

(No Model.)

2 Sheets—Sheet 1.

W. WHITEHEAD.

STEERING MECHANISM FOR VESSELS.

No. 379,840.

Patented Mar. 20, 1888.

Fig. 1.

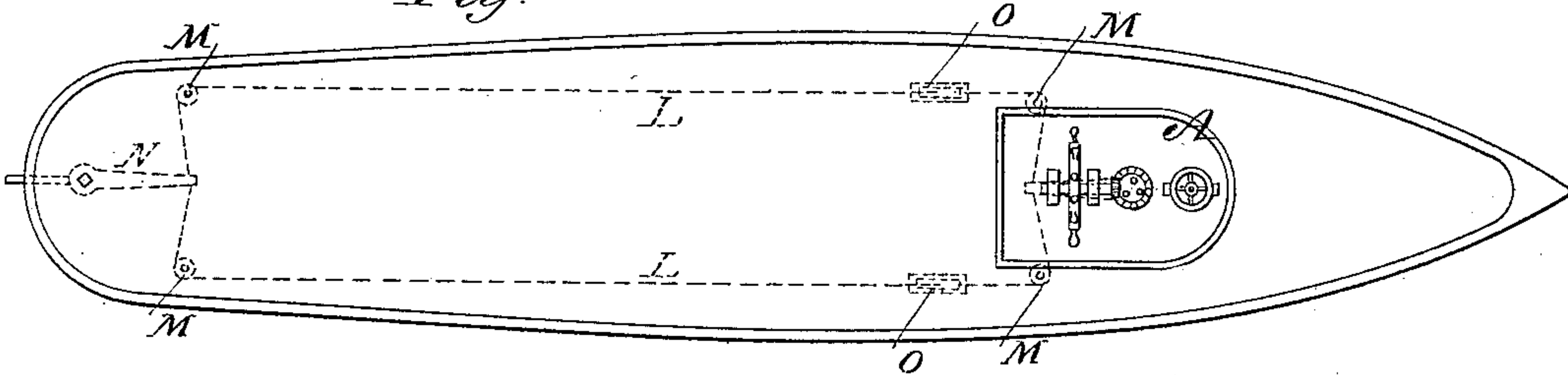


Fig. 2.

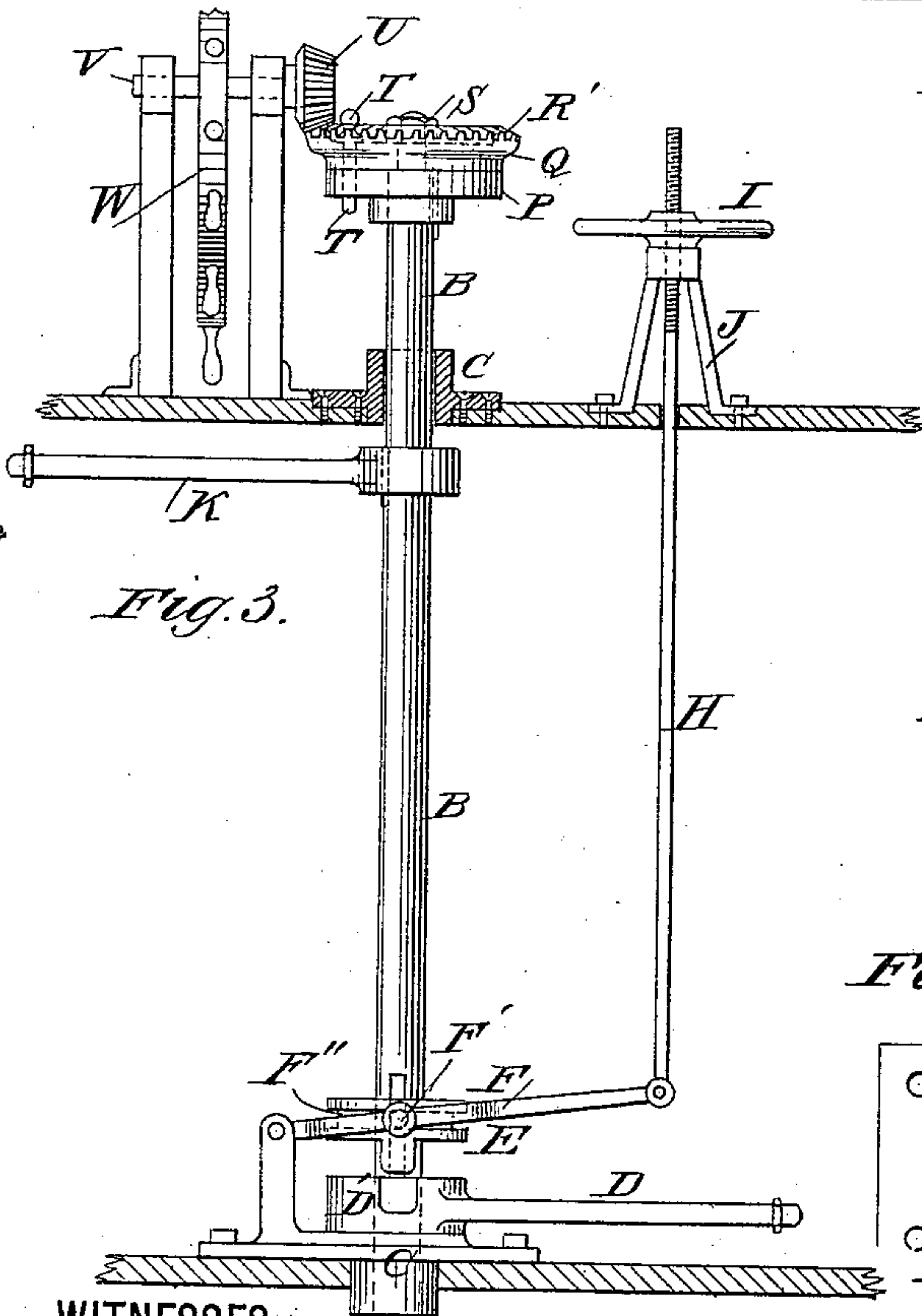
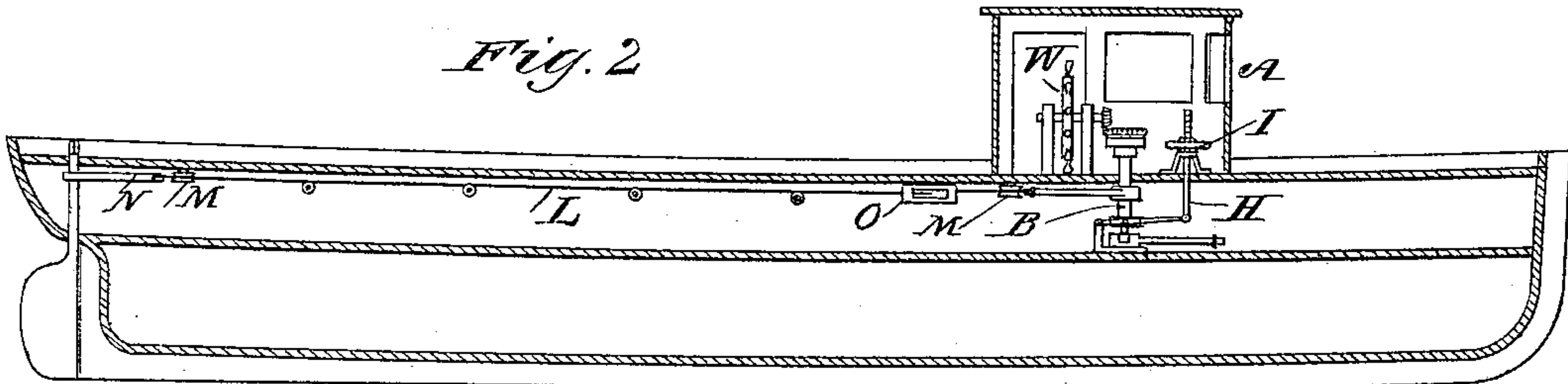


Fig. 4.

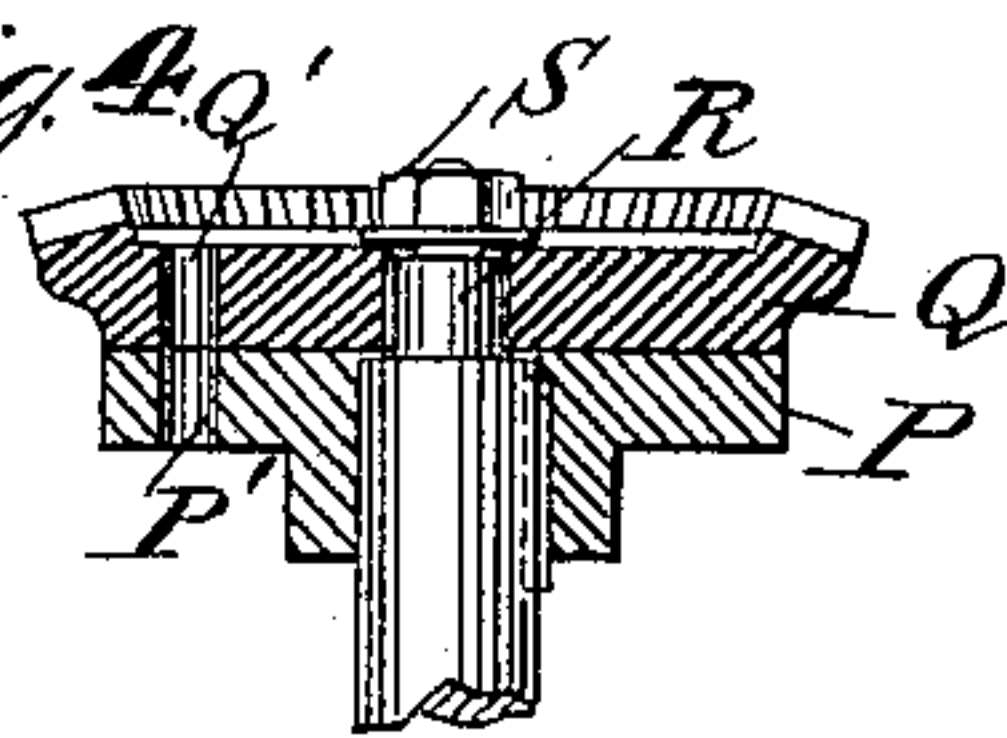


Fig. 5.

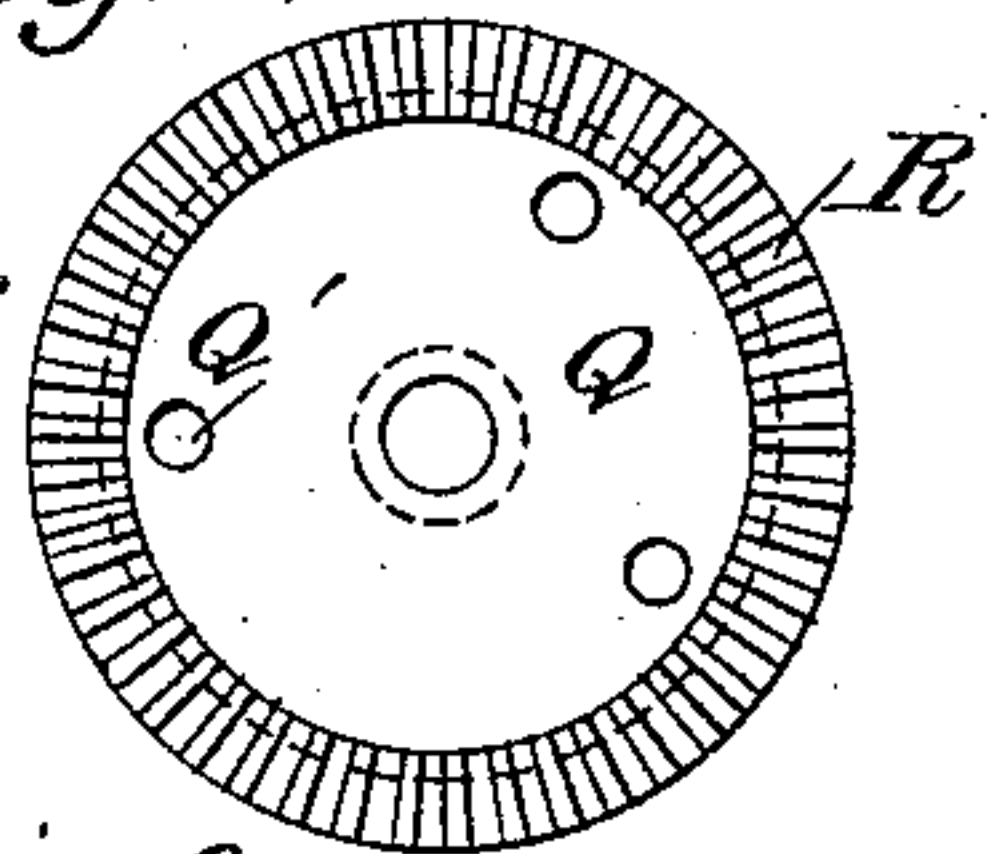


Fig. 6.

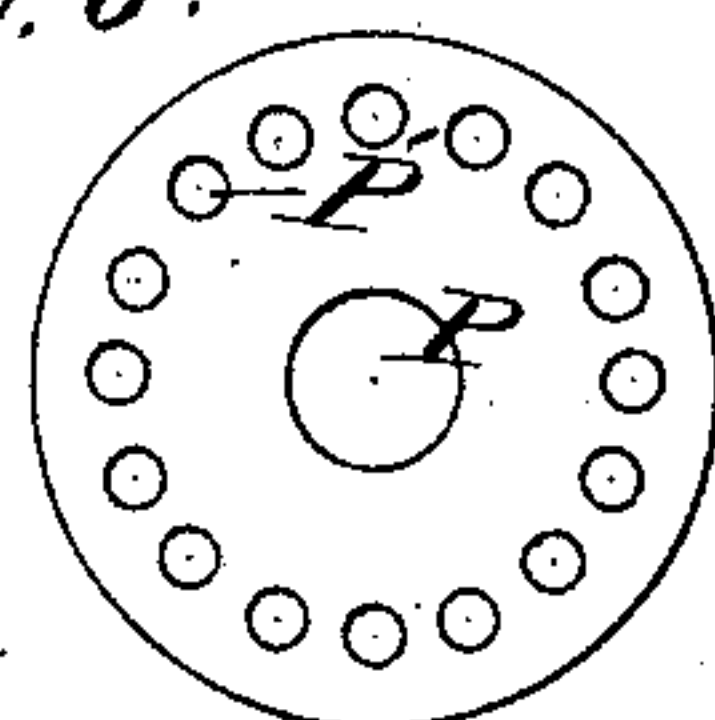
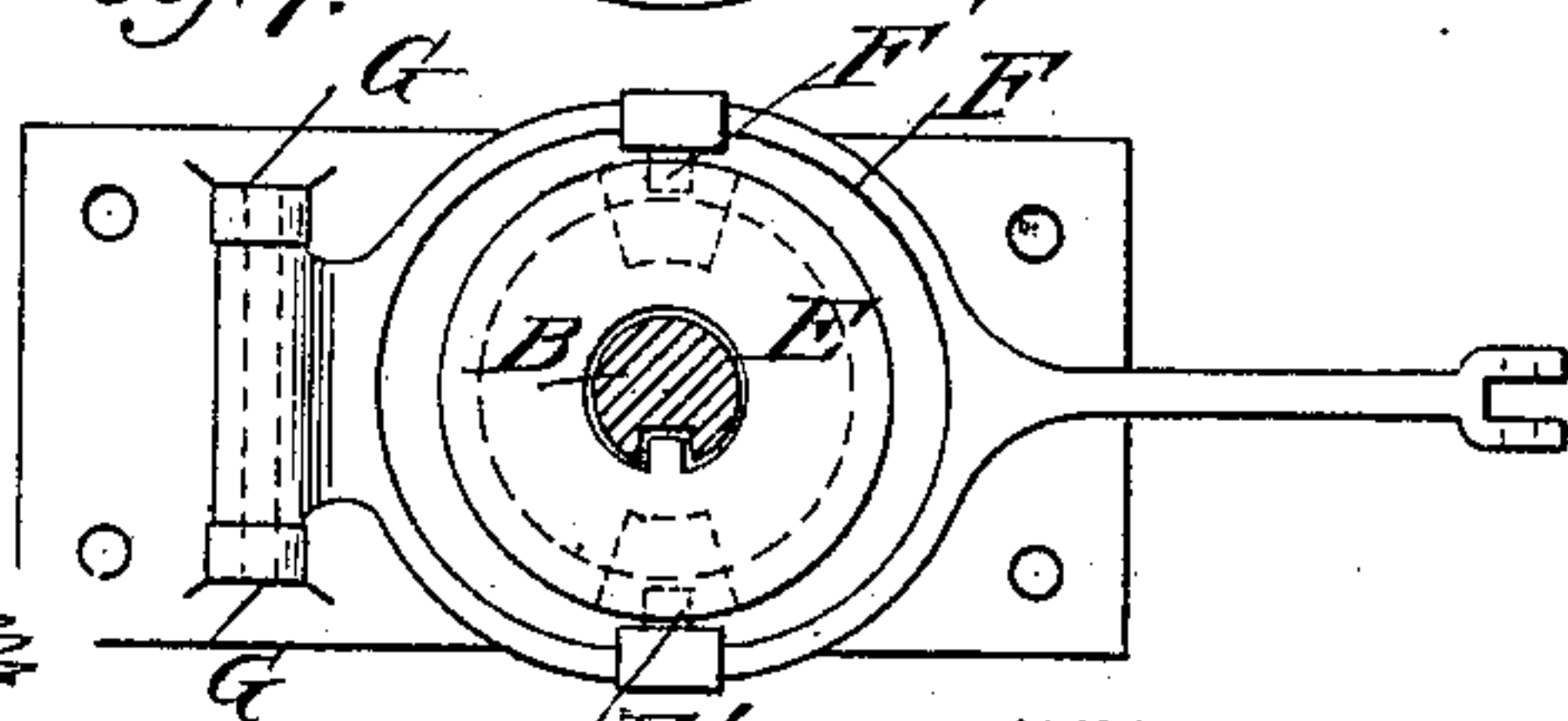


Fig. 7.



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(No Model.)

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Fig. 8.

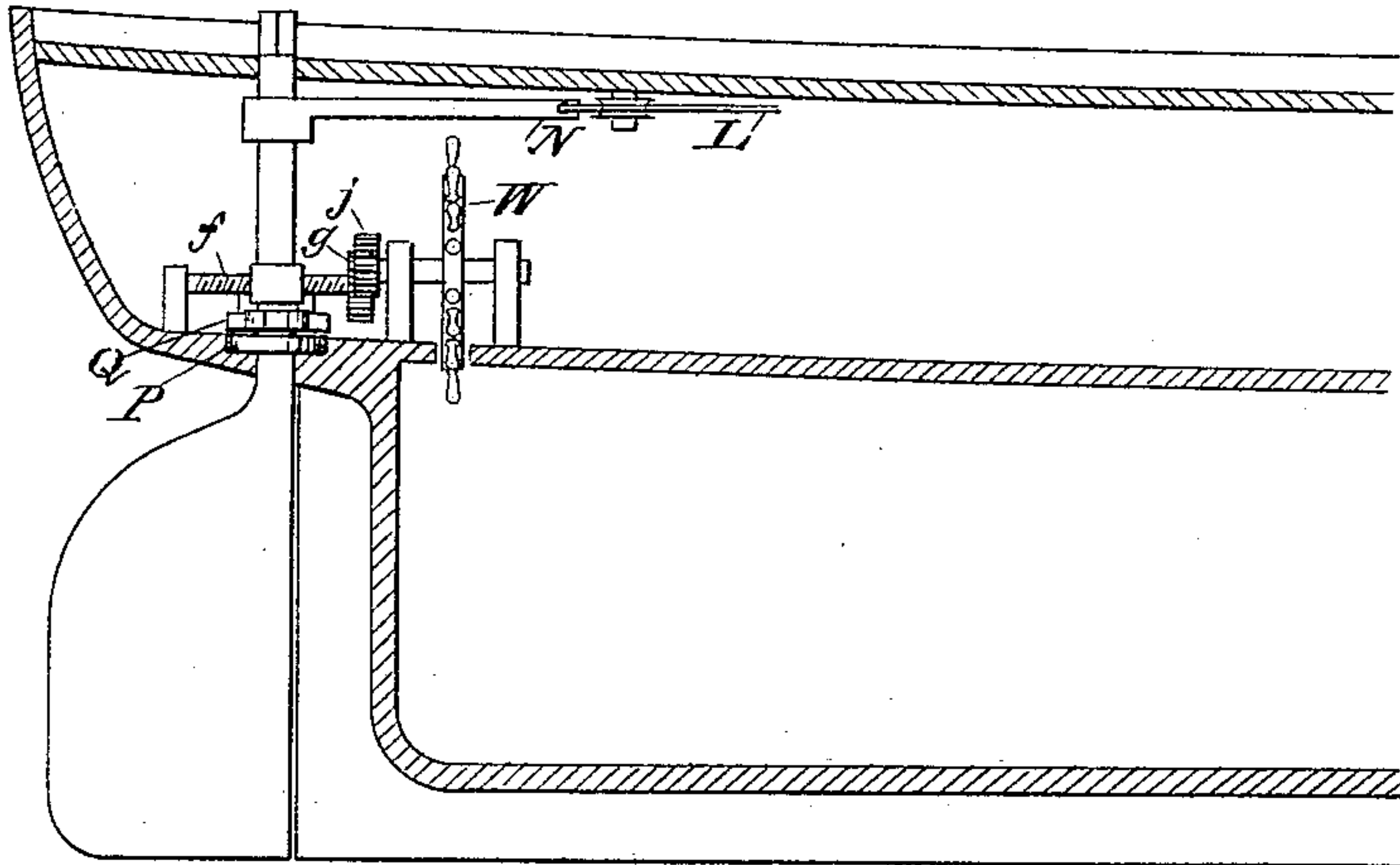
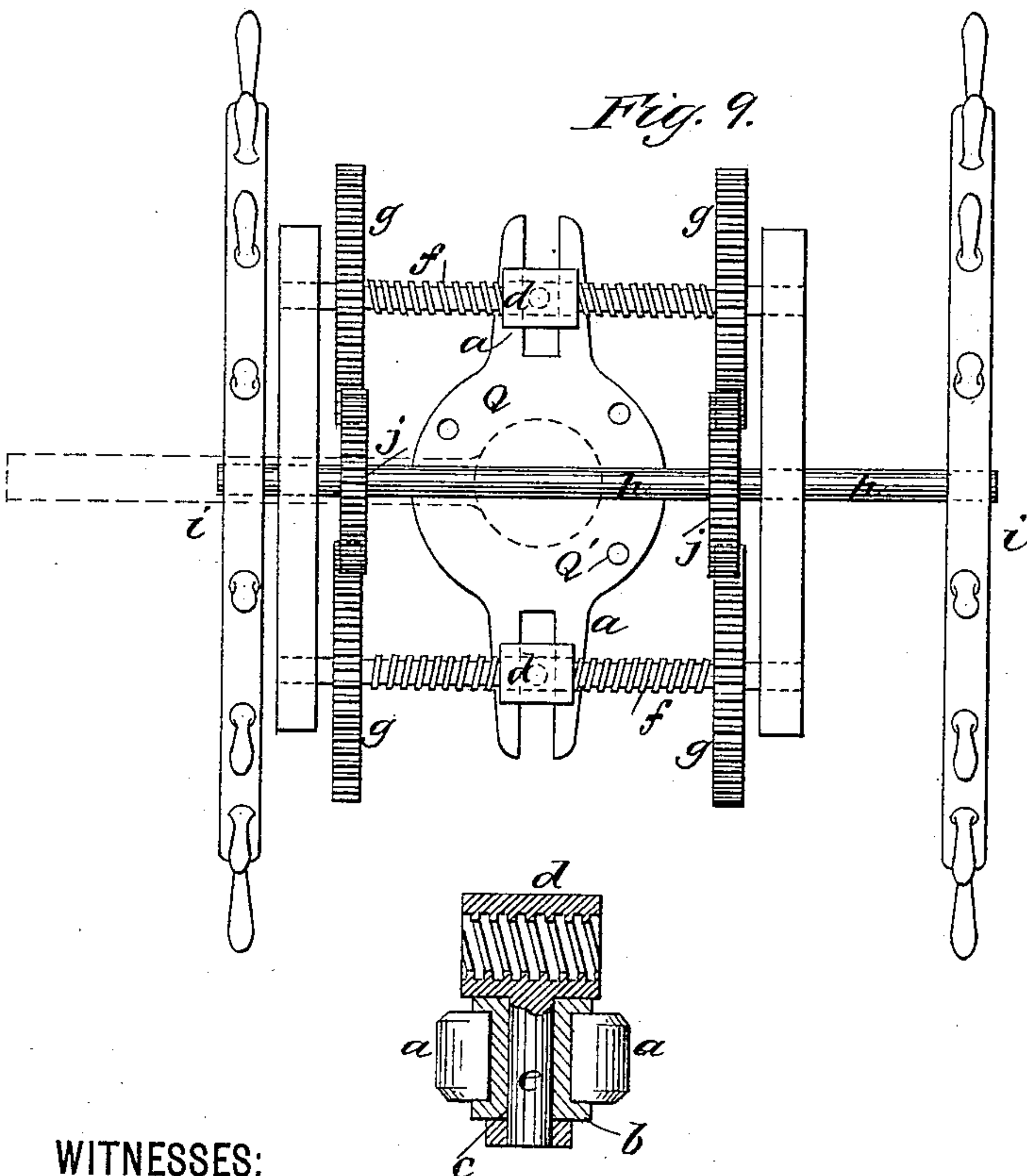


Fig. 9.



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UNITED STATES PATENT OFFICE.

WILLIAM WHITEHEAD, OF NEW YORK, N. Y.

STEERING MECHANISM FOR VESSELS.

SPECIFICATION forming part of Letters Patent No. 379,840, dated March 20, 1888.

Application filed September 5, 1887. Serial No. 248,777. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WHITEHEAD, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improved Steering Mechanism for Vessels, of which the following is a specification.

The steering of modern vessels, especially those of large size, is usually effected by power emanating from suitably-located engines operated by steam, compressed air, &c., which are connected, through the medium of chains, rods, or equivalent devices, with the tiller or segment-arc, or equivalent device, attached, directly or indirectly, to the rudder-post, and it is essential that there should be appliances provided whereby the vessel may be steered by hand in case the power-steering devices become inoperative; and as such interchangeable apparatus has heretofore been constructed they have required considerable time to disconnect the power apparatus and to connect the hand steering mechanism, and since the exigencies of the occasion usually require complete and continuous control of the rudder the time consumed in effecting the change from the power to the hand steering mechanism has been such as frequently to imperil the vessel, if not actually resulting in disaster.

My invention obviates the foregoing defects and affords means whereby hand steering mechanism and power steering mechanism are always in place in proper relation to the rudder, or to the mechanism immediately connected with the rudder, both systems of mechanism being independent of each other, and yet adapted for almost instantaneous connection and disconnection in the event of derangement or fracture of either system.

In the drawings the same reference-letters refer to the same parts in all the figures.

Figure 1 illustrates a top view of a vessel, showing the position of the steering-chains and the coacting parts of my invention. Fig. 2 illustrates a vertical section of the vessel shown in Fig. 1. Fig. 3 illustrates a side view, partly in section, of the invention. Fig. 4 illustrates a vertical section of the mechanism employed to connect the hand steering mechanism with the steering-shaft. Figs. 5

and 6 are detail views of the upper and lower plate employed to connect the hand steering mechanism to the steering-shaft. Fig. 7 illustrates an enlarged view of the clutch mechanism employed to connect the power steering-lever to the steering-shaft, as seen from above. Fig. 8 illustrates the hand steering mechanism as applied directly to the rudder-post. Fig. 9 illustrates a modified form of hand steering mechanism adapted to very large vessels.

A is the pilot-house, preferably located forward on an upper deck, as usual.

B is a vertical shaft supported in suitable bearings, CC, in the upper deck and the deck below. It is not essential, however, that this shaft should extend from deck to deck. Any suitable support for the foot of the shaft and the other contiguous parts may be provided between the decks.

D is an arm collared loosely at its hub D' to the shaft B, so that when not clutched to the shaft, as hereinafter explained, it has free rotary movement thereon. The power steering mechanism is attached to the end of this arm D, as usual.

E is a clutch, which may be of any desired construction. It is supported on a bifurcated shipper-bar, F, by means of pins F', which project from the bifurcated arms of the shipper-bar, one on each side, and preferably opposite each other, and they enter and slide through a groove, F'', made in the periphery of the clutch. The fulcrumed end of the shipper-bar is pivoted preferably to uprights G. A rod, H, is attached to the other end of the shipper-bar, which extends upwardly, passing through the upper deck and entering the pilot-house. Its upper end is threaded with a thread having considerable pitch, so as to be quick.

I is a hand-wheel having a threaded hole in its hub, which receives the threaded end of the rod H. The hand-wheel is supported on a bracket, J, or equivalent support.

K is another arm, which is keyed fast to the shaft B. It may project therefrom in the opposite direction to the arm D, as shown, or in the same direction, as preferred. The movement of the rudder will, however, be changed, depending on the position of this keyed arm. The steering chains or rods L L are attached

to the end of the arm K and extend thence over sheaves M M M M and connect with the tiller N, as usual.

O are turn-buckles for taking up the slack of the chains or rods L.

P is a horizontal circular plate keyed to the head of the shaft B. It is provided with a series of holes, P', near its edge.

Q is a corresponding circular plate turning loosely on the upper end of the shaft B. It is held in position by an upwardly-extending portion, R, of the shaft B, which is threaded and provided with a nut, S, which holds the plate Q down upon the plate P, not rigidly, however, but allowing rotary movement of the plate Q on the part R as its axis. Any other suitable means for holding the plate Q in position may be employed instead of those stated. The plate Q is provided with a number of holes, Q'. They are located the same distance radially from the center of the shaft B as are the holes in the plate P. There may be as many holes through the plate Q as desired. I show three in the drawings, and I prefer to space them irregularly, as shown, so that some one of them will be coincident or practically coincident with one of the holes in the plate P at all times. This irregular spacing, however, is not at all essential, because the movement of the rudder will almost always speedily slide the plates past each other, so that the holes therein will coincide and the pins may be inserted.

T are pins, which, passing through the holes in the two plates, lock them together against rotary motion. One or more of them may be used, depending on the number of holes in the upper plate, Q, and their coincidence with the holes in the plate P. The upper plate, Q, is provided with cogs R' on its upper surface, near the edge thereof, into which mesh the cogs on a pinion, U, which is attached to the shaft V of an ordinary hand steering-wheel, W, which is likewise within the pilot-house. The holes in the plates P and Q are located sufficiently far from the edge of the plate Q that the pins T will not interfere with the cogs on the plate Q.

The method of operation is as follows: Assuming that the power steering mechanism is in operation, the clutch E is of course in engagement with the hub D' of the arm D, the wheel I having been run up on the threaded end of the rod H, and the pins T are withdrawn from the holes in the plates P and Q, thus disconnecting them and leaving the post B free to be moved by the power steering mechanism, as desired, without conveying motion to the hand steering-wheel or its coacting parts or to the upper plate, Q. If, now, any accident occurs to the power steering mechanism, or if for any cause it becomes inoperative, the hand-wheel I is revolved in such manner as to lift the rod H through the medium of the threads on its upper end. This act lifts the clutch E from engagement with the hub D' and disengages the arm D from the shaft B.

At the same time that the hand-wheel I is being operated the hand steering-wheel W is slightly turned, which act turns the plate Q and brings one or more of the holes Q' coincident with the holes P' in the plate P. The pins T, one or more of them, as the case may be, are then passed through the holes Q' P', thus locking these plates together. When this is done, the hand steering-wheel is engaged with the shaft B, and the vessel may be steered with it without moving the power steering-arm D. It will usually not be necessary to turn the hand steering-wheel to bring the holes in the plates P and Q coincident, because the motion of the rudder will suffice for this purpose. The disconnection of the power steering apparatus and the connection of the hand steering apparatus, both being done simultaneously, take but a moment.

The construction and arrangement above described will ordinarily be found effective and reliable; but for additional safety, and especially on war vessels, where the tiller rods or chains L are apt to be destroyed by cannon-shot, &c., I provide a still further means whereby control of the vessel through her rudder may be maintained. It is illustrated in Fig. 8.

The power steering devices may be the same as illustrated in the other figures, and a hand steering mechanism may also be employed in the pilot-house, as described; but if a cannon-shot or any other agency should carry away or derange the rudder-chains L between the pilot-house and the rudder-post then both of the said steering mechanisms would be rendered useless. I therefore provide an additional hand steering mechanism, which I apply directly to the rudder-post proper, as seen in Fig. 8. It may be of the construction above described or of the construction shown in Fig. 9, or of any other preferred construction; and it may be placed between decks, as shown in Fig. 8, and attached to the rudder-post proper, between the upper edge of the rudder and the cap of the rudder-post, or it may be placed on the upper deck directly on the cap of the rudder-post. In war vessels I prefer it to be placed where the men at the wheel will be protected, as, for instance, between decks.

In Fig. 9 I illustrate a modified construction of the hand steering mechanism, which is especially adapted to very large vessels, since it exerts great power on the rudder.

The plates P and Q may be the same substantially as the like plates illustrated in the other figures, and they may be provided with the holes P' and Q', and with the pins T, all as above described. The plate Q, however, in this construction is provided with rigid laterally-extending bifurcated arms *a a*, which receive blocks *b b*. The inside vertical edges of the bifurcated arms are planed off to act as slides, and the blocks *b b* are planed to match. The blocks are bored vertically, as at *c*.

d d are horizontally-threaded blocks provided with a downwardly-extending cylindri-

cal stem, *e*, which enters the holes in the slide-blocks *b b*.

f f are threaded shafts journaled in the frame of the wheel at their ends, the thread on one being right-handed and on the other left-handed. They mesh into the corresponding threads in the blocks *d d*. The shafts *f f* are provided with pinions *g g g g* at their respective ends, which are keyed fast to the shafts *f f*. *h* is the main shaft. It is journaled in the frame of the wheel, as shown, and has one, two, or more hand-wheels, *i i*, keyed to it, two are shown in the drawings; and there are also two pinions, *j j*, keyed to the shaft *h*, which mesh into the pinions *g g g g*, as shown.

The operation of this form of steering-wheel is as follows: The connection with the rudder-post, or with the post *B*, as the case may be, is made by means of the pins *T* entering the holes *P'* and *Q'*, as before stated. The turning of the hand-wheel rotates the shaft *h* and pinions *j*, which, acting through the pinions *g g g g*, turn the threaded shafts *f f*, which cause the correspondingly-threaded blocks *d d* to move toward opposite ends of the shafts *f f*, thus turning the plate *Q* on its axis, the slide-blocks *b* moving in and out through the bifurcated arms *a a* as the plate *Q* turns. The plate *Q* being pinned to the plate *P*, of course the rudder is correspondingly turned.

I do not limit myself to the details of construction shown. Many alterations may be made therein and still my invention be employed—as, for example, segment-arcs may be employed in place of the arms *D* and *K*. The hand steering-wheel may be engaged with the plate *Q* in any other suitable manner than that shown, and the two plates *P* and *Q* may be engaged and disengaged by devices other than the pins *T*. I show and describe the devices as above for effecting these objects as efficient means simply for accomplishing the results desired, and in the claims hereof I intend to cover all such equivalent constructions.

Having described my invention, I claim—
1. The combination, in a steering apparatus, of a shaft having suitable connection with the rudder, and hand and power steering mechanisms, separate and distinct from each other, adapted to be interchangeably connected with or disconnected from said shaft in such manner that either the said hand or power mechanism may be operated independently of the other to steer the vessel, substantially as set forth.

2. The combination, in a steering mechanism, of a shaft, *B*, provided with a laterally-extending arm or lever, *K*, to which the steering-chains are attached, another arm or lever, *D*, having independent rotary movement relative to the said shaft to which the power steering apparatus is attached, a clutch adapted to clutch the said arm or lever to the shaft,

and hand steering mechanism provided with a plate, *Q*, set on the said shaft, but having independent rotary movement thereon, and provided with suitable devices whereby it may be rigidly attached to the shaft, substantially as set forth.

3. The combination of a shaft, *B*, having a laterally-extending lever, *K*, rigidly attached thereto, to which the tiller-chains are attached, and another laterally-extending lever, *D*, loosely collared to the shaft to which the power steering mechanism is attached, a clutch or its equivalent operated from the pilot-house, whereby the said last-named lever may be rigidly clamped to the shaft, and hand steering mechanism detachably attached to said shaft *B*, substantially as set forth.

4. The combination of a hand steering-wheel mounted on an independent shaft provided with a fixed pinion which meshes into a gear-wheel on the steering-shaft and having free rotation thereon, a plate rigidly attached to the steering-shaft, pins constructed and arranged to enter holes in said gear-wheel and in said plate, whereby the said gear-wheel may be clamped to the plate on the steering-shaft, and rudder-chains connecting the said shaft with the rudder, substantially as set forth.

5. In a vessel steered by steam, pneumatic, or hydraulic power, supplemental hand steering mechanism consisting of a hand-wheel, the shaft of which carries a pinion which engages with teeth on a loosely turning plate, *Q*, attached to the upper end of the steering-shaft, another plate, *P*, keyed fast to the steering-shaft, and pins *T*, adapted to enter holes in the plates *Q* and *P*, for uniting the said plates, substantially as set forth.

6. The combination of power steering mechanism and hand steering mechanism independently and detachably connected and disconnected from the tiller chains or rods, and supplemental hand steering mechanism detachably attached directly to the rudder-post, substantially as set forth.

7. The combination of a hand steering-wheel mounted on a shaft provided with a pinion which meshes into a gear-wheel on the rudder-post and having free rotation thereon, a plate rigidly attached to the rudder-post, and pins which pass through holes made in said plate and in said gear-wheel, whereby the said gear-wheel may be detachably attached to the said plate, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 2d day of September, A. D. 1887.

WILLIAM WHITEHEAD.

Witnesses:

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GERRARD IRVINE WHITEHEAD.