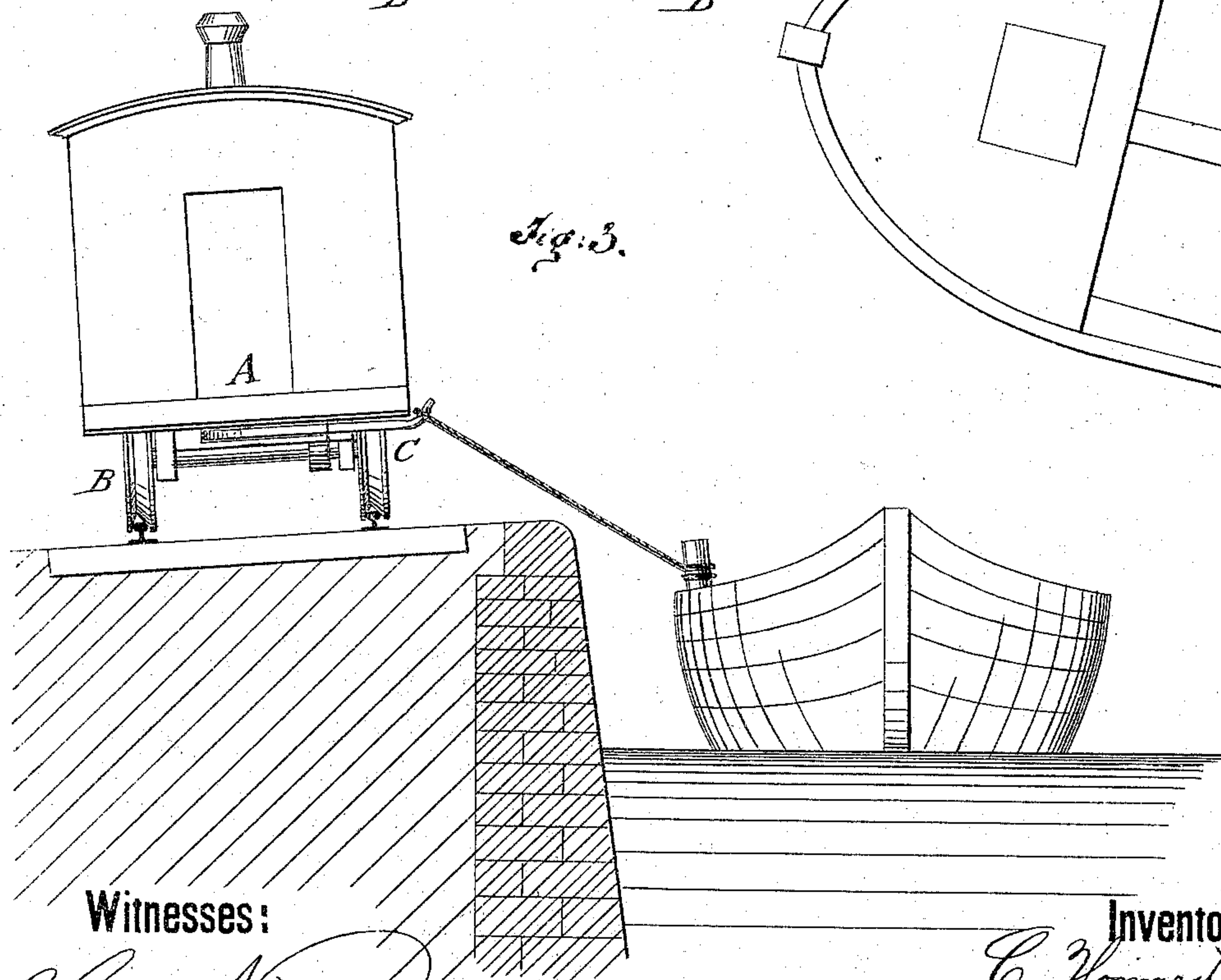
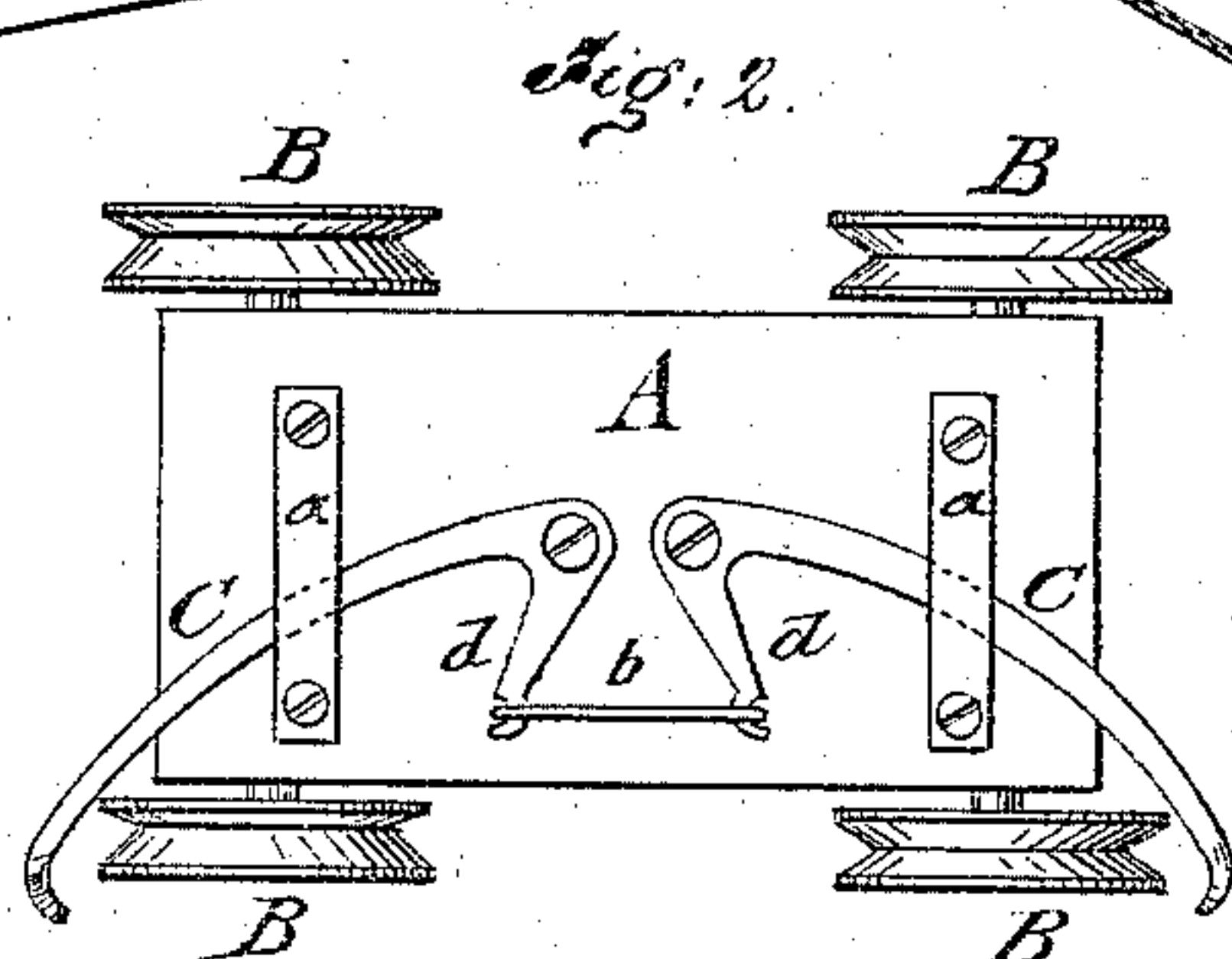
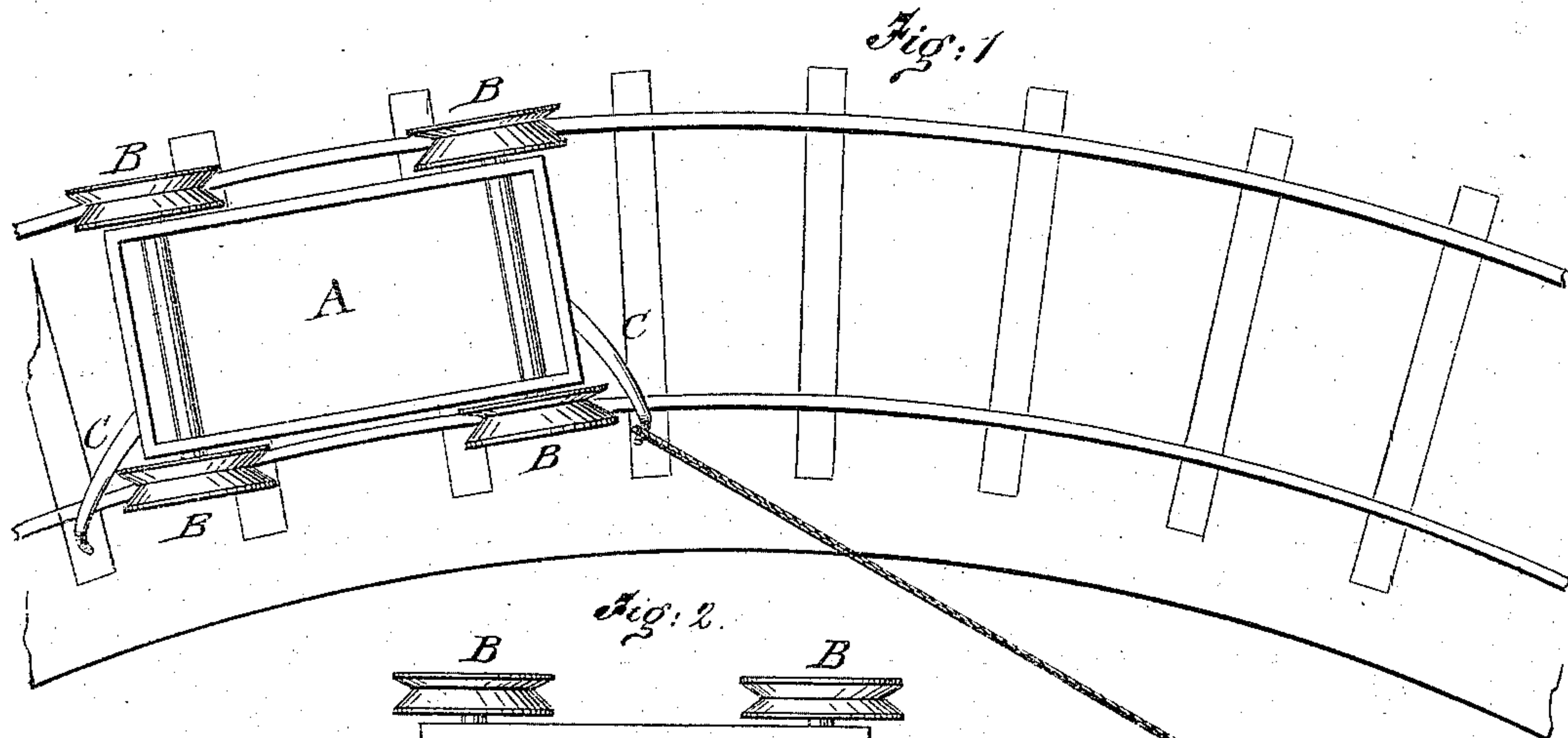


C. HOWARD.

Locomotive-Attachments for Towing Canal-Boats.

No. 157,400.

Patented Dec. 1, 1874.



Witnesses:

Chas. Nida
Edgwick

Inventor:

C. Howard
Per *Munn*
Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES HOWARD, OF NEW YORK, N. Y.

IMPROVEMENT IN LOCOMOTIVE ATTACHMENTS FOR TOWING CANAL-BOATS.

Specification forming part of Letters Patent No. **157,400**, dated December 1, 1874; application filed March 15, 1873.

To all whom it may concern:

Be it known that I, CHARLES HOWARD, of the city, county, and State of New York, have invented a new and Improved Locomotive for Towing Canal-Boats, and doing other heavy and slow towing, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a top view of my locomotive, showing the construction of the driving-wheels. Fig. 2 is a bottom view of the same, showing the construction of the towing-bars; and Fig. 3 is an end elevation of the same.

Similar letters of reference indicate corresponding parts.

The invention consists in the improvement of locomotives for towing canal-boats, as hereinafter described, and pointed out in the claims.

In the drawing, A represents the frame of the locomotive; B, the driving-wheels of the same. They are constructed with a V-shaped groove in the periphery, so as to bring the bearing diagonally on the sides of rails without touching the tops of the rails. This adds to the traction in proportion to the angle or sharpness of the groove. Thus, if the angle of the flanges be a right angle, the traction will be double. If the angle of the flanges be one of sixty degrees, or the angle of an equilateral triangle, the traction will be three times that of a wheel lying on the top of the track in the usual way. If the angle be still more sharpened, the power of adhesion will correspondingly increase.

To guard against the tendency of the tow-line drawing the locomotive sidewise from the rails, the angle of the grooves of the driving-wheels may be slanting toward the side farthest from the load—or, in other words, the apex of the angle is placed to the side of the vertical axis of the flanges—so that the flanges farthest from the canal approach nearer to a perpendicular direction. This may be assisted by laying the track under some inclination rising toward the canal.

The track will run on both sides of the canal, with one side of the locomotive always farthest from it, so that the outer flanges of

the wheels, by approaching the perpendicular, will resist heavy side strain with greater force and certainty.

The driving-wheels B act wedge-like on the rails, whether constructed with upright or slanting V-flanges.

In the drawing two of the wheels are constructed with equal angles toward the disks, and two with unequal angles.

The towing-bars C are applied on the bottom of the frame A, in order to bring the strain down as low as possible. They are pivoted equidistant from the wheels, near the center of frame A, and are of curved shape, extending beyond the wheels of the locomotives, so as not to interfere with them.

The towing-bars C are bent at their ends into upward and slightly forward turned hooks. The curved ends of the towing-bars swing toward the canal, allowing thereby a free adjustment to the different positions of the towing-line.

Whenever the towing-line comes so near sidewise as to be under almost a right angle to the wheels, the turned-up hooks allow the slipping off and disengaging of the tow-line.

Suitable guide-pieces *a*, applied to the bottom of the frame, control the swing of the tow-bars.

Spring *b* connect, in suitable manner, the lever-arms *d* of the towing-bars C, forcing the latter sidewise when there is no strain on them, and preventing the obstruction of the track by the slackened tow-line. The locomotives may therefore freely stop or move backward for the stopping of the boats or other purposes.

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

1. The laterally-curved towing-bar C, having arm *d*, one end to be pivoted on the bottom of the locomotive body or frame A, and the other end to fasten tow-line, substantially as and for the purpose set forth.

2. The curved towing-bar C, made with a lateral curve, with one end made in a suitable form, and pivoted on the bottom of a lo-

comotive or frame, A, at a point equidistant from all four of the driving-wheels, and the other end made in a suitable form to have the towing-line attached, substantially as and for the purpose set forth.

3. The combination, with frame A on bottom of locomotive, of the towing-bar C, piv-

oted equidistant, or nearly so, from all of the four driving-wheels, substantially as and for the purpose set forth.

CHARLES HOWARD.

Witnesses:

T. B. MOSHER,

ALEX. F. ROBERTS.