(No Model.) 2 Sheets—Sheet 1.

G. B. BOOMER.

METHOD OF CONSTRUCTING LEVEES.

No. 452,989. Patented May 26. 1891.

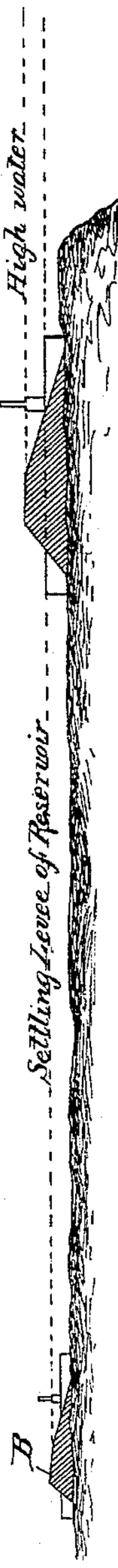

Fig. 2.

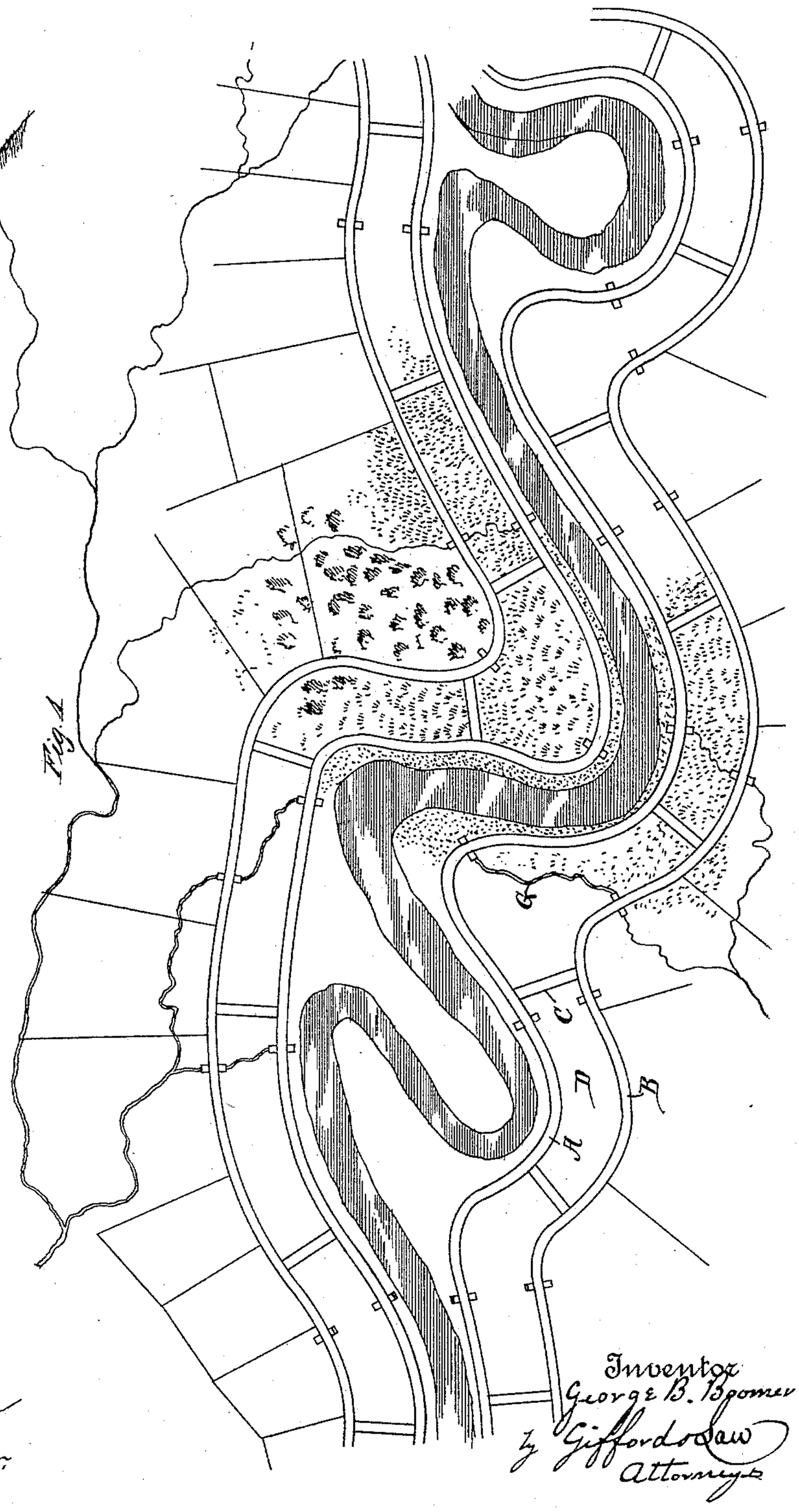

Fig. 1.

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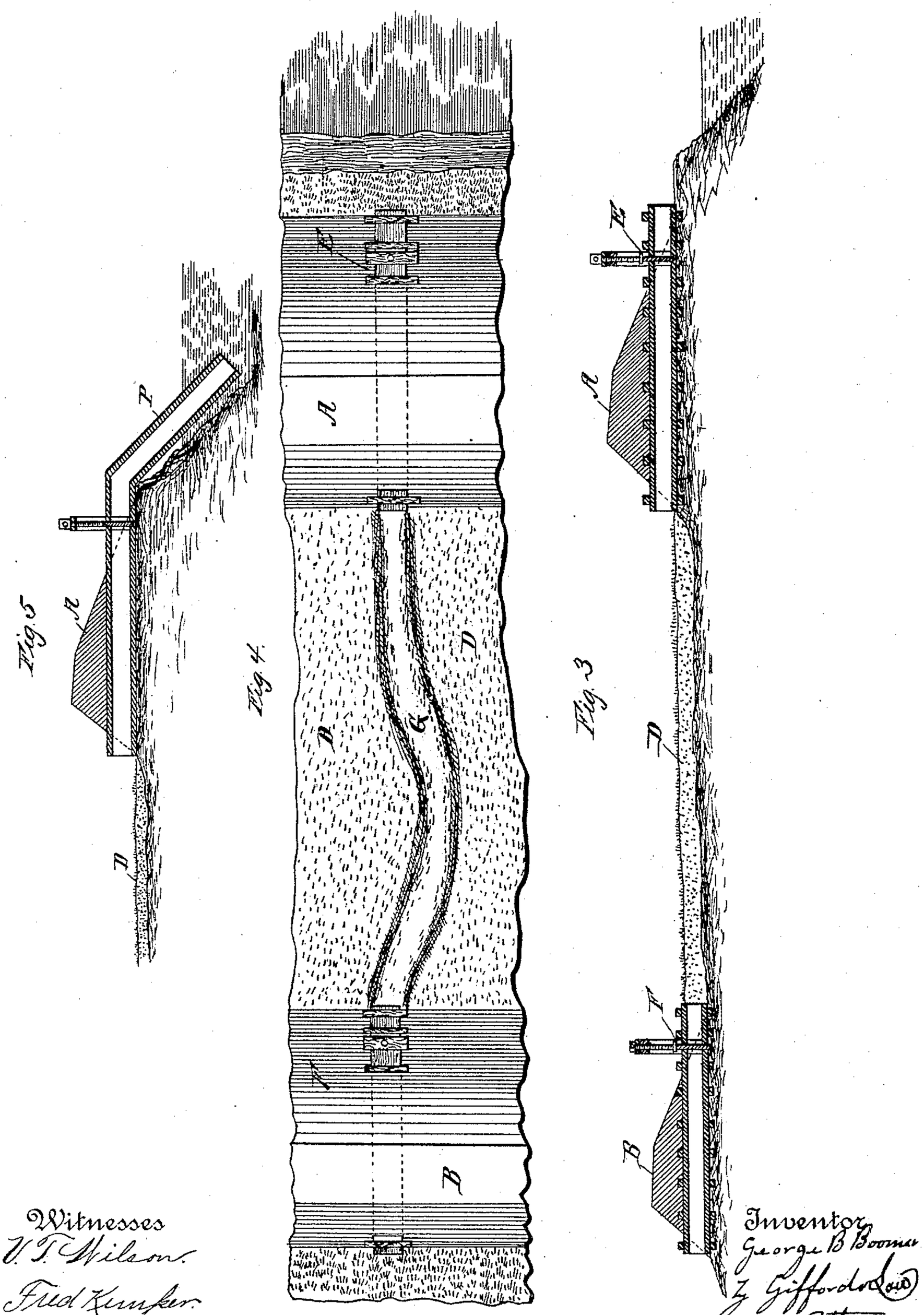

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UNITED STATES PATENT OFFICE.

GEORGE B. BOOMER, OF MOUNT PLEASANT, NEW YORK.

METHOD OF CONSTRUCTING LEVEES.

SPECIFICATION forming part of Letters Patent No. 452,989, dated May 26, 1891.

Application filed July 18, 1890. Serial No. 359,216. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. BOOMER, a citizen of the United States, and a resident of Mount Pleasant, in the county of Westchester and State of New York, have invented certain new and useful Improvements in the Method of Constructing Levees, of which the following is a specification, reference being had to the accompanying drawings.

My invention consists in an improvement in the art of constructing levees or embankments along navigable rivers or streams where it is desired to confine the river within its channel, and in relieving the river along its course of the excess of water during the time of freshets, so as to prevent it from accidentally overflowing its banks; and it furthermore consists in irrigating and fertilizing the banks of the river, so as to make them more productive.

My improvement is applicable to those streams that contain or carry down with their current earth or similar sediment which settles when the water becomes stationary. Many rivers, especially in time of freshets or high water, contain or hold suspended large quantities of sediment or earth, most of which is carried down with the current and deposited at the mouth of the river. Some of this sediment settles on the bed of the river and gradually raises the latter, and another portion is deposited on the land lying along the river when the latter overflows its banks and floods the adjacent country. My improvement consists in utilizing this earth or sediment contained in the river to build up the embankments or levees by catching and retaining the sediment and applying it to the land on each side of the river; and it furthermore consists in regulating and controlling the rise of the water by a system of gates in the levees, by which the water is drawn off at certain points when the river threatens to rise above a safe level. In the system of levees now in use on all rivers the design has been to confine all the water of the stream or river in its channel from its source to its mouth. To do this it has been necessary to build strong and in some places high levees at great expense, which require constant attention and repairs and which must be increased in size every few years. These levees on account of their size are apt to give way in time of freshets, and as there is no way of drawing off the water at any other point the country where the break occurs is flooded and great damage is done before repairs can be made.

My improved method of constructing levees is as follows, reference being had to the drawings, in which—

Figure 1 is a plan view of a river, showing my improved levees on each side of the same. Fig. 2 is a sectional view of the levee on one side of the stream, showing the position of the two levees or embankments. Fig. 3 is an enlarged sectional view of the levee, showing the gates and bulk-head in the levees. Fig. 4 is a view of a section of the levee, looking down from above, showing the portion included between the two levees and the ditch or passage-way through the latter and connecting the gates in the two levees. Fig. 5 is a sectional view of a modified construction of my improvement.

On each side of the stream or river is formed a levee (marked A in the drawings) similar to those now in use. This can be of any height found practical; but in general its summit should be about one foot above high-water mark. Back from this main levee A and in a line substantially parallel with it is a second or sub-levee B. This sub-levee may be any distance from the main levee desired, depending on the configuration of the land and the area it is desired to flood, as stated below, but in general will be about one mile back of the river or levee A. The sub-levee should be about five feet high; but the height may vary according to circumstances. Across the space included between these two levees A and B are constructed cross levees or dikes C, dividing the space into basins D. These cross-dikes may be made at regular or irregular intervals, thus forming basins of the same or varying area as the distance between the levees A and B and the nature of the country shall determine. In general these dikes C will be made often enough to form basins of convenient and manageable area and capacity.

In each basin or division D in the main and sub-levees A and B are placed bulk-heads and gates E F, (shown more clearly in Fig. 2,) by which water from the river may be admitted

into the basin and then withdrawn from the same into the country back of the river. These gates E and F are naturally placed at the lowest depression in the basin or at each end of any natural drainage through the basin, so that the water will readily flow from the one gate E to the other gate F through the basin when it is not desired to flood the latter, as is stated below. Where there is no natural depression or drainage through the basin, a ditch G may be formed from the one gate to the other, as indicated in the drawings. There is thus in the main levee A a series of gates E, by means of which water may be drawn from the river at high water to flood the basins D or space between the two levees, and in the sub-levee B a corresponding series of gates F, by means of which the water may be drawn off from the basins D and allowed to flow off into the country back of the river. It is intended to arrange these gates E and F along the whole course of the river from near its source to its mouth. Water may thus be drawn off at any point or series of points, as is desired.

During the time of the spring freshets the water of the river or stream is apt to be charged with a large amount of earth or sediment. As the water rises and threatens to overflow its banks, the gates E in the main levee A are opened, the gates F being closed and the basins D flooded with the water from the river until they are full to the top of the levee F. If all the gates E along the course of the river are opened and the whole space between the two levees on both sides of the river is flooded, it follows that a large volume of water will be withdrawn from the river and the level of the water lowered, so that the threatened overflow is prevented. It is not necessary that all the basins should be flooded at one time, but the gates E may be opened here and there along the course of the river as is found desirable and necessary to lower the water in the river. As the water confined in the basins D remains quiet and unagitated, the earth and sediment held in suspension in the water settles on the bottom of the basin. After the water has become clear the gates F in the sub-levee B are opened and the water is allowed to flow off through the country back of the river. The basins D may then be again flooded with water, as before, and this may be repeated as often as is necessary while the river remains high. Every time the basins D are filled with water so much water is withdrawn from the river and the level of the latter reduced, and at the same time a fresh quantity of earth is deposited on the bottoms of the basins. This deposit not only builds up the levee or bank between the dikes, but being sediment from the river renders the land on which it is placed very fertile and capable of producing large crops. This withdrawing of the water from the river and flooding the basins may be repeated during the whole year, if desired, as often as the water rises in the river and it is required to lower its level; but if it should be desired the basins D, or the space included between the two levees A and B, may be cultivated, and on account of the rich deposits obtained from the river will be very fertile and produce large crops. When the spaces D are thus cultivated, if a freshet or high water should occur while the crops are growing, or when it would be injurious to flood them, the water may be drawn off from the river through the basins by opening both gates E and F and allowing the water to flow along the ditches G or natural depressions from one gate to the other, and thus out into the country back of the river. It will thus be possible to withdraw the water from the river without flooding the basins and injuring the crops, and at the same time, by reason of the gates along the whole course of the river, to withdraw the water in small quantities here and there and avoid injuriously flooding the region back of the river.

In general, while the basins D are under cultivation the gates F are left open to insure drainage from the lands and keep the ditches G clear. These ditches or depressions G may be opened and made ready to draw off the water by occasionally washing them out with water from the river by opening the gates E. After the crops have been harvested the basins D may be again flooded and a fresh deposit of earth placed on them, as above described. Thus every year a fresh supply of rich earth is deposited along the bottoms of the basins D, rendering the land very fertile, and at the same time the space between the levees is gradually raised and built up to form a strong embankment. When in course of time the basin or space D is filled up to the top of the levee B, the latter is raised, and as it is only necessary to build this sub-levee five feet or so this can be readily and cheaply done. In the same way the levee A may be readily raised when required. In this way only low levees are necessary and the great expense of high levees avoided.

As will thus be seen, in my improved system the river builds up its own banks by depositing its own sediment in times of high water, and by my system of gates along the whole course of the river it is possible to control the rise of the water and prevent it overflowing its banks or breaking through its levees. As when in time of heavy rains an increase in the water is expected, the level of the river near its mouth may be lowered by opening the gates in that part of the river, so that when the freshet comes it will be provided for and can do no damage, and not only is the rise of the water kept under control and the banks built up, but the rich sediment in the river is applied to the land so as to render the latter very fertile.

Fig. 5 shows a modified construction of my improvement. In place of the gate E in the main levee A, I place an iron pipe or conduit P, which extends through the levee and down

the sides of the river bank and opens out into the river near the bottom of the latter, as will be understood from the drawings. In this pipe is placed any suitable valve or cock by which it may be opened or closed. When it is desired to draw off the water from the river, the valve in the pipe P is opened and the water allowed to flow through the pipe in the same manner as through the gate E; but instead of coming from the surface of the river, as when it flows through the gate, it comes from near the bottom of the river, where there is a greater amount of sediment, and thus a larger amount of earth is deposited on the land. This modification is particularly adapted for filling up low places, as swamps, sloughs, lakes, and other low lands, where it is more important to fill up the low places than it is to cultivate them, as the sediment from the bottom of the river is more apt to contain sand and less fertilizing material.

What I claim is—

1. The improvement in the art of levee construction, which consists in withdrawing the water from the river, retaining it in basins along the banks of the latter, allowing the sediment in the water to settle therefrom, and then permitting the water to escape into the country back of the river, as and for the purpose set forth.

2. The method of building levees herein described, consisting of withdrawing the water from the river through the main levee and settling it in basins formed by dikes, and then drawing the clear water off into the country back of the river, substantially as described.

3. In a system of building levees, the levees A and B, inclosing the space D and provided with means for flooding from the river and draining off into the back country, substantially as and for the purpose set forth.

4. The combination of the levee A, having the gates E for withdrawing the excess of water from the river, and the levee B, having the gates F for allowing the water to escape into the back country, substantially as described, and for the purpose set forth.

5. In a system of building levees, the levee A, provided with the conduit P, as and for the purpose set forth.

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Witnesses:
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