

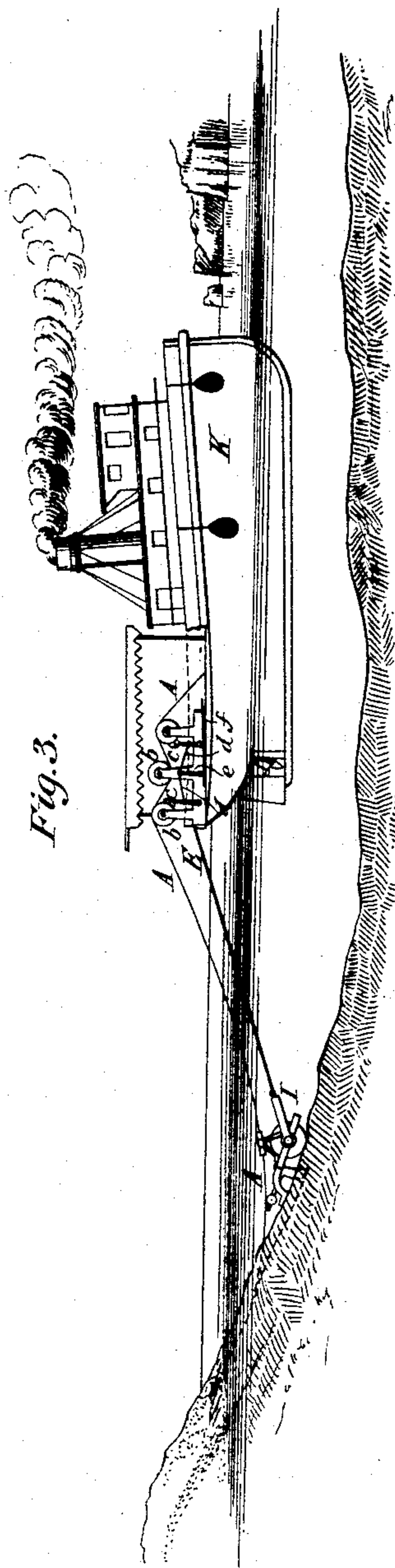
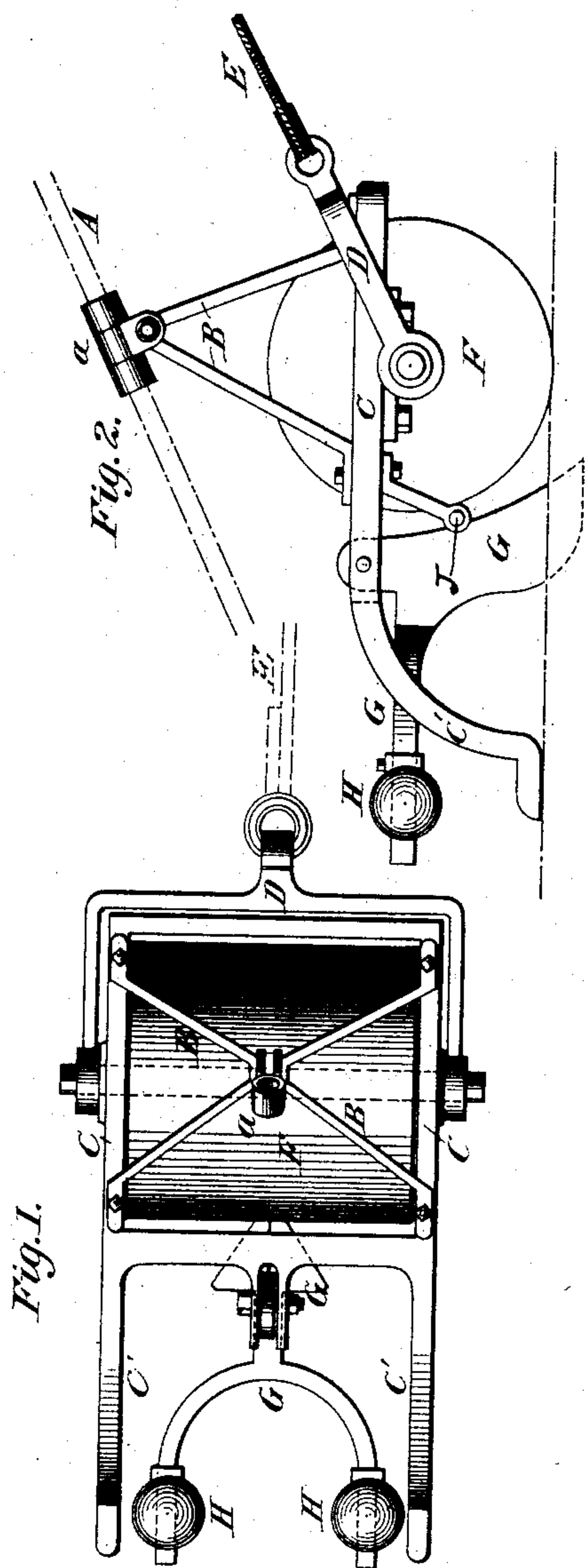
(No Model.)

H. C. SPALDING.

APPARATUS FOR LAYING SUBMARINE CABLES UNDERGROUND.

No. 339,341.

Patented Apr. 6, 1886.



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APPARATUS FOR LAYING SUBMARINE CABLES UNDERGROUND.

SPECIFICATION forming part of Letters Patent No. 339,341, dated April 6, 1886.

Application filed June 1, 1885. Serial No. 167,325. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. SPALDING, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Laying Submarine Cables Underground, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

Submarine electric cables are usually run off from a ship and laid upon the bottom of the body of water across which communication is to be established. In some places this is objectionable—as, for example, in rivers, tide-ways, or other places where strong currents are apt to run, for in such cases the cable is liable to accumulate sea-weed and other débris from the water, and to acquire such bulk as to oppose a very powerful resistance to the current. Cables under these circumstances have frequently been broken.

My object is, mainly, to prevent this and similar accidents to a cable—such as the engagement therewith of ships' anchors—and to accomplish this result I bury the cable under the sand or soil at the bottom of the body of water in which it is laid.

In carrying out my invention I make use of a novel form of plow, or an apparatus which, when dragged along by the ship, forms a furrow or trench along the bottom, and I combine therewith means for laying the cable in this furrow as it is formed. Mechanism for a like purpose has heretofore been employed or suggested; but from certain inherent defects in the manner of its construction and consequent mode of action no useful or practicable results have as yet been secured from its use. This is mainly due to the fact that no provision has been made for carrying the apparatus over obstacles in its path, such as large rocks or very hard bottom.

In the apparatus designed by me I employ a frame carrying a wide roller or pair of heavy wheels, that maintain the same in proper position and assist in regulating the depth of the furrow. Back of this roller the blade or share is pivoted to the frame, and a weighted arm extends from it, which keeps it in the furrow until it encounters some obstacle, when it allows it to tip and run over the obstruction.

The frame also carries a guide or tube of desired length, through which the cable runs, and by which it is laid in the trench cut by the blade. These and other features pertaining to my invention will be more clearly understood by reference to the accompanying drawings.

Figure 1 is a plan view of the apparatus; Fig. 2, a side elevation of the same; Fig. 3, a view showing the mode of using the device in laying a cable.

The frame C carries one or more wide rollers, F, and is provided with a head or other suitable means, D, by means of which it is connected by a cable or rope, E, with the ship that drags it. Back of the roller F is pivoted a blade or share, G, the rear portion of which is extended in two arms, that carry heavy weights H H, adjustable, if so desired. These weights are so proportioned or adjusted as to hold the plowshare in the furrow against the resistance of the ordinary soil which it will encounter, but are not heavy enough to overbalance the share when the latter is engaged in the earth and throw it forward out of the furrow. Besides, I may arrange a cross-bar, as at J, Fig. 2, below the frame in front of the plowshare, and in position to prevent it from rising forward. From the frame C extend two tail-pieces, C' C', with bent ends, that in the movement of the plow drag along the bottom and serve to steady and guide it, and, together with the roller F, determine the depth of the furrow or trench. A tube, a, is pivoted to a set of strong braces, B, on frame C. This tube may be of any length between that shown and that sufficient to extend down into the furrow formed by the plow. The cable A, that is paid out from the ship, runs through this tube, and is delivered by the same into the trench behind the plow.

In Fig. 3 the ship K, from which the cable is laid, is shown as provided with the usual rollers or drums, b b, for delivering the cable from the hold over the stern. Upon the drums b bear brake-shoes c on levers d, that are operated by the toggle-levers and link e, controlled by a bar or lever, f. These devices are for regulating the tension of the cable and its rate of delivery. The plow is designated by the letter I, and the other parts by letters corresponding to those employed in Figs. 1 and 2.

In using the apparatus for laying a cable the

plow I is attached to the ship's stern by the hawser E, and is dragged after it, the cable being passed through the guide *a*. It is desirable in starting from the shore to place the plow a short distance from shore and drag it along into the water, so that the cable will be buried above high-water mark, so in reaching the opposite shore the cable A and hawser E are carried to a stationary windlass on shore and the plow dragged up out of the water.

The arrangement of the paying-out apparatus on the ship for conjoint action with the plowing apparatus renders the laying of a cable an easy and speedy operation.

It is desirable, in order to insure the successful operation of the plow, that it shall be used in connection with a cable-paying-out apparatus provided with means for regulating the tension of the cable in front of the plow, as in case of too great tension the plow would be liable to be lifted clear of the earth, and if the cable should be too slack it might coil or kink in front of the guide *a* with an obvious disastrous result.

What I claim is—

1. The combination, with a submarine plow having a guide for a cable, and means for connecting the plow to a ship, of a cable delivery or paying-out apparatus placed on the ship and provided with means for regulating the tension of the cable between the ship and plow, essentially as set forth.

2. A submarine plow consisting of a frame and means for connecting the same to a ship, in combination with a pivoted blade or plow-share arranged to engage the earth and to yield rearwardly and upwardly on encountering extraordinary obstacles, essentially as set forth.

3. A submarine plow consisting of a frame and means for connecting the same to a ship, in combination with a pivoted blade or plow-share having weighted arms extending rearwardly therefrom, substantially as described.

4. A submarine plow consisting of a body or frame and means for connecting the same to a ship, in combination with a pivoted share having weighted arms extending rearwardly from the same, and a roller or rollers journaled in the frame for supporting the same, and the tail-pieces C' C', which, with the roller, form means for regulating the depth of the furrow, as set forth.

5. The combination, with the frame of a submarine plow, of a pivoted blade or share, and a tube or guide for a cable pivoted to the frame independently of the plow, substantially as described.

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Witnesses:

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