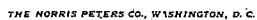


SYSTEM TO PREVENT THE OVERFLOWING OF RIVERS.
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UNITED STATES PATENT OFFICE.

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969,334.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN BRYAN, a citizen of the United States, residing at Yellow Springs, in the county of Greene and State of Ohio, have invented certain new and useful Improvements in Systems to Prevent the Overflowing of Rivers, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to systems to prevent the overflowing of rivers and is designed more particularly to prevent the flooding of a given place or places along a portion of a river. As is well known many
15 streams periodically overflow their banks, inflicting very great injury to the property situated along their banks. The worse floods usually occur along bends or curves in the river owing to the restricted passage of the
20 water and the shape of the channel and the greatest damage is usually inflicted upon property lying on the outer side of the bend in the river. Frequently large cities are located along the outer side of a bend in the
25 river and the damage inflicted upon the property of said cities periodically is very great, and, not only is the actual damage great, but the value of property adjacent to the river is materially affected by the liability of such floods.

30 The object of the present invention is to so reduce the amount of water passing around such a curve or bend in the river as to prevent the river from overflowing its banks along such bend, and further, to accomplish
35 this result without affecting the normal level of the river.

In the accompanying drawings, Figure 1 is a top, plan view of a river containing a series of bends, showing my invention applied thereto; Fig. 2 is a sectional view, taken on the line $x-x$ of Fig. 1 and looking in the direction of the arrows; and Fig. 3 is a top, plan view showing a slightly modified form
45 of the invention.

In Fig. 1 of these drawings I have indicated at 1 a river containing a series of bends, indicated at A, B and C. Considering the first bend, A, in the river it will be
50 noted that this bend is quite sharp and obviously the flow of the water through the same will be somewhat retarded. During

a freshet this retarding of the flow of the water will cause the same to spread out over the banks of the river and the strong
55 current which exists at such times will also have a tendency to cause the river to overflow the outer bank along the bend in the river. I aim to prevent the river from overflowing its banks along the bend by
60 removing a portion of the water from the river at a point above the bend and discharging the same into the river at a point below the bend. In this manner the water in the river along the bend is prevented
65 from exceeding a predetermined height and the city or other properties located along the bend are protected from floods. I prefer to remove the water from the river, and thus shunt the same across the bend, by
70 means of a conduit or canal 2 connected to the river at a point above the bend or near the upper end thereof, as indicated at 3, extending across the neck of land formed by the bend and again connected to the
75 river at a point below the bend or near the lower end thereof, as indicated at 4. It will be obvious that the canal may be of a size and may be so connected to the river as to protect the whole of the bend or only
80 a given portion thereof, and that the degree of curvature of the bend is immaterial to the successful application of the invention. In the canal 2 which extends across
85 the bend A, as shown in Fig. 1, the inlet end of the canal is arranged almost in line with the course of the river above the bend. Consequently, the current of the river would tend to carry the same directly into the canal. To prevent too large a quantity of
90 water being removed from the river and thus affecting the normal depth of the river along the bend therein the bottom of the canal at its inlet end, and preferably along the entire length thereof, is arranged above
95 the normal water level of the river, but below the danger point, *i. e.*, the point at which the river would be liable to overflow its banks along the bend. When the water has risen above the bottom of the canal or
100 conduit at its inlet end a very considerable portion of the same will enter the canal. The canal is preferably constructed of masonry or concrete and the arrangement

of the bottom thereof relatively to the normal water level of the river is thereby made permanent and the banks are prevented from washing and changing the course of the canal. Further, this construction offers a very slight resistance to the movement of the water through the canal. Therefore, owing to the straight, unobstructed character of the canal or conduit and to the comparatively short length thereof, a very large portion of the excess water in the river will pass through the canal and will be discharged into the river at a point below the place or places which it is desired to protect.

Where the river contains a series of bends, such as shown in Fig. 1, and it is desired to protect points along each bend other canals may be provided, as shown at 5 and 6. The arrangement of the inlet end of the second canal relative to the discharge end of the first canal may be varied according to existing conditions, but usually the inlet of the second canal would be arranged some distance down the river from the discharge of the first canal. The canals or conduits are here shown as perfectly straight and built substantially on a level, but, in the actual construction of such canals or conduits, it is very probable that slight turns or curves would necessarily be imparted thereto, that at points the entire body of the canal would be above the level of the ground and that at other points the body of the canal would be sunk below the level of the ground, this depending entirely upon the character of the land across which it is necessary to convey the water.

It is desirable that the depth and width of the river bed adjacent to the end of the canal or conduit should be always the same, and, to accomplish this it may be desirable, in certain instances, to arrange a protecting wall 7 along the side of the river opposite the inlet end of the canal and to cover the bottom of the river with a layer of rock or the like, as indicated at 8, thus preventing the washing out of the bottom of the river or the shore and permanently determining the amount of water which can pass through the river at this point without rising above the level of the bottom of the canal. It may also, in some instances, be desirable to provide a protecting wall for the river's bank opposite the discharge end of the canal, as indicated at 9. The desirability of these protecting devices, however, would depend upon the conditions existing in each particular instance.

If it should be desired to utilize the canal for navigation purposes a uniform depth of water may be maintained therein at all seasons of the year and locks may be provided at the ends thereof to lift the vessels therein and discharge the same therefrom.

Such locks are indicated at 10 in Fig. 3 of the drawings. A suitable depth of water may be maintained in the canal, when the level of the river is below the bottom thereof, by any suitable means. The pumping system patented by me July 7, 1903, No. 732,704, is well adapted for this purpose. Further, by maintaining a constant level of water in the canal the same could be utilized as a source of water supply by persons living along the course thereof.

While I have shown and described one embodiment of my invention it will be understood that this showing and description are for the purpose of illustration only and many modifications thereof may be made without departing from the principle involved. I, therefore, wish it to be understood that I do not desire to be limited to the details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

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

1. A system for preventing a river from overflowing its banks at a given place consisting of a conduit extending between two points on said river, one above and the other below said given place, the bottom of said conduit being arranged at a point between the normal water level of the river and the danger point.

2. Means for preventing the overflowing of a river comprising a conduit connecting two points along a bend in said river, the inlet end of said conduit having its bottom arranged at a point between the normal level of the river and the danger point.

3. Means for preventing the overflowing of a river at a given place comprising a conduit connecting two points along the river, one above and the other below said given place, said conduit having its bottom arranged at a point between the normal level of the river and the danger point.

4. Means for preventing the overflowing of a river at a given place comprising a conduit connecting two points along the river, one above and the other below said given place, said conduit having its bottom arranged at a point between the normal level of the river and the danger point, and means for maintaining that portion of said river-bed adjacent to the inlet end of said conduit at a fixed width and depth.

5. Means for preventing the overflowing of a river at a given place comprising a conduit connecting two points along the river, one above and the other below said given place, said conduit having its bottom arranged at a point between the normal level of the river and the danger point, and locks at the opposite ends of said conduit.

6. Means for preventing the overflowing of a river at points along a bend therein comprising a conduit connecting two points along said bend, said points being arranged one above and the other below the places to be protected, said conduit having a substantially smooth bottom and side walls of a fixed character and having its bottom ar-

ranged between the normal water level of the river and the danger point.

In testimony whereof, I affix my signature in presence of two witnesses. 10

JOHN BRYAN.

Witnesses:

ELZA F. MCKEE,
EDWARD L. REED.