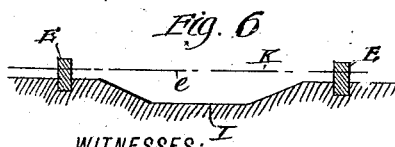
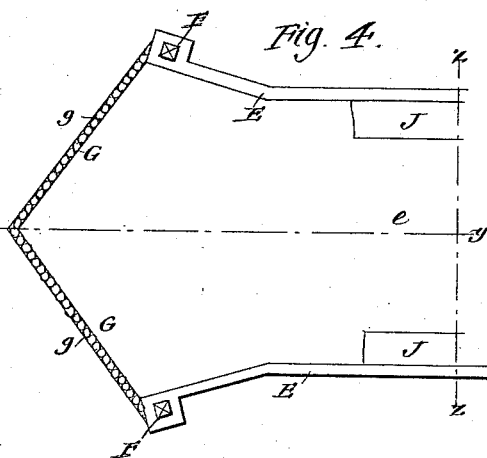
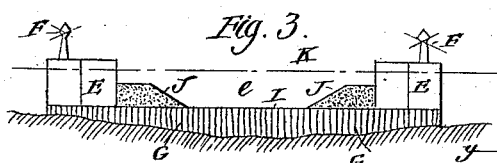
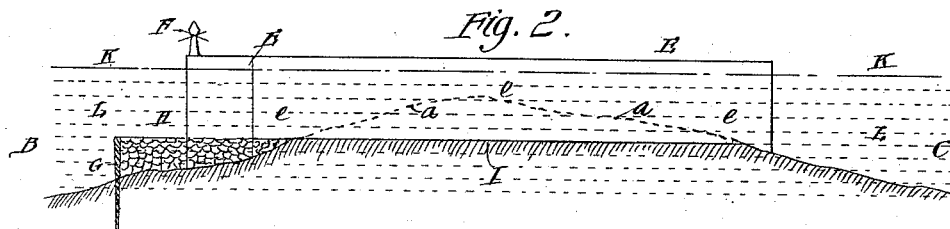
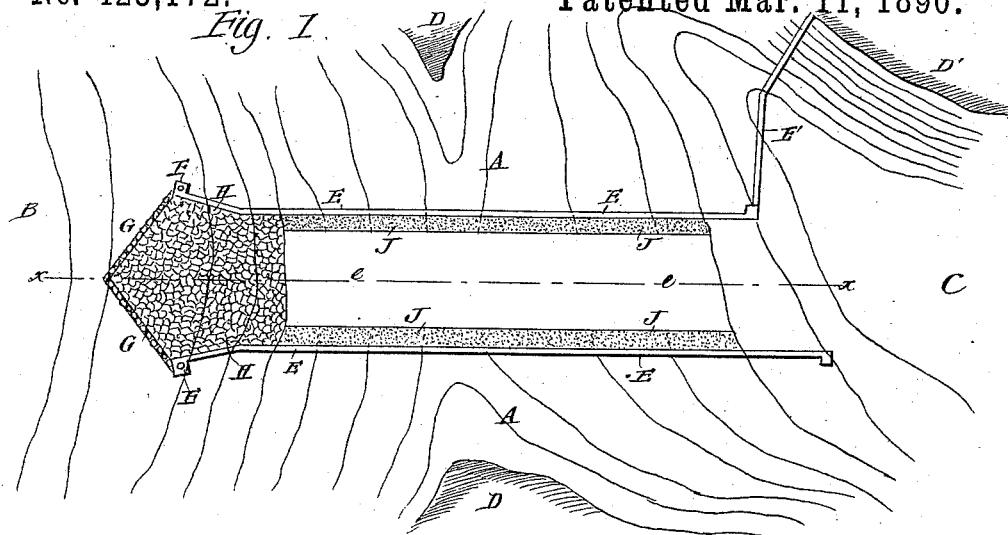


(No Model.)

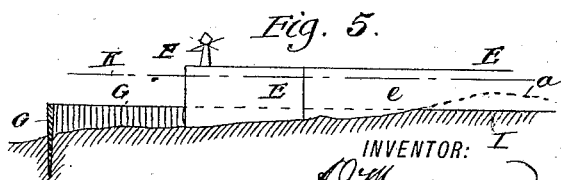
A. J. MAUERMANN.
SUBMARINE CHANNEL PROTECTION.

No. 423,172.

Patented Mar. 11, 1890.



WITNESSES: *I*
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UNITED STATES PATENT OFFICE.

ALBERT J. MAUERMANN, OF HOUSTON, TEXAS:

SUBMARINE-CHANNEL PROTECTION.

SPECIFICATION forming part of Letters Patent No. 423,172, dated March 11, 1890.

Application filed August 15, 1889. Serial No. 320,811. (No model.)

To all whom it may concern:

Be it known that I, ALBERT J. MAUERMANN, of Houston, in the county of Harris and State of Texas, have invented a new and useful Improvement in Submarine-Channel Protection, of which the following is a full, clear, and exact description.

My invention relates to a protection for submarine channels, and has for its object to permanently maintain a navigable channel across a bar or bank.

The improvement is more especially adapted for localities not favored by swift-running rivers or streams wherein jetties may be used to advantage.

The jetty system seeks to wash or scour the sand or obstruction from the channel, while my improvement operates on the reverse principle—that is to say, it prevents entrance of sand to fill up a channel once formed, and obviates subsequent dredging operations.

The invention consists in certain novel features of construction of the submarine-channel protection, all as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of water-courses with my improved submarine-channel protection built therein to provide a permanent water-way across a sand-bar. Fig. 2 is a vertical longitudinal section taken on the line *x x* in Fig. 1. Fig. 3 is an end view of the improvement. Fig. 4 is a detail plan view of one end of the improvement drawn to a larger scale and with the filling inside the submarine barrier omitted, as may at times be the construction. Fig. 5 is a side elevation of the improvement in section on the line *y y* in Fig. 4, and Fig. 6 is a transverse vertical section taken on the line *z z* in Fig. 4.

The drawings illustrate my improvement in submarine-channel protection as applied to a sand bar or bank A, ranging along between the ocean or deep water B and an adjacent harbor C, the channel and its protection ranging transversely across the bar to give a clear deep water-way between the ocean and harbor. Islands D D are shown at each side of

the channel improvement as instances of land projections, which under ordinary natural conditions, would promote accumulation of sand on the bar A to interrupt or close the channel to the harbor.

In carrying out my improvement, I first build two walls or dams E E, preferably ranging about parallel with each other across the sand-bar A, and at any distance apart the traffic requires—say, one, two, or three hundred feet or more—to provide a permanent channel *e* between them. At their ends facing the ocean or deep water B the dams are preferably flared to either side to facilitate entrance of vessels, and light-houses F F will preferably be built upon the dams at their heavier outer ends. The buttresses of these light-houses, or the heavier ends of the dams should no light-houses be built on them, give a substantial backing or support to the opposite sides of the submarine barrier G. This barrier is shown with two relatively-inclined faces or wings *g g*, which meet at the center and front of the channel or water way *e* between the two dams E E in a somewhat obtuse angle; but the front of the barrier may have right-angular or acute-angular form, or it may have a rounded form, between the walls or buttresses which its ends rest against. I represent the barrier constructed of piles driven into the water bottom; but it may be constructed of sand mats, fascines, or quarried rock, as the natural resources of the country may render most convenient or least expensive. The barrier G may consist of the wings or wall of piling alone, as shown in Fig. 4 of the drawings, or of such piling or mats, or fascines, or quarried rock, and a filling H, extending from the top of the barrier and backward inside of it about to the level I, at which the sand or earth or bar deposits has been excavated between the dam-walls E E, to provide sufficient depth of water in the channel *e* between them, this construction with the rock or sand mat, or fascine filling H behind the barrier G, being shown in Figs. 1 and 2 of the drawings. It will be understood that the top of the barrier G, and also of its backing or filling H, when used, will never be so high but that any vessel capable of passing the channel *e* between the dam-

walls E E may safely pass over the barrier at mean low tide, and that whatever be the conformation of the bottom, the barrier G will be built out sufficiently far into deep water to have its top range from ten to fifteen feet above the bottom, as shown in Figs. 2, 3, and 5 of the drawings, to prevent the sand washing over the top of the barrier and lead or roll the sand back down its natural slope. A berme or side filling J is preferably built next each wall E within the channel *e* formed between the two walls.

When desirable or necessary, a lateral extension E' of a dam-wall E may be built to an adjacent piece of land D', as shown in Fig. 1 of the drawings, to prevent sand being washed into the harbor C by water-currents deflected from the wall E with which the auxiliary wall connects. The sand excavated from between the walls E E to form the channel *e* may be dumped outside said walls to avoid carrying it into deep water and economize time and labor in building the improvement. The outline of the bar or bank A, cut away to make the channel *e*, is indicated at *a* in irregular dotted line in Fig. 2 of the drawings, and the high-water level is indicated by the broken horizontal line K, while the horizontal dotted lines L below the line K indicate different heights or levels of water above the bottom of the channel. With this im-

provement it is quite impossible for sand to wash over the barrier G into the channel *e*, hence the channel will be kept permanently clear and open for navigation and occasional expensive dredging will not be necessary. Should there be strong currents or eddies of water at both ends of the channel which would be liable to carry sand into it and fill it up more or less, I will build a barrier G either with or without a filling H at both ends of the channel, as will readily be understood.

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

1. A submarine-channel protector consisting of two walls approximately parallel with each other extending across the sand-bar, and a barrier consisting of inclined wings extending from the side walls to the center of the channel, and a filling in rear of the wings, substantially as described.

2. A submarine-channel protector consisting of the flared side walls E, the barrier G formed of inclined wings *g*, the filling H for the barrier, and the filling J for the side walls, substantially as herein shown and described.

ALBERT J. MAUERMANN.

Witnesses:

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JAMES H. BERRY.