

No. 676,738.

Patented June 18, 1901.

W. R. EDWARDS.  
ELECTRICALLY PROPELLED BOAT.

(Application filed Mar. 2, 1901.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.

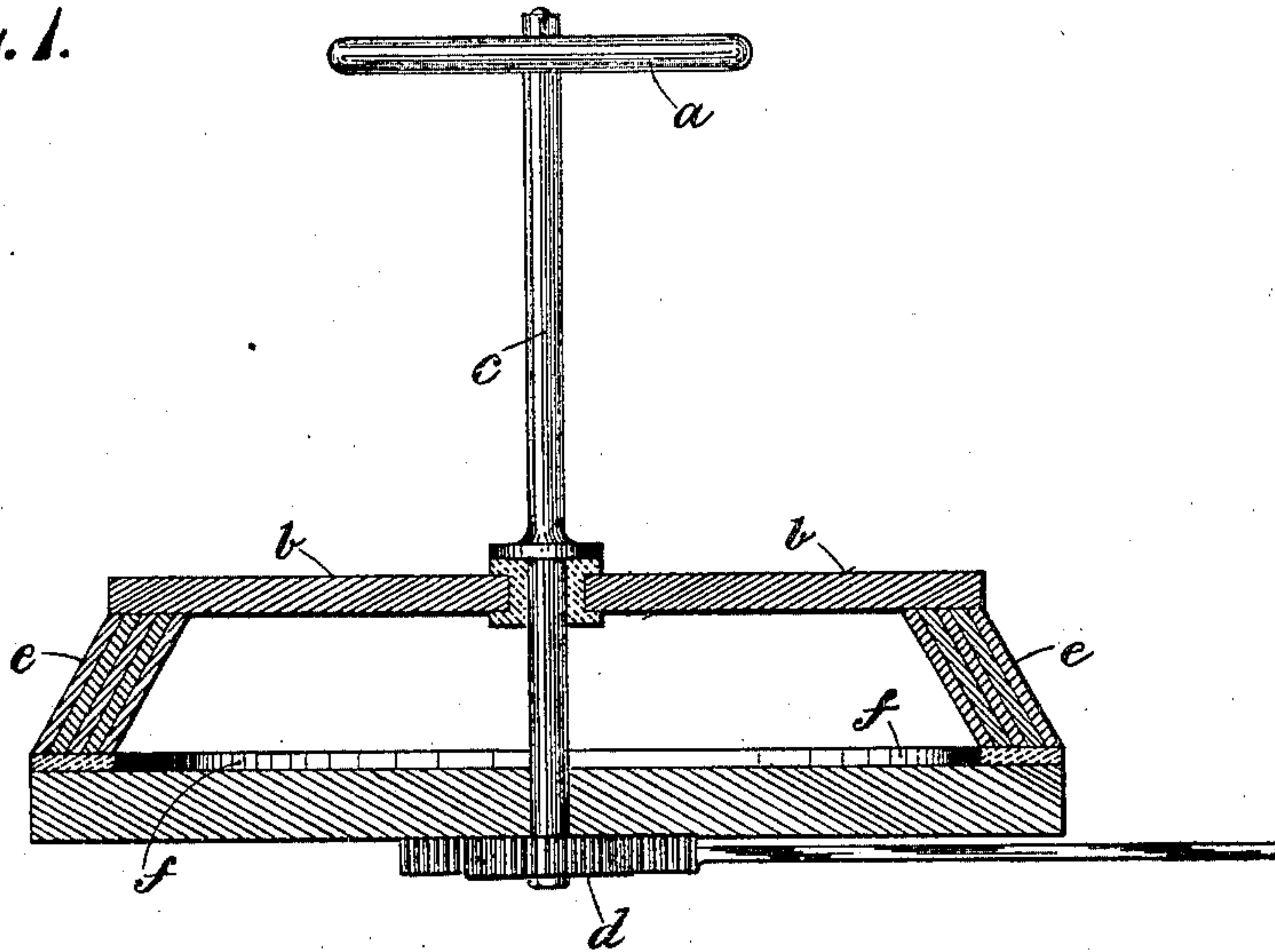
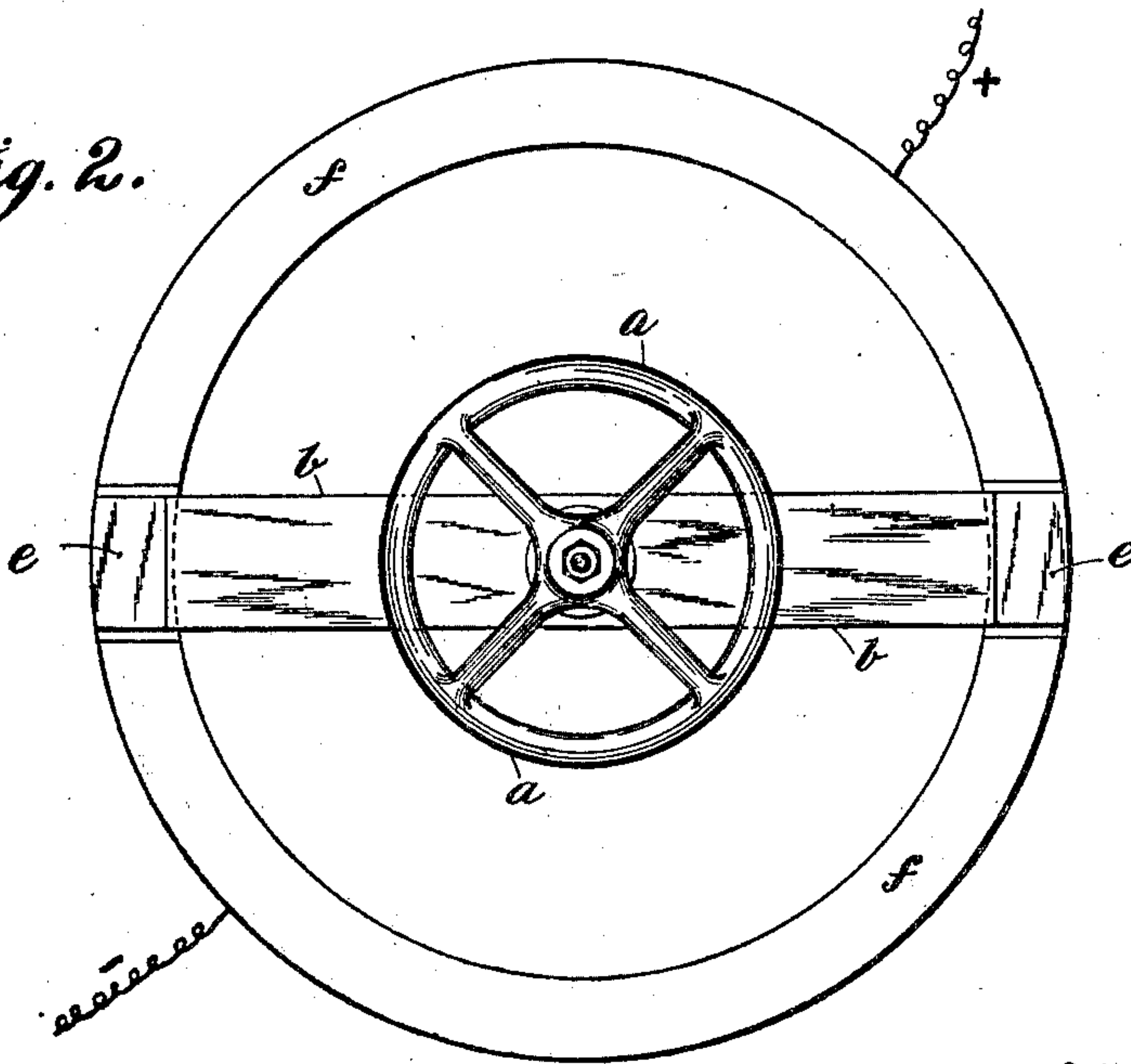


Fig. 2.



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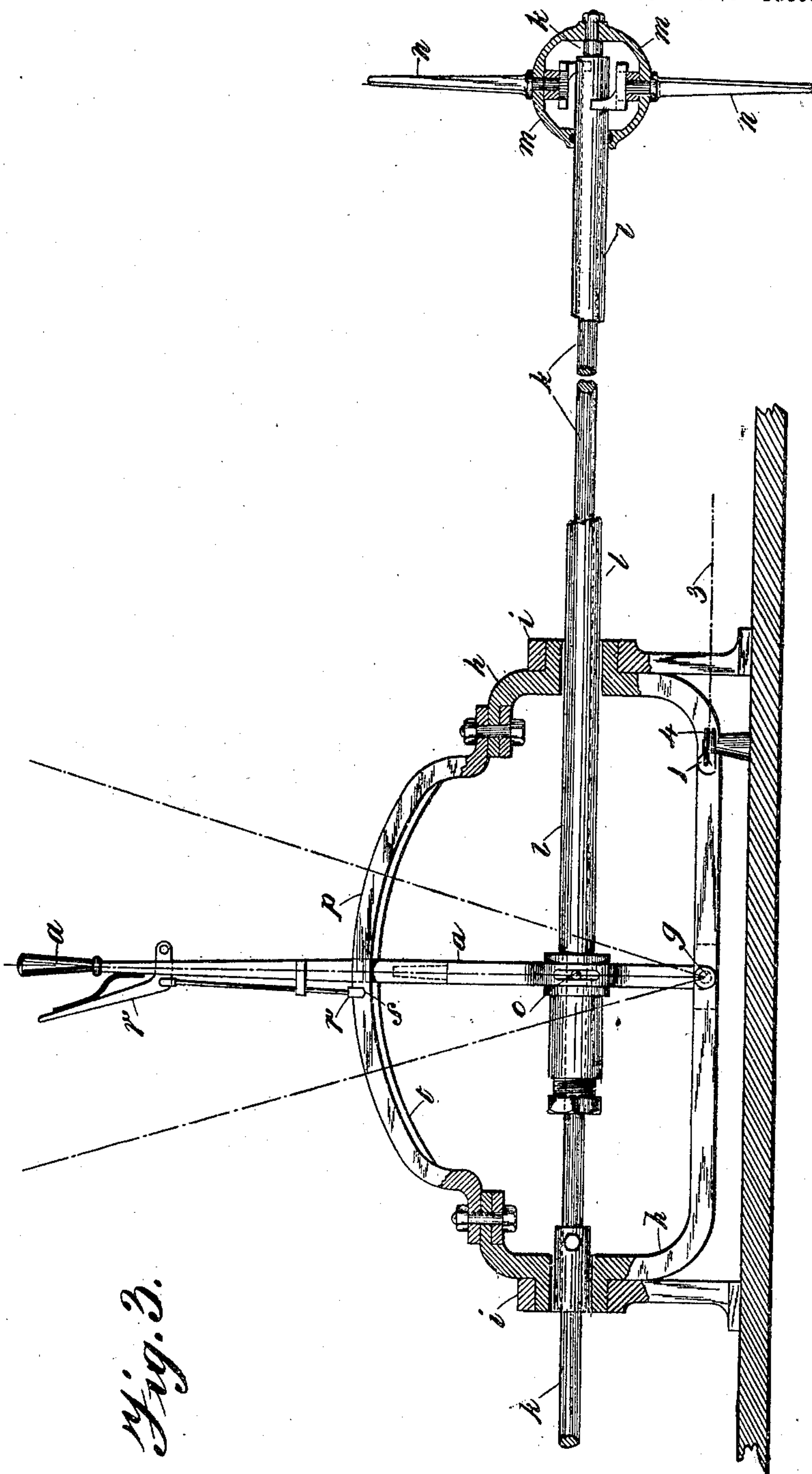


Fig. 3.

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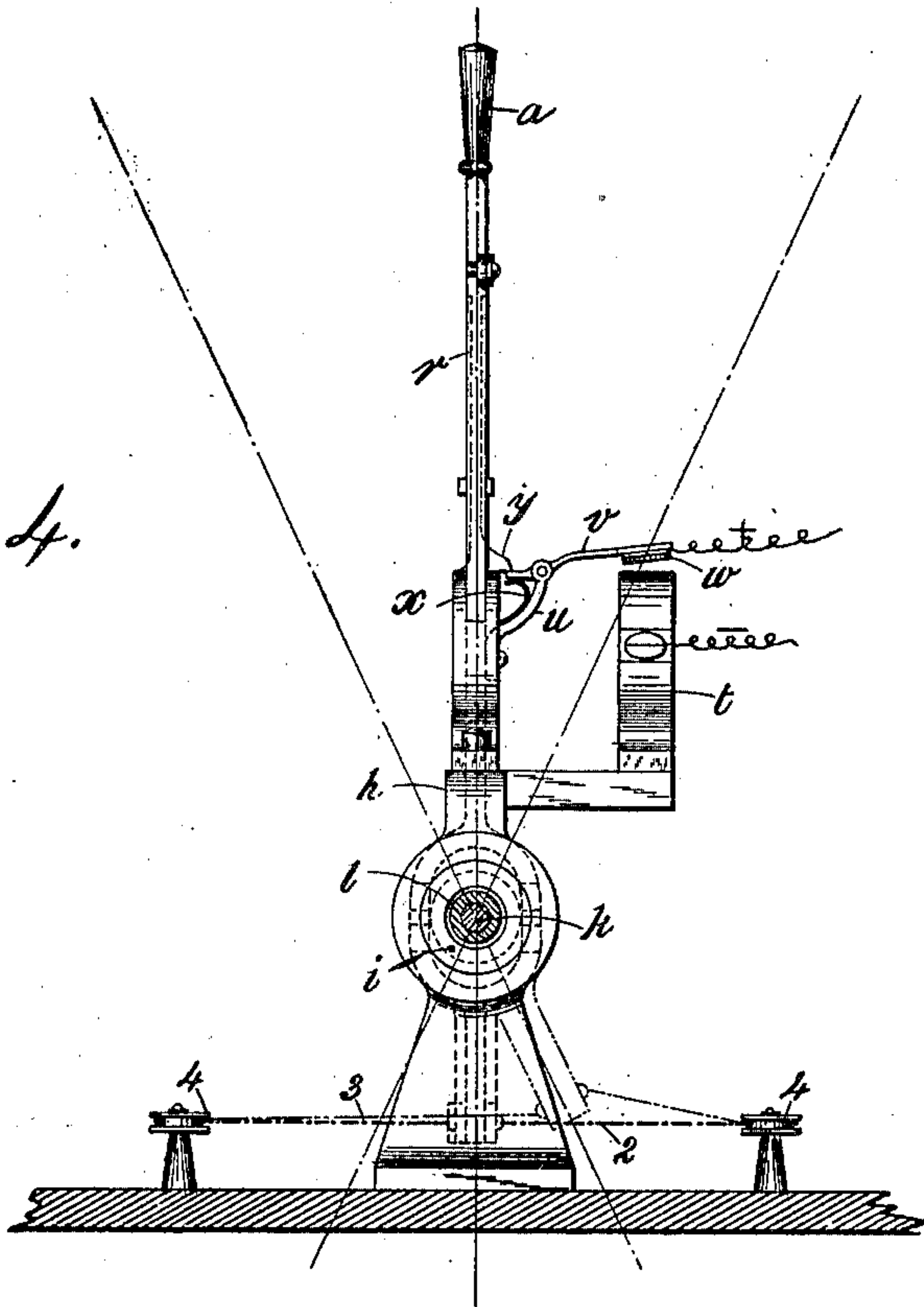
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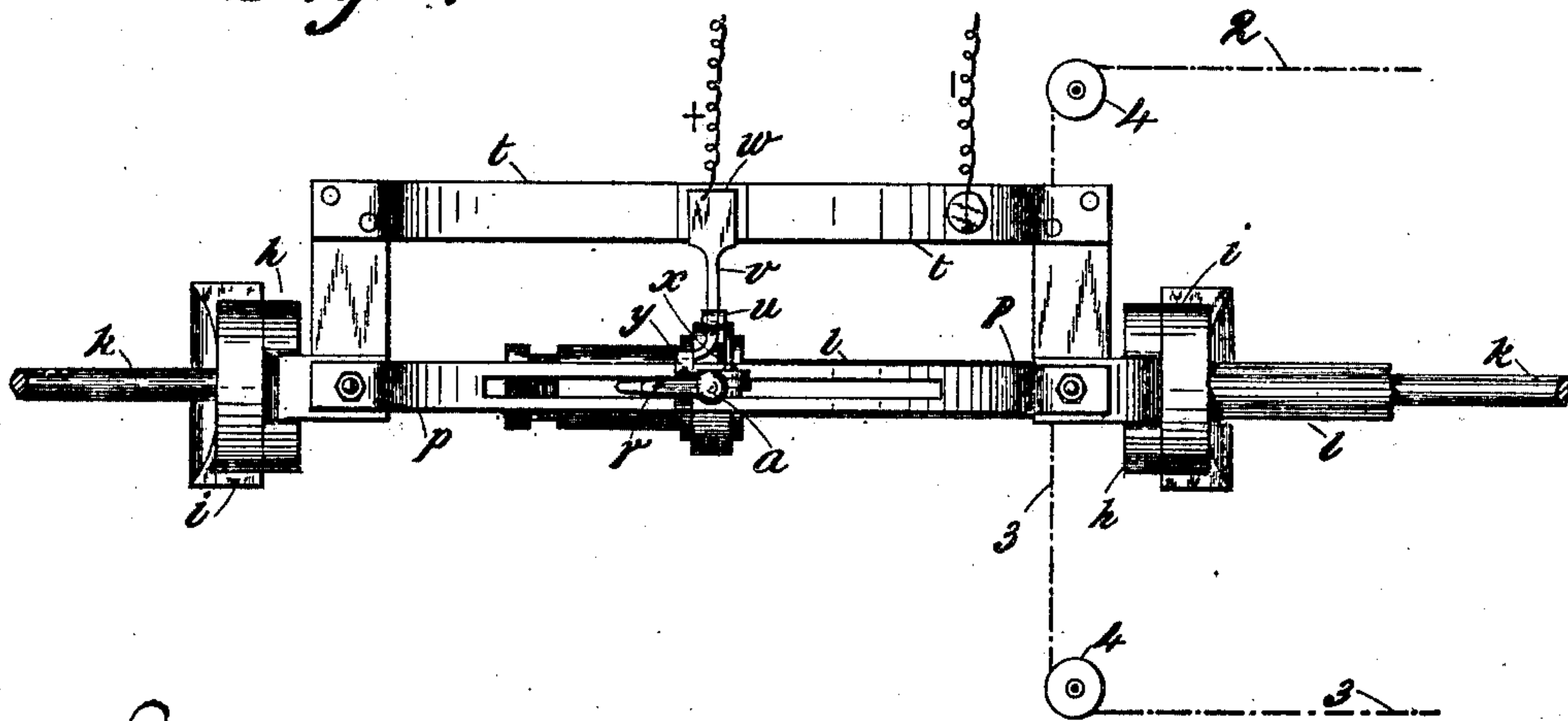
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*Fig. 4.*



*Fig. 5.*



*Witnesses:*  
*Stephen Brinley*  
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*Witnesses:*  
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# UNITED STATES PATENT OFFICE.

WILLIAM ROWLAND EDWARDS, OF WEYBRIDGE, ENGLAND.

## ELECTRICALLY-PROPELLED BOAT.

SPECIFICATION forming part of Letters Patent No. 676,738, dated June 18, 1901.

Application filed March 2, 1901. Serial No. 49,626. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM ROWLAND EDWARDS, a subject of the King of Great Britain, residing at Weybridge, in the county of Surrey, England, have invented certain new and useful Improvements in Electrically - Propelled Boats; and I hereby declare the following to be a full, true, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in boats or launches propelled by electricity; and the objects of my improvements are, first, to avoid the wearing of the brushes to sharp edges upon the commutator which catch and cause sparking when the electromotor is reversed, and, second, to prevent the necessity for separate mechanism and attention for starting, stopping, reversing, and steering the boat, the armature of the motor always running in the same direction, so that the brushes used are simplified and the starting, stopping, and reversing, as well as the steering of the boat, if desired, are effected by a single lever or handle. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of my apparatus where it is not required that the boat should be steered by the same lever which operates the starting, stopping, and reversing. Fig. 2 is a plan of the same. Fig. 3 is a side view of the form of the apparatus in which the steering of the boat is effected by the same handle as the starting, stopping, and reversing. Fig. 4 is an end view, and Fig. 5 is a plan of the same.

Similar letters refer to similar parts in the several views.

In Figs. 1 and 2, *a* is a wheel placed in a convenient position in the boat, (which is not itself shown.) *b* is a conducting-bar of a type such as that used in an ordinary single-pole switch, but insulated at its center from the spindle *c* of the wheel *a*, to which it is fixed. This spindle *c* is connected at its lower end with a rod or tube used for reversing the blades of the propeller when required, as illustrated in Fig. 3, and actuates it by means of a toothed rack and pinion *d* or other convenient equivalent means. The bar *b*, insulated

at its center, forms or has fixed upon it at each end a conducting-brush *e e*, and these brushes are allowed to work or slide over brass plates *f*, suitably fixed, which form segments of a circle electrically separated from each other and only connected together by means of the said brush-bar *b* when it is turned to the desired position by means of the wheel *a*. These segments are connected in the electrical circuit by which the motor is actuated, and when the bar *b* connects them together the circuit is complete.

Assuming that the wheel *a* is so placed that the blades of the propeller are at right angles to or across the center line of the shaft—that is to say, in their neutral position—a gap or break is made in the brass segments *f*, as shown in Fig. 2, exactly under the brushes *e e* on the brush-bar, but somewhat wider than the latter, so that the circuit is broken and no current passes. If the wheel *a* be turned slowly around in one or the other direction, the blades of the propeller are also slowly turned to the required angle with the shaft, and at the same time the brush-bar *b* moves around and brings the brushes *e* into contact with the segments *f* and completes the circuit, and the boat commences to move either forward or backward, according to the direction of the angle in which the propeller-blades have been turned, the electromotor itself always revolving in the same direction. The current will be very slight at first, as there will be but little resistance, and will increase gradually as the blades are turned farther, and vice versa as the blades are turned back, thus causing no suddenness or rush of the current, which is detrimental to the motor and cells. The latter, therefore, may always be used in series and will work evenly. The wiring is of the simplest description, everything being placed in one single circuit, and any speed may be obtained from dead slow to full speed, suitable arrangements of any well-known kind being provided for holding the wheel *a* in any desired position.

Referring now to Figs. 3, 4, and 5, *a* is a lever or handle turning upon a center *g* upon the lower part of a frame *h*, which itself turns or swings upon the propeller-shaft or in bearings *i i*, concentric with the propeller-shaft *k*, upon which fits an outer tube *l*, (which re-



volves with the shaft, but can move endwise upon the latter,) the outer end of which passes into the propeller *m* and actuates the blades *n n* in the well-known way, so that they can  
 5 be turned with their propelling-surfaces at right angles to the shaft *k* or at any desired angle for propelling the boat either ahead or astern. The inner end of the tube *l* is connected with the lever *a* at *o* in such manner  
 10 that by moving the latter around the center *g* the propeller-blades are moved to the required angle for going ahead or astern, while when the lever is in its central position the blades can revolve without moving the boat  
 15 in either direction.

The upper part of the swinging frame *h* carries a quadrant *p*, in which the lever *a* works and is guided, and the lever is provided with a supplementary handle and spring-  
 20 catch *r*, which in the central or neutral position of the lever is forced into a notch *s* in the quadrant *p*. A supplementary parallel quadrant *t* is carried by the frame *h* or quadrant *p* and has a curved metallic face connected with the electrical circuit. The lever  
 25 *a* is provided with a bracket *u*, in which is pivoted a lever *v*, the outer end of which carries a brush or contact *w*, which is also connected with the electrical circuit, and a spring  
 30 *x* tends to press the brush *w* against the metallic quadrant *t*. When, however, the lever *a* is in its central position, the catch *r* is forced strongly into the notch *s*, and a lateral projection *y* upon it forces down the inner  
 35 end of the lever *v* and breaks the contact between the brush *w* and the metal quadrant *t*, the center of which under the brush should have a piece of carbon inserted to prevent injurious sparking.

40 To a suitable part of the frame *h*, as at 1, are attached wire ropes 2 3, which after passing around pulleys 4 4 are carried back to the tiller of the rudder, which they operate.

It will be seen that in the improved arrangements there is practically nothing to  
 45 get out of order and that by them all the usual causes of breakdown are removed. As the motor is always running in one direction, it will not be injured if the handle is moved  
 50 over from full-speed ahead to full-speed astern, an operation which is ordinarily very detrimental.

Any convenient form of propeller with reversible blades may be used; but I prefer to  
 55 use narrow blades, flat, instead of being helically curved upon their propelling-surface, so that the action in going either ahead or astern is the same. The arrangement of the brush-gear, wheel, or lever and other parts  
 60 of the apparatus may be varied to suit varying circumstances, my invention consisting, essentially, in the working of an electric launch by means of a propeller with reversible  
 65 blades, the reversal of which is effected by a wheel or lever or other equivalent device connected to the propeller-blades in any suitable way, the moving of this wheel or lever

or other arrangement at the same time causing the electric circuit to be completed and the boat to travel in the direction required, 70 while where it is desired the steering of the boat can be effected by a suitable movement (at right angles to its reversing movement) of the same lever by which the boat is started, stopped, or reversed, the advantages obtained being that no complicated or expensive switch is required, that all the operations are effected by a single lever or handle, no complicated wiring or brush-gear is required, the cells may always be used in series without any injurious rush or suddenness of current, and any speed from dead slow to full speed in either direction may be easily obtained, as desired. 75

The lever and parts connected with it may 85 be arranged in any convenient part of the boat and connected with the reversing and steering gear by rods or other suitable connections.

The upper part of the lever may be made separate from the lower part, so that it can be 90 removed when desired.

The details of construction and arrangement may be varied more or less, as may be found desirable to meet different circumstances. For instance, instead of the quad- 95 rant and lever and brush described a contact-brush may be used fixed upon the main lever and operated when desired by the supplementary handle.

What I claim as my invention, and desire 100 to secure by Letters Patent, is—

1. In a device of the character described, the combination with a propeller-shaft, adapted to be driven by an electric motor, reversible propeller-blades carried upon one end of 105 said propeller-shaft, and propeller-reversing mechanism carried by said propeller-shaft, mechanism for operating said reversing mechanism to operate said blades, and means carried by said mechanism for controlling the 110 current through said motor, whereby, when said reversing mechanism brings said blades to a neutral position, the current ceases to flow through said motor, substantially as described. 115

2. In a device of the character described, the combination with a propeller-shaft, adapted to be driven by an electric motor, reversible propeller-blades carried upon one end of 120 said propeller-shaft, and a sleeve or tube fitted upon said shaft, which when moved in a longitudinal direction relatively to said shaft, reverses said propeller-blades; of a frame, in which said shaft and sleeve are mounted, steering mechanism connected to said frame, 125 reversing mechanism also carried by said frame, and means carried by said reversing mechanism for controlling the current through the motor, substantially as described.

3. In a device of the character described, 130 the combination with a propeller-shaft adapted to be driven by an electric motor, reversible propeller-blades, carried upon one end of said propeller-shaft, and a sleeve fitted



over said shaft, for reversing said propeller-blades; of a swinging frame through which said sleeve and shaft pass, steering mechanism connected to said frame and operated through the oscillations of said frame, mechanism mounted in said frame for operating the reversing-sleeve, and means carried by said mechanism for controlling the current to the motor, substantially as described.

4. In a device of the character described, the combination with a propeller-shaft, adapted to be driven by an electric motor, reversible propeller-blades carried upon one end of said propeller-shaft, and a sleeve fitted over said shaft for reversing said propeller-blades; of a swinging frame, through which said sleeve and shaft pass, steering mechanism connected to said frame and operated through the oscillations of said frame, a lever mounted in said frame, through which said reversing mechanism is operated, and mechanism operated by said lever, for controlling the current to the motor; substantially as described.

5. In a device of the character described, the combination with the propeller-shaft adapted to be operated by an electric motor, propeller-blades and mechanism for reversing said blades; of a frame, steering mechanism connected to said frame, a lever mounted in said frame for reversing said propeller-blades, an electrical conductor carried by said frame, and a contact carried by said lever for controlling the current to the motor, substantially as described.

6. In a device of the character described, the combination with the propeller-shaft

adapted to be driven by an electric motor, propeller-blades, and mechanism for reversing said blades; of a frame, steering mechanism connected to said frame, a lever mounted in said frame for reversing said propeller-blades, a conducting-quadrant carried by said frame, a pivoted arm carried by said lever, and a conductor carried by said arm adapted to close the circuit through said quadrant, substantially as described.

7. In a device of the character described, the combination with the propeller-shaft, adapted to be driven by an electric motor, propeller-blades, and mechanism for reversing said blades; of a frame, a lever mounted in said frame for reversing said propeller-blades, a catch or stop carried by said lever, a guide or quadrant carried by said frame provided with a notch in the center thereof, into which said catch is adapted to engage when the lever occupies a vertical position, a pivoted arm connected to said catch and carried by said lever, provided with an electrical contact upon its free end, and a conductor-quadrant mounted upon said frame beneath said pivoted arm, whereby an electrical circuit is completed when said lever occupies any position other than the central or vertical position, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

WILLIAM ROWLAND EDWARDS.

Witnesses:

EDMUND EDWARDS,  
ARTHUR E. EDWARDS.