(No Model.) 2 Sheets—Sheet 1.

E. B. HAYES.

TOWING CANAL BOATS.

No. 302,400. Patented July 22, 1884.

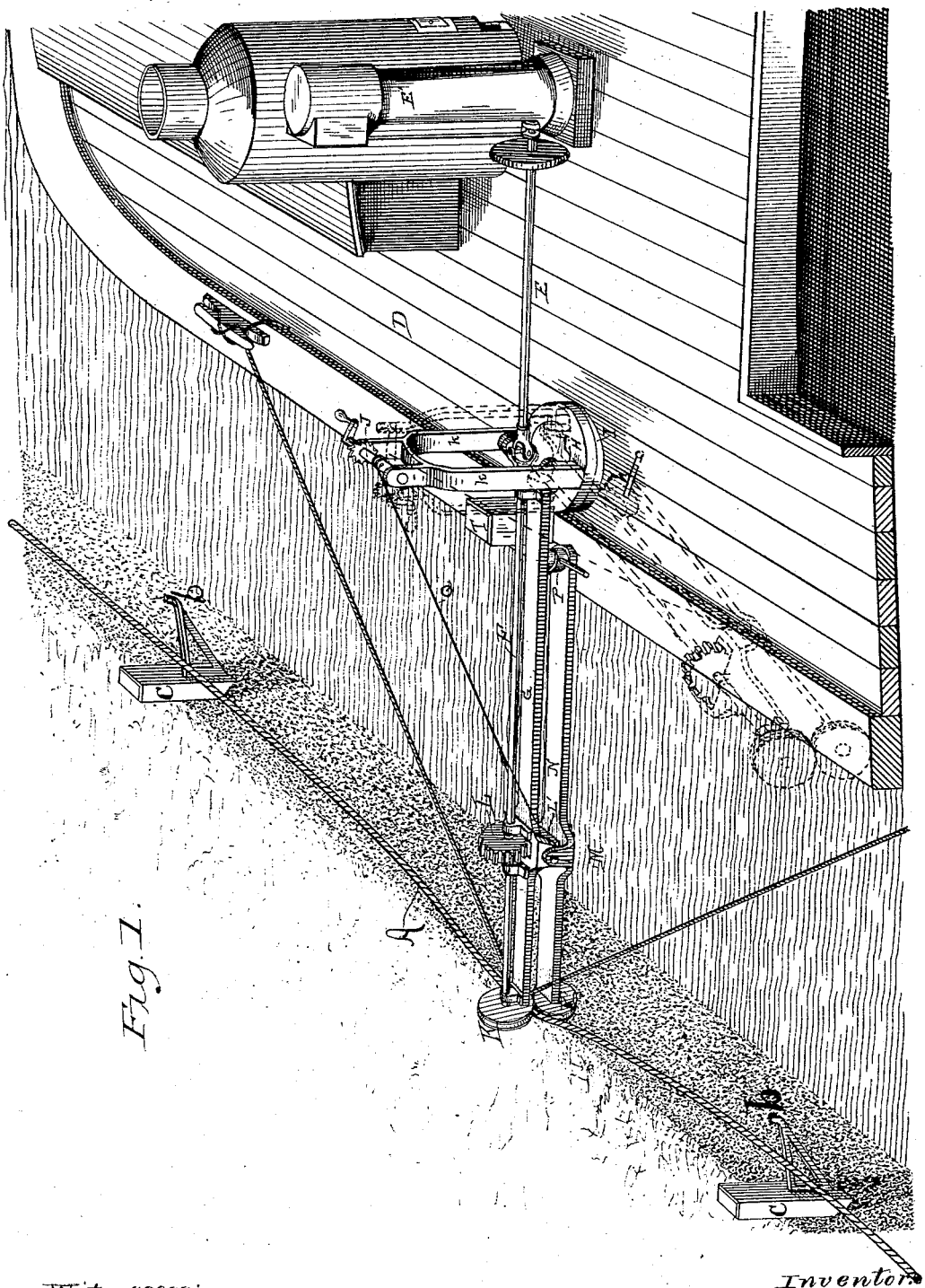

Fig. 1.

Witnesses:
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E. D. Clapp

Inventor.
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By his atty
R. D. Smith

(No Model.) 2 Sheets—Sheet 2.

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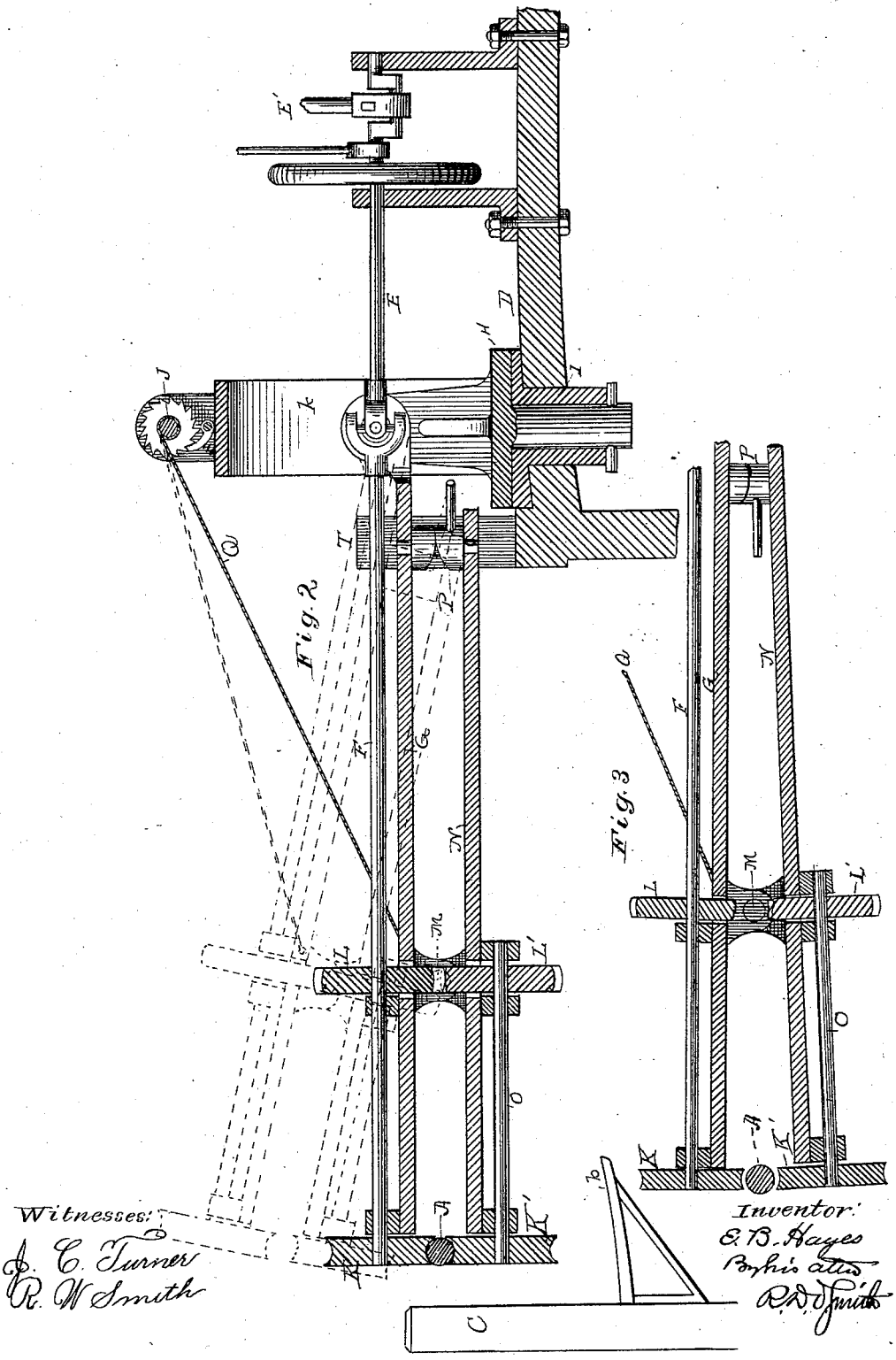

UNITED STATES PATENT OFFICE.

ELI B. HAYES, OF BIG RAPIDS, MICHIGAN.

TOWING CANAL-BOATS.

SPECIFICATION forming part of Letters Patent No. 302,400, dated July 22, 1884.

Application filed April 2, 1884. (No model.)

To all whom it may concern:

Be it known that I, ELI B. HAYES, of Big Rapids, county of Mecosta, and State of Michigan, have invented new and useful Improvements in Apparatus for Towing Canal-Boats and other Vessels; and I do hereby declare that the following is a full and accurate description of the same.

This method relates to that method of towing wherein the steam-motor is located upon the boat, and the motive power is exerted upon a stationary traction-rail on the bank, or a traction chain or cable submerged in or suspended above the water.

I am aware that a rigid rail has been placed along the margin of the water, and that a motor-wheel, actuated by a steam-engine upon the boat, has traversed said rail, engaging therewith by cogs, by friction, or otherwise. This method involves a large expense of a rigid rail firmly and solidly mounted, and the boat is, as it were, rigidly attached to said rail, and is compelled to follow its guidance inflexibly.

I am also aware that a chain or cable has been laid along the bottom of the canal, and the boat has been propelled by the revolution of a drum or windlass in engagement with said cable, said drum being attached to the boat and the motive power being derived from a steam-engine, also on the boat. This method involves considerable modification of the boat and the unpleasant duty of handling the wet cable in cold weather and great practical difficulty in releasing and recovering the cable under water, as it is frequently necessary to do.

I am also aware that cables have been suspended above the canal, to be employed with traction-motors upon the boat, but this method involves a large expense for the suspension of the cables.

My invention differs, essentially, from these methods, although it relates to the same general plan. My invention employs a traction-cable, located along the margin of the water, in place of the rigid track-rail, which has heretofore been employed in that place. The advantage of a cable in this place is in its flexibility, which permits in the boat desirable freedom of movement laterally; also, in cheapness and in ease of mounting and repair. My invention also employs a traction-motor of peculiar and simple construction, capable of being projected outboard to seize the cable, or withdrawn inboard when not in use, and of adjustment to engage with the cable at various elevations.

That others may fully understand my invention, I will now fully describe it, having reference to the accompanying drawings, wherein—

Figure 1 is a perspective view of my invention. Fig. 2 is a side sectional elevation. Fig. 3 is a similar section showing different positions of traction-wheels.

A is the cable, preferably of wire. It is laid along the margin of the water with its extremities anchored in some proper manner, and its intermediate parts are supported upon brackets *b*, which project from post C. These posts are placed at such distances apart as may be required by the direction of the shore—that is to say, if the shore is curved, the posts must be more numerous than if it is straight. The brackets are simply rests for the cable, and are not attached to it. They are placed near to the water-line, though it is preferable that the cable shall not be permitted to drop into the water. D is the boat, provided with a suitable small engine, E′. This engine and its boiler may be placed either above or below deck; but I think it is better to place it above deck, where it will not encroach upon the freight-space. The crank-shaft E from the engine E′ extends to a point near the gunwale of the boat, where it is jointed by means of a universal joint to the extension-shaft F, the bearings for which are supported on the frame G, which is attached by a horizontal joint to the swivel-plate H, capable of motion on a vertical axis in a swivel-plate, I, secured to the deck. The frame G is supported at its outer end by a guy-rope or chain, Q, the inboard end of which is attached to the winch J at the top of the standards *k k*, which are mounted upon the plate H, whereby the outer end of the frame G may be raised or lowered. The extension-shaft F carries at its outer end a grooved traction-wheel, K, and also a gear-pinion, L, at a point in the plane of the joint M, which unites the frame G with the counter-frame N, on which is mounted the counter-shaft O. At the extremity of said counter-shaft there is a grooved traction-wheel, K′,

and a gear-pinion, L′, in mesh with the pinion L, whereby the two traction-wheels are coincidently driven. The counter-frame N is moved on its joint so as to grip the traction-rail or cable A or release the same by means of a clamp, P, or other suitable device. The pitch-line of the pinions L L′ contact at the axis of the joint M, so that the movements of the counter-frame N upon the joint M will not disturb the mesh of the pinions L L′. The frame G is therefore capable of motion directly in a vertical or horizontal plane or conjointly in any intermediate direction.

It will be observed that the vertical and horizontal axes upon which the frame G may move, and the cross-axes upon which the shafts E F may move, must be so arranged that they will all intersect at a common point on the axis of shaft E, and the various movements of the frame G will then be made without cramping or in any way disturbing the action of said shafts.

When the frame G and the traction-pulleys are in action, said frame will stand out perpendicular to the side of the boat, and the forward thrust will be sustained by a stanchion, T, or other suitable stop, and when out of action said frame may be swung around inboard and permitted to rest upon the deck, as shown by dotted lines. As the boat progresses, the pulleys K K′ pass high enough to clear the brackets *b;* but the sag of the cable, after the pulleys have passed, returns it to its place upon the bracket again. If from any fault of the steersman or other cause the cable should fail to fall upon its bracket again, no harm will ensue, because the next boat to arrive will pick it up and replace it again. Boats moving in opposite directions will obey the usual rules in passing, one letting go the cable and engaging it again after passing, the momentum of the detached boat being sufficient to carry it around the other without trouble.

Having now described my invention, what I claim as new is—

1. The line-shafts E F, coupled together by a universal joint and provided with the traction-wheel K at the extremity of shaft F, combined with the shaft O, parallel with shaft F, mounted in bearings upon a counter-frame, N, which is pivoted to said frame G and provided with traction-wheel K′, said shafts being provided with pinions L L′, substantially as set forth.

2. The pivot-plate H, mounted upon the deck with a vertical pivot, so as to be capable of revolution in a horizontal plane, combined with the gearing-frame G, mounted upon and connected to said plate by a horizontal pivot, and the line-shafts E F, coupled with the universal joint, the transverse axes whereof and the axes of plates H and frame G intersect at a point common to them all.

3. The gearing-frame G, the shaft F, and traction-pulley K, mounted thereon, combined with the counter-frame N, pivoted to the frame G, and the shaft O and pulley K′, mounted thereon, and the clamp P, between said frames G and N, whereby the pulleys K K′ have a positive relative motion to grip or release the cable A.

4. The line and counter shafts F and O, with the pulleys K K′ and the matching-pinions L L′ mounted thereon and supported in bearings on the frames G N, respectively, combined with the joint M, the axis whereof is in the plane of the wheels L L′, and intersects their pitch-lines.

5. The frame G, pivoted to the boat, and the shafts F O, with the pulleys K K′, supported thereon, combined with the stanchion T, whereby the forward thrust of the traction-power is transferred to the boat.

6. The swinging frame G, pivoted at one end to the boat, with its shafts and traction-pulleys at the outer ends of the same, combined with the winch J, mounted on the standard *k*, and the winch-line Q, the outer end whereof is attached to frame G near its outer end, whereby said frame is supported and controlled, as set forth.

7. The plate H, adapted to be pivoted to the deck, and provided with the side standards, *k k*, and winch J, supported thereon, combined with the frame G, pivoted to said plate, and the shafts F O and traction-pulleys K K′, carried on the ends of said shafts.

8. The plate H, adapted to be pivoted to the deck, and provided with the side standards, *k k*, and the windlass J, supported thereon, combined with the frame G, pivoted to said plate, and the shafts F O and traction-pulleys K K′, carried on the ends of said shafts, substantially as set forth.

ELI B. HAYES.

Witnesses:
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F. N. HAYES.