

(No Model.)

A. B. SMITH.  
BOAT PROPELLING MECHANISM.

No. 377,123.

Patented Jan. 31, 1888.

Fig. 1.

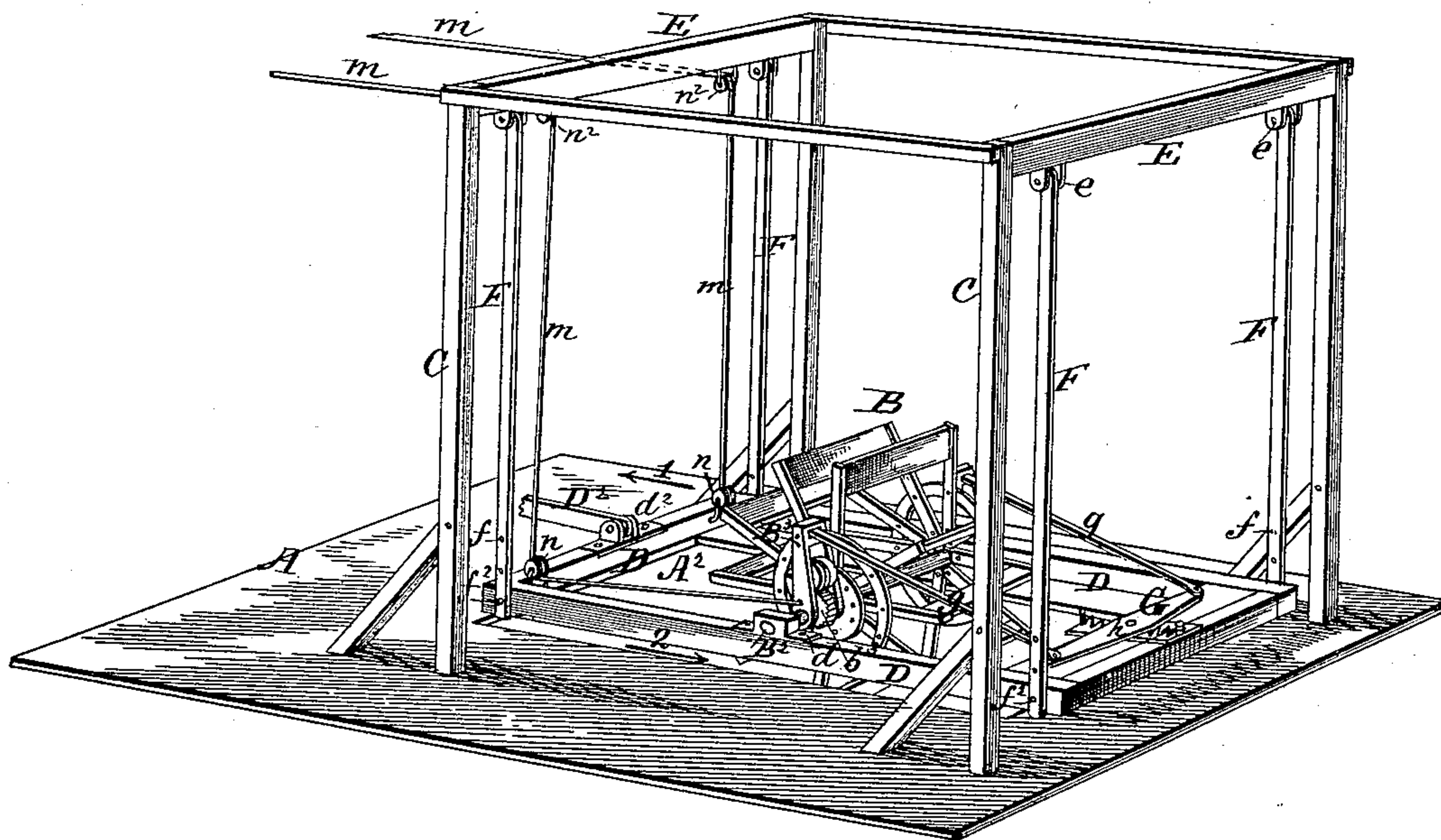


Fig. 2.

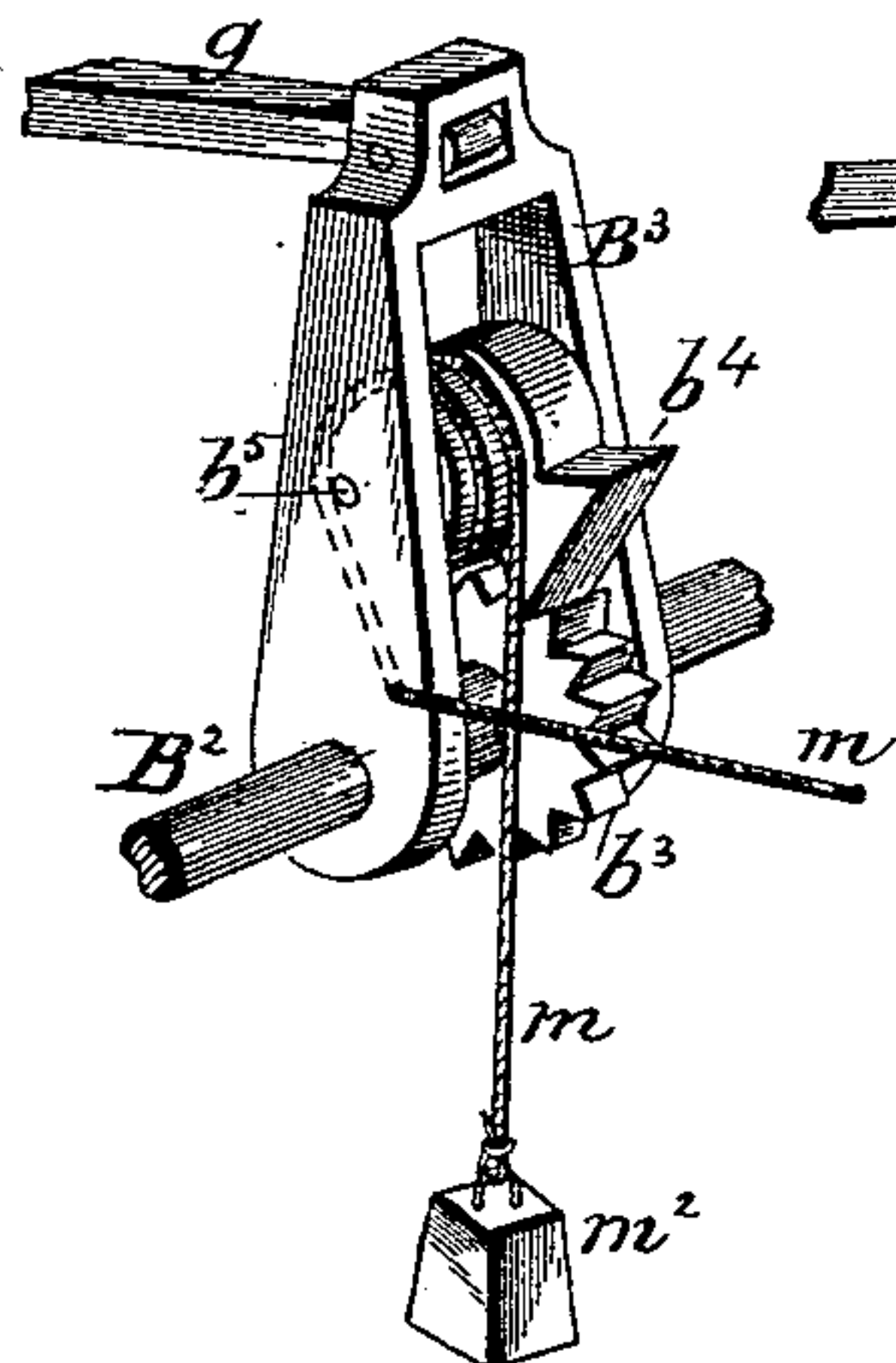


Fig. 3.

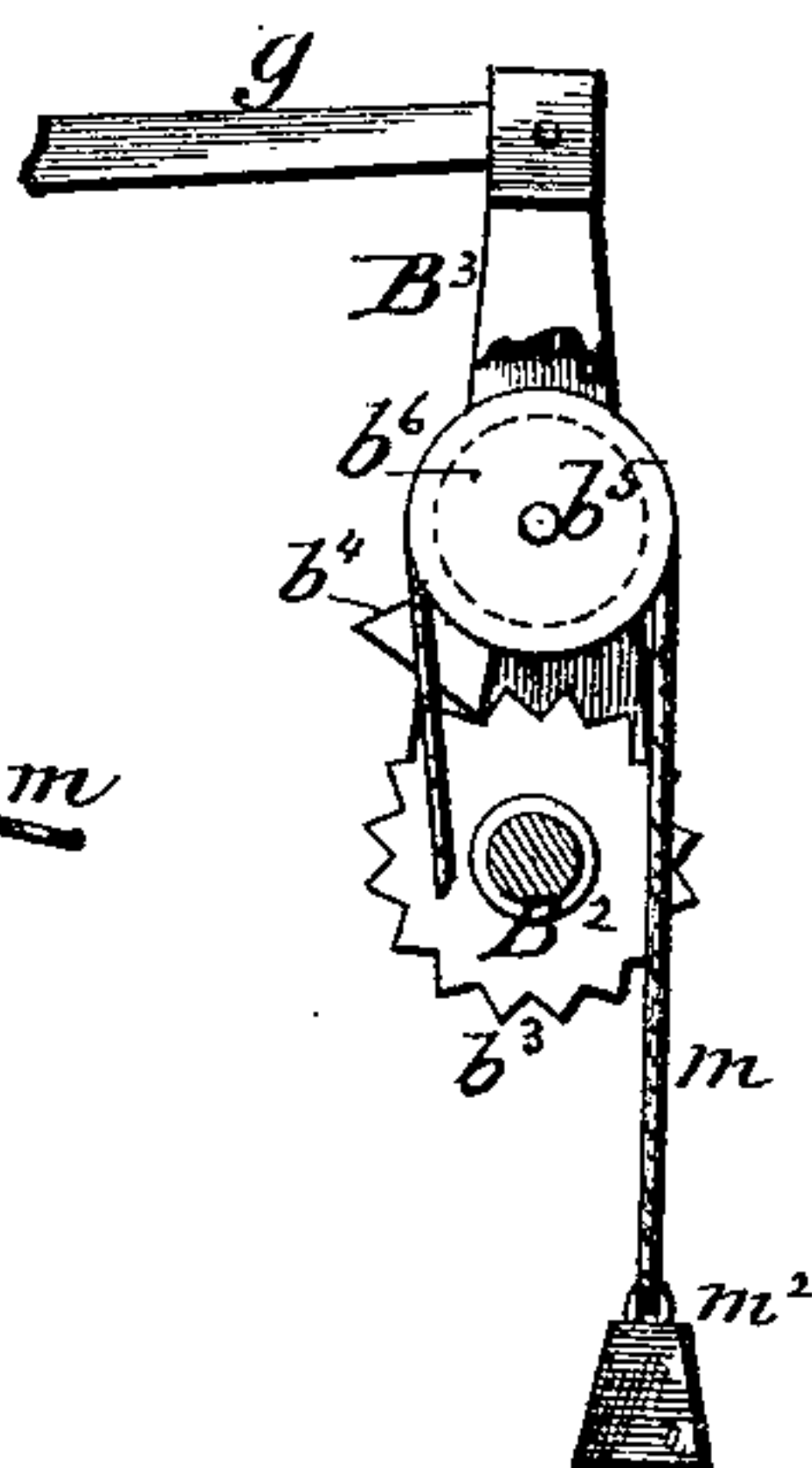


Fig. 4.

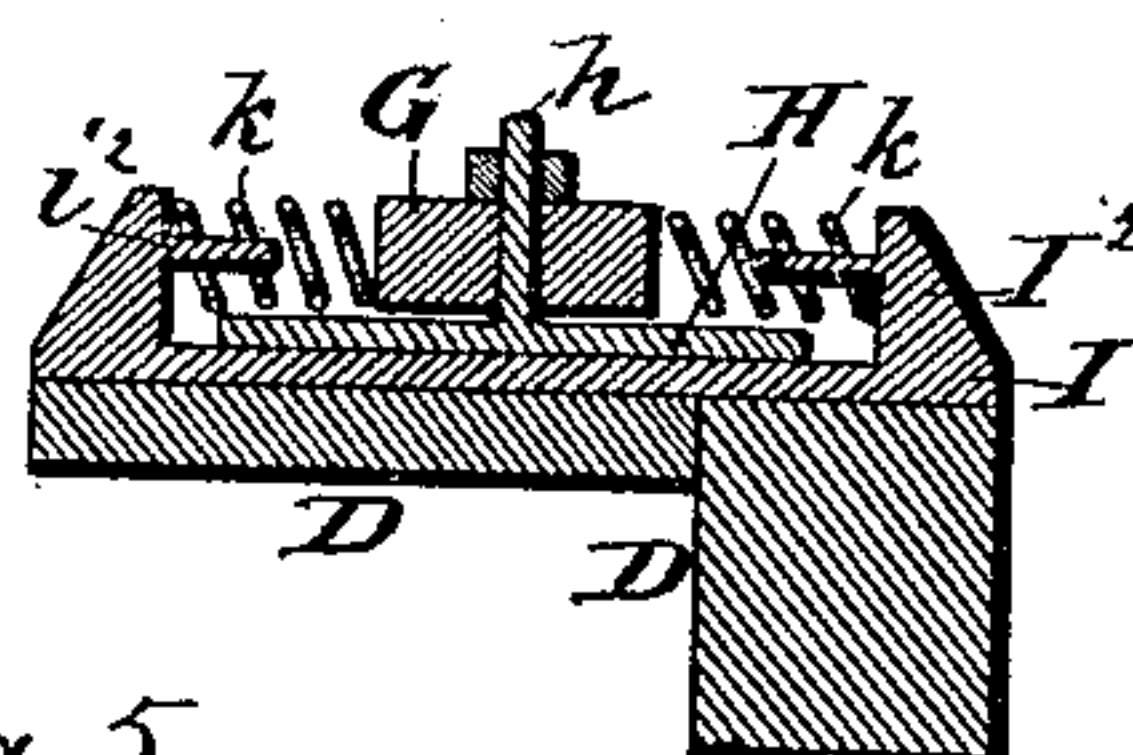
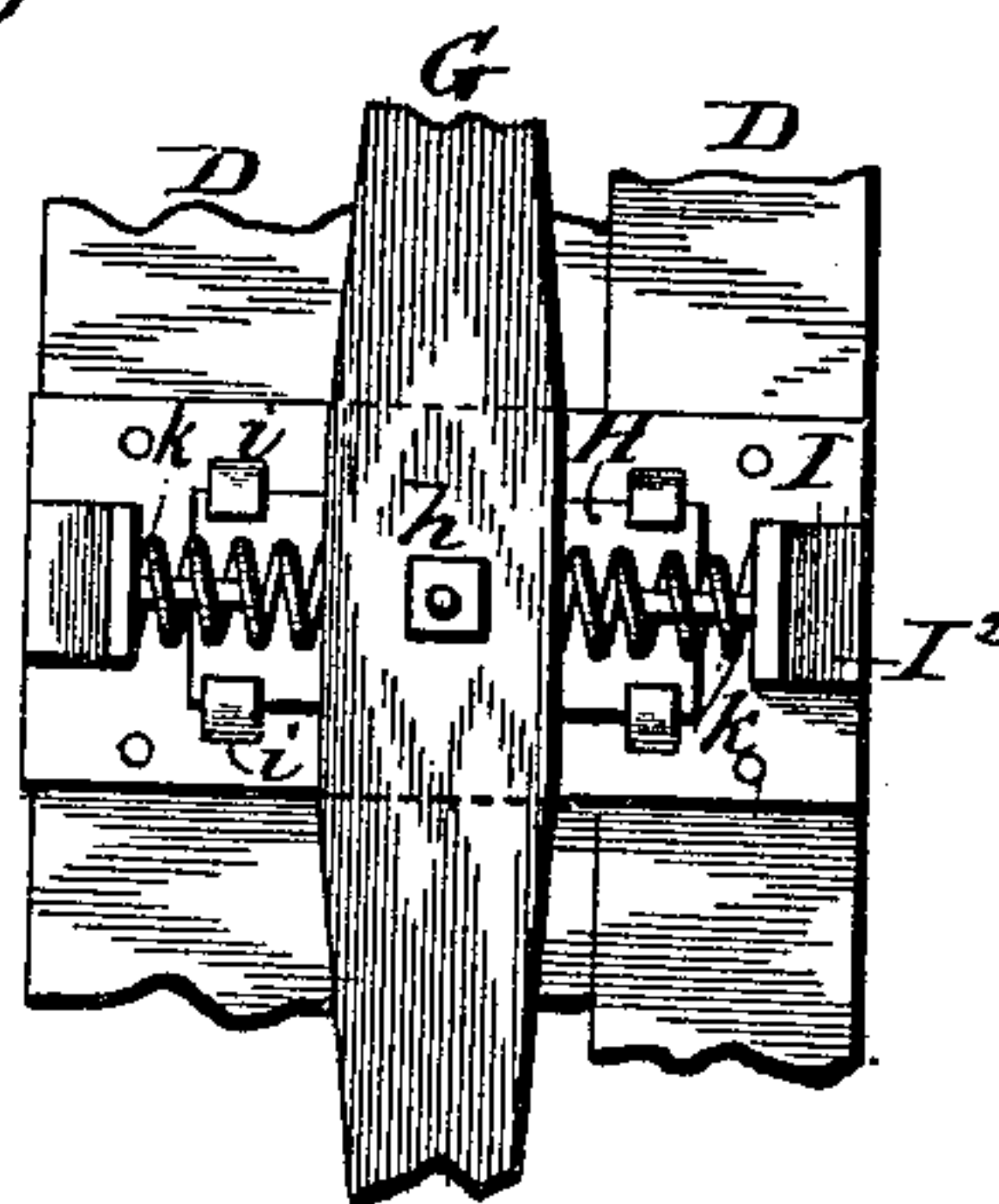


Fig. 5.



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# UNITED STATES PATENT OFFICE.

AMROY B. SMITH, OF AUGUSTA, ARKANSAS.

## BOAT-PROPELLING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 377,123, dated January 31, 1888.

Application filed March 28, 1887. Serial No. 232,677. (No model.)

*To all whom it may concern:*

Be it known that I, AMROY B. SMITH, a citizen of the United States, residing at Augusta, in the county of Woodruff, State of Arkansas, have invented certain new and useful Improvements in Boat-Propelling Mechanism, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to vibrating propellers; and the objects of my improvement are to produce a combined reciprocating and intermittently-revolving propeller adapted to be reversed and operated under the control of the pilot of a boat, as hereinafter described.

In the accompanying drawings, Figure 1 represents in perspective a portion of the deck of a vessel carrying the supports for and having the controlling mechanism of the propeller constructed in accordance with my invention. Fig. 2 is a perspective view of a portion of the propeller-shaft and its controlling mechanism, as seen from the opposite side of that shown in Fig. 1. Fig. 3 is a side view of the same, showing the controlling-pawl reversed to back the boat. Fig. 4 represents, on an enlarged scale, a transverse section through the evenner and its support, forming a part of my improvement. Fig. 5 is a top view of a portion of said evenner and support.

In said drawings, A represents a portion of the deck of a vessel. Said portion may be the stern of a boat, as in boats propelled by a stern wheel, or a portion of one of the overhanging sides in a boat using side wheels. Through said deck there is an opening, A<sup>2</sup>, for the passage of the propeller-wheel B, the central shaft, B<sup>2</sup>, of which passes through boxes d, secured upon a horizontal rectangular frame, D, capable of moving back and forth in a substantially horizontal plane under the impulse of a rod, D<sup>2</sup>, pivoted at d<sup>2</sup> to one end of said frame. This rod D<sup>2</sup> may be the connecting-rod of an engine or any other rod or mechanism connected with the piston-rod of a steam-engine.

To permit the frame D (and the propeller thereon) to be reciprocated with the least expenditure of power, it is pivotally suspended from horizontal beams E by means of pendant rods F, pivotally secured to said beams at e, and the lower portion of said rods have a series of perforations, f, to receive a pivotal

bolt, f<sup>2</sup>, that is secured to the frame D at or adjacent to the ends thereof. The adjustability of the bolt f<sup>2</sup> in either one of the perforations f is to permit the frame D and the propeller carried thereby to be raised and retained at a suitable distance above the surface of the water and the paddles of the propeller be made to dip the proper distance in the water, whether the boat is lightly or heavily loaded. The beams E may be supported by posts C, as shown, properly secured and braced to the deck, or by any suitable frame or supports.

To permit the propeller to revolve under the impulse of the water-current when advancing in one direction—as, for example, forward in the direction of the arrow 1 when the boat is going forward—and to prevent it from revolving when the frame is retrograding or swinging back in the direction of the arrow 2, and thus cause its dipping paddle or paddles to force the water toward the stern of the boat, the shaft B<sup>2</sup> has secured thereon, near each end, a ratchet-wheel, b<sup>3</sup>, with which a reversible pawl, b<sup>4</sup>, is made to engage. This pawl is pivoted upon a journal-pin, b<sup>5</sup>, carried by a forked arm, B<sup>3</sup>, having its lower portion loosely mounted upon the propeller-shaft. To prevent this arm B<sup>3</sup> from revolving under the impulse of the ratchet-wheel b<sup>3</sup> through the medium of the pawl b<sup>4</sup>, that is in engagement with said ratchet-wheel, the upper end of the forked frame carries pivoted thereto a rod, g, that has its opposite end pivoted to one end of the evenner G. The opposite end of said evenner is similarly connected with the ratchet upon the opposite end of the shaft B<sup>2</sup>. To guard the evenner against jerking motion or concussion by the pawl-and-ratchet mechanism above described after each intermittent motion of the propeller-wheel, the pivotal pin h of the evenner is carried by a plate, H, adapted to slide a short distance horizontally upon a larger plate, I, secured to the reciprocating frame D, said plate I having hooked clamps i to guide the plate H. A strong coiled spring, k, is placed front and rear of the evenner, one of said springs bearing against said evenner and the opposite end against a lug, I<sup>2</sup>, projecting up from the plate I. A horizontal pin, i<sup>2</sup>, extending inwardly from the lugs and entering within the springs k, retains the latter in proper position.



To control the motion of the wheel B and cause it to propel the boat either forward or backward, the reversible pawls  $b^4$  are under control of the pilot in the pilot-house by means of ropes  $m$ . These ropes are attached to the pawls and are wound a few turns upon the drums  $b^6$  of said pawls. One end of each rope  $m$  carries a weight,  $m^2$ , to cause the pawl to make three-quarters of a revolution and become engaged with the ratchet-wheel  $b^3$ , and remain so engaged while the wheel B is engaged to propel the boat forward, the frame D swinging in the direction of the arrow 2 and the wheel B being kept from revolving by the ratchet wheel and pawl, said parts being as shown in Fig. 1 and also in Fig. 2, (the latter figure showing the opposite side of the pawl shown in Fig. 1.) When the frame D swings in the direction of the arrow 1, the pawl still occupies the position shown in Figs. 1 and 2, but the teeth of the ratchet-wheel are allowed to slip from under the pawl, while the wheel B makes a portion of a revolution under the impulse of the current acting against its paddles. When the wheel B has reached the forward end of its course, its shaft becomes again locked, and its paddles force the water rearward under the impulse of the motor connected with the frame D.

When the pilot desires the boat to remain stationary, (or to float with the current, if upon a river,) he pulls upon the ropes  $m$  a sufficient amount only to lift the pawl from engagement with the ratchet-wheel, and thus renders the propeller loose in its bearings. When he desires to back the boat, he pulls further upon the ropes  $m$ , and thus throws the pawl in engagement with the opposite side of the ratchet, as shown in Fig. 3, and thus the power of the propelling-wheel and its intermittent motion is reversed.

Although weights  $m^2$  are shown to retain the ropes  $m$  under tension, it is evident that springs may be used for the same purpose. To cause the length of the ropes  $m$  to remain uniform, whatever may be the position of the propeller while swinging, said ropes are made to pass around pulleys  $n$ , secured to the frame D, substantially inclined with the pivot-pins  $f^2$ , and over pulleys  $n^2$ , pivoted to the beams E, inclined with the axis of the pivot-pins  $e$ .

The propeller-supporting frame D is shown suspended from the rods F, to take advantage

of the power of gravity of such a heavy weight as a propeller, and of the ease with which it can be swung; but it is evident that the frame D and its adjuncts may be carried on trucks arranged to roll back and forth upon guide-rails secured to the deck, or to a frame above it. It is also evident that two or more wheels may be used upon the same boat without departing from the spirit of my invention.

Having now fully described my invention, I claim—

1. A boat-propelling apparatus consisting of a reciprocating frame, a propeller-wheel having its shaft mounted loosely in bearings secured to said frame, and means, as set forth, for locking and releasing said shaft, substantially as described.

2. The combination of a reciprocating frame, a propeller-wheel having its shaft mounted loosely in bearings secured to said frame, a ratchet-wheel secured upon said shaft, and a pawl engaging with said ratchet-wheel, with means, as described, for operating said pawl, substantially as and for the purpose described.

3. The combination of a reciprocating frame, a propeller-wheel having its shaft mounted loosely in bearings secured to said frame, a ratchet-wheel secured upon said shaft, arm  $B^3$ , pivoted upon said shaft, a reversible pawl pivoted upon each arm, an evenner connected with the reciprocating frame, and rods connecting said evenner with the arms  $B^3$ , substantially as described.

4. The combination of a reciprocating frame, a propeller-wheel having its shaft mounted loosely in bearings secured to said frame, and means for locking and releasing said shaft, an evenner located on one end of said frame and connected with said means, and springs to support said evenner, substantially as described.

5. The combination of a reciprocating frame, a propeller-wheel having its shaft loosely mounted in bearings secured to said frame, a ratchet-wheel secured upon said shaft, a reversible pawl engaging with said ratchet-wheel, and a rope to reverse and control said pawl, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

AMROY B. SMITH.

Witnesses:

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