2 Sheets—Sheet 1.

W. B. JOHNS.

SYSTEM AND APPARATUS FOR THE IMPROVEMENT OF THE NAVIGATION OF RIVERS.

No. 193,516. Patented July 24, 1877.

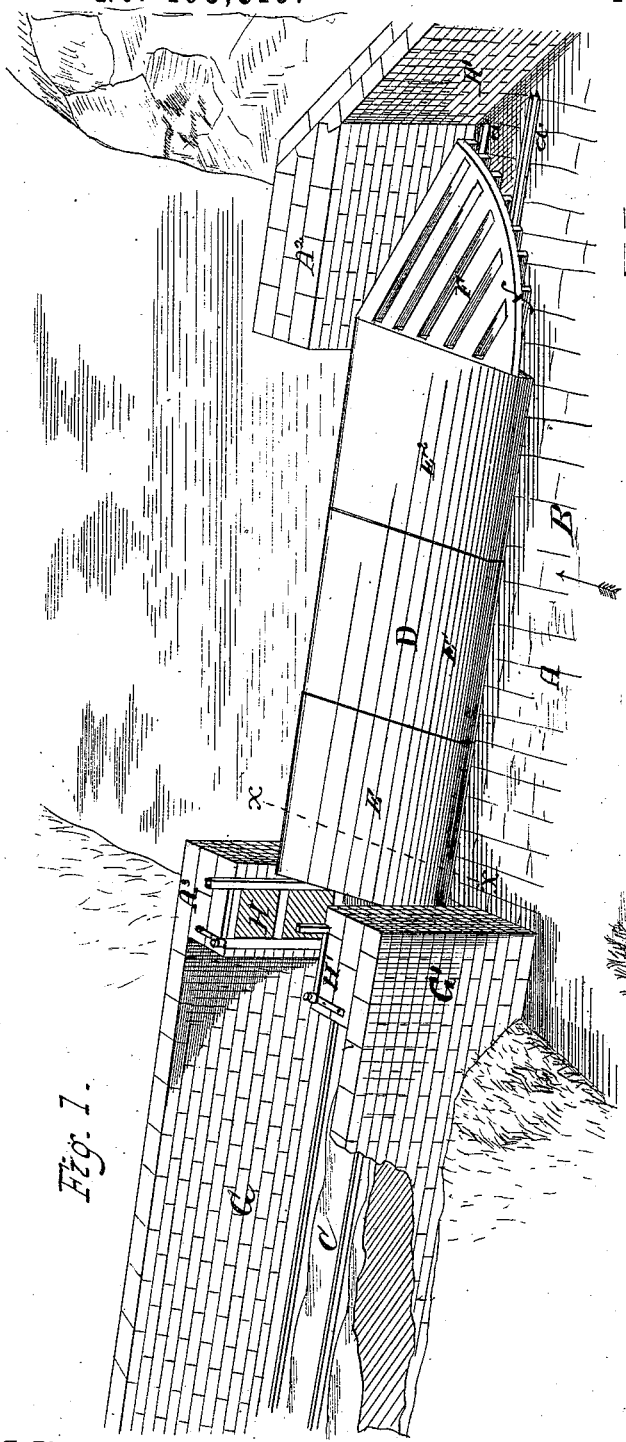

Fig. 1.

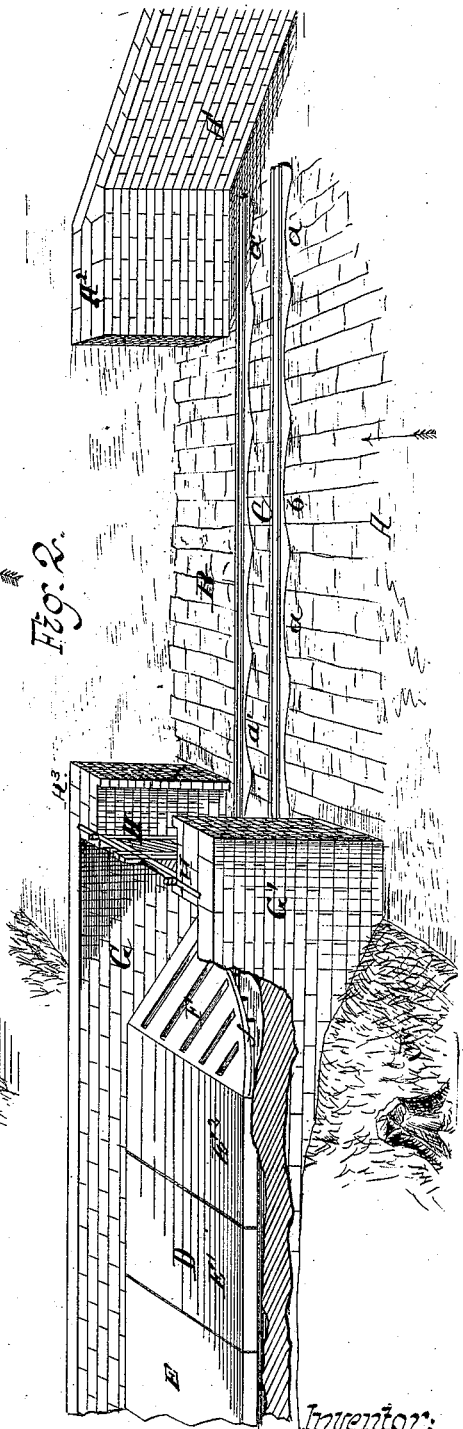

Fig. 2.

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SYSTEM AND APPARATUS FOR THE IMPROVEMENT OF THE NAVIGATION OF RIVERS.

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Fig: 3.

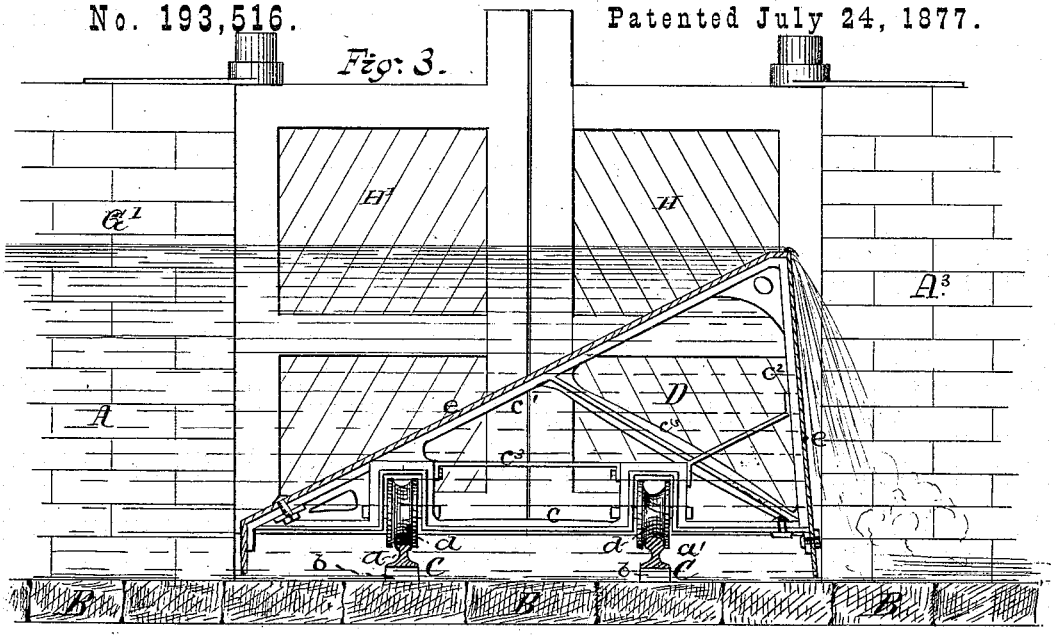


Fig: 4.

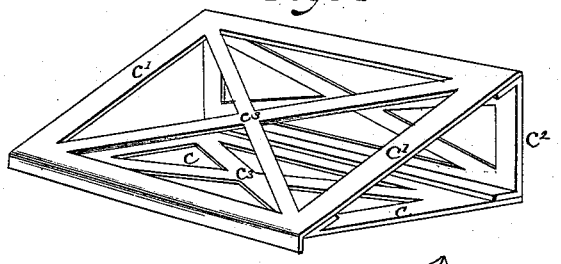
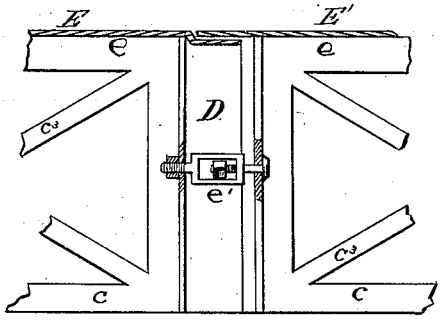


Fig: 5.



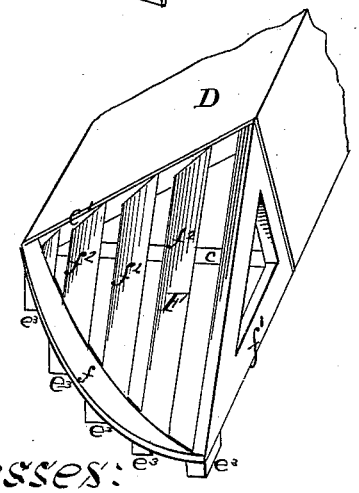
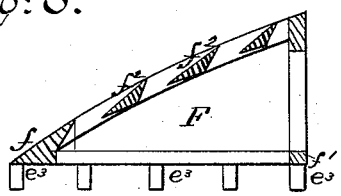


Fig: 6.



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UNITED STATES PATENT OFFICE.

WILLIAM B. JOHNS, OF GEORGETOWN, DISTRICT OF COLUMBIA.

IMPROVEMENT IN SYSTEM AND APPARATUS FOR THE IMPROVEMENT OF THE NAVIGATION OF RIVERS.

Specification forming part of Letters Patent No. **193,516**, dated July 24, 1877; application filed June 29, 1877.

To all whom it may concern:

Be it known that I, WILLIAM B. JOHNS, of Georgetown, in the county of Washington and District of Columbia, have invented a new and useful Improvement in System and Apparatus for the Improvement of the Navigation of Rivers; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The object I have in view is the improvement of the navigable capacities of such rivers as during seasons of drought have an insufficient depth of water in portions of their channels; and my invention therein consists principally in the system and apparatus employed by me, as more fully hereinafter described.

In the present modes adapted for the improvement of such rivers, which are either wing-dams more or less elaborate in construction, or permanent dams in connection with locks, there are serious objections which I wish to avoid. The wing-dams, for instance, are not sufficient where there is a considerable fall in the river, for the reason that they do not create a back flow of water of any considerable amount, without at the same time creating a positive fall or pitch of the water, difficult to pass up over, and dangerous to descend. The permanent dams and the locks are exceeding expensive of construction, particularly when the latter are adapted for large steamboats or other large water-craft; and when the waters are high such dams are dangerous to pass in one direction, and difficult to pass in the other, besides requiring with the lock-gates continual and expensive repairs.

My system aims to combine the best qualities of each of the above-described methods for the improvement of rivers, and to avoid the evils, inconveniences, and largely the expense, connected with them.

Stated in general terms, my system includes wing-dams, extending diagonally down stream in the usual way, from one bank or from each bank of the river, terminating at the stream ends in abutments, and leaving a space between them for the channel or deepest part of the river sufficient for the free passage of all river-craft, and a movable sectional dam, wide enough to span such free passage, and rest at its ends against the up-stream sides of the abutments, which dam is supported upon suitable trucks or wheels, which, in turn, rest upon proper rails, and has connected with it suitable machinery, by which it may readily be withdrawn entirely away from the channel-way, or returned to position across the channel-way, as may be desired.

In order that those skilled in the matter may know how to use my system and construct my apparatus, I proceed to describe the same, having reference to the drawings, in which—

Figure 1 is a perspective view, showing my movable dam in position in a stream, and a receptacle or basin into which it is adapted to be withdrawn; Fig. 2, a similar view, with the dam withdrawn; Fig. 3, a vertical section through the dam and its supporting-bed on the line *x x* in Fig. 1; Fig. 4, a view of one section of the dam, with the shell removed, to show the bracing of the parts; Fig. 5, a section through the ends of two parts of the dam, showing the connections; and Fig. 6, a view of the track-cleaner at the end of the dam.

Like letters denote corresponding parts.

A represents the channel into which the water is turned by a wing-dam, A^1, having an abutment, A^2, at its end. At the opposite side of the channel is another abutment, A^3, placed, preferably, close to the shore to support the ends of the movable dam when in position across the stream. The bottom of this channel is paved with a flooring, B, of heavy cut stone, presenting a smooth surface, on which obstructions are not likely to lodge. On this pavement is laid a track, C, extending directly across the channel A, close to the abutments, the rails *a a'* of which track are rigidly secured to the pavement the proper distance apart to receive the trucks of the movable dam. These rails are, preferably, raised on blocks, so as to leave a clear space, *b*, between them and the pavement, which space allows the sand and sediment to be washed by the current directly under as well

as over such rails, and the down-stream rail a' is supported somewhat higher than the other rail, Fig. 3, so as to more securely hold the dam against the pressure of the current, and prevent the wheels from being thrown off of the track by the force of the water.

D is the movable dam, which rests on the track C, and, when in position across the channel A, overlaps the abutments A^2 A^3.

This dam is constructed in any desired number of sections, E E^1 E^2, secured together at their ends, so as to form a tight dam, and having a limited vertical and lateral movement independent of each other, or under certain circumstances may be made in one section. Each section is composed of three rectangular iron frames, c c^1 c^2, each of which frames is braced by rods c^3, and all secured together so as to form a structure preferably of the shape of a hollow prism. This construction of the sections I consider to be very desirable, since the frames brace each other, and, being braced within themselves, form a structure which is strong and rigid, and capable of withstanding the greatest pressure which can be exerted by a stream of running water.

The bottom frame c of each section is supported on four or more wheels, d, which are made with deep double flanges, adapted to hang down on each side of the rails. The journal-boxes of these wheels are intended to be made water-tight, and can be easily kept lubricated by means of tubes running up to the comb of the roof, and provided with screw-caps to exclude the water. The inclined top frame c^1 and the vertical side frame c^2 are covered with boiler-iron e, firmly secured thereto. This roofing e extends a short distance beyound the ends of the sections, and overlaps that of the adjoining section or sections, as shown in Fig. 5. The end sills of the lower frames or parallelograms c are joined by heavy eyes and bolts e^1, or any other strong and flexible connections which allow the sections a limited vertical and lateral movement.

I prefer to construct the dam with open bottom and ends, as shown, so that its interior will fill with water and hold the whole structure down; but the dam may be closed, if found desirable, and thereby made more buoyant, so it can be operated with less power.

By having the dams flexible, the wheels of the sections will more readily accommodate themselves to any irregularities in the track, while the whole structure will have sufficient rigidity to allow it to be pushed out in a straight line. At the outer end of the dam is built a track-cleaner and sediment-harrow, F, with its main frame somewhat in the form of one-half of the cow-catcher to locomotives. A strong beam, f, made on the arc of of a circle, extends from the junction of the frames c c^1 of the end section, being that part facing up the river, to a point in line, or nearly so, with the side c^2, where it is connected with a straight beam, f^1. Inclined pieces f^2 connect the roof of the section with the beam f. These pieces have spaces between them, which allow the water to pass through into the interior of the dam, but turn its force outwardly, so that it will not strike against the upright or down-river side c^2.

From the under side of the beam f project heavy teeth e^3, which hang down between and on the outside of the rail. This track-cleaner is adapted to throw off any obstructions from the track, such as brush or bowlders, while the teeth e^3 will harrow through any sediment, and allow it to be washed down by the current.

I have designed to have the dam withdrawn from its position across the channel in a number of ways, one of which is shown in Figs. 1 and 2. According to this plan I build a basin or receptacle, G, partly or wholly cut into the shore, and place the abutment A^3 at the outer end of the same, on the down-river side. The other wall of the basin has an abutment, G′, opposite, and similar to the abutment A^3, and lock-gates H H′ are hung in these abutments, and are adapted to be opened and closed as desired. The track C extends into this basin, and the dam is intended to be withdrawn within the same, and moved out of it, by means of any suitable mechanism operated by steam or other power, with or without the use of counter-weights.

When the dam is within the basin, the lock-gates H H′ can be closed to keep the running water out of the basin, and the water within the basin may be pumped out for the purpose of repairing the dam.

In some localities, it may be found desirable to withdraw the movable dam up onto the bank above high water-mark. This I can accomplish by inclining the track and employing a system of counter-weights connected to the dam, and operated by well-known mechanism.

A short basin or receptacle on the line of the shore may be used with the inclined ways, and have lock-gates, through which the dam would be moved in both directions. By having the movable dam of the inclined form shown, with the slanting side faced up river, the pressure of the flowing water will have a tendency to force the dam down upon the track and keep it rigidly in position.

It is evident that many modifications of the construction of my apparatus can be made without departing from the spirit of my invention—for instance, in favorable localities, two movable dams may be employed, one on each side, meeting in the center of the channel, when moved into position, and forming a single dam, a greater number of rails than shown can be used, and the number of sections to the dam changed, as desired.

The uses of my system and apparatus, it is evident, are quite various under varying conditions. In ordinary instances, as many sets of works will be required as will serve to raise the water at just such points as may be

needed. In some instances, dams will be required just below the falls in the river-current, to flow out such falls, and in other instances such dams may be required both above and below the falls, so that when the upper dam is withdrawn the vessel may have the advantage of the volume of water retained to carry it over the pitch, and to a vessel going up stream the volume of water accumulated by the lower dam will flow out the same, and enable the vessel to pass up over. On long shoals it is evident that there may be a series of such dams, so that a vessel can pass from one into another, as through a series of locks.

The advantages of my system and apparatus are obvious, as aside from the cheap cost of construction of the latter, and the rapidity with which it may be made. It has this decided advantage, that, in the winter-season, when the waters of rivers are commonly high, and frequently filled with ice, the dams may be permanently withdrawn, and thus be secure from wear or injury, as permanent dams cannot be, and there will not be created ponds of water liable to freeze, as would be the case with permanent dams, or with locks; but the whole river flows through unobstructed channels, and thus keeps itself in a condition for navigation. There are other advantages, so obvious as not to require enumeration, connected with the management of these dams.

Having thus described my system and its apparatus, what I claim as new therein, and my own invention, is—

1. The system for the improvement of rivers, consisting of wing-dams and abutments, a channel-space between the abutments, and a movable dam filling such channel-space, adapted for withdrawal to open the channel-space, or for replacement to close the channel-space, substantially as described.

2. The combination of one or more wing-dams for turning the water of a river into an open channel, abutments on each side of the channel, with a dam adapted to be moved across or withdrawn from such channel, substantially as and for the purposes set forth.

3. The combination, with the channel A, of the dam D, moving on a track laid in the bottom of such channel, and the receptacle or basin G, into which the said dam is adapted to be withdrawn, substantially as described and shown.

4. A movable dam of prismatic form, arranged with the longest face against the current, substantially as described.

5. The movable dam D, constructed in sections, substantially as and for the purposes set forth.

6. In combination with a movable dam, constructed as set forth, the track-cleaner F, substantially as described.

This specification signed and witnessed this 27th day of June, 1877.

WILLIAM B. JOHNS.

Witnesses:
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