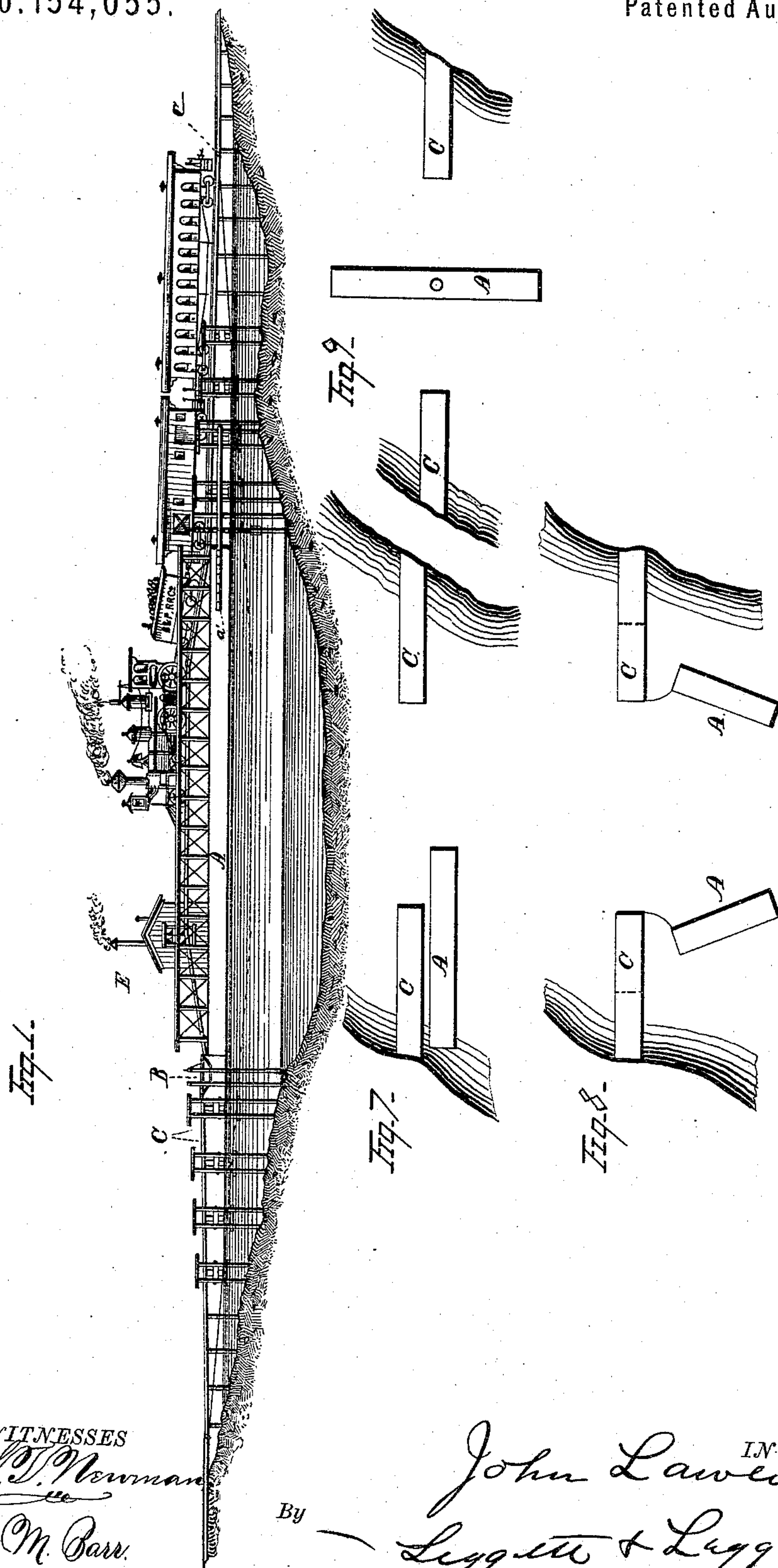


J. LAWLER.
Floating Draw-Bridges.

No. 154,055.

Patented Aug. 11, 1874.



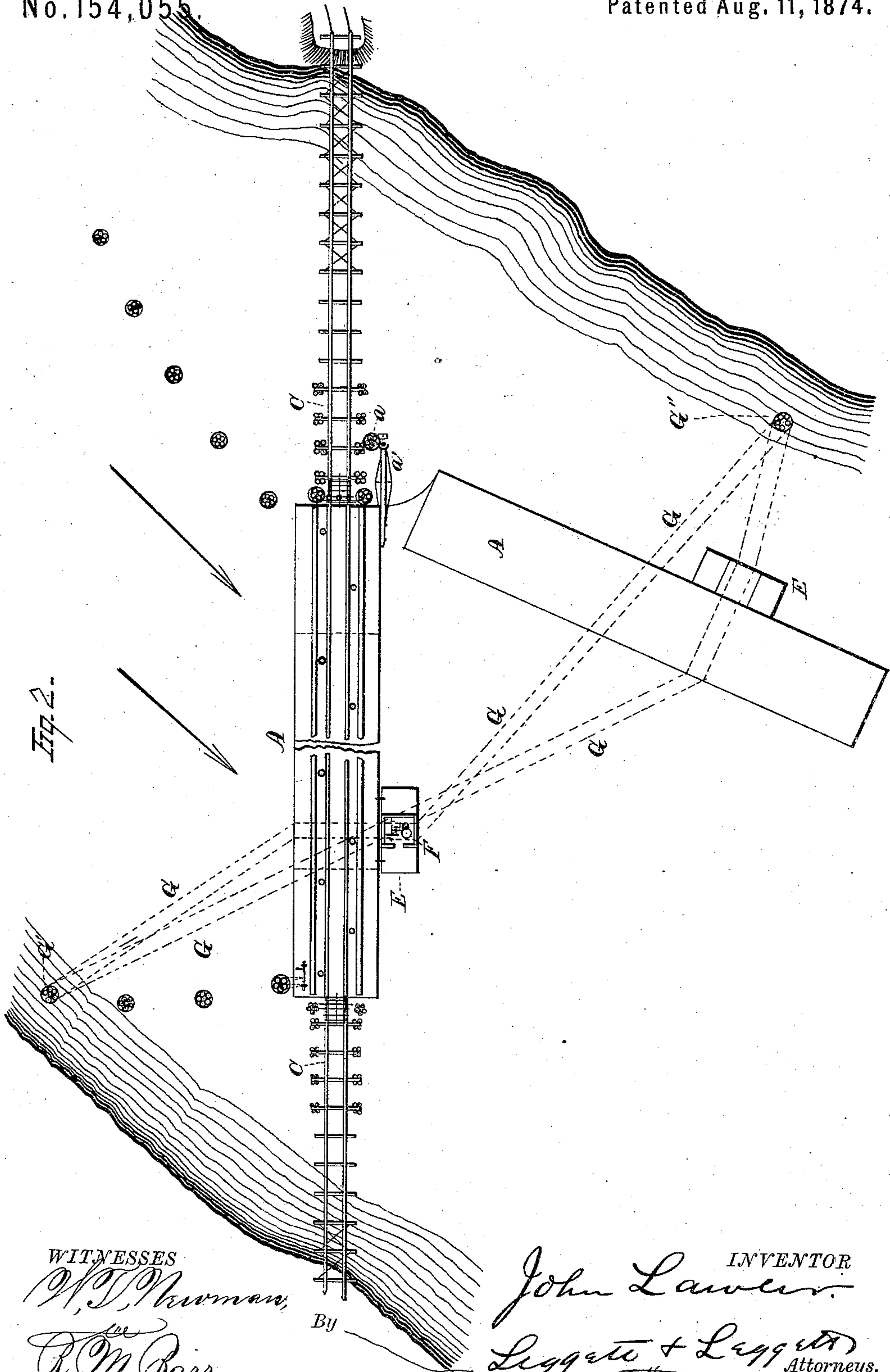
WITNESSES
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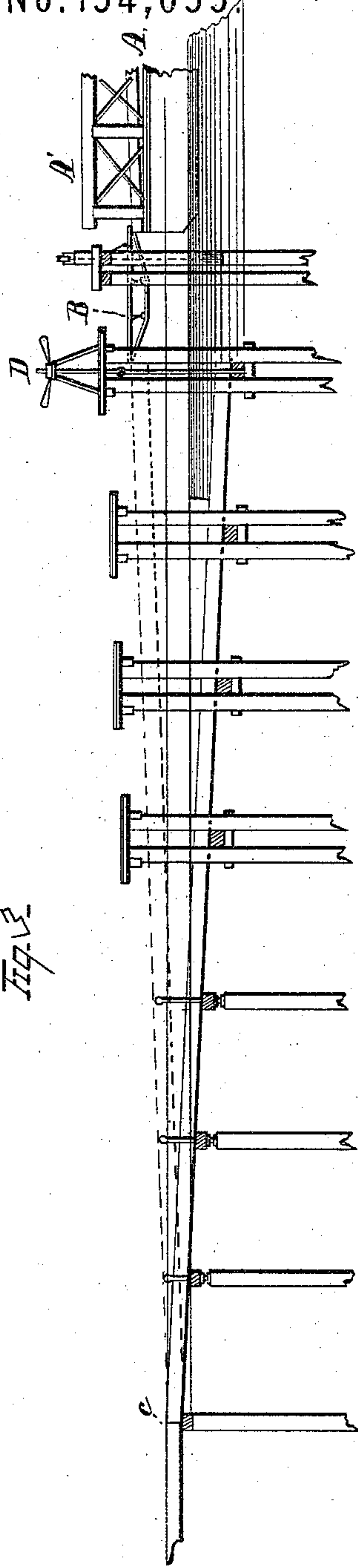
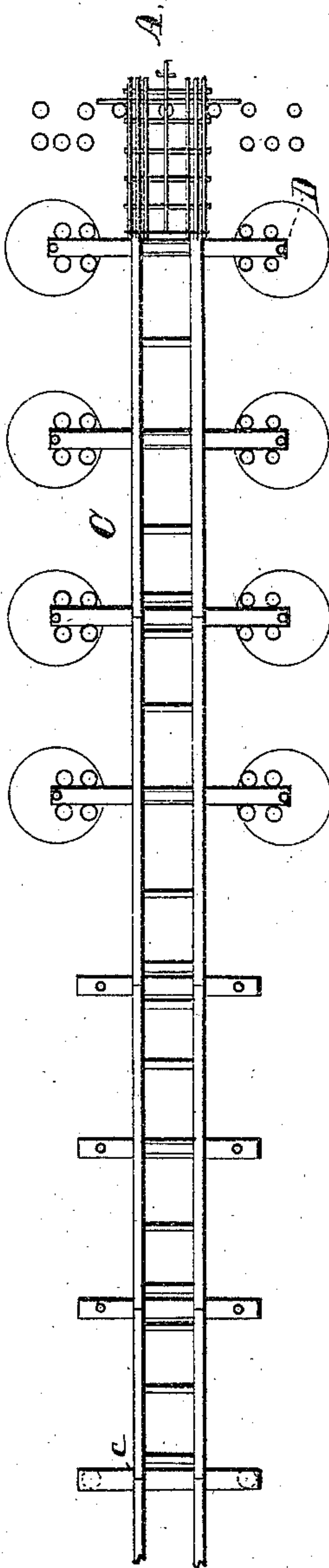


Fig. 12

Fig. 13



WITNESSES
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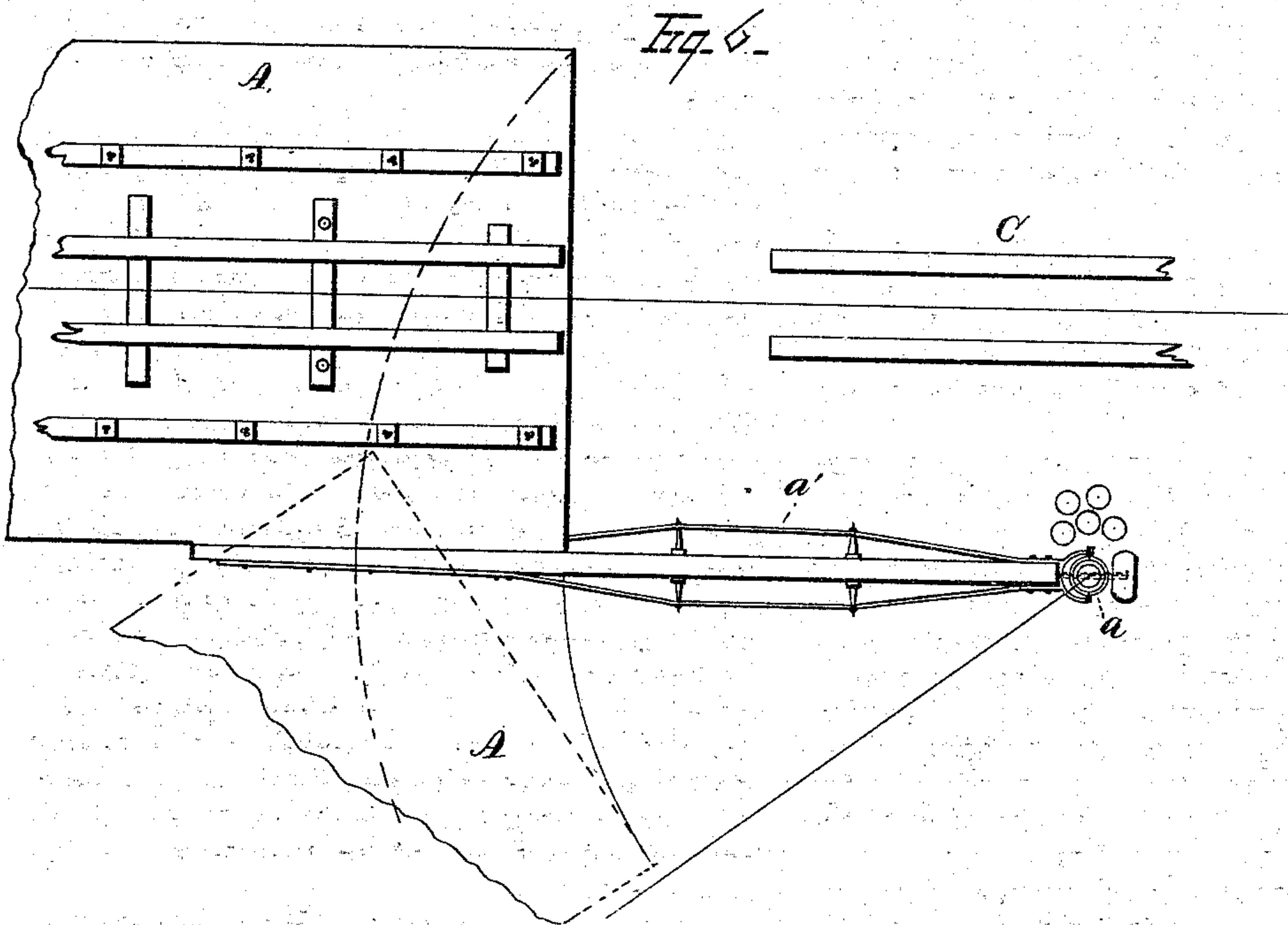
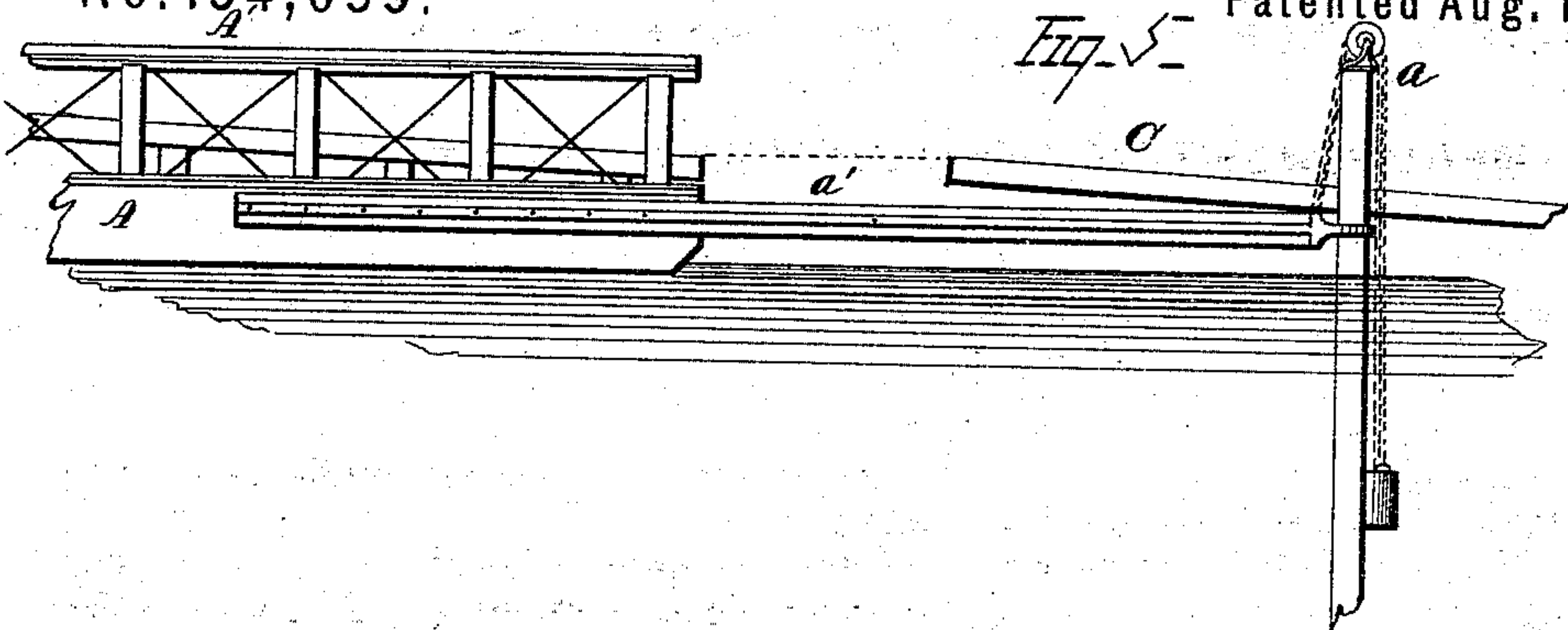
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UNITED STATES PATENT OFFICE.

JOHN LAWLER, OF PRAIRIE DU CHIEN, WISCONSIN.

IMPROVEMENT IN FLOATING DRAW-BRIDGES.

Specification forming part of Letters Patent No. 154,055, dated August 11, 1874; application filed July 30, 1874.

To all whom it may concern:

Be it known that I, JOHN LAWLER, of Prairie du Chien, in the county of Crawford and State of Wisconsin, have invented certain new and useful Improvements in Draw-Bridges; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in floating draw-bridges; and is designed for use upon rivers and lakes, and is especially adapted to navigable streams, where broad channels are demanded by the interests of navigation.

In the drawings, Figure 1 is a view in side elevation of my invention in operation at a high stage of water, the dotted lines showing the position of the bridge and road-bed at a lower stage. Fig. 2 is a plan view of my invention, showing the same closed and opened. Fig. 3 is a side elevation, showing my adjustable apron for approach. Fig. 4 is a plan view of the same. Fig. 5 is a side elevation, showing one form of connecting my swinging bridge to its anchorage. Fig. 6 is a plan view of the same showing its operation. Fig. 7 is a plan view, showing a modification of my invention, wherein the draw-bridge is detached, and moved alongside of one of the approaches C; Fig. 8, another modification of my invention, adapted for very wide channels, wherein the hull A is divided into two sections, each section swinging from an opposite approach, C, and meeting together in the channel. Fig. 9 is another modification, showing the floating hull A turning upon a central pivot.

My invention consists in the following parts and combinations, as hereinafter specified and claimed, wherein A is a hull, made, preferably, after the fashion of a flat-boat or scow. But any suitable form of boat may be adopted, of sufficient buoyancy, length, and strength

of construction, as will hereinafter more fully appear.

If the bridge is to be of great length, and is intended for the transit of very heavy bodies, such as railway-trains, any suitable system of bracing, A', may be provided; although I prefer, in general use, the principle, modified as may be required, as shown in Figs. 1 and 5.

I do not, however, limit myself to this or any other principle of bracing, as the same may be varied to meet the use and requirements of the bridge.

a is a suitable pile-pier, or other anchorage, upon which swings the rigid-arm connection a', which joins one end of the hull A to the anchorage a. This arm a' is made of suitable strength, style, and material to secure and insure an attachment between the anchorage a and the hull A, inasmuch as its proper construction and adjustment depends, first, on accuracy of movement in the swinging of the bridge from the anchorage a; second, the proper position and relation between the fixed end of the hull A and its adjacent aprons B C. B B are short aprons, constructed of suitable material, and properly braced and strengthened, if required to bear very heavy weights. The short aprons B B connect the hull A and the long aprons or approaches C C.

I may, at times, prefer to dispense with the short aprons B, and make a direct connection between the long apron C and the hull A, or I may omit the long apron C, and employ the short apron B to connect the hull A with the shores.

The long aprons or approaches C are made adjustable by vertically rising and falling from a pivot or joint, c, placed at any suitable distance from the end of the hull A.

I make the aprons C longer or shorter, as may be desired, to accommodate the required grade caused by the rise and fall of the water, as will hereinafter appear.

I may also provide an apron upon one or

both ends of the hull A, similar in construction and operation to the apron C, and designed to co operate in function with the aprons C.

In order to adjust and fix the aprons C at a proper point, screw devices D, or any suitable equivalent thereof, may be used, whereby the free end of the approaches C C may be brought into proper relation with the ends of the hull A, and thereby accommodate the rise and fall of the water.

Instead of the screw arrangement or its equivalent for adjusting and fixing the approaches C C, I may float the free end of the apron C in substantially the same manner as the hull A, when it will be apparent that, in rising and falling with the different stages of water, the aprons C C and the hull A will always be at a proper level in relation to each other.

When I employ this device for maintaining the proper relation between the aprons C C and the hull A, the aprons C may be suitably strengthened by appropriate bracing or other device.

E represents the power by which my bridge is operated. It is composed substantially of a cylinder or drum, F, around which are wound or turned the cables G G a sufficient number of times to insure sufficient "bite" or friction.

Upon rotating the cylinder F, by any appropriate means, it will be obvious that its operation upon the cables G G will be to carry the hull A in one direction or the other accordingly as drum F is turned.

The cables G G are attached to suitable fastenings or anchors.

When desired to close the bridge in order to permit transit over the same, the cylinder F is rotated so as to swing the free end of the hull A in the direction of the anchor G'. To open the bridge and free the channel, reverse the motion of the cylinder F, and the free end of the hull A will be drawn toward the anchor G'', as shown in Fig. 2.

I do not limit myself to the number of drums or the number of cables, inasmuch as the object of my invention may be carried out with one or more, as necessity requires, the object of my invention being to leave unobstructed the entire channel of the river to navigation.

My invention may be subject to many modifications without departing from the spirit thereof. First, if the channel to be bridged be exceedingly wide—such as the Potomac at Washington, D. C., or the Detroit River, at Detroit, Michigan—instead of constructing the hull A of a single piece, it may be made in two sections, which shall swing from fixed

points at either shore, and meet and be properly fastened and adjusted by knuckle-joints, or any other appropriate locking device, in the channel. In such a case it is obvious that each section of the bridge must be provided with independent cables G.

The swinging arm *a'* is so adjusted to the anchorage *a*, as shown in Fig. 5, that the arm *a'* is prevented from binding or catching upon the anchorage *a* in rising or falling with the hull A. The power E, as shown in Fig. 2, I prefer to place upon a separate float, in order that I may attach the same at a smaller or greater distance from the swinging end of the hull A as may be required by the strength of the current in different rivers, or at different stages of water in the same river. This is the preferable method that I adopt, although the power E may be built upon or attached directly to the hull A.

I do not propose to limit myself to any particular construction of the hull A, but I prefer, generally, to construct it after the following plan: The hull to be heavily sponsoned near the line of floatation, so as to sink slowly when loaded. The sponsons to be wider, or the hull A to have greater beam near the extremities than at the center.

It will be obvious that a bridge made after my plan, as herein set forth, may be constructed to provide either for railway or ordinary highway purposes, separately or combined.

Among the numerous advantages accomplished by a bridge made after my plan, as herein described, may be enumerated: First, the fact that a floating structure like mine, across a channel, will not interfere with the natural course of the river. Any stationary structure in the channel of a river will divert the deposits contained in the water from their natural course. My plan permits said deposits to continue undisturbed in their original and proper manner, thereby avoiding and preventing any change of channel. Second, absolute safety, inasmuch as my bridge would float any weight that would be placed upon it, even though it should become detached from its connections. Third, the immense comparative cheapness of construction over all other bridge structures, especially such as are used for spanning navigable waters or wide channels. Fourth, the comparatively short time in which the structure can be completed and put in operation. Fifth, a wider channel may be left perfectly unobstructed by my invention than by any other of which I am aware.

I make no claim on the aprons or on the means of adjusting the same.

What I claim is—

1. In combination with a bridge the float-

ing draw A provided with a continuous hull, and adapted in use to close the space between the permanent portions of the said bridge, and to open by swinging above or below the said approaches around a fixed pivot.

2. A floating draw-bridge adapted to swing or turn upon a fixed anchorage, and provided at the said anchorage with appliances *a a'* for accommodating the point of support of the said draw to the rise and fall of the bridge.

3. In combination with the hull A the capstan E adapted to be adjustable at different points along the hull A, substantially as and for the purpose shown.

4. The combination of the hull A, capstan E upon the said hull, and lines or cables G

fixed at both ends to the shore, substantially as and for the purposes set forth.

5. The combination of the swinging bridge A, whose bed is a continuous hull, swinging or turning upon a fixed anchorage, the adjustable aprons or approaches C C, adjustable capstan E, and one or more fixed cables, G, substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing, I have hereunto set my hand this 29th day of July, 1874.

JNO. LAWLER.

Witnesses:

LEVERETT L. LEGGETT,
HENRY H. GORRINGE.