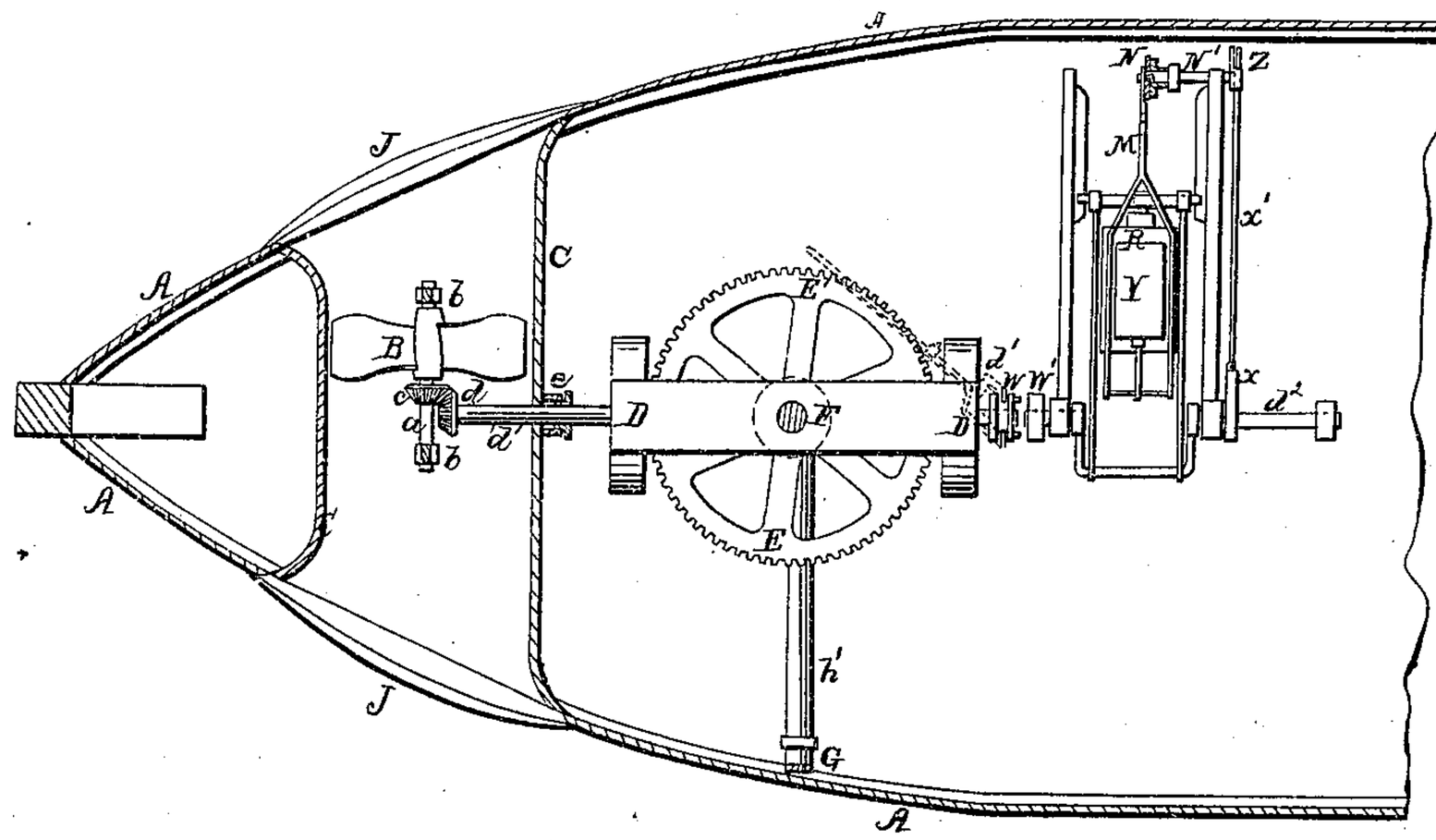
Sheet 1. 2 Sheets.

R. Creuzbaur.

Steering.

No. 64,846. Patented May 21, 1867.

Fig: 1:



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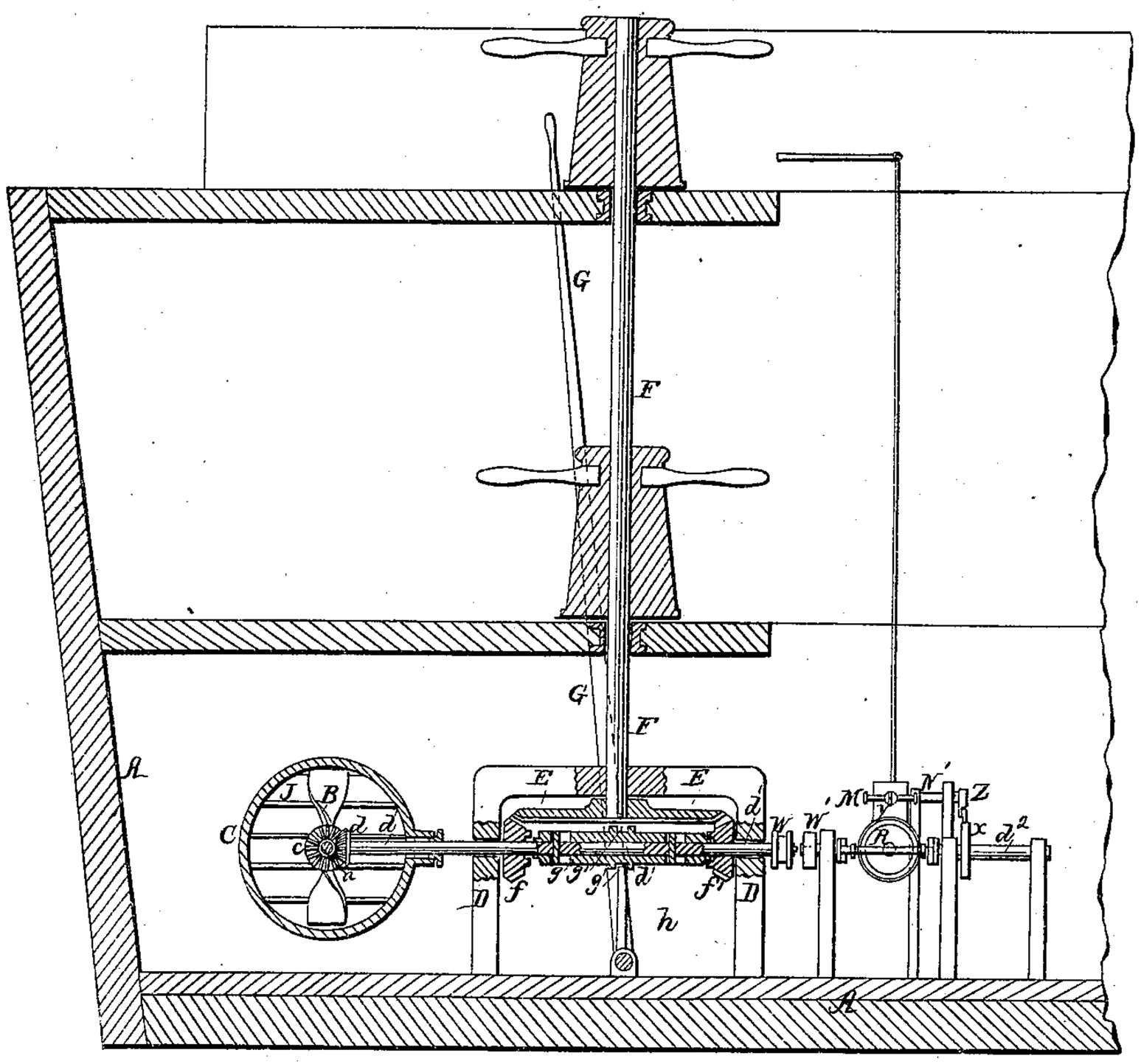

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R. Creuzbaur.

Sheet 2. 2 Sheets.

Steering.

No. 64,846. Patented May. 21, 1867.

Fig: 6:

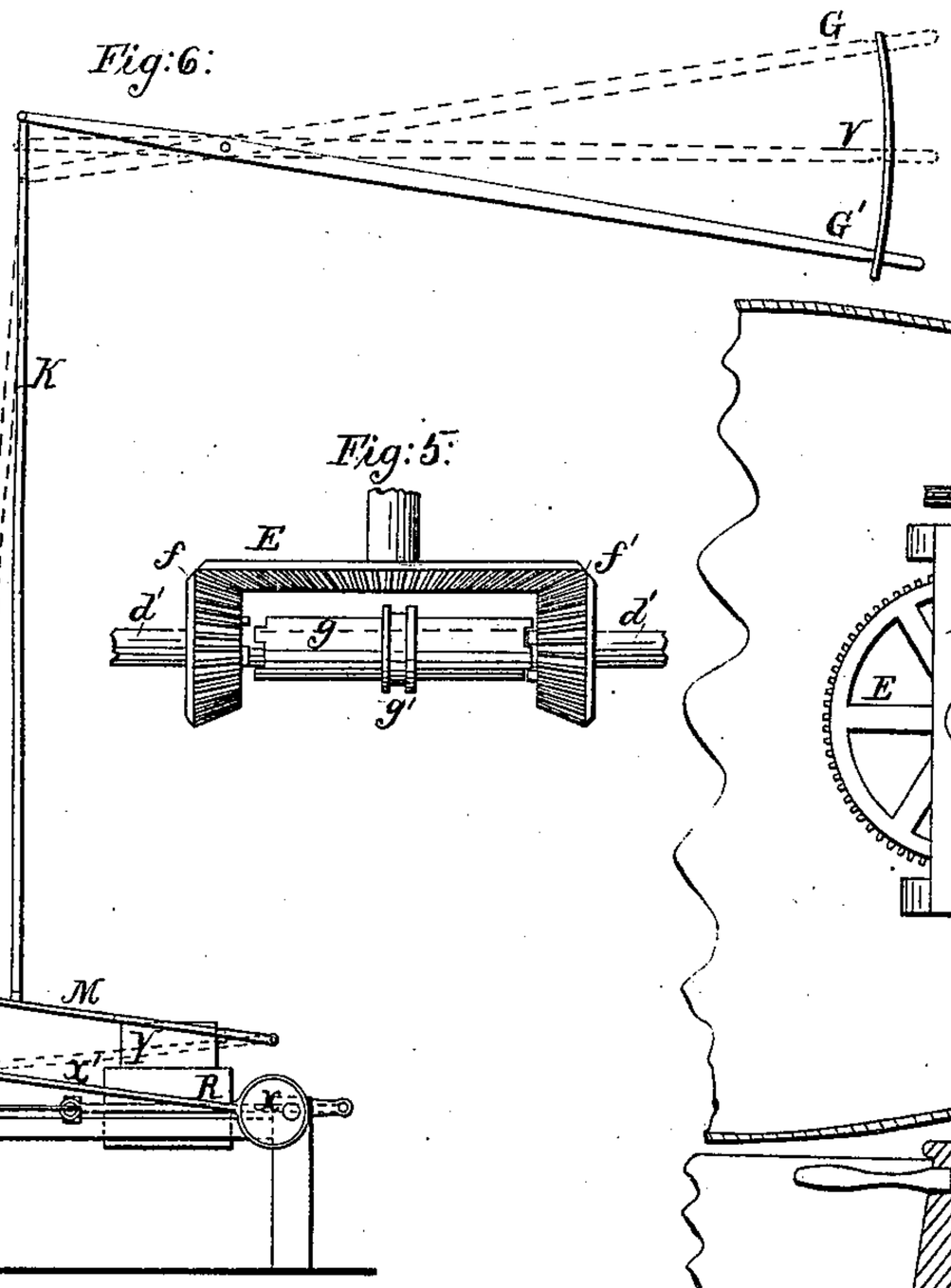


Fig: 5:

Fig: 3:

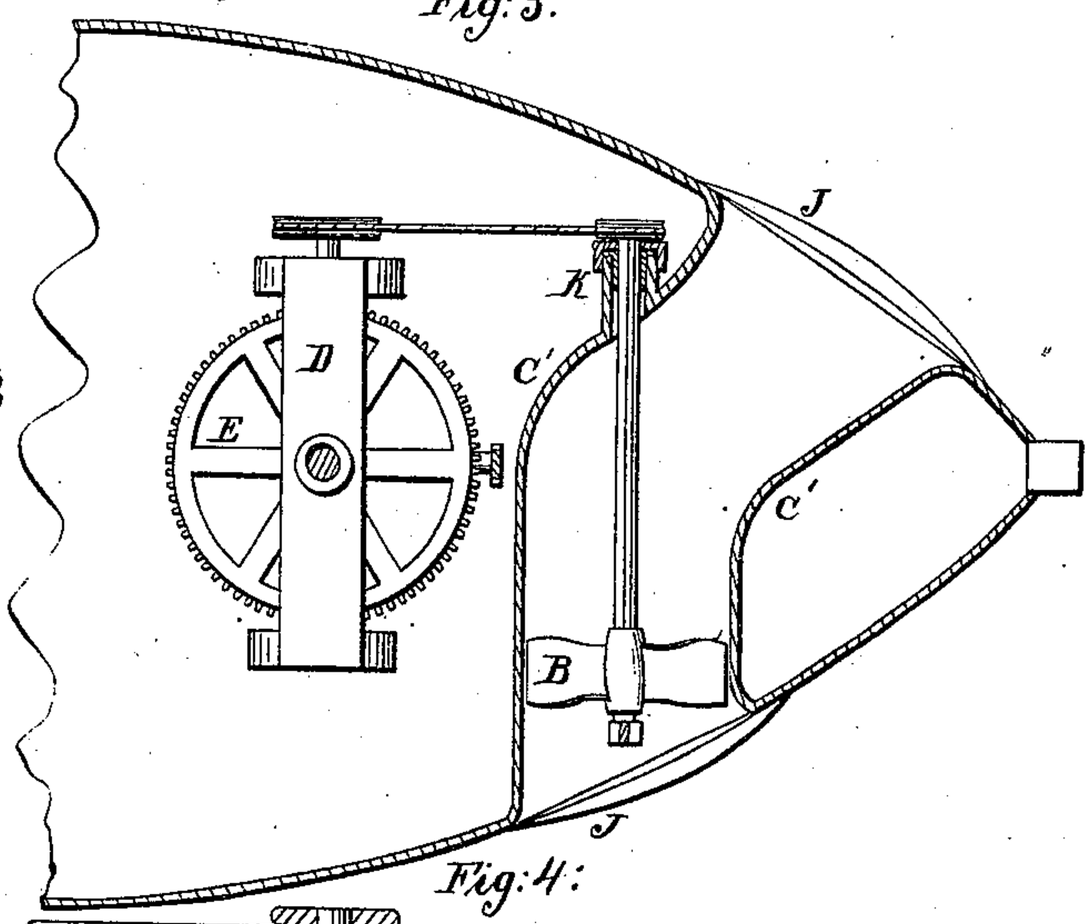


Fig: 7:

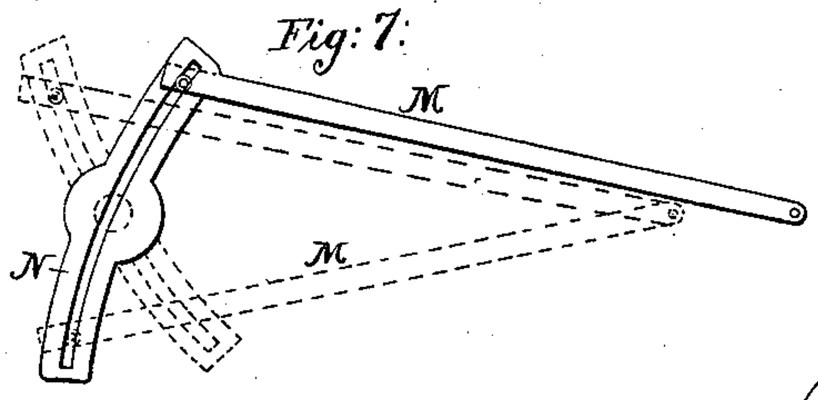
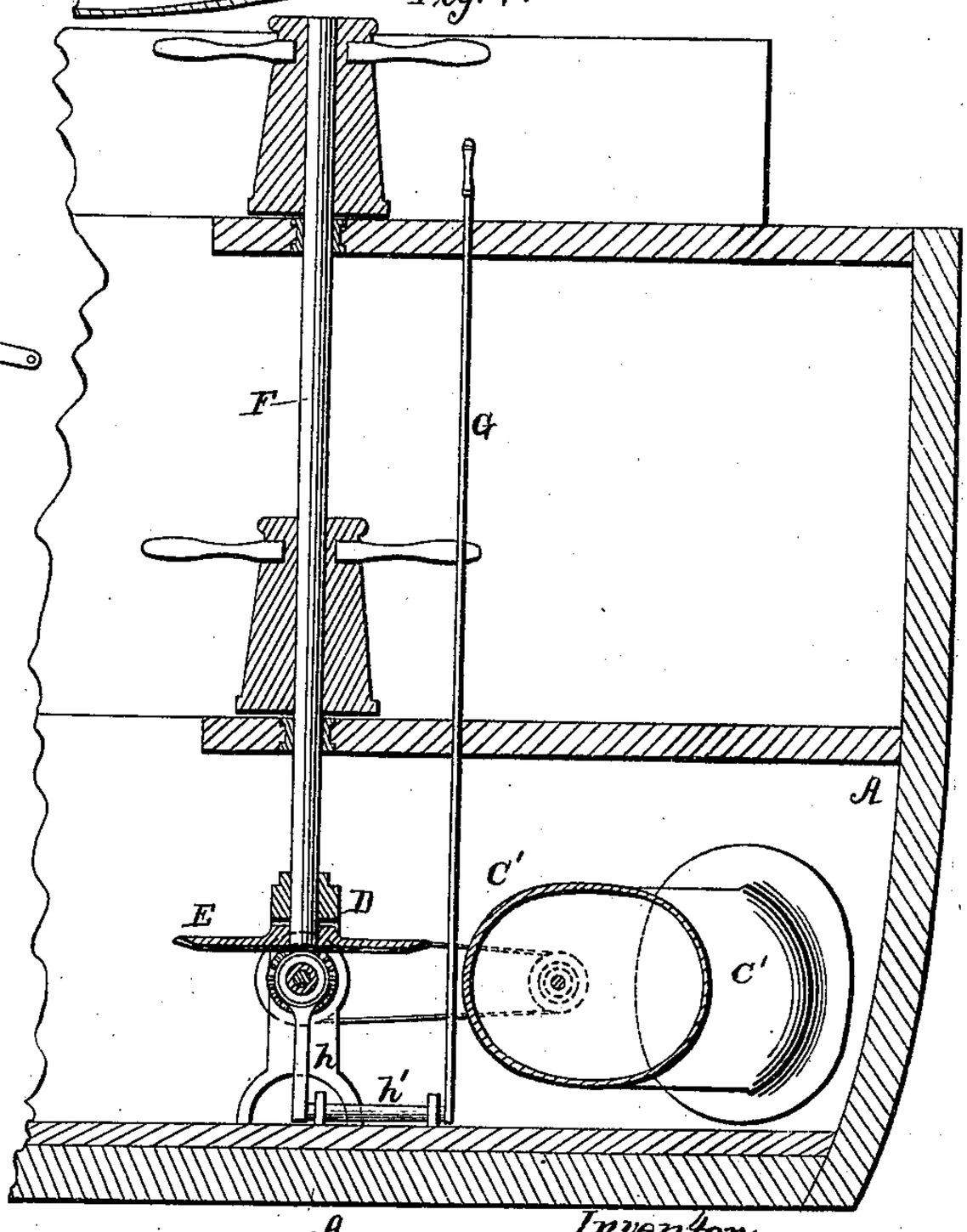
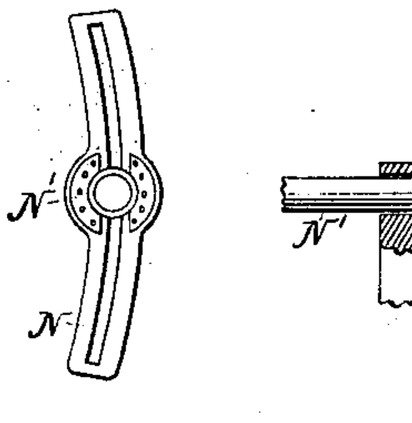
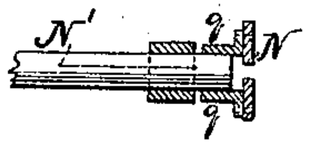


Fig: 4:







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United States Patent Office.

ROBERT CREUZBAUR, OF NEW YORK, N. Y.

Letters Patent No. 64,846, *dated May* 21, 1867.

IMPROVED MEANS FOR STEERING VESSELS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, ROBERT CREUZBAUR, of the city and county of New York, in the State of New York, have invented an improved Mode of operating Screws which are arranged in Transverse Pipes for Steering Vessels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a horizontal section of the stern of a vessel, showing my improved mode of operating a steering-screw.

Figure 2 is a vertical central section through the stern of a vessel, showing an elevation of the same parts.

Figure 3 shows a steering-screw applied within a curved pipe or water-way.

Figure 4 is a longitudinal section taken in a vertical plane through the centre of fig. 3.

Figure 5 is a side view of the bevel spur-wheels and their sliding clutch.

Figure 6 is a side elevation of the engine and its attachments.

Figure 7 shows in detail the construction of the rocking-yoke N.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to an improved mode of operating screws which are arranged in water-ways or pipes that pass transversely through the hulls of vessels.

Previous to my invention screws have been thus arranged within water-ways, which extend transversely through the hulls of vessels, so as to act and react upon the water in a direction which is transverse or oblique to the length of the keel, thereby admitting of a vessel being turned, whether under headway or lying at rest. But in connection with screws thus arranged no practical mode has ever been devised for enabling the pilot to manœuvre his vessel speedily and with ease.

My improvement not only provides for a ready and easy mode by which the pilot can control through an engine the vessel, if a steam vessel, with facility, directly from his station at the pilot-house, without any intervening action of an engineer, but it furthermore provides for propelling such screw by the crew through the capstan when the steam power is crippled, or when, in a sail vessel, the want of headway renders a common rudder useless, and in such manner that while the crew continuously work the capstan in one direction the pilot can start, reverse, and stop the screw instantaneously at pleasure, and thus keep a vessel's head to sea after all headway is lost, which must effectually prevent the foundering of a vessel by reason of falling into the trough of the sea. And in a steam vessel these two powers are so connected that either can be used, and the other applied in its stead instantaneously.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation with references to the accompanying drawings.

In the drawings I have represented a steering-screw, B, applied within a pipe, C, which is straight, and terminated in flaring ends, and which passes transversely through the hull A of a vessel, at right angles to the keel thereof. Also a steering-screw, which is applied to a curved pipe, C′. Either one of these forms of pipes may be employed, whichever may be deemed most desirable. The pipes C C′ may be made of any required diameter, but for a vessel of one thousand tons burden such pipes may be about two and a half feet in diameter for receiving a screw, the blades of which are allowed to turn freely in them. The screw B is applied to a transverse shaft, *a*, which has its bearings in two cross-pieces, *b b*, which extend diametrically across the pipe C, and are suitably secured within this pipe as shown in fig. 1. On the shaft *a* a bevel spur-wheel, *c*, is keyed in a suitable position to engage with a corresponding wheel *d*, which is keyed to a longitudinal shaft, d^1, that passes through a stuffing-box, *e*, applied to the pipe C. This shaft d^1 has its bearings in a frame, D, and between the standards of the latter two pinion spur-wheels *f f′* are applied loosely on this shaft d^1, which engage with the teeth of a large bevel-wheel E, and are both rotated by means of this large wheel. Between the pinions *f f′* a tubular clutch, *g*, is applied on the shaft d^2, so as to turn with it, and also to move in a direction with its length. This clutch *g* has teeth on its ends, which are adapted for entering recesses formed in the pinions *f f′*, and engaging one or the other of these pinions with the shaft d^1. The clutch *g* has a grooved collar, *g′*, formed on it for receiving a yoke which is on the upper end of a vibrating arm, *h*, that is fastened to a rock-shaft, *h′*. This rock-shaft *h′* is oscillated by means of a long lever, G, which extends up through the decks of

the vessel, as shown in figs. 2 and 4, so that it can be operated from either deck, or down in the hold. Or this shipping motion is carried to the pilot-house, or to any other desired point, by means of connecting-rods or chains, or in any suitable manner. The object of the lever G is to move the clutch *g*, and engage it with one or the other of the bevel spur-wheels *f f'*, and thus engage either one of these wheels with the shaft d^1 at the pleasure of the pilot, according to the direction in which it is desired to have the steering-screw turn. When it is not desired to turn the steering-screw B, or when the motion of the pinion spur-wheels *f f'* is not to be communicated to their shaft d^1, (the wheel E being continuously moved by the crew in one direction,) the clutch *g* is moved to a central position, in which it does not engage with either one of the pinions *f f'*. The large spur-wheel E is keyed on the lower end of a vertical shaft, F, which passes up through the decks, and on each deck a capstan is applied to it, by means of which this shaft, together with the large spur-wheel E, is turned by the crew, from either deck, continuously in the same direction. By this arrangement it will be seen that while the main driving-shaft F is rotated continuously in one direction, the pilot can communicate a right or left motion to the screw B, or he can stop and start this screw at pleasure. The pilot can in this manner and by these means manœuvre his vessel as he pleases, without expending much labor, and without requiring the crew tor everse their movement at every change required in the motion of the screw.

I have described one mode of communicating motion to the steering-screw by manual power. I will now describe a mode whereby the steering-screw can be operated by a steam or other engine, and started, stopped, or reversed by the pilot whilst at his station in the pilot-house. In steam vessels it is contemplated to employ steam for turning the screw; and when, in case of a storm, the fires are put out beneath the boilers, and the engines are rendered inoperative, I shall use manual power, as above described, for turning the screw. To effect this object, I extend the shaft d^1, and apply on its end a clutch-head, W, which is adapted for engaging at suitable times with a head, W', which is on the coinciding crank-shaft d^2, so that these two shafts can be coupled together or disconnected at pleasure by moving a clutch-lever, which is shown in dotted lines in fig. 1. The lever G', figs. 2 and 6, is made to communicate, by rod K, with the connecting-rod M, which moves the slide-valve of the steam-chest Y. The end of this connecting-rod M slides freely up and down in the rocking-yoke N; this yoke is fast on the rocking-shaft N', which is moved by the eccentric X by means of its rod X' and the crank Z. The rod K, which is attached at one end to and moved by lever G', is pivoted to the connecting-rod M at the other end near the yoke N. When the rod M is at the upper end of the yoke N, the engine and screw move in a contrary direction to that which it receives when the rod M is in the lower end of the yoke. And when rod M is in the centre of the yoke N, the slide-valve in the steam-chest will receive no motion, and hence the screw B and its shaft d^1 will not be rotated. The steam-chest remains in full communication with the steam in the main boiler of the ship at all times. By this simple arrangement it will be seen that the pilot is enabled to start, stop, or reverse the motion of the screw by simply moving the handle G' into the proper one of the three corresponding notches in guard V. There may be other intermediate notches or fastenings in said guard V, in which the engine would have more or less speed. When two driving-cylinders are used, the lever G' is connected to the slide-valves, or their substitutes, of both cylinders in the same or in a similar manner to that described. Additional rods and links may be necessary between the handle G' at the pilot's station, and the rocking-yoke N and connecting-rod M, according to the relative position of the engine and pilot station, which may occasion more or less angles to be turned; or the motion of the handle G' may be transmitted through ropes, or through a combination of rods, levers, and ropes. When the two shafts d^1 d^2 are coupled together and the engine is in operation, the sliding-clutch *g* should be disengaged from both pinions *f f'*; otherwise the shaft F will be rotated, which is not necessary.

In figs. 3 and 4 I have represented a mode of transmitting motion to the steering-screw, wherein the parts are accessible for oiling and repairing. By curving one side or end of the pipe C', one end of the shaft of the screw is supported within this pipe, and the other end is supported in a stuffing-box bearing, K, by passing said shaft through the elbow of the pipe, as shown in fig. 3. If both journals of the screw-shaft are required to be accessible, then both ends of the pipe or water-way C' should be curved.

When repairs are necessary and a dry-dock is not convenient, water-tight caps are placed over the ends of the pipe containing the steering-screw, or an internal gate may be arranged on each side of the screw for this purpose. The water is then pumped out of the pipe, after which the pipe can be entered by means of a man-hole provided for the purpose.

In order to exclude objects from the interior of the pipe or water-way containing the screw, fenders or gratings J are applied to the open ends thereof, and constructed so as not to materially obstruct the passage of water through the pipe when the screw is rotated. The pipes or water-ways are constructed with outwardly flaring ends, for the purpose of facilitating the influx and discharge of water.

The effect of a screw thus arranged is to draw water away from that side of the vessel toward which its stern is moved, and thus decrease the pressure on such side. At the same time the screw will deliver the water on the opposite side of the vessel, and thereby increase the pressure on this side. The screw will also have the benefit of the thrust or impact upon the water, as any screw-propeller. Hence it will be seen that a very small screw and pipe or water-way will be sufficient to turn a large vessel, requiring the expenditure of a very small amount of power as compared to the power which is consumed by screw-popellers placed as usually at the stern of a vessel with their axes of motion parallel with the keel. A common rudder can be used as usual for ordinary sailing, reserving the screw-steering apparatus for difficult manœuvering, and for use in storms; or the steering-screw may entirely supersede the use of the common rudder, as may be desired.

I am aware that it is not new to use a screw within a pipe extending transversely through the hull of a vessel for the purpose of steering the same; nor is it new to apply a steering-screw within a curved pipe passing through a vessel's hull, and therefore I do not wish to be considered as making claim to such a device for

steering vessels My invention, to repeat, relates to a mode of enabling the pilot to manœuvre his vessel with such a screw, when it receives its motive power from an engine, with facility and directly from his station, without the intervention of an engineer, and without the co-action of any other person. And it furthermore relates to a mode for driving the screw by manual power in case steam should fail; or if not a steam vessel, when the sails are carried away in a storm, or otherwise rendered useless, under which circumstances the pilot controls the screw in the same complete manner without the co-action of others as to changing its motion; the means consisting in having the vertical driving-shaft F revolved in one direction by the crew, while the pilot can give a right and left rotary motion to the screw, or stop the motion thereof at pleasure, as here above fully described.

It would be impossible to steer a ship by the screw, if the crew turning the capstan-shaft must be stopped and their course reversed in order to reverse the motion of the screw. It is well known that steering must be done at the precise time, particularly in a storm, under excitement and noise, when it would be impracticable for a pilot to control a crew sufficiently for the safety of a ship. Hence I provide for controlling the action of the steam power by reversing it through the agency of the pilot, and for reversing the gearing upon which the manual power operates when the steam fails. Steam is an agent which can be managed, hence its power may be reversed; but an excited crew becomes unmanageable, and therefore it is impracticable to reverse them.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with a steering-screw, or its equivalent, arranged within a pipe or water-way extending transversely through the hull of a vessel, I claim a means which will enable the pilot to give a right and left motion to the said screw, or to stop or start it at pleasure, without stopping or reversing the motion of the driving power, substantially as described.

2. The combination of a steering-screw, or its equivalent, arranged within a water-way extending transversely across the hull of a vessel, with a means which will enable the pilot from the pilot-house to stop, start, and reverse the motion of an engine which is used for rotating said screw, substantially as described.

3. In combination with a steering-screw arranged to operate substantially as described, I claim the employment of an engine for rotating the screw, and a means for rotating the screw when the engine is inoperative, substantially as described.

4. Providing for disconnecting the capstan-shaft F from the screw-shaft d^1, when this latter shaft is connected to and driven by the engine shaft d^2, substantially as described.

5. The combination of the capstan or capstans upon shaft F with the gearing E f f', clutch g, lever G', shaft d^1, and with an extension d^2 of shaft d^1, clutch W W'. and a driving engine, substantially as described.

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