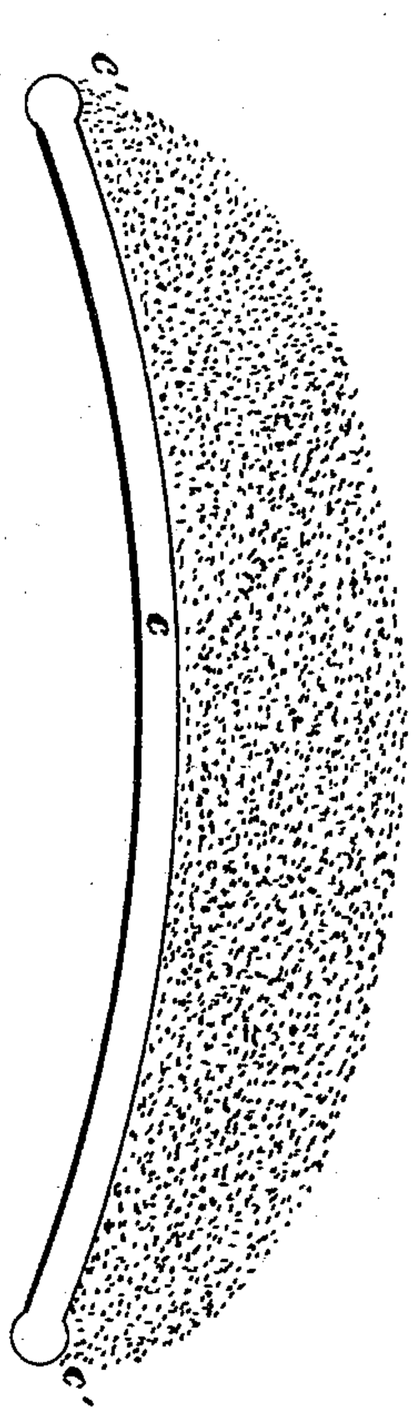
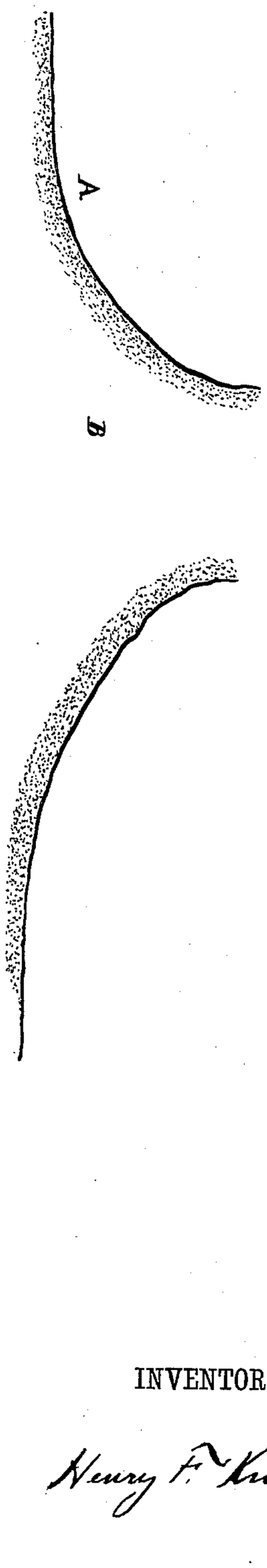
(No Model.)

# H. F. KNAPP.

## DEEPENING HARBOR BARS.

No. 390,237. Patented Oct. 2, 1888.




WITNESSES:

Edmund Wetherbee

John Bedell

INVENTOR

Henry F. Knapp

# UNITED STATES PATENT OFFICE.

HENRY F. KNAPP, OF NEW YORK, N. Y.

## DEEPENING HARBOR-BARS.

SPECIFICATION forming part of Letters Patent No. 390,237, dated October 2, 1888.

Application filed May 2, 1883. Serial No. 93,687. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY F. KNAPP, of the city, county, and State of New York, have invented a new and useful Improvement in the Means for Deepening the Bars at the Mouths of Harbors and Rivers, of which the following is a specification.

This invention consists of a certain improvement in the manner of building a rigid and submerged artificial bar on the outside of and as a substitute for nature's sand-bar at the mouth of a harbor or port; and it consists in building the structure on a curve that radiates seaward, or, in other words, has its convexity toward the mouth of the harbor, thereby enabling the shore-currents to work in behind the structure in greater volume and force, and so carry off with increased facility any sedimentary deposits that may be dropped there. Such convexity of form has also the power and tendency to influence and control the flow of the flood-tide currents running into the harbor or river over the submerged bar, so as to better concentrate such currents on a central line or channel after passing over the artificial bar, and so help to obtain and maintain an increased depth of channel inside the harbor's mouth, or, in other words, on nature's sand-bar. Such convexity will also influence and control the current force resulting from wave action, (which rushes upon the submerged bar,) to concentrate itself to a degree on the same inside central channel-line, and thereby largely enhance the original purpose and effect of an artificial-bar system.

The apex of the artificial and submerged bar is on a level considerably lower than the top of nature's sand-bar. Therefore the form of the artificial bar would not affect the ebb or outflowing currents no matter what its alignment or curve; but it is just the reverse on the counter current—viz., the flood-tide current and wave-force current resulting from wave action coming in from the sea; and for this purpose the inshore convexity is given the structure, so as to obtain an important benefit and avoid a disadvantage.

For fuller description I will explain by detail from the accompanying drawings, in which—

A represents the shores on each side of the mouth of harbor B, and C represents the artificial and submerged bar having its convexity inshore toward the mouth of the harbor, its apex or top being submerged deep enough to permit the passage of vessels over it without touching.

C′ represents an increased capacity of structure at its ends on account of being more exposed or assailable.

I claim—

A submerged artificial bar placed before the mouth of a river or harbor and formed with its convexity toward said mouth and its concavity toward the sea, as and for the purpose set forth.

HENRY F. KNAPP.

Witnesses:
EDMOND WALDORF,
JOHN BEDELL.