

(No Model.)

J. JOHANNSEN.
STEERING APPARATUS.

No. 550,046.

Patented Nov. 19, 1895.

Fig. 1.

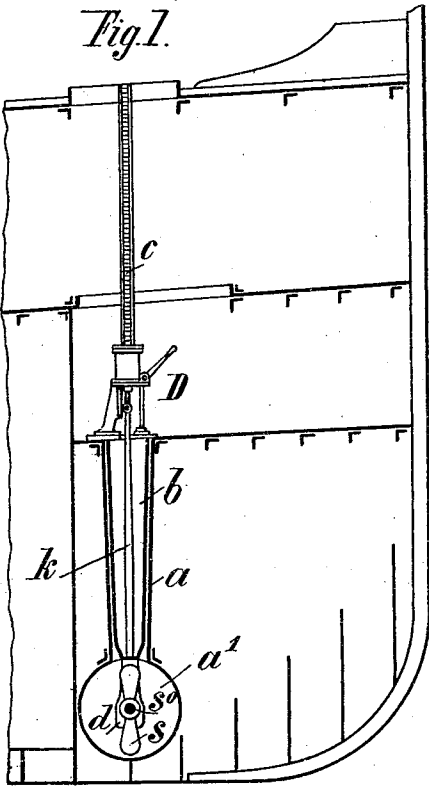


Fig. 2.

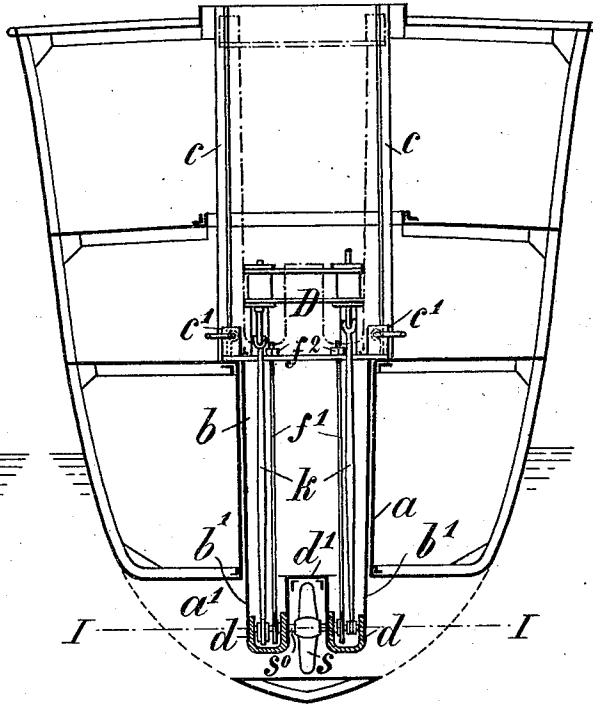


Fig. 3.

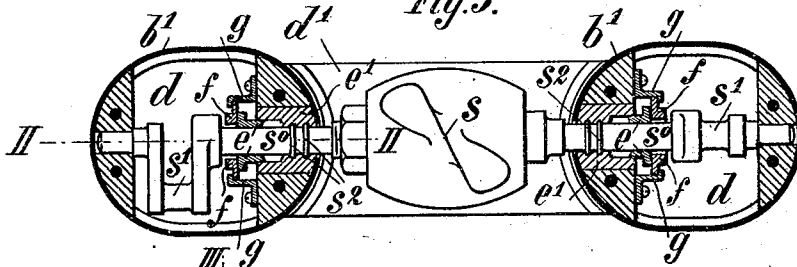


Fig. 4.

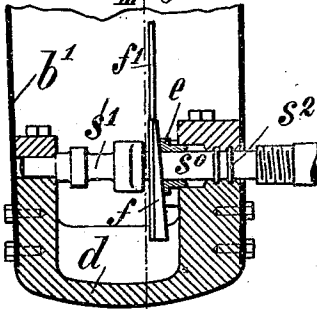
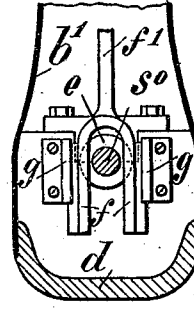


Fig. 5.



Witnesses:

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UNITED STATES PATENT OFFICE.

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STEERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 550,046, dated November 19, 1895.

Application filed July 6, 1895. Serial No. 555,144. (No model.)

To all whom it may concern:

Be it known that I, JOACHIM JOHANNSEN, a subject of the German Emperor, and a resident of Lübeck, in the Empire of Germany, have invented certain new and useful Improvements in Steering Apparatus, of which the following is a specification.

My invention relates to improvements in steering apparatus in which transverse steering-propellers are used in order to assist the action of the ordinary steering device—that is to say, of the commonly-used helm—and to increase thereby the steerage of the ship; and it consists in certain features of construction and combinations of such features of construction which will be described in full in the specification, and will be more particularly indicated in the statement of the claims.

Referring to the accompanying sheet of drawings, in which similar letters refer to similar parts throughout the several views, Figures 1 and 2 are vertical sections at right angles through the fore-body or bow of a ship provided with my improved steering apparatus, showing the latter in a side and front elevation, respectively. Fig. 3 is a horizontal section on the line I I, Fig. 2, showing on an enlarged scale a bottom view, partly in section, of the steering-propeller and its crank-shaft and the bearings for the latter. Fig. 4 is a vertical section on the line II II, Fig. 3, and Fig. 5 a transverse section on the line III III, Fig. 4.

The marine vessel is provided in its fore-body near the bow with a vertically downward-extending well *a* and a transverse opening or passage *a'*, both being in communication with each other. In the well *a* there is arranged a casing *b*, containing the steering apparatus, and capable of being lifted or lowered in the said well by means of suitable racks and pinions *c c'*. From the bottom plate *d'* of the movable casing *b* project two hollow arms or brackets *b'*, the lower ends of which are closed by means of channel or U-shaped caps *d*, securely fixed to the tubular arms *b'*—that is to say, the lower closed end of the casing is bifurcated and the legs *b'* are provided with bearings for the steering-propeller shaft, the inner or proximate bearings being constructed to exclude water from the interior of the casing, as will appear herein-

after. The crank-shaft *s*⁰, carrying the steering propeller *s*, is journaled in the sides of the said caps *d* and tubular arms *b'*, so that the steering-propeller *s* is placed between the said arms *b'* and beneath the bottom plate *d'* of the casing *b*, and may be lifted and lowered together with this casing *b*. Motion is imparted to the propeller *s* from a suitable motor *D* by means of connecting-rods *k* attached to the cranks *s'* of the shaft *s*⁰, the cranks *s'* being within the hollow arms *b'* and their caps *d*.

For using the steering apparatus the casing *b* needs to be descended in the well *a*, so that the arms *b'* *d* and the propeller *s* project into the transverse water channel or passage *a'*, as shown by Figs. 1 and 2, whereupon the motor *D* is put in motion in order to revolve the propeller *s* in the desired direction. It is evident that the propeller *s*, according to the direction in which it revolves, will act upon the water within the transverse passage *a'* in one or the other direction and cause the bow of the vessel to fall off to starboard or to port accordingly, assisting thereby the action of the helm. When not in use, this auxiliary steering apparatus may be lifted or hoisted in the well *a*.

Suitable thrust-collars *s*² on the shaft *s*⁰ prevent the latter from being displaced in its longitudinal direction, and stuffing-boxes *e e'*, in connection with the inner journal-bearings *e' e'*, being provided to protect the interior of the hollow arms *b* against leakage. In order to enable the adjustment of the stuffing-boxes *e e'* from the interior of the vessel the following means are provided: *f f'* are bifurcated rods, the wedge-shaped prongs *f* of which are adapted to embrace the shaft *s*⁰ and to act upon the gland of the stuffing-boxes *e e'*, as shown by Figs. 4 and 5, and are for this reason vertically guided by suitable guide-pieces *g* attached to that side of the caps *d*, Fig. 5, constituting the thrust-bearings of screw-shaft *s*⁰. The described fork-heads may be operated by means of suitable nuts *f*², screwed on the threaded upper ends of the bars or rods *f'*, Fig. 2. When such a fork-bar *f' f* is drawn upward with the aid of the corresponding screw-nut *f*², the wedge-shaped fork-heads *f* slide along on the similarly-inclined surface of the gland or cover *e*, Fig. 4, pressing there-

by the latter at the time more or less into the stuffing-box, as it may be desired.

In most cases it will be advantageous to give the arms *b'* and caps *d* an elliptic or turtle-shaped form, (see cross-section, Fig. 3,) as this form is most adapted to overcome the resistance and pressure of the water entering into the transverse channel *a'*.

I am aware that prior to my invention steering apparatus have been made with transverse-acting steering-propellers. I therefore do not claim such an apparatus broadly; but

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

1. The combination with a vessel provided with a vertical well and with a transverse open-ended passage intersecting the lower end of said well; of a steering shaft, a steering propeller secured to said shaft, mechanism for lowering the steering shaft into and lifting it out of the aforesaid transverse passage, and a motor for revolving the shaft, substantially as and for the purpose set forth.

2. The combination with a vessel provided with a vertical well, a transverse passage intersecting the lower end of said well, a steering shaft, a steering propeller secured to said shaft, mechanism for lowering the shaft into and lifting it out of said transverse passage, and a motor connected with and adapted to revolve said shaft, said motor moving up and down with the steering shaft, for the purpose set forth.

3. The combination with a vessel provided with a vertical well and with a transverse open-ended passage intersecting the lower end of said well, a casing contained in the latter, said casing having its lower closed end bifurcated and provided with bearings; a steering shaft revoluble in said bearings; a steering propeller secured to the shaft between the legs of the bifurcated closed end of the casing mechanism for lowering and lifting the casing in its well, and a motor for revolving the steering shaft, for the purpose set forth.

4. The combination with a vessel provided with a vertical well and an open ended transverse passage intersecting the lower end of said well, a casing having its closed lower end bifurcated, bearings formed in the legs of the bifurcated portion, the inner or proximate bearings provided at their inner end with a stuffing box, and a stuffing box gland for said stuffing box; of a steering propeller shaft revoluble in said bearings, adjusting devices adapted to be operated from a point above

the well, said devices acting upon the stuffing box glands to move the same into their stuffing boxes when said adjusting devices are moved in a given direction, a lifting and lowering mechanism for the casing, and a motor for revolving the steering propeller shaft, substantially as and for the purpose set forth.

5. The combination with the legs *b'* of the casing *b*, bearings in said legs, the inner or proximate bearings provided with interior annular grooves and with a stuffing box at their inner end, and a stuffing box gland for said stuffing box; of a steering shaft revoluble in said bearings and provided with thrust collars fitting the grooves therein, and a steering propeller secured to the shaft between said legs *b'*, of fixed abutments and wedge-shaped bifurcated adjusting devices working against said abutments and upon the stuffing box glands, substantially as and for the purpose set forth.

6. In a steering-apparatus the combination of a casing (*b*) capable of being lifted in a vertical well (*a*) and lowered into a transverse channel (*a'*) of the vessel, of hollow arms (*b'*) projecting from the said casing and being closed at the bottom ends by means of caps (*d*) forming the bearings for a crank-shaft (*s⁰*), of a steering-propeller (*s*) fixed to the crank-shaft and arranged between the said hollow projecting arms (*b'*), and of a motor (*D*) for driving the crank-shaft and steering-propeller, substantially as described.

7. In a steering-apparatus the combination of a casing (*b*) capable of being lifted in a vertical well (*a*) and lowered into a transverse channel (*a'*) of the vessel, of hollow arms (*b'*) projecting from the said casing and being closed at the bottom ends by means of caps (*d*) forming the bearings for a crank-shaft (*s⁰*), of a steering-propeller (*s*) fixed to the crank-shaft and arranged between the said hollow projecting arms (*b'*), and of a motor (*D*) for driving the crank-shaft and steering-propeller, of a movable bar (*f'*) having wedge-shaped arms (*f*) adapted to act upon the correspondingly shaped gland (*e*) of the stuffing box, and of guide-pieces *g* for the said arms (*f*), substantially as specified.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 22d day of June, 1895.

JOACHIM JOHANNSEN.

Witnesses:

JOHANNES JULIUS THEODOR KRIEGER,

EMIL ADOLPH JOHANNES JOACHIM BERTRAM.