

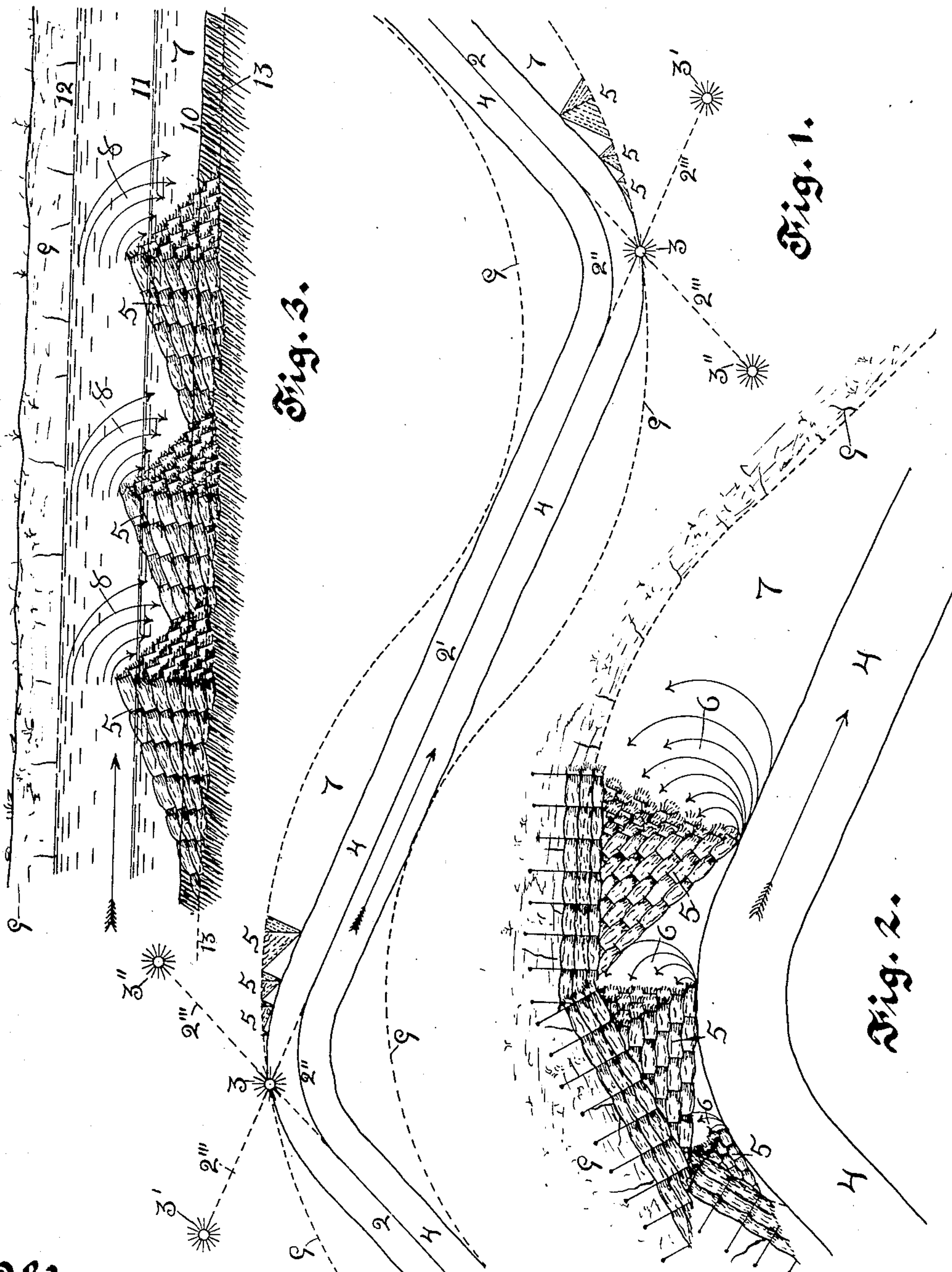
No. 892,610.

PATENTED JULY 7, 1908.

D. NEALE.

METHOD AND MEANS FOR STRAIGHTENING, DEEPENING, CONTROLLING,
AND NAVIGATING STREAMS.

APPLICATION FILED JAN. 10, 1907.



Witnesses:
Burl Vaughan.
J. J. Butler

David Neale Inventor,
By Son. Vaughan,
his Attorney.

UNITED STATES PATENT OFFICE.

DAVID NEALE, OF FORT CALHOUN, NEBRASKA.

METHOD AND MEANS FOR STRAIGHTENING, DEEPENING, AND CONTROLLING STREAMS.

No. 892,610.

Specification of Letters Patent.

Patented July 7, 1908.

Application filed January 10, 1907. Serial No. 351,665.

To all whom it may concern:

Be it known that I, DAVID NEALE, a citizen of the United States of America, residing near Fort Calhoun, in the county of Washington and State of Nebraska, have invented a new and useful Method of and Means for Straightening, Deepening, and Controlling Streams, of which the following is a specification.

My invention particularly relates to improved methods and means for straightening and controlling rivers of great depth and rapid current at certain points and periods and which are continually changing their course through their destructive erosive action against their banks; and the objects of my improvements are, first, to provide means disposed in such a manner that a limited sized structure is unaffected by high water or flood and will perform the work desired and not be destroyed or carried away; and second to facilitate the dredging of the channel along the desired lines of navigation of the stream when the correct channel is hidden during periods of high water or flood. I attain these objects by the method and means illustrated in the accompanying drawing in which—

Figure 1, is a map or plan showing the application of my method and means to a double or reverse bend of a stream; Fig. 2 is a plan at larger scale showing the manner of placing the jetties; and Fig. 3 is a stretchout of longitudinal and vertical section of the channel looking toward the jetties and contiguous bank.

Similar numerals refer to similar parts throughout the several views; and the straight arrows indicate the direction of the current of the stream.

For obvious reasons it is impossible to straighten a river into one line from its source to its mouth, or in most cases for any very great part of its length; but its channel may be straightened and deepened between principal bends as shown in Fig. 1, where the curved broken lines 9, 9 indicate the old banks of the stream, just before applying this method. And the narrower portion 4, 4, etc., lying between, represents the corrected deepened channel traced along its center by the line of navigation 2, 2' and 2".

While different constructions of dikes or jetties may be used in applying this method, the "Submerged Hollow Fascine Di-

slight modifications in some instances, serves best for general application, and is indicated in the drawings by the numeral 5. Fig. 2 shows three of these jetties applied to a shorter bend than those shown in Fig. 1; any required number of jetties may be used and in some instances one alone will suffice to build out and protect the eroded bank and turn the current.

The curved arrows 6, 6 and 6 indicate the horizontal movement of the water as it swirls from the point to the downstream side of the jetty, tending to form an eddy thereat. The points of these jetties are ranged to just touch the bank of the corrected and deepened stream and give the direction of bend and straight course beyond as shown in Figs. 1 and 2.

In Fig. 3 the line 12 indicates high-water-mark, the line 11, low-water-mark, 10 the natural bed of the stream, and the broken line 13, the probable bed of the new-cut deepened channel. As here shown the crests or tops of the jetties are finished only a little above the low-water line and far below the high-water line, only about one-half the whole depth of the stream at high-water-mark. The downward movement of high water as it plunges over the jetties is indicated by the curved arrows 8, 8 and 8. This is met by the horizontal swirls 6, 6 and 6 and the two opposing currents neutralize each other as they impinge the bed 10 and the bank 9, resulting in dead water at the lower side of the jetty; which space rapidly fills with any debris, silt, mud or sand carried by the stream. When the high flow of water subsides, to or below the tops of the jetties, there is not sufficient force in the shallow eddies formed at 6, 6 and 6, to carry away the accretions therein, or to erode the banks beyond. The dead water space 7 below the lower jetty is continually moved downstream by the bank of accretion forming below this jetty. And while at low water the stream is forced into the narrower and consequently deepened channel 4 along the points of the jetties, periods of overflow serve only to deposit new accretions over the whole until the jetties and bars below are buried beneath the new-formed banks.

The straightening controlling and deepening of that portion of the stream between the bends is accomplished by such dredging as is found necessary to cut and keep open the line

or track of navigation directly along the center of the new channel. To facilitate this, on the outer bank at the center of each bend is placed a signal-post or tower 3, provided with a light at night which serves to always mark the place of change of direction and lights the way around the bend 2". Out on the land a suitable distance from this signal-light-tower and about each bend there are placed two other signal-towers 3' and 3'', to be used in conjunction with the tower 3, and for this purpose they are disposed as follows:—The towers 3' and 3'' are directly in range with the straight part 2' of the navigation line and beyond and in alinement with the signal-towers 3 and 3 as indicated by the broken lines 2''' and 2'''. In a like manner the signal-towers 3'' and 3''' are in alinement with the opposite straight portions 2 and 2' of the navigation line, beyond the bends 2'' and 2'', and with the signal-towers 3 and 3'. Any craft approaching any bend has only to keep the two signal-towers directly in range ahead to keep the vessel exactly to the right course and along the straightened and deepened channel.

By such means large craft can safely navigate the stream during periods of high water, keep to the narrow channel and avoid the danger of grounding on the jetties, newly-formed banks or old shore lines. Dredges are also enabled by these guide-signals to operate along the correct line to keep the straight narrow channel open, free from bank formations of sand and the accumulations of drift which often form impassable jams and make dangerous snags.

The jetties are discontinued in height at the lowest possible altitude to still be effectual; namely:—just above low-water-mark. They are thus less liable to be injured or destroyed by the drift accompanying floods, or by ice jams, until the stream has by its own action as described above buried them in its new permanent bank.

As described in the patent referred to above:—In placing these dike-jetties, they will finally settle into the bed of the stream as deep as the newly cut channel; and this feature is accordingly taken note of; allowing extra height if placed during a period of high water, so they may settle to the desired height when the channel cuts down along their points.

I claim:

1. The method of forming new banks to change the curvature of the bends of streams,

consisting of, damming at one or more separated points that part of the stream below a plane just above low-water-mark but far below high-water-mark and from the old bank out to the proposed new line of curvature, whereby the fall of high water over the dams and the lateral swirls from the points of the dams toward the old bank neutralize each other to form dead water thereby facilitating accretions to fill the spaces between said dams and downstream from the lower dam and high water spreads out above and deposits accretions over the whole.

2. The method of modifying and controlling streams and deepening their channels, consisting of, changing the curvature of selected bends and straightening the intervening portions, by damming at one or more separate points in said bends that part of the stream below a plane just above low-water-mark but far below high-water-mark and from the old bank out to the proposed new line of curvature and dredging out new straight channels tangentially connecting said bends.

3. Means for modifying, deepening and controlling the channels of streams, consisting of, one or more jetties projected from the old bank out to the line of curvature of the new bank for a new bend of the stream, said jetties limited in height to a horizontal plane only a little above low-water-mark but far below high-water-mark, to form permanent artificial foundations only for the new banks and allow high water to spread out above and deposit accretions over the whole.

4. Means for modifying, deepening and controlling the channels of streams, consisting of, one or more jetties projected from the old bank out to the line of curvature of the new bank for a new bend of the stream, said jetties limited in height to a horizontal plane only a little above low-water-mark but far below high-water-mark, to form permanent artificial foundations only for the new banks and allow high water to spread out above and deposit accretions over the whole, and straight portions of the channel connecting this bend upstream and downstream with the next bends, and at each bend a signal placed in alinement with both of the adjacent proposed straight portions.

DAVID NEALE.

Witnesses:

WM. H. BELKNAP,
F. N. CLARIDGE.