

(No Model.)

3 Sheets—Sheet 1.

F. JOHNSON.

DEVICE FOR PROPELLING AND VENTILATING SHIPS.

No. 407,214.

Patented July 16, 1889.

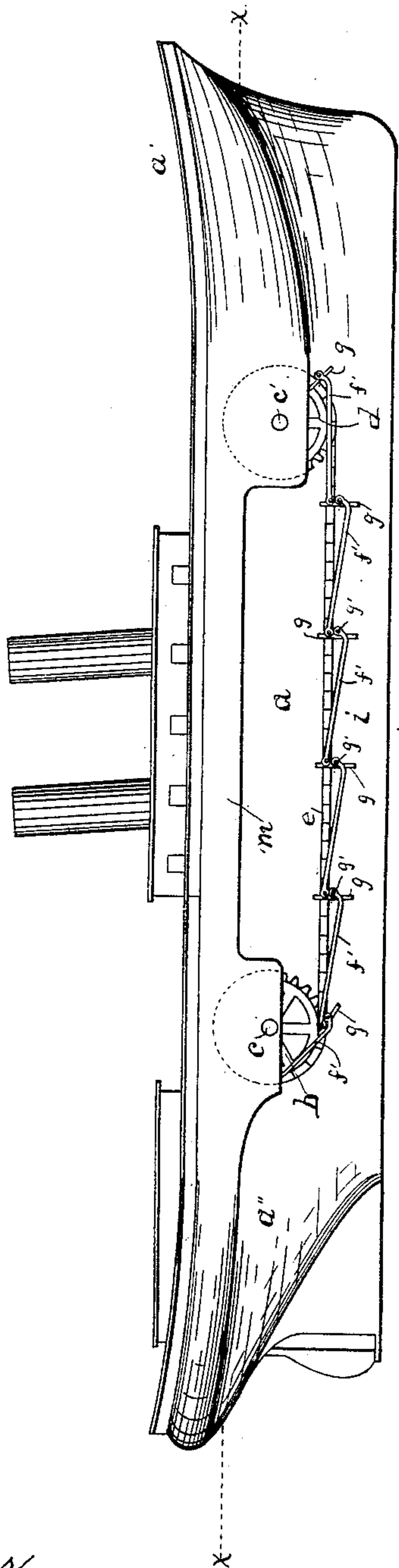


Fig. 1.

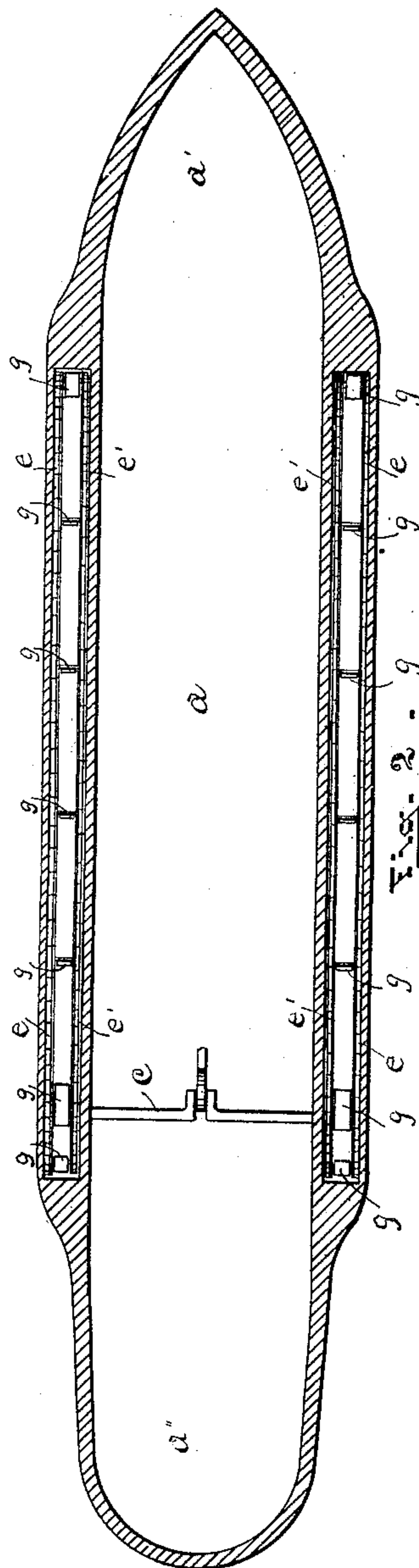


Fig. 2.

ATTEST.

W. H. Power

J. O. Thomas

INVENTOR.

Ferdinand Johnson

By Jas. O. Thomas.

Atty.

(No Model.)

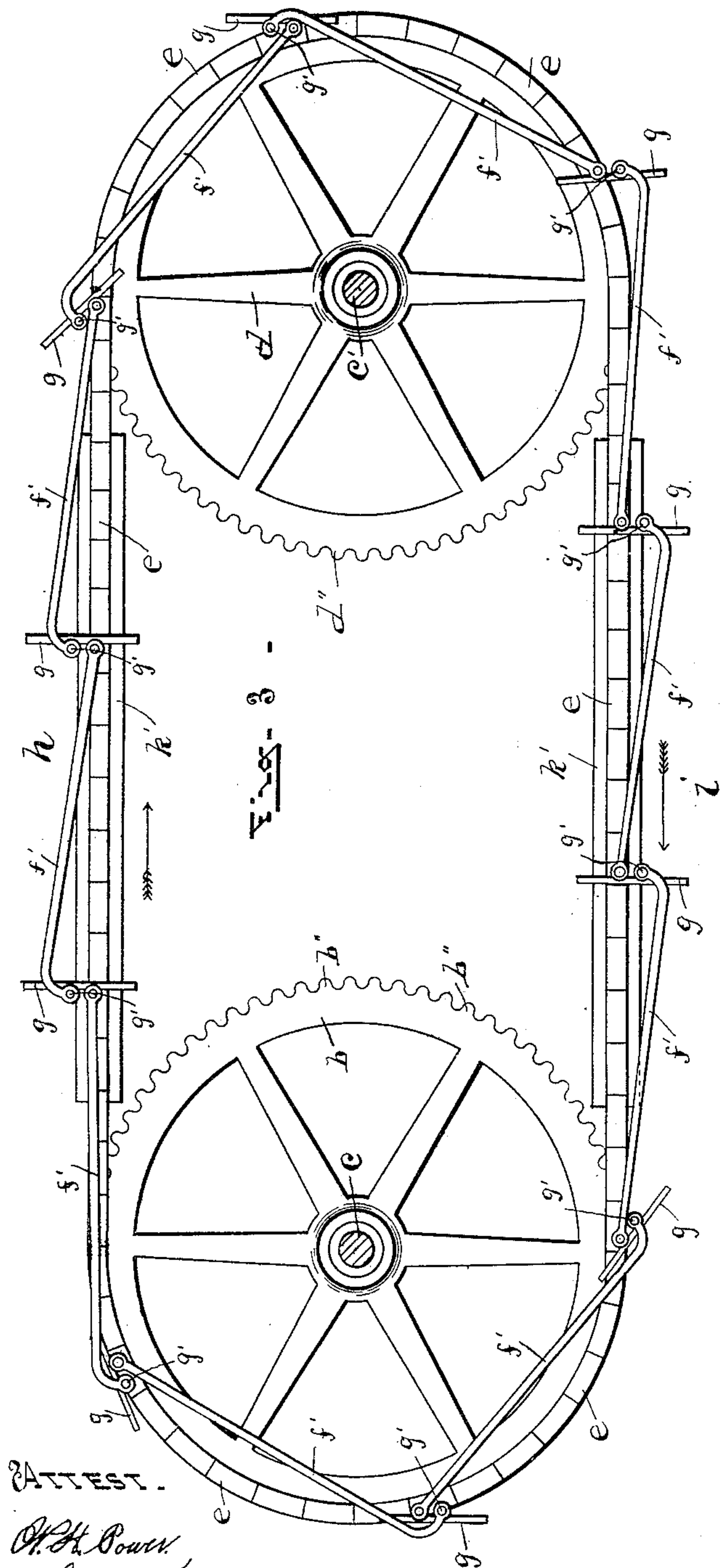
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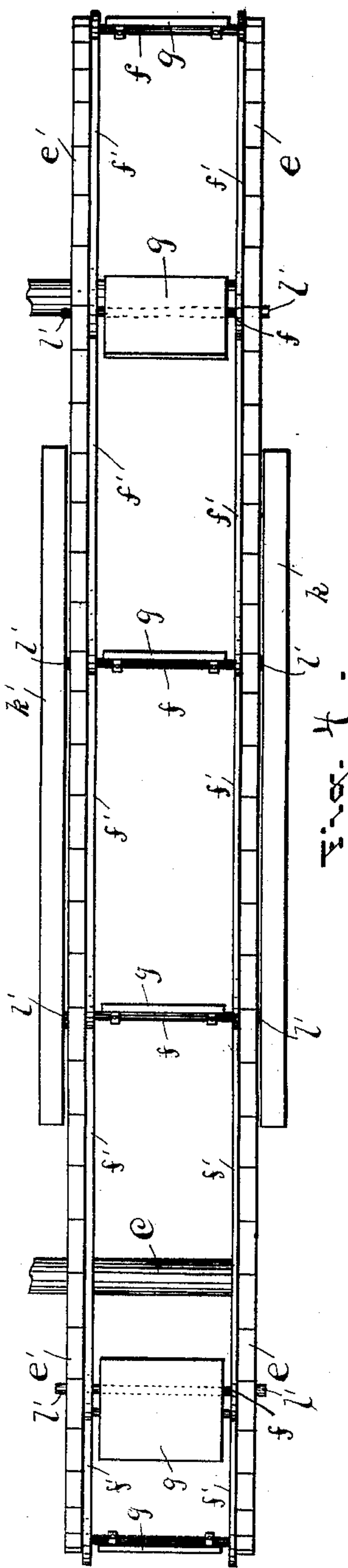
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INVENTOR:

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By Jas. E. Thomas
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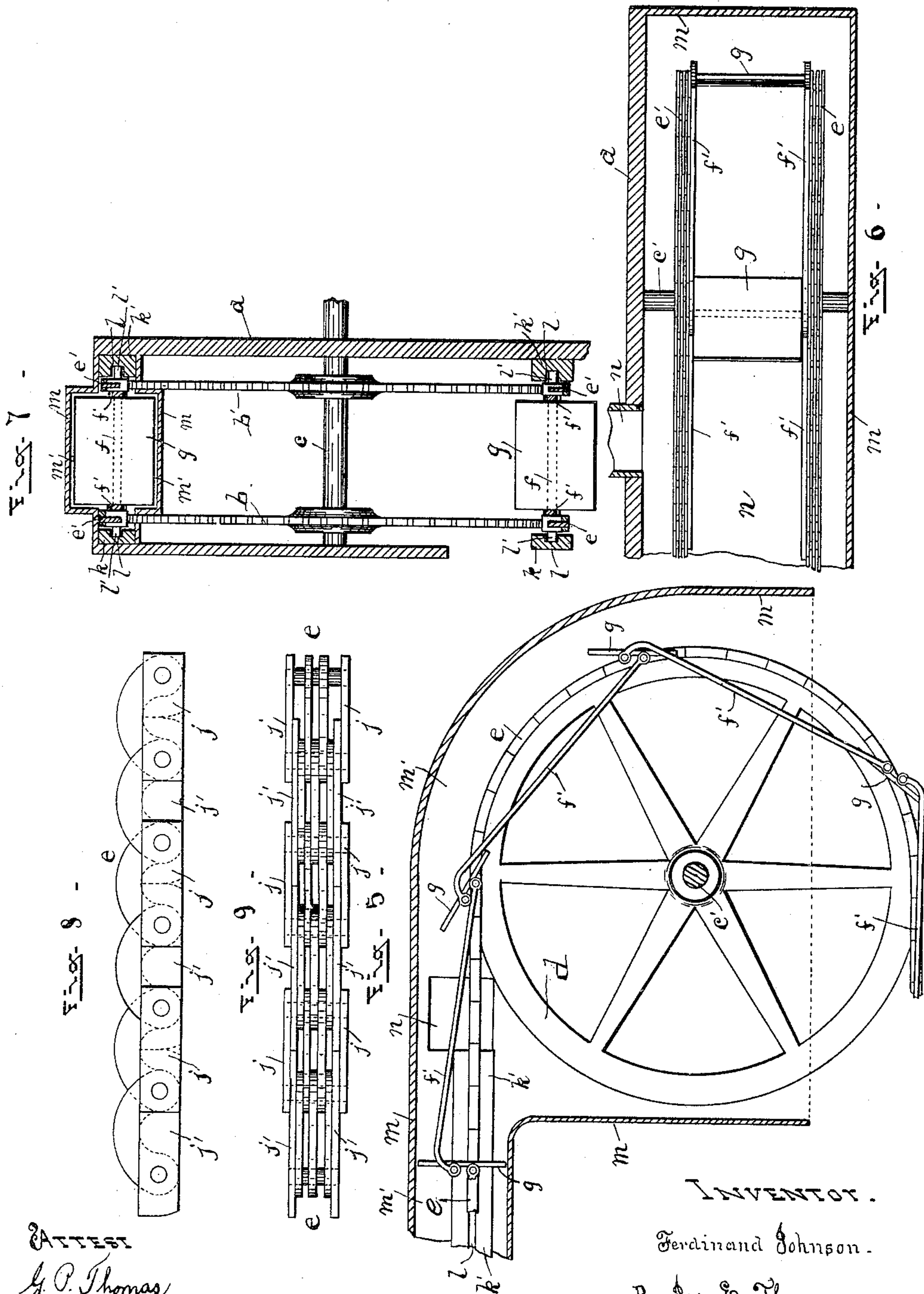
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UNITED STATES PATENT OFFICE.

FERDINAND JOHNSON, OF NEW LONDON, PENNSYLVANIA.

DEVICE FOR PROPELLING AND VENTILATING SHIPS.

SPECIFICATION forming part of Letters Patent No. 407,214, dated July 16, 1889.

Application filed October 30, 1888. Serial No. 289,571. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND JOHNSON, a citizen of the United States, residing at New London, in the county of Chester and State of Pennsylvania, have invented certain new and useful Improvements in Devices for Propelling and Ventilating Vessels; and I do declare the following to be a full, 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in devices for propelling and ventilating boats or vessels; and the invention consists in devices for ventilating the vessel by means of a forced current of air produced by the action of moving paddles through the air; and the invention also consists in the combination and arrangement of the several devices and parts that are used in the construction of the devices, as I hereinafter more fully describe, and definitely point out in the claims.

One of the objects of my invention is to provide a propelling device which may be easily attached to the hulls of vessels already built without materially changing or altering their present form or construction.

A second object is to provide a propelling device which will have a greater capacity to engage with the water without being cumbersome, unsightly, or inconvenient, whereby a greater and firmer resistance by the water is obtained and the "slip" of the paddles is reduced.

A third object is to provide devices whereby a proper feathering movement of the paddles will be obtained as they pass into and rise out of the water, in order that all pounding and lifting of the water in the movement of the paddles may be avoided.

A fourth object of my invention is to utilize the action of the blades of the paddles passing rapidly through the air on their return movement to force a current of pure air to the boiler-room or other compartments of the vessel, whereby a means of ventilation for the vessel is provided without extra expense.

The accompanying drawings illustrate the

devices I employ to attain these objects, Figure 1 therein being a side view in elevation of the hull of a vessel with my improvement embodied therein. Fig. 2 is a horizontal section of the same taken at $x x$. Fig. 3 is a side view in elevation of the propelling device, on an enlarged scale, and detached from the hull. Fig. 4 is a top or plan view of Fig. 3. Fig. 5 is a side view of my improvement, and showing a vertical longitudinal section of the ventilating portion of the device. Fig. 6 is a horizontal section of the same. Fig. 7 is a transverse vertical section of Fig. 3, taken forward of the after wheels and looking toward the stern of the vessel. Fig. 8 is a side view of the chain-section. Fig. 9 is a plan view of the same.

a represents the hull of a vessel or boat, a' being the bow and a'' the stern thereof.

b and b' are wheels placed on opposite sides of the hull a , and provided on their peripheries with suitable teeth or engaging sprockets b'' , and mounted upon a shaft c , which passes into the hull a , and there connects to the engines which are to supply the power to revolve the shaft and wheels. This shaft c may extend entirely through the hull, or may be divided and each portion connected to the source of power independently of the other, if desired, and is provided with suitable boxes and supporting devices for properly retaining the shaft and wheels in position. The location of the shaft is near the stern a'' , and it is also situated so that when the hull is without a load or "light" the lower portion of the wheels will be beneath the water and submerged to a considerably greater extent, of course, when the vessel is loaded.

d and d' are wheels provided with teeth d'' , similar in form and construction to the wheels b , and are placed on opposite sides of and near the bow of the hull a and in alignment with the wheels b , and are mounted upon the shafts c' . The shafts c' , however, are preferably short, and do not extend into the hull a , but are entirely supported by suitable bearings outside thereof.

e and e' are endless chains, the construction of which will be presently explained, passed over the wheels b and d , the links or pivoted sections of the chain being arranged

to engage with the teeth b' and d' of the wheels.

f are cross-bars placed in series, with their ends connected with the chains e and e' , respectively, preferably by being passed through the sections thereof, and forming the pivotal connections therefor, and upon these bars f are secured in any convenient manner the series of paddles or blades g , the blades being arranged to turn on the bars, or the bars to turn in their bearings in the chains, so that the blades will be pivotally supported, the pivotal point on the blades being preferably somewhat above their horizontal centers, so that a greater portion of the blades will be below the supports when in the water, and the blades are retained in a position nearly or substantially perpendicular to the chains by the rods f' , one end of which is pivoted to the blades or paddles at g' , while the opposite ends thereof are pivotally connected to the carrying-chains at a point at some distance from the paddles, preferably as shown, by being provided with an opening through which is passed the cross-bar next nearest.

The chains, being carried by the wheels b and b' and d and d' , form an upper horizontal run of chain h and a lower run i , which, as the wheels b' are revolved by suitable power in the proper direction, propel the lower run i of the chain from bow to stern through the water, usually at a considerable depth below its surface, while the upper run h is passed in the opposite direction through the atmosphere, the paddles g , carried by the chain, being passed into the water near the bow by the wheels d and d' and withdrawn therefrom by the wheels b and b' near the stern, and by arranging and pivotally connecting the rods f' , as before described, a means of feathering the paddles is provided, which, as shown in Fig. 3, turns the paddles as they begin to ascend out of the water to such a position that one edge thereof is presented to the line of movement, which removes the resistance of the water, the action of the rods being that while the chains follow the peripheries of the wheels and form the arc of a circle the rods remain a direct line between the buckets and form the chord of the arc, which of course is less than the length of the arc, and the forward ends of the rods being immovably secured to the chains, the opposite ends, which are pivoted to the buckets below their pivotal supports, move to the rear, turning or feathering the buckets upon their bearings to a position nearly horizontal with the chains, the position of the feathered buckets being regulated by the position in which the rods are pivoted thereto. As the buckets follow the peripheries of the wheels to near their upper portions, and the forward pivoted ends of the rods f' move upon the upper horizontal run h , the chains again straighten, and the buckets then resume their original perpendicular position, and the

feathering action again takes place in the same manner as the buckets pass over the front wheels d and the buckets are submerged with their edges presented to the water, and as they start on the lower horizontal run of chain they are again moved to their original perpendicular position.

The form of chain which I prefer to use in the construction of the device is that shown and described in Letters Patent No. 327,446, dated September 29, 1886, a change being made by annexing to the lateral sides of the toothed sections i' the brace-plates j and j' , as shown in Figs. 8 and 9, the plates j being secured by passing the pivots which hold the chain-sections together through the ends of the plates, and the plates then, besides strengthening the chain, also act as flanges on opposite sides of the teeth of the carrying-wheels, which serve to retain the chain in position upon the peripheries thereof. In order to properly sustain the chains in position on the horizontal runs h and i between the wheels, and support the weight thereof, guide-pieces k and k' are placed in position between the wheels and provided each with a longitudinal groove l , the guide k' being secured to the hull a , while the outer guides k are properly supported outside of the runs of chain. On the opposite sides of the chains e and e' are secured, in any suitable manner, the laterally-projecting blocks or lugs l' , which pass into and slide along the grooves l , and the lugs l' are preferably formed, as herein illustrated, by extending the ends of the rods f beyond the lateral sides of the chains, the projecting end being provided with a suitable block, sleeve, or roller, as desired.

The upper runs h of the chains are housed in or covered by a casing m , the casing also covering the upper portions of the wheels b and d , the chamber m' within the casing being of a suitable dimension to allow the buckets to pass when in a perpendicular position, and the portion inclosing the wheels d is extended downward below the surface of the water, forming an air-tight seal for the forward end of the chamber m' , while the after end of the casing is provided with openings in any suitable manner to allow the free admission of the air to the chamber.

n is an air pipe or tube connecting with the forward end of the chamber m by one end and the opposite end is led to the boiler-room of the vessel, or may be carried to any other portion thereof by branches, &c., as desired.

I have described herein my invention as being constructed with two endless chains and four carrying-wheels as being most convenient and desirable; but for use on smaller craft the device may be, perhaps, preferably formed with one broad chain, carried, of course, by two sprocket-wheels, which would then necessitate the pivotal points of the

blades to be at their upper edges, and the working action of this construction would be the same.

The operation of the device is: The power of the engine is preferably applied to the shaft to revolve the wheels *b* and *b'* in the direction of the arrows shown in Fig. 3, and the chains *e* and *e'*, engaging with the teeth upon the wheels *b* and *b'*, are propelled with considerable velocity, the lower horizontal run *i* moving from bow to stern with the paddles in a perpendicular position and engaging with their full area upon the water to propel the vessel forward until the peripheries of the wheels *b* and *b'* are reached, when the paddles are turned and rise over the peripheries of the wheels to the upper run *h*, passing edgewise through the water, and offer no resistance until they are again turned to a perpendicular position at the beginning of their forward movement within the chambers *m'*, and the paddles, having an area which nearly fills the entire area of the chamber transversely, move forward and carry the air which is caught up as they start to the forward ends of the chambers, and the chamber being sealed by the water at the forward end of the casing causes the air thus brought forward by the paddles to pass from the chambers through the pipes *n* to the interior of the hull of the vessel.

It will be observed that the numerous paddles which are passing through the water at the same time present a great resistance and overcome to a great degree the slip of propelling-wheels of the ordinary well-known forms, so that the power is nearly all utilized for propelling the vessel forward instead of being lost to a great extent in the slip or moving backward of the water.

The length of the rods *f'* and the distance at which they are pivoted from the pivotal supports of the blades regulates the amount of "feather" or turning movement that is imparted to the blades, and, if desired, the forward pivoted ends of the rods may be secured to the chains at a point considerably in advance of the pivotal support of the next paddle, in order to obtain the required movement in case it should be deemed advisable to locate the paddles nearer to each other.

The position of the paddles *g* is herein described as being perpendicular to the chains on the upper and lower horizontal runs *h* and *i*; but I do not, however, confine the description entirely to this position, as for use in some cases it may be desirable to have the blades set at a slight angle with the chains in order to produce the best working result, and by properly arranging the feathering devices

the paddles may be retained in a position horizontal to the chains when passing over the upper run *h*, and then the devices may be located entirely below the surface of the water and have the same action in propelling the vessel, although in that case the ventilating devices would be omitted.

Of course the details of construction I have herein set forth are not altogether to be followed in every particular, as in different circumstances the devices must be adapted to vessels of different construction and outline, which would necessarily somewhat change the form and construction of my improvement, and hence I wish it distinctly understood that I do not propose to confine my invention entirely to the precise form and mode of applying the several devices I have described; but

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

1. In a device for propelling vessels, the combination, with the hull, the endless gear-chains mounted on sprockets and arranged with upper and lower horizontal runs between the said sprockets, the cross-rods *f*, with their ends passed through the chains and carrying the blades *g*, pivotally secured thereto, the brace-rods *f'*, with one end pivotally secured to the blades below their pivotal supports and with their opposite ends extended forward and pivoted to the chains, of the lugs *l'*, projecting laterally on opposite sides of the chains, and the horizontal guide-pieces *k* and *k'*, supported on opposite sides of the chains and provided with the grooves *l* to receive the lugs *l'* and support the chains on the said horizontal runs thereof, substantially as set forth.

2. In a device for propelling and ventilating vessels, the combination, with the hull *a*, the endless chains *e* and *e'*, mounted on supporting-wheels and provided with an upper horizontal run *h* and a lower horizontal run *i* between the supporting-wheels, the blades *g*, supported in a perpendicular position between and carried by the said chain, of the casing *m*, inclosing the upper run *h* of the said chains, and having its forward end extended downward and sealed by the water, and the air-pipe *n*, opening into the forward end of the said casing and leading to the interior of the hull, substantially as and for the purpose set forth.

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

FERDINAND JOHNSON.

Witnesses:

H. KNOWLTON,
JAS. E. THOMAS.