest part of the entrance; but this impedes navigation, and, owing to the great weight of the chains, it is almost impossible keep them in their entire length near enough to the surface, while, moreover, by reason of the facilities for lifting and cutting them now possessed by modern war-ships, their purpose is easily obviated. The third method is to extend a permanently-fixed floating boom across the channel; but such a boom impedes or blocks navigation, wants requisite strength to resist being broken by concussion, is subject to be torn asunder by shot, or may often be depressed or jumped.

To meet the requirements and overcome all objections, I have devised a construction at once simple and feasible and capable of any required strength, and which may be called a "gate-boom" or "raft-boom" with "raft-gates."

The invention is to be used not as a substitute for torpedoes and forts, but as a valuable aid to these, being employed especially under the aid of a fort or forts.

My gate-boom can be made available for the ports of the coast as well as for those of the lake cities.

In order to show the construction and mode of operation of my invention, I select the port of New York, for example. The gate-boom or raft-gate may be located either in the ship-channel at Sandy Hook or in the Narrows, near the two forts. I select the latter site.

At a suitable distance beyond the inside end of each fort I construct a strong stone

abutment, built mostly under ground, and within this fasten securely one or more (preferably four) of the largest and strongest chains forged at the present day, and in addition one or more (preferably four) strong wire cables. Hereto I attach one or more (preferably four) logs of suitable size—say, of six feet in diameter and of thirty feet in length—(the Puget Sound fir-trees will yield logs of the requisite dimensions) or logs in bundles to give the requisite dimensions, the bundles being securely and substantially formed, and each log or bundle of logs being provided with one or more eyebolts or ring-bolts on each end, and on its under surface with a perforation from top to bottom about four feet from each end, and with a peripheral groove or collar near each perforation. Each chain from the abutment passes to a log, passes upward through a ring-bolt at the end, then along the upper surface to the perforation, then down through the perforation, then around the log at the groove or collar in a half-hitch, with the bight underneath, then along the under surface of the log, through the ring-bolts to the other perforation, then upward through the perforation, then around the log with a half-hitch, with the bight on the upper side. Each wire cable from the abutment passes to a log and is fastened to it, securely holding the log by a timber-hitch.

The boom is constructed in sections, preferably of four logs or bundles of logs each, and in the manner above described the end sections will be flexibly, but with great strength, attached at the shore. Other sections may be added to either or both end sections, as follows: The chains from the logs will be crossed and each will pass to a log in corresponding position on the opposite side. In this manner additional sections may be added at will, it being understood that the fastening of the chains to and upon the additional sections will be in manner similar to that of the first section. The cross-chains are beneath the surface of the water at the under portion of the logs. In addition to these, at the upper portion of the logs, there are wire cables passing directly from log to log. By the manner of attachment of the chains and cables great strength is given to the entire structure, and by the method of joining the sections not only is great resistance presented to any concussive force brought to bear between them, as by a ram, but sufficient resiliency is afforded to give them tendency to come together, and thus to bring a crushing-force to bear laterally upon the assaulting object, thus also entangling it, the momentum of the adjoining sections aiding in these respects. The purpose of the double attachment of the boom at the shores is to give increased strength, as most of the pressure in case of an attempt to force the boom would fall here. The logs support the chains, &c.,

and these bear down the logs, so that very little target-surface is offered.

A general objection to booms is that when once placed in position they present a serious obstruction also to those employing them, and with a boom constructed as above described, with its exceeding strength, the objection might be even greater; but to obviate this I make my boom capable of being parted, either from the shore or intermediately—that is, of being opened and shut—the sections being then extended and moored or anchored along shore.

To bring the boom into position, it will only be necessary to tow the free ends together or haul them together from the shore, as by a steam-engine or otherwise, and to fasten the boom in position I employ a simple but very effective device in the nature of a cable bend—that is to say, I form of the projecting ends, from the free ends of the meeting sections, a bend consisting of a loop, a half-hitch, and another half-hitch, and fasten the free part of the chain sufficiently near its end to the standing or first portion of the chain by whipping or otherwise, the chain itself being hooked, anchored, or concealed in any suitable manner.

It is to be understood that when the boom is capable of being parted at either shore and is reattached the wire cables will be fastened to the logs, as before described.

With the construction above described it is not likely that any attempt would be successful to submerge the boom or to pass over it; but for additional security I employ one or more strong and flexible wire cables which pass beneath some of the sections of the boom, preferably at the center, and wind the same upon cylinders or drums on the shore, driven by suitable power. It is obvious that the winding up of the cable or cables will elevate the boom as desired.

It will be clear that I may employ several booms side by side.

As my boom will be immediately under the guns of a fort, it is obvious that there could be no successful attempt to blow it up by dynamite or otherwise. The boom will be properly lighted by electricity or otherwise, and be as well protected as the fort itself.

In the drawings, A designates the boom, formed in sections, B designating the sections. C indicates the abutments, and D one or more forts. The sections are made up of one or more logs or bundles of logs *b*, properly lashed or banded together, or secured together in any other suitable manner. The logs are perforated at *b'*, and may be grooved or provided with collars at *b²*, and have one or more eye or ring bolts *b³* at each end, and one or more eye or ring bolts *b⁴* along the under surface of each. The chains from the abutments are designated by *c*, and the half-hitches formed by them on the logs are indicated at *c'*, the extension of the chains on the surfaces of the

logs being marked c^2 , and their crossings between sections being marked c^3 . The wire cable from the abutments to an end section of the boom is marked c^4 , being attached each to a log by a timber-hitch at c^5 . The cable bends are designated at c^6 , and c^7 is the cable for supporting the boom against depression, this cable to be wound up for use on a drum or drums c^8 and to be removed or parted when the boom is to be swung open.

It is to be understood that the drawings are chiefly in the nature of diagrams, rather serving to illustrate the principle of my invention than as representative of the exact mode of embodiment, since what is described and shown may be considerably varied without departing from the spirit of my invention.

It is obvious that a chain, instead of first passing up through a ring-bolt and then along the upper surface of a log, then down through a perforation, then in a half-hitch around the log, then along the under surface of the log, then up through the other perforation, then in a half-hitch around the log, then along the upper surface of the log to the end, and down through a ring-bolt to a log of the next section, may first pass down through a ring-bolt and then along the under surface, and so on, either on all the logs or alternately; but the attachment first described is preferred.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A gate-boom or raft-gate, made in two parts detachably connected, consisting of buoyant sections flexibly joined, both parts capable of being swung to open or close the boom.

2. The combination, with abutments, of a gate-boom or raft-gate, consisting of buoyant sections flexibly connected, the boom being made in two parts detachably joined, each part capable of being swung.

3. The combination, with a boom made in sections flexibly joined, of a supplemental cable joined to the sections and means for pulling upon the cable, substantially as and for the purpose set forth.

4. The combination, with a boom made in one or more parts, of chains joined by fastening in the nature of a cable bend, substantially as described.

5. The combination, with an end section of a boom, of an abutment and chains and cables, the chains and cables being firmly fixed in the abutment, and each chain being attached to a log by a half-hitch, and each cable by a timber-hitch, substantially as described.

6. In a sectional boom, the combination of an end section formed of one or more logs or bundles of logs, each provided with a perforation, of an abutment and of one or more chains, each chain passing to the upper surface of the log, down through the perforation, then being formed in a half-hitch around the log, and passing on along the under surface of the log, substantially as set forth.

7. In a sectional boom, the combination of an end section formed of one or more logs or bundles of logs, each provided with two perforations, of an abutment and of one or more chains, each chain passing to the upper surface of the log, then down through the first perforation, then formed in a half-hitch around the log, and passing on along the under surface of the log to the second perforation, then up through this perforation, then formed in a half-hitch around the log, and passing on along the upper surface of the log, substantially as described.

8. In a sectional boom, the combination of an end section formed of one or more logs or bundles of logs, the logs of each section being securely lashed or banded together, each log provided with two perforations and with one or more circumferential grooves or collars, of an abutment and of one or more chains, each chain being securely fastened to the abutment and passing to a ring-bolt fixed in the log, then over or under the log to the nearest perforation, then through this perforation and around the log in a half-hitch, then along the log, either guided or not by eye or ring bolts, then through the other perforation to the opposite side of the log, then around the log in a half-hitch, and then along the log to another eye or ring bolt, substantially as described.

9. In a boom formed in sections, the combination, with the sections, of chains and cables, the chains being crossed and the cables being fastened to their respective logs, substantially as set forth.

10. A gate-boom or raft-gate, made in one or more detachable parts formed of buoyant sections flexibly joined by cables and cross-chains, the whole boom or any part capable of being swung to open or close.

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

THOMAS RAFTERY.

Witnesses:

DAVID H. MEAD,
JAMES F. MULLALLY.