

No. 832,482.

PATENTED OCT. 2, 1906.

J. HUTCHINGS.

APPARATUS FOR GENERATING POWER FROM WAVES, TIDES, OR THE LIKE.

APPLICATION FILED DEC. 4, 1905.

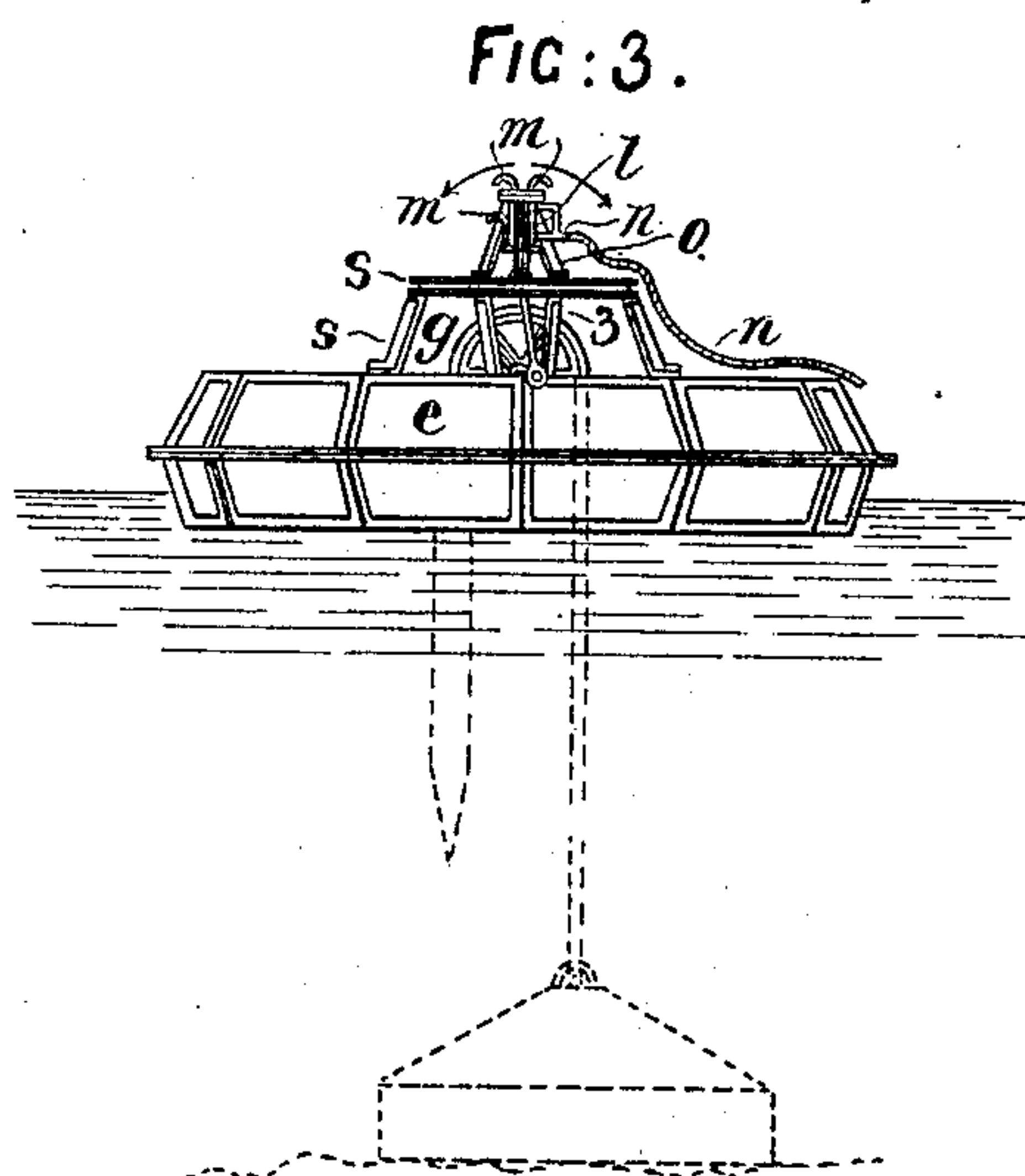
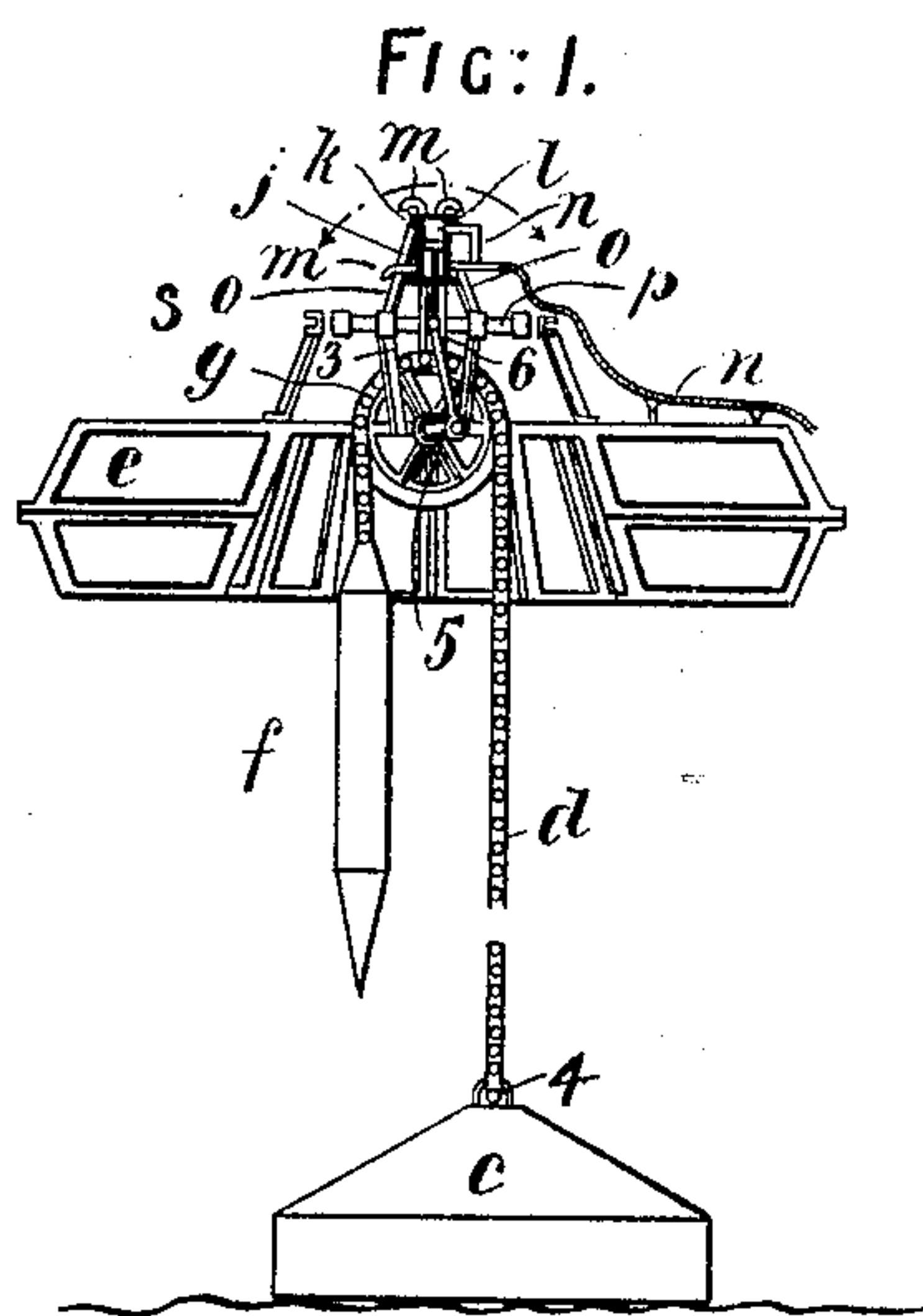
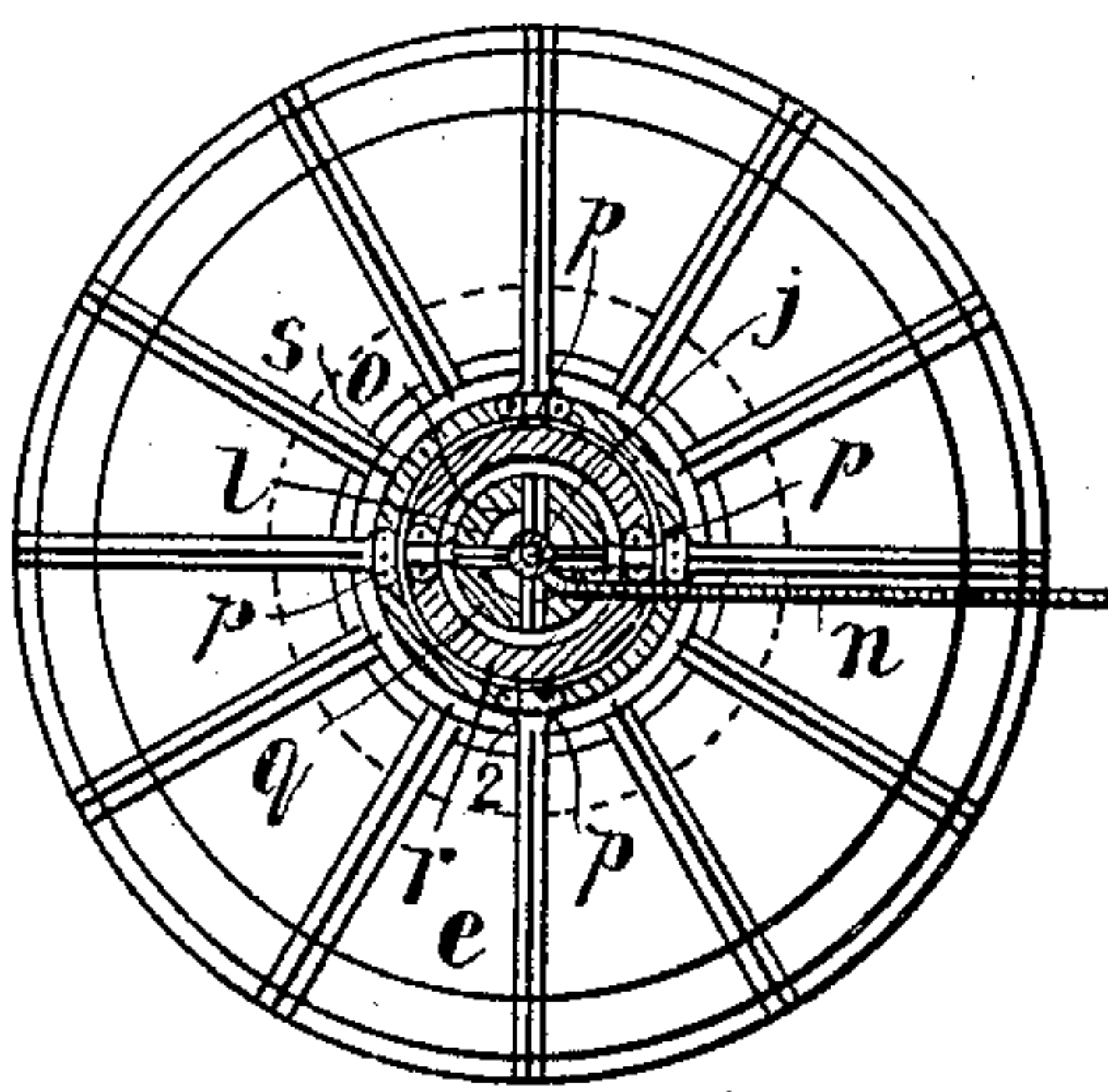


FIG: 2.



Witnesses:

*W.B. Keeler*  
*C.H. Heister*

Inventor  
*John Hutchings*  
By *James L. Norris*  
*Atty*



# UNITED STATES PATENT OFFICE.

JOHN HUTCHINGS, OF LONDON, ENGLAND.

APPARATUS FOR GENERATING POWER FROM WAVES, TIDES, OR THE LIKE.

No. 832,482.

Specification of Letters Patent.

Patented Oct. 2, 1906.

Application filed December 4, 1905. Serial No. 290,240.

To all whom it may concern:

Be it known that I, JOHN HUTCHINGS, engineer, a subject of the King of Great Britain, residing at 210 Moorgate Station Chambers, Moorfields, in the city of London, England, have invented certain new and useful improvements in means and apparatus employed in generating motive power from waves, tides, or the like movements of water, of which the following is a specification.

This invention relates to means and apparatus employed in generating motive power from waves, tides, or other movements of bodies of water—such as the sea, inland waters, river estuaries, tidal rivers, and lakes—acting on a floating buoy or floating buoys held to the bottom of the sea or in equivalent situation by a chain and anchoring-weight or by equivalent means of fixture, such as a line from the sea-shore or the like.

Figure 1 is a section taken on the line A B of Fig. 2. Fig. 2 is a plan view thereof. Fig. 3 is an external side view showing the form of the buoy.

*c* indicates the anchoring-weight resting on or in the sea-bottom. *d* is the connecting-chain between it and the floating structure.

*e* is the buoy; *f*, the self-adjusting counter-balance-weight to take up slack of the chain *d*. *g* is a sprocket or pulley wheel pendent from the structure.

*h* is a crank-pin; *i*, a crank-rod; *j*, the piston-rod; *k*, the pumping or compression piston; *l*, the pumping or compression cylinder; *m*, the intake-pipes controlled by valves.

*n* represents conducting-pipes.

*o* is the top swing-pedestal forming the cylinder and pendent pulley-wheel frame, to which is connected the pendent framing 3.

*p* represents gimbal-bearings.

*q r* indicate gimbal-rings.

*s* is the pedestal platform framing provided with supports or legs 2 2.

1 1 are trunnions forming parts of the gimbal-bearings between the rings and supported in the bearings *p*.

When the buoy *e* and its other associated parts have been built, fixed in working order, and launched, the generation of power is effected by fixing the lower end of the chain *d* onto the anchor-weight *c* by means of a universal-joint coupling at 4. Thence the chain *d* is passed into working position on the pulley-wheel *g*. On the end thus passed over the

wheel *g* is fixed the pressure-balancing weight *f*. The buoy *e* has air-tight joints to insure buoyancy.

The wheel *g* and its subtended bearing holding frames 3 are securely fixed and hung to the bottom plate of the gimbal-ring *q* and by means of the wide scope of movement of such bearings are thereby enabled to rock or swing in any direction freely, while the buoy *e* may be tilted.

The cylinder cradle frames *o* and the cylinders *l* are securely fixed to the top plate of the gimbal-ring *q*, and by means of the downward pull of the weight *f* and the wheel *g* and the wide scope of movement in the gimbal-bearings the cylinder *l* is continuously held in a more or less vertical working position, while the buoy *e* may be tilted or tossed to the highest angles ever reached.

The chain *d* is fixed to and works over the toothed periphery of the sprocket-wheel *g*, which may be caused to revolve whole or parts of cycles, according to the height of the generating-waves, or to oscillate to and fro around its axle-bearing 5 when actuated through the chain *d* by means of up or down movements of the buoy *e*.

When the buoy *e* is lifted or lowered by waves or tides, the wheel *g*, through the chain *d*, is forced to revolve, while the weight *f*, being attached to the end of the chain, is in consequence lifted or lowered, accommodating itself automatically through the chain *d*, running over the wheel *g*, to any rising or falling motion, responding inversely to the generating movements of the buoy *e*. During any such movement of the buoy *e* and chain *d* the wheel *g* forces the crank-rod *i*, the cross-head or slide-block 6, the piston-rod *j*, and in turn the double-acting piston *k* to and fro reciprocally within the cylinder *l*, each to-and-fro movement compressing air or pumping water through the cylinder *l* and its valves, thence into and through the conducting-pipes *n* to a suitable receiver to be conserved or stored and used as required.

The gimbal-rings *q r* and their bearings *p p* and trunnions enable the buoy *e* to move freely in all directions, while the pendent frame 3, the wheel *g*, the cradle-frame *o*, and the cylinder *l* may swing and rock in such positions as they may be held into while working by the weight *f*, chain *d*, and anchor-weight *c*.



The floating buoy *e* is made with air-tight joints, thus confining the air and producing buoyancy.

This power-generator may be anchored in 5 water of great depth or worked along the shallow shore of seas or other waters.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is— 10

1. An apparatus of the character described, comprising an oscillatory buoyant body having a centrally-arranged opening extending entirely therethrough, a super- 15 structure arranged upon the top of said body and extending over the opening, a mooring supported from said structure, an air-cylinder and piston mounted on said superstructure, means interposed in the line of mooring 20 to compensate for the rise and fall of the tide and to exert an operative and substantial pressure on the air in the cylinder, and a connection between the piston and said means.

2. An apparatus of the character de-

scribed, comprising an oscillatory buoyant 25 body having a centrally-arranged opening extending entirely therethrough, a superstructure upon the top of said body and extending over said opening, a pulley suspended from said superstructure, an air-cylinder 30 and a piston mounted on said superstructure, a flexible member traveling over said pulley, a mooring carried by one end of said member, a weight carried by the other end of said member and adapted to exert an operative 35 and substantial pressure on the air in the air-cylinder beside taking up the slack of said flexible member, and an operative connection between said piston and said pulley for the purpose set forth. 40

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN HUTCHINGS.

Witnesses:

ALFRED GEORGE BROOKES,  
JOHN COODE HARE.