

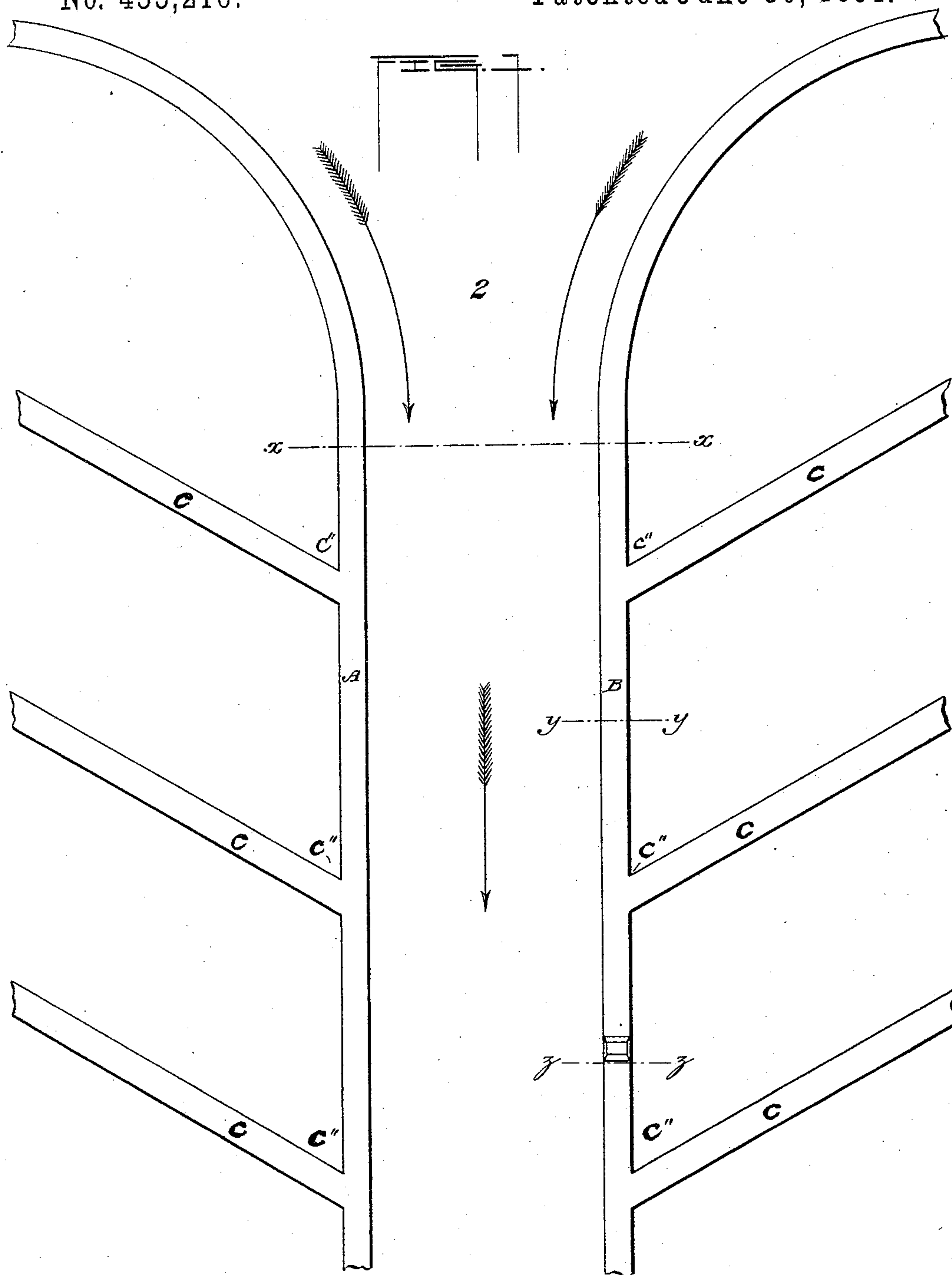
(No Model.)

3 Sheets—Sheet 1.

A. KIRK.  
JETTY.

No. 455,216.

Patented June 30, 1891.



WITNESSES

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INVENTOR

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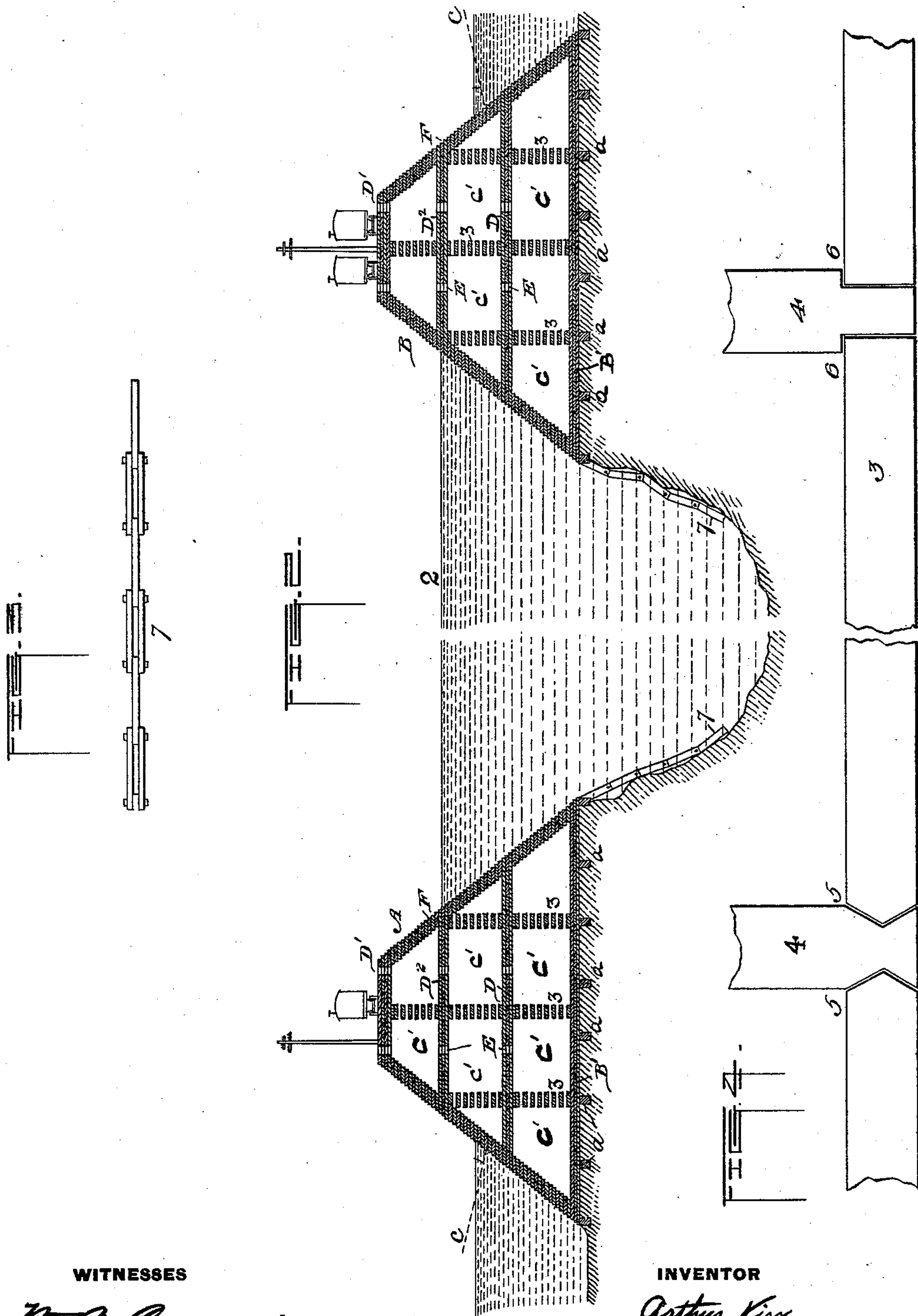
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3 Sheets—Sheet 2.

A. KIRK.  
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No. 455,216.

Patented June 30, 1891.



WITNESSES

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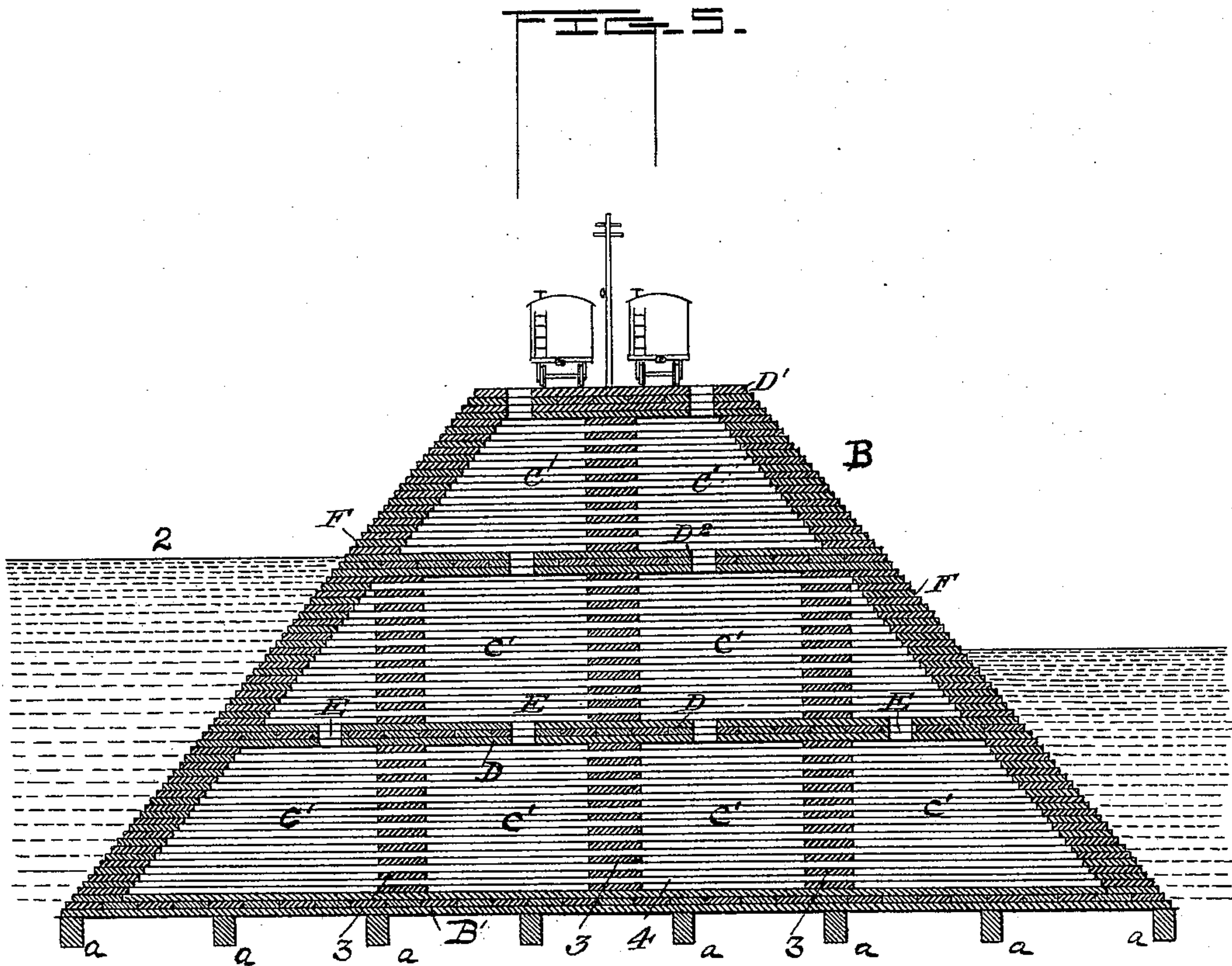
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3 Sheets—Sheet 3.

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# UNITED STATES PATENT OFFICE.

ARTHUR KIRK, OF SHARPSBURG, PENNSYLVANIA.

## JETTY.

SPECIFICATION forming part of Letters Patent No. 455,216, dated June 30, 1891.

Application filed January 12, 1886. Serial No. 188,306. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR KIRK, of Sharpsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Jetties; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1, Sheet 1, is a diagram view illustrating my improved jetty system. Fig. 2, Sheet 2, is a vertical cross-section across the bed of the stream on the line  $x x$  of Fig. 1. Fig. 3 is an edge view of a chain shown in Fig. 2. Fig. 4 is a plan view illustrating one of the details of construction of the jetty. Fig. 5 is a cross-section on the line  $y y$  of Fig. 1.

Like symbols of reference indicate like parts in each.

The object of my invention is mainly to improve the navigation of rivers and streams of all sizes by a new and improved construction of artificial walls or jetties between which the water of the stream is caused to run, and by means of which the banks of the stream are prevented from being washed away or undermined, the level of the banks is raised, and the water is so confined as to increase the flow and render it more uniform, while the current is so directed that the alluvial matter shall not be permitted to deposit itself in the channel, and that the water shall be made to cut out and deepen the bed of the stream.

In the diagram Fig. 1 and in Fig. 2, 2 represents the course of a stream, and A and B are side walls or jetties, which are separated from each other a sufficient space to provide a proper channel between them, and at their upper ends are flared outwardly, so as to catch the water and converge it within the channel. A series of wing dams or walls  $c$  project from the outer sides of the jetties A and B toward the shores and slant upstream, say, at about an angle of forty-five degrees. These wings on a given side of the jetties are preferably placed at intervals about half or a quarter of a mile apart. The height of the walls A and B is sufficient to collect nearly all the water of the stream during low water, and in high water the wings  $c c$  will so shoal and retard the flood water that it will deposit its sand, gravel,

or alluvium behind the wings, and in doing so will fill up the bottom and in time will recover much land which would otherwise be of little value. It will be noticed that the wings  $c$  project from the sides of the jetty-walls A B, which extend upstream from their juncture with the wings, so as to make angles  $c''$ , which check the current and cause the water to deposit its alluvium. In this regard my invention is different from other prior systems, in which, instead of having closed angles on the upper sides of the wings, there are openings at these places through which the water may flow freely, carrying the alluvium with it. As shown in Fig. 2, the wings  $c$  are made to increase gradually in height at an angle of about thirty minutes or more from the jetty-wall to the shore. The purpose of this is that when the stage of water is high in the river the flow over the jetty-wings and the swiftest current may be toward the middle of the stream at the junction of the wing with the jetty-wall, while near shore the water, being backed up by the wing, may be slack. It is well known that alluvium is deposited very much more rapidly from slack water than where the current is swift, and hence the filling up of the stream behind the jetty will be greatest at the shore end and will continue outward toward the channel. This prevents the useless formation of sand-banks in the middle of the stream, and renders the reclaiming of the land much more certain and efficacious.

I do not wish to limit myself under this patent to the use of the wings  $c$  in combination with the jetty-walls. They may with advantage be used alone, extending from the shore toward the middle of the stream, and decreasing in height, as already described. In addition to these results, my invention has also for its object the construction of the jetty-walls so that they may furnish a good road-bed for railroads, telegraph-poles, horse-roads, and similar purposes.

I will now describe the construction of the jetty-walls A and B. Referring to Fig. 5, the wall is composed of boards, planks, or other sawed timber.  $aaa$  are mud-sills, which are laid on the bed of the stream and prevent percolation of water under the structure.  $B'$  is the lower floor composed, preferably, of two or more series of boards, the lowest of which



is at right angle to the mud-sills and fastened thereto, the next series is laid at right angles to the lowest, and the third layer, if any, at right angles to the second. The boards of each course being laid adjacent to each other form a practically water-tight base for the jetty. Upon the floor B', I lay a series of planks 3, extending longitudinally the entire length of the wall, the adjacent rows being distanced laterally about eight feet or more from each other, and upon these I lay a series of planks 4, extending transversely from side to side of the wall, and so continue to build until a number of alternately transverse and longitudinal courses of planking have been superposed. These are then fastened, preferably by wooden pins, which are practically indestructible when submerged, and then the structure is covered by a flooring D, which is constructed of layers of alternate transverse and longitudinal planking, similarly to the construction of the lower flooring B', before described. In this way a number of chambers c' c' are formed, which are in the case supposed about eight feet square. They are clearly illustrated in Fig. 2, whose section lines run through the middle of the chambers, and not so clearly in Fig. 5, in which the section is taken at the transverse planking 4, thus showing it and the longitudinal plank 3, which together form the walls of the chambers. Holes E are made in the flooring D to afford openings through which sand or some other heavy material may be introduced to fill up the chambers. In the same manner another series of chambers c' is built above the flooring D. These are in turn covered by a second flooring D<sup>2</sup>, upon which other chambers are built until the structure has reached the desired height. The side lines F are contracted as the building progresses, so that the wall when completed shall have a pyramidal form, and the whole is covered by a roof D', constructed like the floorings D and D<sup>2</sup>, before described. The latter may be of sufficient width to accommodate the tracks of a railroad. The contraction of the side lines of the wall is not an essential feature of my invention, since their inclination may be such as to give the wall any desired shape in cross-section. Each of the floorings D and D<sup>2</sup> and the roof D' is provided with the holes E, through which sand or other ballasting material may be introduced to fill the chambers c' and to give strength and stability to the skeleton structure. When thus made, it is desirable that the outer walls F of the jetty should be tight to exclude the water and to prevent washing out of the contents of the chambers c'. This would not be so were the construction simply as I have described it above, because there would be chinks in the wall between the courses of the longitudinal planks of a length equal to the distance between the rows of cross-planks. To prevent the existence of these chinks I lay the courses of the longitudinal planks 3, forming the outer walls,

directly upon each other, as shown in Fig. 5, and instead of resting the ends of the cross-plank 4 between adjacent courses of the planks 3 I interpose them between the ends of abutting planks in the same row, which are separated for that purpose, as shown in Fig. 4. The sides of the cross-planks are then notched, as at 5, and the ends of the planks 3 tongued so as to fit within these notches; or the ends of the cross-planks may be tongued so as to have shoulders 6, and the ends of the planks 3 abutted against these tongues and seated on the inner sides against the shoulders. In either case a water-tight joint is made and the planks 3 are given a hold upon the cross-planks, which will prevent the former from being squeezed in and displaced by the great pressure of water.

I do not desire to limit myself to the employment of the structure just described on jetty-walls. It may often be used with advantage as the foundation for mills or other structures which are required to be built in streams or in marshy places.

In Fig. 2, which represents a stream provided with my improved system, I show a useful device for preventing scouring and undermining of the sides of the channel and the foundations of the jetties. It consists of chains 7, composed of wooden links, which are hung from the bases of the jetty-walls and lie upon the bed of the channel. The links are weighted, so that they may sink to the bottom of the stream. These links are shown in detail in Fig. 3.

By the word "boards" used by me in the following claims I mean sawed or hewn lumber or planks of any kind.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A jetty-wall constructed of several floors having intervening spaces divided into compartments by partitions formed of boards laid to cross each other at intervals, said compartments being filled with suitable ballasting material, said wall being built in a stream, the top of the wall extending above the water and having an obtuse surface to afford a foundation for a superstructure or road-bed, substantially as and for the purposes described.

2. A jetty-wall constructed of several floors having intervening spaces divided into compartments by partitions formed of boards laid to cross each other at intervals, the outer sides of the wall being composed of superposed courses of boards and the cross-boards of the wall secured to the outer sides by interposition between the ends of adjoining boards in the same course, said cross-bars being provided with notches or shoulders which bear against the boards of the side wall and brace the same, substantially as and for the purposes described.

3. The combination, with a jetty-wall extending lengthwise of the stream, of a wing projecting therefrom toward the shore and



inclined upstream, said wing forming a closed angle at its juncture with the jetty on the upstream side of the wing, substantially as and for the purposes described.

5 4. The combination, with jetty-walls to deflect the water of a stream into a channel between them, of wings projecting therefrom toward the shore and inclined up the stream and increasing in height from the jetty-wall to the shore, substantially as and for the purposes described.

10 5. In a stream, a wing projecting from a point near the shore toward the middle of the stream and decreasing in height from the shore outward, substantially as and for the purposes described.

6. In a stream, a wing projecting from a point near the shore toward the middle of the stream, having an inclination down the stream and decreasing in height from the shore, substantially as and for the purposes described. 20

7. The combination, with a jetty-wall or similar structure, of chains attached thereto and lying upon the bed of the adjacent stream, substantially as and for the purposes described. 25

In testimony whereof I have hereunto set my hand this 9th day of January, A. D. 1886.

ARTHUR KIRK.

Witnesses:

W. B. CORWIN,

THOMAS W. BAKEWELL.