

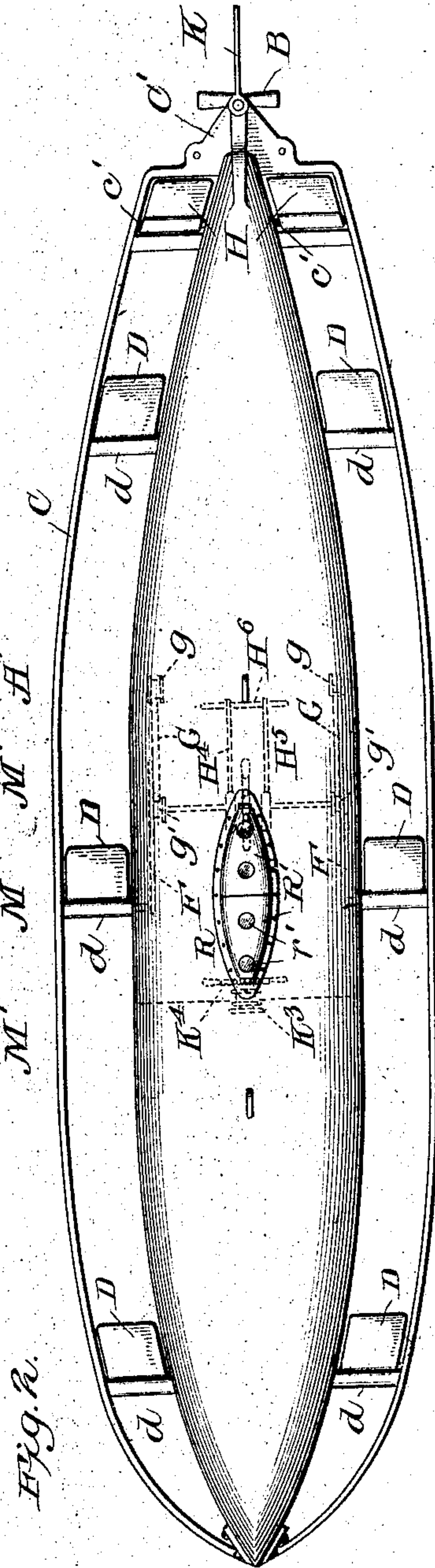
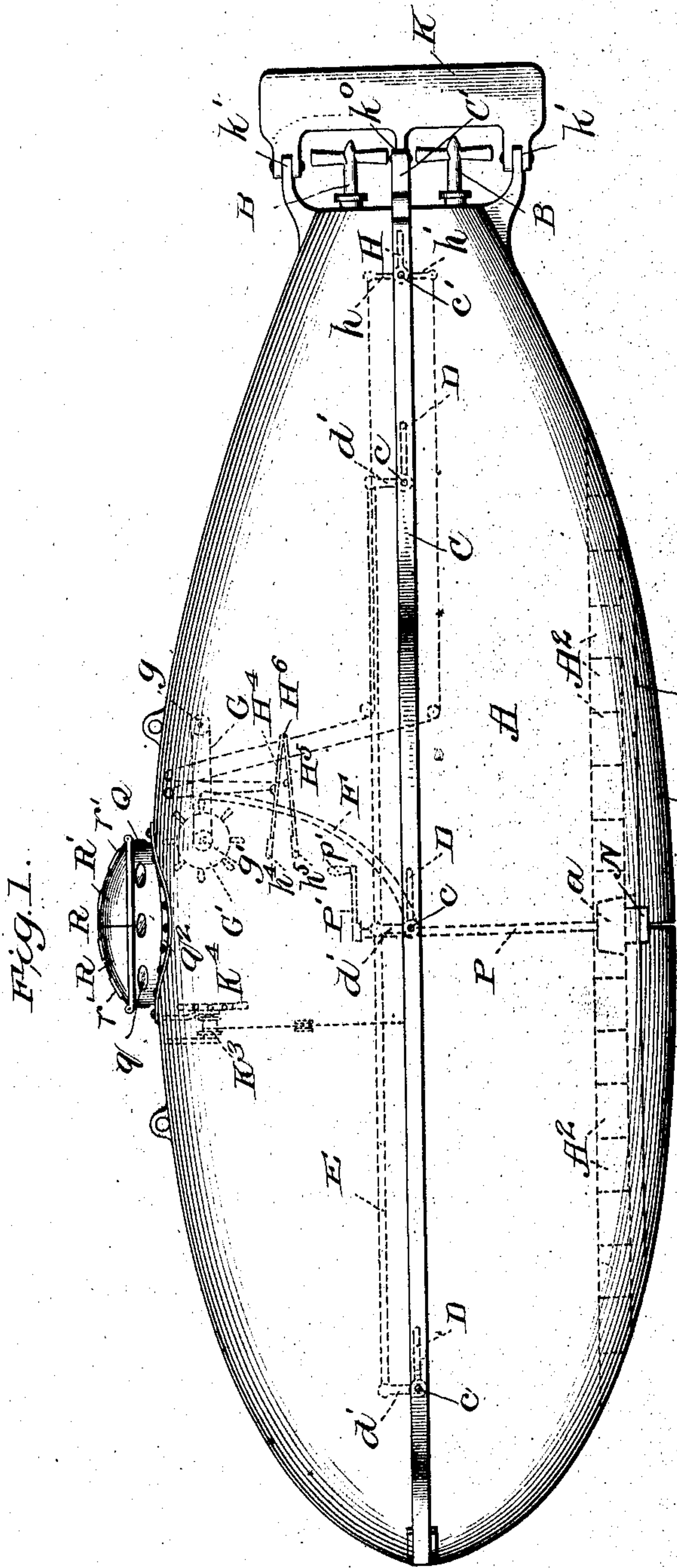
No. 850,831.

PATENTED APR. 16, 1907.

J. J. HARPAIN.
SUBMARINE BOAT.

APPLICATION FILED APR. 23, 1906.

3 SHEETS—SHEET 1.



Witnesses
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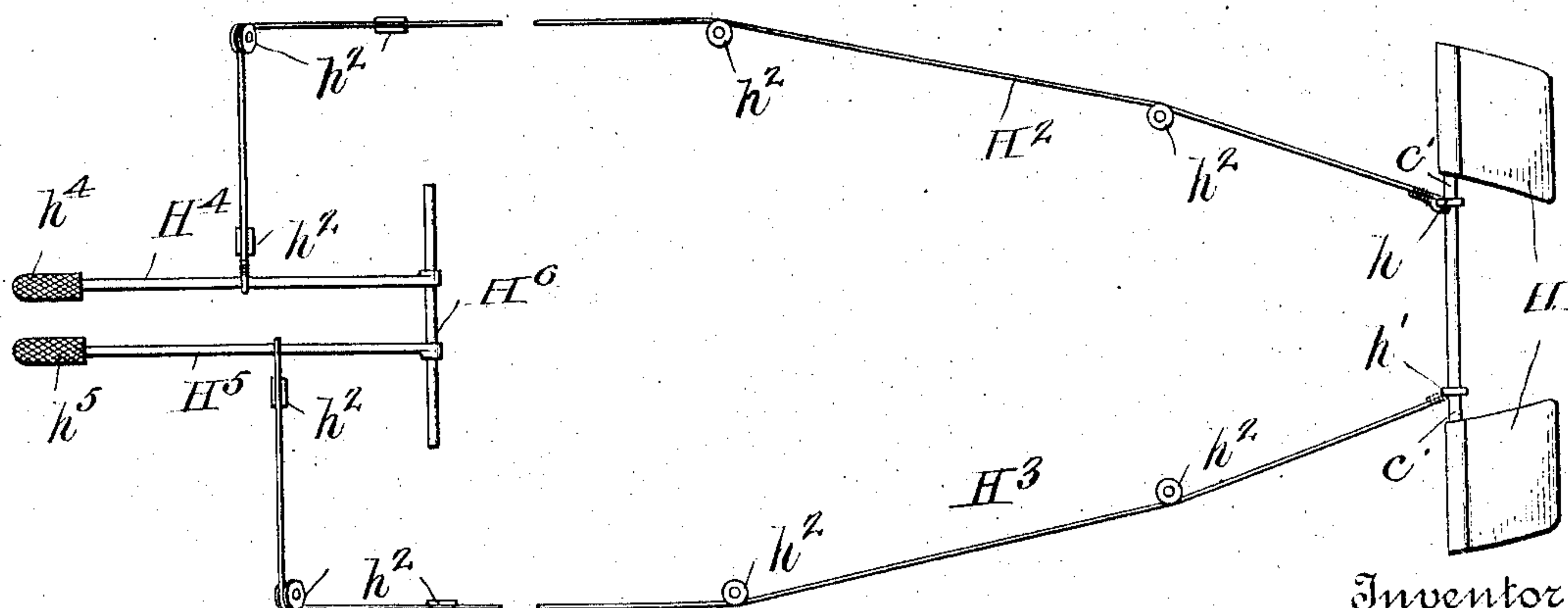
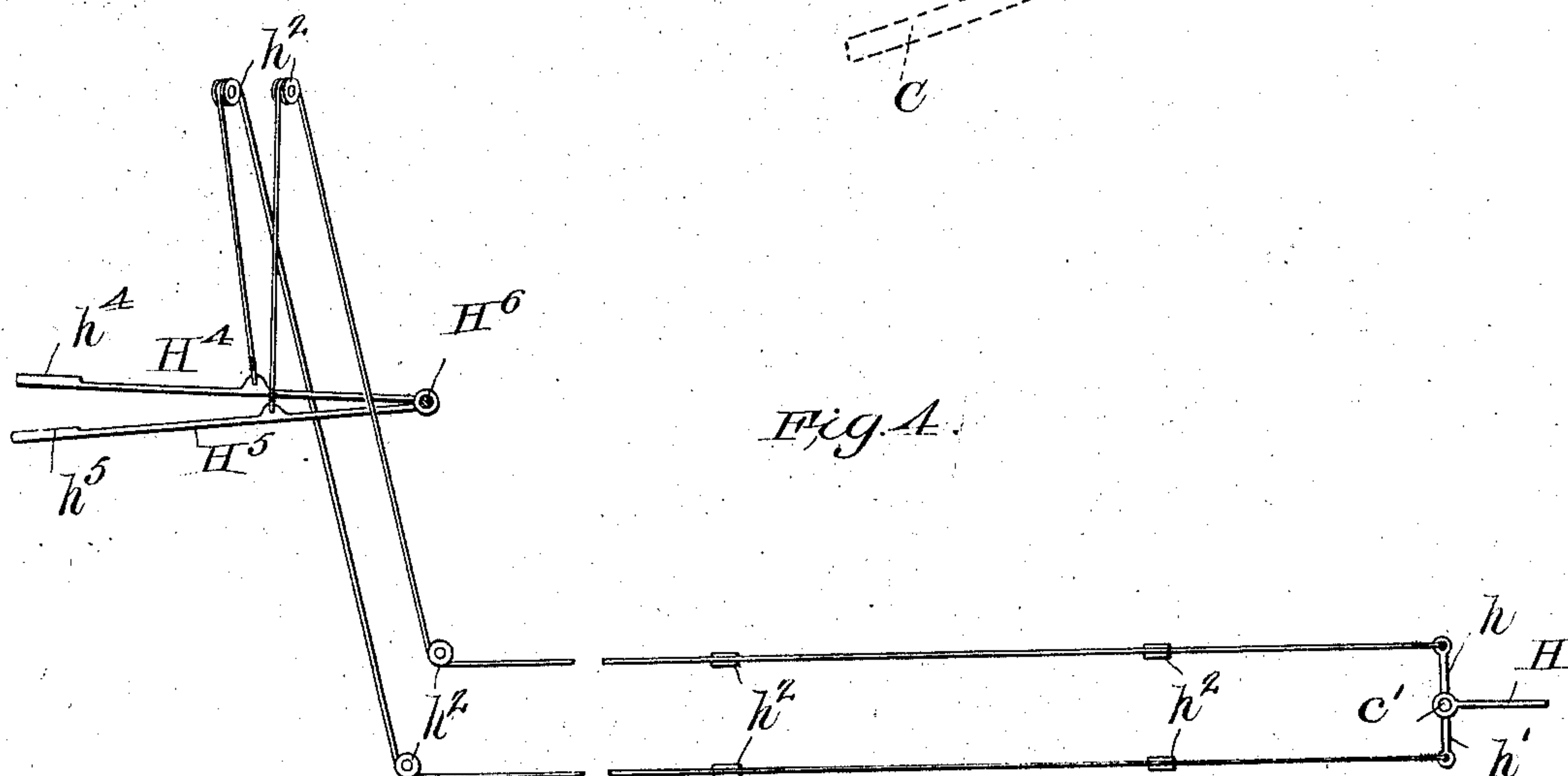
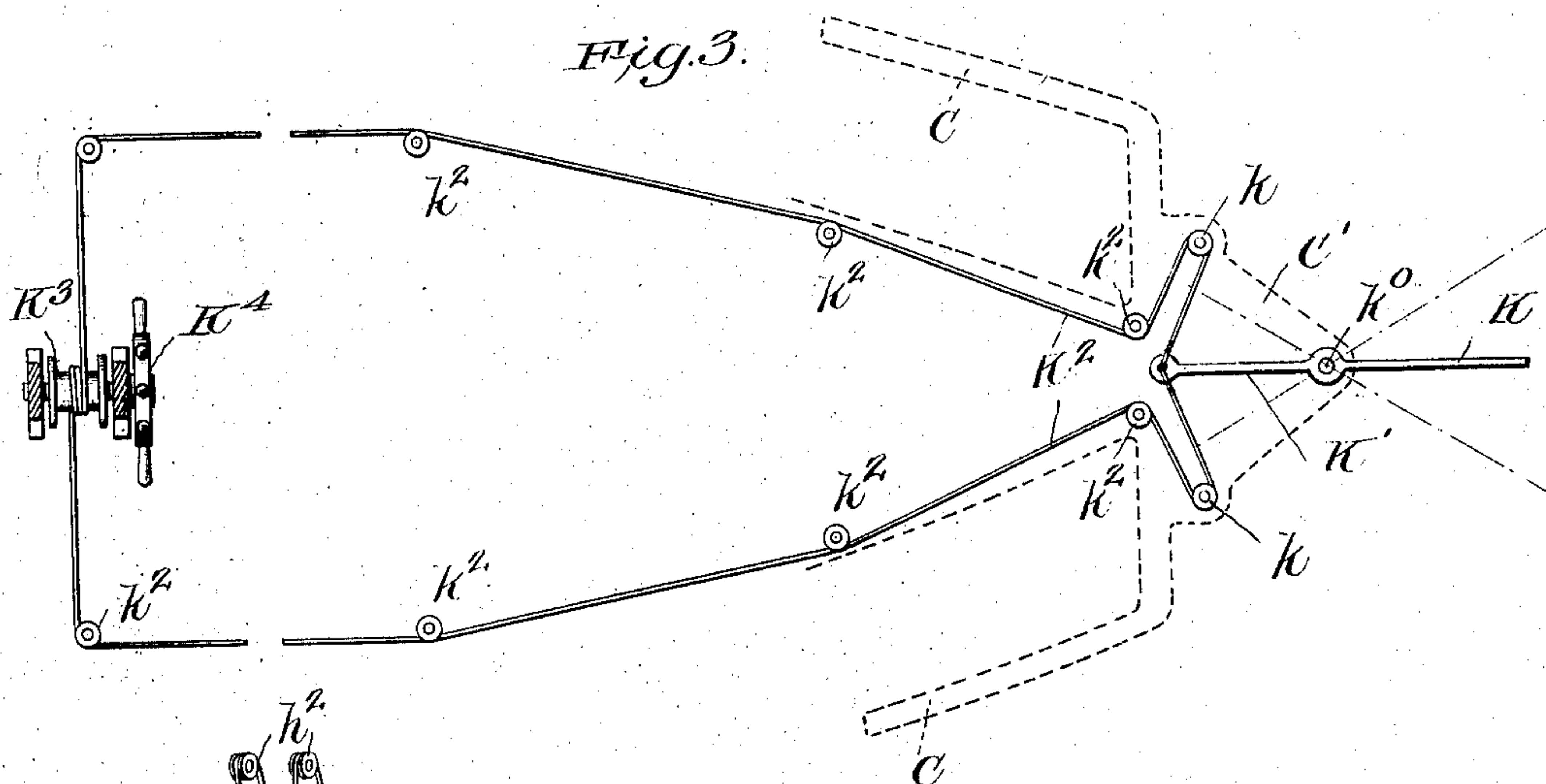
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3 SHEETS—SHEET 2.



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Fig. 5.

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3 SHEETS—SHEET 3.

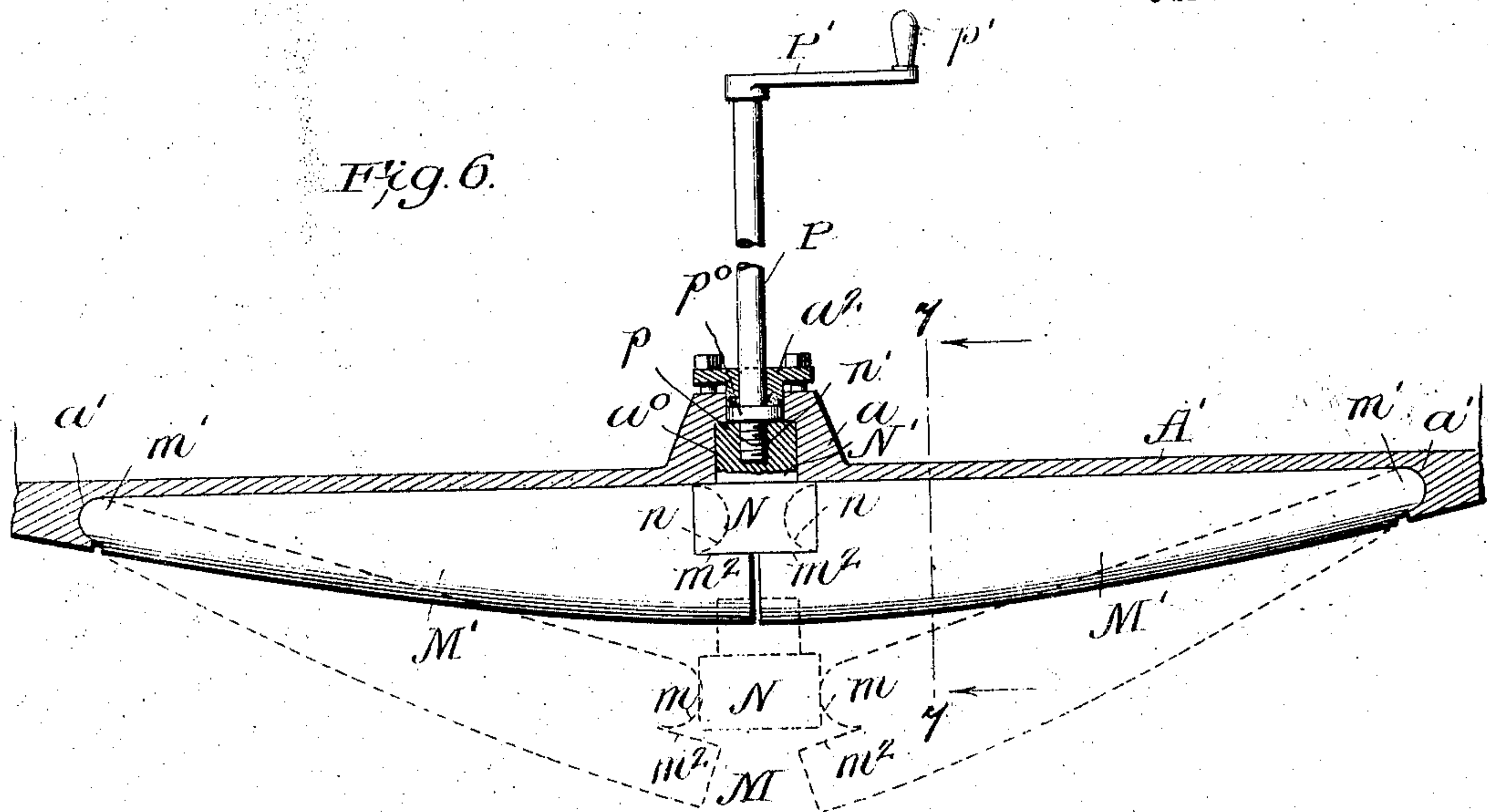


Fig. 7.

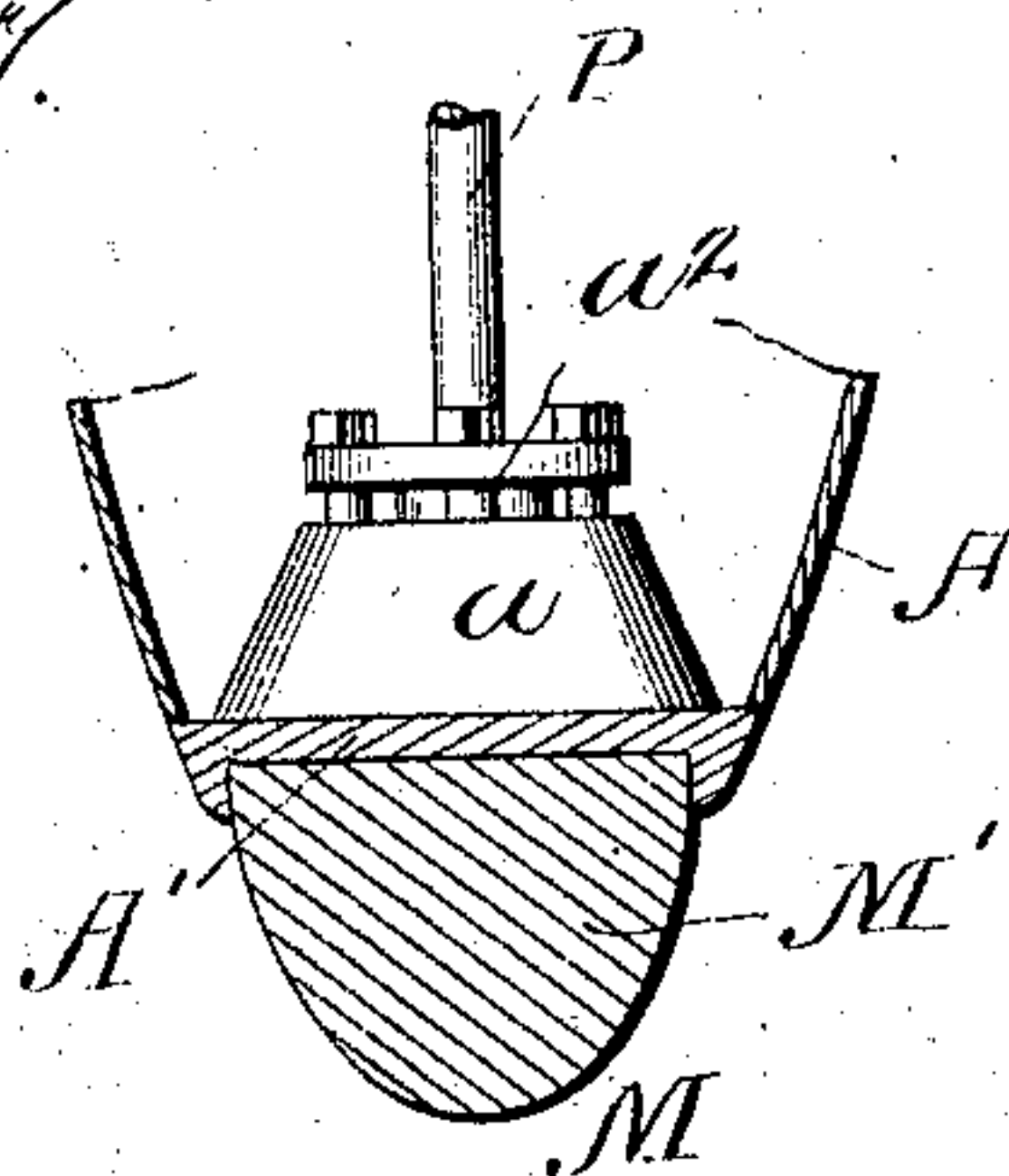


Fig. 9.

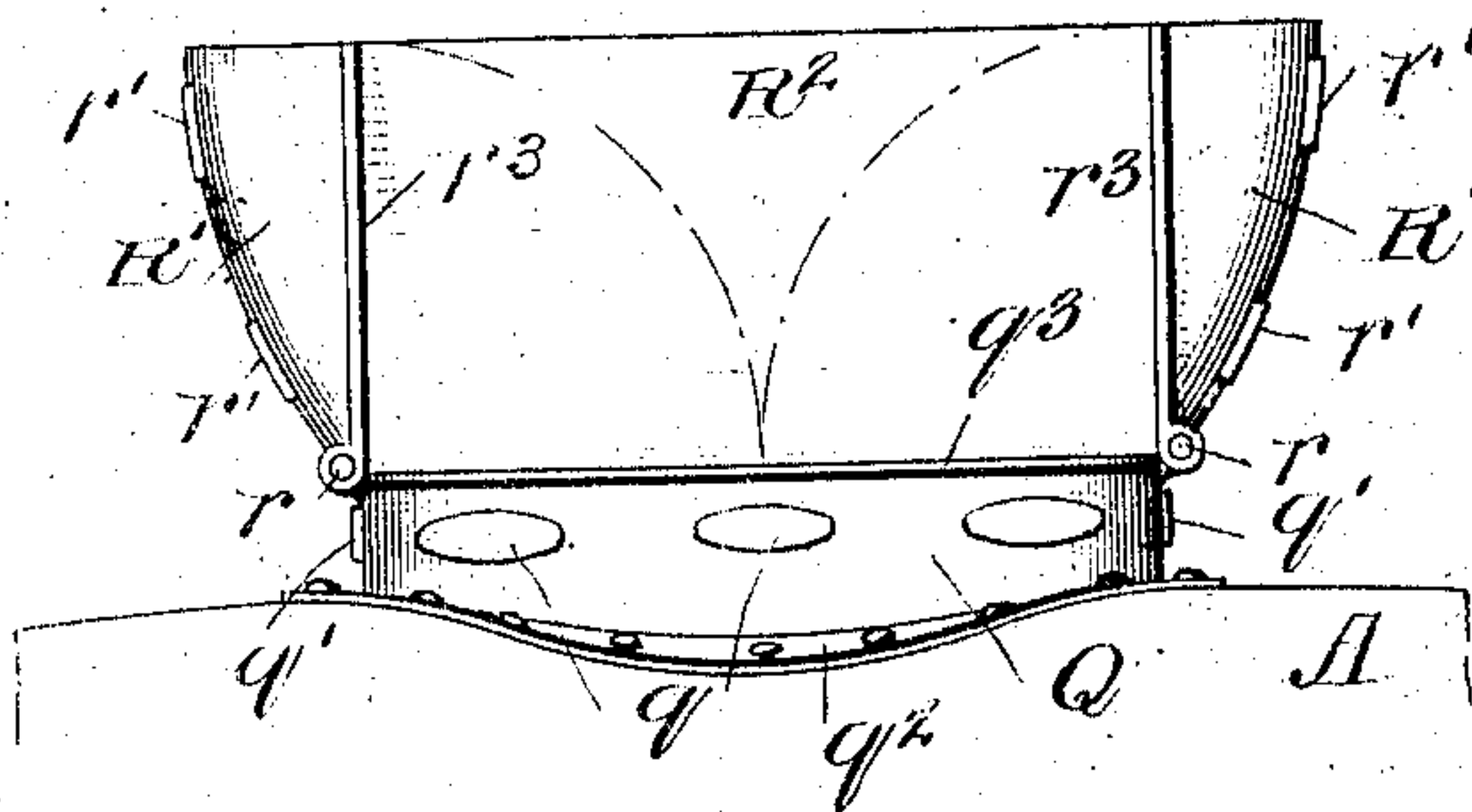


Fig. 10.

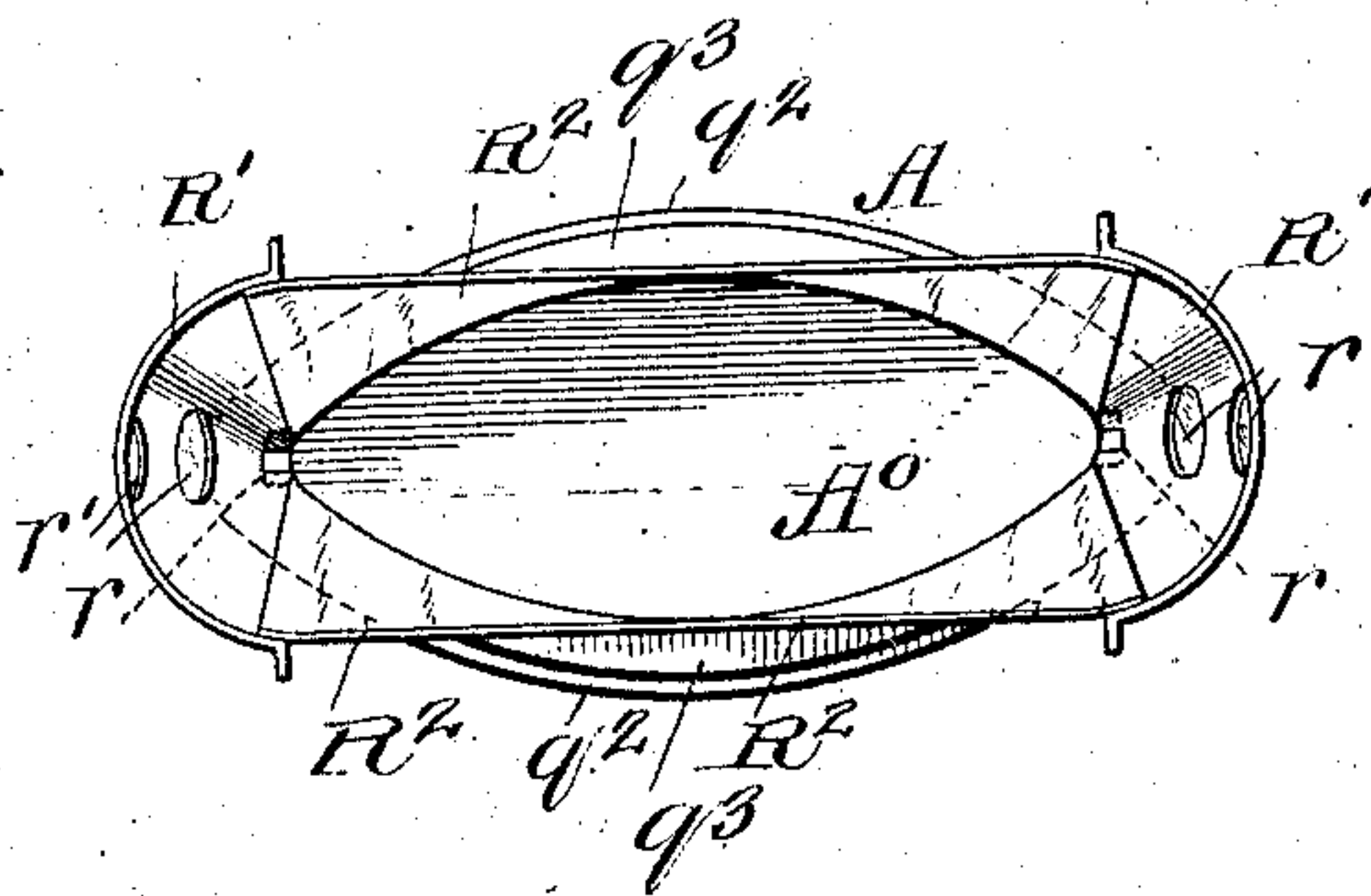
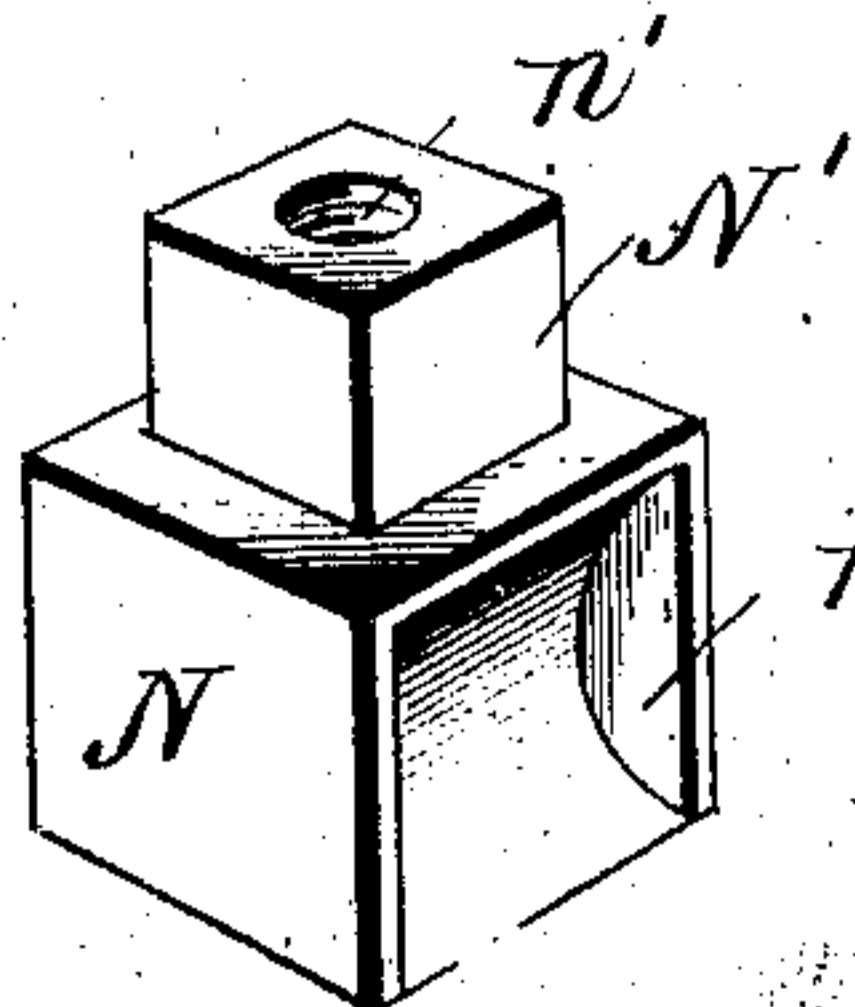


Fig. 8.



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UNITED STATES PATENT OFFICE.

JOHN J. HARPAIN, OF THE UNITED STATES NAVY.

SUBMARINE BOAT.

No. 850,831.

Specification of Letters Patent.

Patented April 16, 1907.

Application filed April 23, 1906. Serial No. 313,266.

To all whom it may concern:

Be it known that I, JOHN J. HARPAIN, a citizen of the United States, of the United States Navy, serving on board United States Steamship *Marblehead*, have invented certain new and useful Improvements in Submarine Boats; and I do hereby 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.

My present invention relates to improvements in submarine boats; more especially small boats of the type adapted to carry torpedoes attached to the exterior of the shell thereof, as was described and claimed in my Patent No. 800,101, granted September 19, 1905; but the said boat may be used for other purposes and as torpedo-boats, if desired. These boats, as herein described, are not intended to cruise for any great lengths, but are intended to be normally carried aboard ship and to be launched in any suitable or convenient way, but preferably as described in my application, Serial No. 313,267, filed April 23, 1906, and entitled "Improvements in apparatus for transporting and launching boats."

My invention will be understood by reference to the accompanying drawings, in which the same parts are indicated by the same letters throughout the several views.

Figure 1 is a side elevation of a boat constructed and equipped according to my invention. Fig. 2 is a plan view of the boat shown in Fig. 1. Fig. 3 is a diagram illustrating the operation of the steering-rudder. Figs. 4 and 5 are diagrams showing in side elevation and in plan the operation of the balancing-rudders. Fig. 6 is a detail showing the connection of the detachable keel to the boat and illustrates the means for securing said keel in place and for releasing same when desired. Fig. 7 is a section on the line 7-7 of Fig. 6 and looking in the direction of the arrows. Fig. 8 is a perspective view, on an enlarged scale, of the socket-block for engaging the ends of the keel members. Fig. 9 is a side elevation showing the hatch with the hatch-cover in the open position, and Fig. 10 is a plan view of the device shown in Fig. 9.

A represents the body of the boat, which is driven by suitable mechanism, such as the

two propellers B and the engine (not shown) for driving the same.

C represents a rail spaced away from the side of the boat and connected thereto by the bolts *c*. Extending between the rail C and the body A of the boat are the sleeves *d* of the rudders D. The sleeve thus serves as a strut or spacer for the rail C.

To each rudder a tiller *d'* is connected, and the rudders on each side have their tillers connected, respectively, to two rods E on the inside of the boat, which rods are rocked simultaneously by the arm F, fast to the band G, which travels on the pulleys *g* and *g'* and is rotated by the hand-wheel G'. The operation of these rudders D is illustrated in Fig. 1, but is fully described and claimed in my Patent No. 800,101 aforesaid. The tendency of these rudders D is to cause the boat to crab down or to rise up bodily.

To facilitate rising or diving or maintaining the boat on an even keel, balance-rudders H are provided, fast on the rod *c'*, which extends across the stern of the boat, as shown in Fig. 2. To this rod *c'* tillers *h* and *h'* are secured, which tillers are oppositely disposed, as shown in Figs. 1 and 4, and are connected, respectively, to the tiller-rods H² H³, which pass over suitable fair-leaders *h*² and are connected to the arms H⁴ and H⁵, which carry, respectively, the treadles *h*⁴ and *h*⁵ and rock on the rod H⁶. By pressing down one or the other of these treadles the balance-rudders are caused to assume the position for diving or rising, as the case may be. Suitable return-springs (not shown) may be provided for restoring the treadles to the initial position.

K represents the steering-rudder, which is journaled in suitable bearings *k*⁰ and *k'*. The rudder has a tiller K', which projects into the V-shaped casing C' in the stern of the boat. In this casing are mounted two pulleys *k*, (see Fig. 3,) which give a suitable direction to the tiller-rope K², which is secured to the tiller K' and passing over suitable fair-leaders *k*² is wound on the drum K³ of the steering-wheel K⁴. Thus it will be seen that by turning the wheel K⁴ the boat may be steered to the right or left as desired, while by pressing on one or the other of the treadles *h*⁴ or *h*⁵ the longitudinal axis of the boat may be tilted, as for rising or

diving, and, finally, the diving-rudders D may be caused to wedge the boat down or up by turning the wheel G'.

The rising or diving of the boat may be facilitated by using a detachable keel, such as is shown in Figs. 6 to 8. In these figures, A' represents the keelson of the boat, which is preferably located beneath suitable ballast-tanks A², which ballast-tanks may be filled or emptied in any of the well-known ways for accomplishing this result. In the keelson A', I provide notches a' to engage the rounded lugs m' of the keel members M', two of which together constitute a detachable keel M. The other ends of these keel members M' carry lugs m above the shoulders m². These lugs engage in recesses n in the locking-block N, (see Fig. 8,) and this block has a squared nut N' on its upper side, screw-threaded, as at n', to receive the screw p on the end of the rod P, which passes through the stuffing-box a² and is held beneath the same by a set-collar p⁰, and is provided with a hand-lever P' and a handle p'. The nut N' is made angular and projects up into an angular recess in the boss a on the keelson A'. In order to attach the keel to the boat, the keel members M' have their lugs m' inserted in the notches a' and the lugs m inserted in the recesses n in the block N, the parts being then in the position indicated in dotted lines in Fig. 6. Now by shoving up on both of the keel members until the nut N' engages the screw-threads p and then screwing up on the screw-rod P the keel members may be brought to the locked position, as shown in full lines in Fig. 6. To release the keel members, turn the hand-crank P' through a sufficient number of revolutions to release the block N and the keel members will fall down, first to the position shown in dotted lines in Fig. 6, and then these members, with the block N, will become entirely released and will fall bodily away from the boat. This dropping of the keel will increase the reserve buoyancy of the boat sufficiently to cause the boat to rise should the diving apparatus fail to operate or should the density of the system prove too great, as from springing a leak or from any other cause.

Q represents the hatch, which has a tapered coaming, as shown, and is provided with side bull's-eyes q, preferably elongated, and with fore-and-aft bull's-eyes q', as shown in Fig. 9. The hatch-coaming is secured to the hull of the boat by means of a flange q². The top of the hatch is closed by two members R', hinged at opposite ends of the hatch, as at r, and provided with suitable bull's-eyes r'. These members R' are provided with flanges r², which drop down and make water-tight connections with the flanges q² of the hatch. Along the edges of the inside of the hatch and secured to the interior of the members R'

are rubber or canvas curtains R³, which form splash-boards or curtains when the members R' of the hatch-hood are in the raised position, as shown in Fig. 9. When these members are lowered, these curtains drop down to the interior of the hatch.

In the drawings I have omitted for the sake of clearness apparatus for attaching the torpedoes to the exterior of the boat, as these are fully shown and described in my patent aforesaid and as they do not constitute a part of my present invention.

It will be obvious that various modifications might be made in the herein-described apparatus which could be used without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. An immersion apparatus for submarine boats comprising a rail secured to each side of the boat and spaced therefrom, diving rudders journaled between said rail and the boat-body; means located in the interior of the boat for simultaneously operating all of these rudders, balancing-rudders pivoted near the stern of the boat and adapted to tilt the longitudinal axis of the boat, means operable from the interior of the boat for rocking said balancing-rudders in either direction, and a detachable keel, comprising two members connected to the hull-body, a locking-block normally engaging said members, and a screw-rod projecting into the boat and adapted to engage and to release said locking-block, substantially as described.

2. In a submarine boat, a detachable keel, comprising two members pivotally connected at their outer ends to the bottom of the boat and provided with lugs on their inner ends, in combination with a recessed block adapted to engage said lugs and to release same when desired, and means for drawing said block into position for locking said keel in place and for releasing said block when desired, substantially as described.

3. In a submarine boat, a detachable keel comprising two members pivotally connected at their outer ends to the bottom of the boat and provided with lugs on their inner ends, in combination with a recessed block adapted to engage said lugs and to release same when desired, a nut secured to or integral with said block, and a rod provided with screw-threads adapted to engage said nut and projecting into the interior of the boat, with means for turning said rod and causing it to engage or to release said block, substantially as described.

4. In a submarine boat, the combination with a keelson provided with a recess adapted to receive a detachable keel, with notches at each end of said recess, two keel members having lugs on their outer ends adapted to engage said notches, and also being provided

with lugs on their inner ends, a recessed block adapted to engage said lugs on the inner end, and means operable from the interior of the boat for drawing up said recessed block to lock said keel members into position or for releasing said recessed block and the keel members and allowing them to fall away from the boat, substantially as described.

5 5. In a submarine boat, the combination
10 with a keelson provided with a recess adapted to receive a detachable keel, with notches at each end of said recess, two keel members having lugs on their outer ends adapted to engage said notches, and also being provided
15 with lugs on their inner ends, a recessed

block adapted to engage said lugs on the inner end, a nut secured to or integral with said block, and a rod provided with screw-threads and projecting into the interior of the boat and adapted to engage said nut, with 20 means for rotating said rod to cause said screw-threads to engage or to release said nut, substantially as and for the purposes described.

In testimony whereof I affix my signature 25 in presence of two witnesses.

JOHN J. HARPAIN.

Witnesses:

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J. McANDREWS.