May 9, 1939. E. J. PRENDERGAST 2,158,046

BEACH MAINTAINING APPARATUS AND A BEACH MAINTAINING METHOD

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FIG.1.

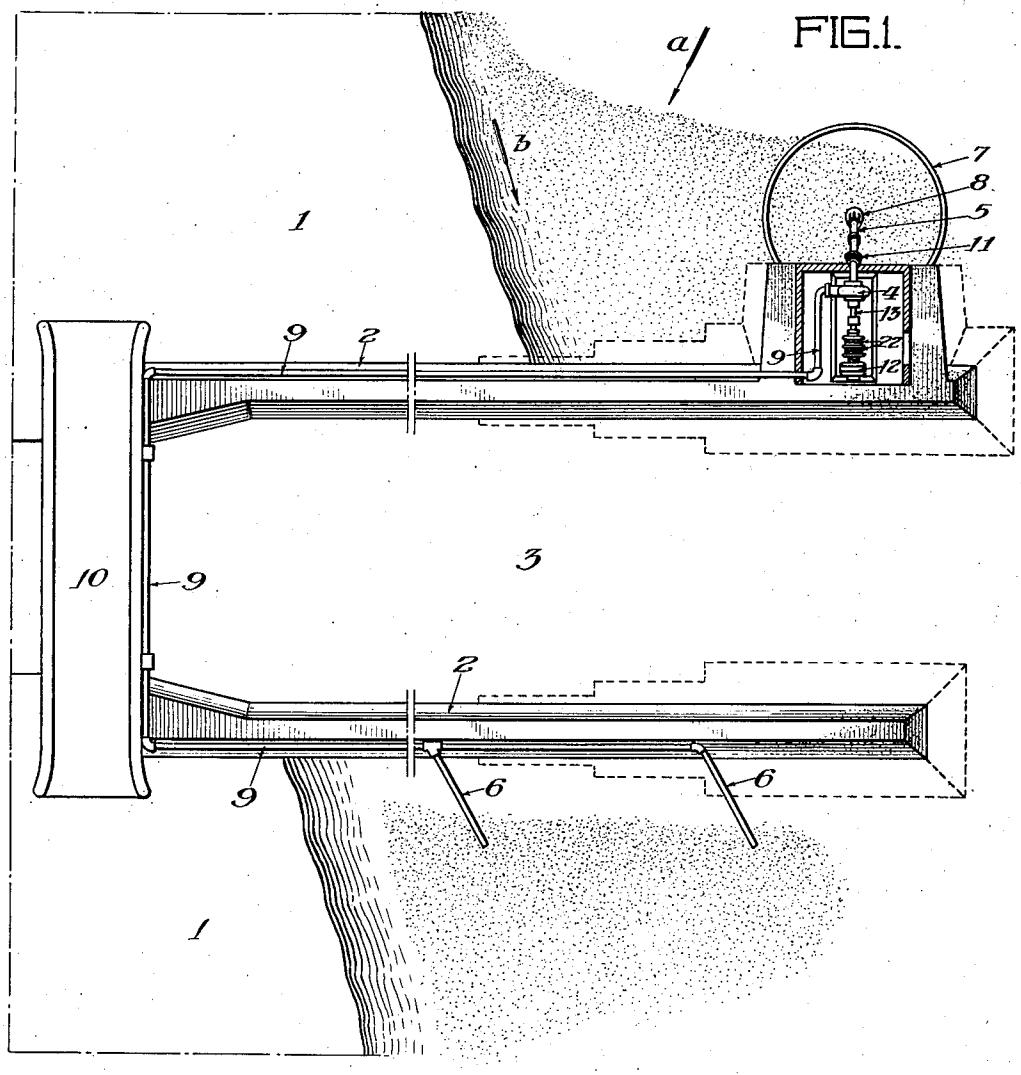
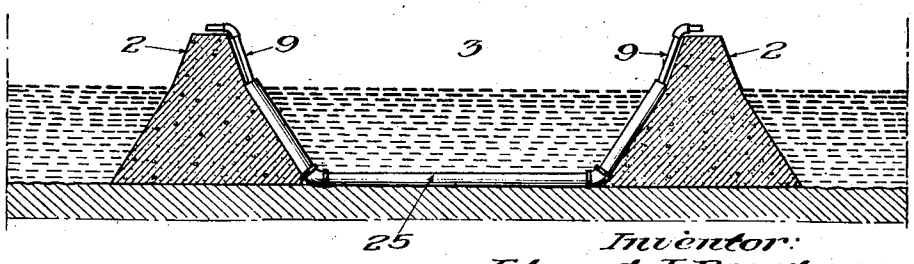



FIG.3.



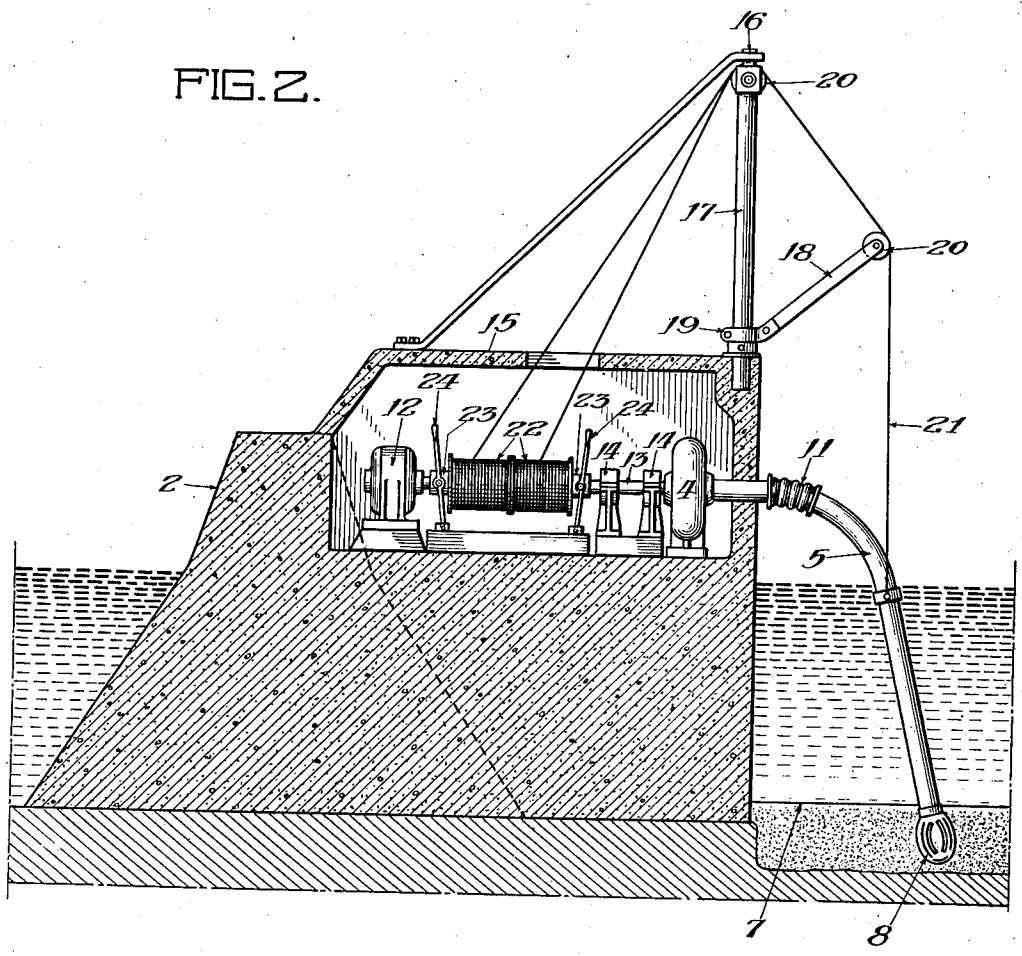

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BEACH MAINTAINING APPARATUS AND A BEACH MAINTAINING METHOD

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FIG. 2.




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# UNITED STATES PATENT OFFICE

2,158,046

## BEACH MAINTAINING APPARATUS AND A BEACH MAINTAINING METHOD

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4 Claims. (Cl. 61—3)

The invention relates to beach maintaining apparatus and a beach maintaining method by which a beach deprived of sand from the sea by a jetty or other obstruction is saved from erosion by the waves.

The beach along the seashore is maintained under normal conditions by sand drifted along the shore by the waves and littoral current and deposited on the beach by the waves.

If a jetty or other obstruction projects into the sea, it causes sand to accumulate in its vicinity from the waves and littoral current and thereby deprives the beach to its leeward of sand from the waves and littoral current.

The present invention has for its object to provide beach maintaining apparatus by which a beach deprived of sand from the waves and littoral current by a jetty or other obstruction is maintained from erosion by the waves.

Another object is to provide beach maintaining appartus which is simple in construction and effective in operation.

Another object is to provide beach maintaining apparatus which may be readily and economically installed and operated.

According to the invention hereinafter described, a suction pipe is arranged to draw from the sea the sand accumulated in the vicinity of a jetty or other obstruction projecting into the sea, a pump is connected to the suction pipe to create suction therein to draw sand from the sea, and a discharge pipe is connected to the pump and arranged to deliver the sand from the pump into the sea near the shore to the leeward of the jetty or other obstruction to supply the waves with sand to deposit on the beach.

The invention provides beach maintaining apparatus by which the sand impounded by a jetty or accumulated in its vicinity is employed to save the beach to the leeward from erosion by the waves.

If the jetty is arranged to protect an inlet or harbor, the sand drawn from the sea in its vicinity is discharged into the sea beyond the inlet or harbor to lessen the accumulation of sand in the channel into the inlet or harbor.

The beach maintaining apparatus illustrated in the accompanying drawings and described in the hereinafter specification exemplifies the invention.

The views in these drawings are as follows:

Fig. 1 is a plan view showing the beach maintaining apparatus.

Fig. 2 is a sectional view showing in elevation the pump and other appliances.

Fig. 3 is a sectional view showing another way to arrange the transfer pipe.

The beach 1 has jetties 2 projecting from its shore into the sea and arranged to protect the channel into an inlet or harbor 3.

The prevailing wind blows in the direction indicated by the arrow *a* and the littoral current flows along the shore in the direction indicated by the arrow *b*.

The terms "windward" and "leeward" as used herein denote the direction in which the sand is advanced along the shore by the waves and littoral current.

The windward jetty impounds sand on its windward side from the waves and littoral current, and thereby deprives the shore beyond the leeward jetty of sand to maintain the beach.

In order to save the beach beyond the leeward jetty from erosion by the waves, the windward jetty is provided with beach maintaining apparatus by which the sand impounded or accumulated in its vicinity is drawn from the sea and then delivered into the sea near the shore beyond the leeward jetty.

The beach maintaining apparatus further serves to keep the channel into the inlet or harbor from being filled by sand from the waves and littoral current.

The beach maintaining apparatus is provided with a hydraulic pump 4 which is connected to a suction pipe 5 arranged on the windward side of the windward jetty and discharge pipes 6 arranged on the leeward side of the leeward jetty.

The suction pipe depends into a sump 7 arranged to accumulate sand impounded by the windward jetty, and it is provided at its suction end with a suction nozzle 8.

The pump is connected to the discharge pipes 6 by a transfer or delivery pipe 9 extending inwardly along the windward jetty, across the inlet from the windward jetty to the leeward jetty, and thence outward along the leeward jetty to the discharge pipes.

A bridge 10, which extends across the inlet, supports the transfer pipe between the windward jetty and the leeward jetty.

The suction pipe is connected to the pump by a flexible joint 11 to be moved to different positions in the sump.

The pump is driven by an electric motor 12 connected thereto through a driving shaft 13 arranged in bearings 14.

The pump and motor are located on the windward jetty within a pump-house 15.

The suction pipe may be moved to different

parts of the sump by a derrick 16, which is shown in the drawings by a diagrammatic representation thereof.

The derrick is provided with a mast 17 supported on the pump-house and a beam 18 extending from the mast and connected thereto by a ring 19.

The mast and the beam carry sheaves 20 over which pass cables 21 connected at the outer ends to the suction pipe on opposite sides.

The cables are connected at the inner ends to winding drums 22 arranged upon the driving shaft between the motor and the pump.

The winding drums are driven from the driving shaft by clutches 23 having actuating levers 24.

The suction pipe may be raised and lowered by drawing on both cables and moved sidewise by drawing on either cable.

The derrick may assume various forms and other appliances may be employed in place thereof to move the suction pipe.

When the beach maintaining apparatus is in operation, the pump draws sand in suspension from the sump through the suction pipe and delivers it through the delivery or transfer pipe to the discharge pipes.

The discharge pipes deliver the sand into the sea near the shore beyond the leeward jetty, and then the waves deposit the sand upon the shore to maintain the beach to the leeward from erosion by the waves.

Fig. 3 shows a modification in the way to arrange the delivery or transfer pipe to convey sand from the pump to the discharge pipes.

The delivery or transfer pipe in this modification extends under the water in the inlet and it is enclosed in a tubular casing 25 to protect it from abrasion and erosion by moving sand and other matter.

The invention described herein may be employed and embodied in various ways which will be within the scope thereof as defined by the hereinafter claims.

The invention described in the foregoing specification and shown in the drawings is hereby defined and claimed as follows:

1. Beach maintaining apparatus, comprising the combination with a jetty or other obstruction projecting from a beach into the sea, of a sump arranged on the windward side of said jetty to accumulate sand from the waves and littoral current, a suction pipe arranged to draw sand from said sump, a pump connected to said suction pipe to create suction therein, and a discharge pipe arranged to deliver said sand from said pump into the sea near the shore to the leeward of said jetty.

2. Beach maintaining apparatus, comprising the combination with an obstruction projecting into the sea and causing sand to accumulate in its vicinity from the waves and littoral current, a suction pipe arranged to draw said sand from the sea, a pump connected to said suction pipe to create suction therein, and a discharge pipe connected to said pump and arranged to deliver said sand into the sea near the shore to the leeward of said obstruction and thereby supply the waves with sand to deposit on the beach.

3. Beach maintaining apparatus to save a beach from erosion and protect a channel into an inlet or harbor, comprising the combination with an obstruction projecting into the sea on the windward side of an inlet or harbor and causing sand to acumulate in its vicinity from the waves and littoral current, a suction pipe arranged to draw said sand from the sea, a pump connected to said suction pipe to create suction therein, a transfer pipe connected to said pump to convey said sand to the leeward side of said inlet or harbor, and a discharge pipe connected to said transfer pipe and arranged to deliver said sand into the sea near the shore to the leeward of said inlet or harbor and thereby supply the waves with sand to deposit on the beach.

4. The method of maintaining a beach deprived of sand by a jetty or other obstruction projecting into the sea and causing sand to accumulate in its vicinity from the waves and littoral current, comprising drawing said sand from the sea and then delivering said sand into the sea near the shore to the leeward of said jetty or other obstruction and thereby supplying the waves with sand to deposit on the beach.

EDMUND J. PRENDERGAST.