2 Sheets—Sheet 1.

J. H. CARPENTER.

STEERING PROPELLER.

No. 189,603. Patented April 17, 1877.

Fig. 1.

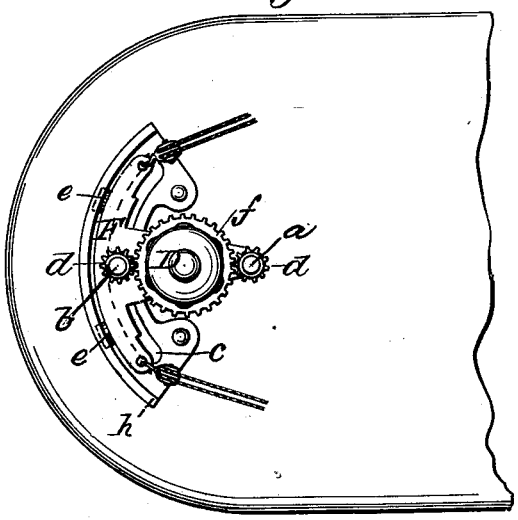
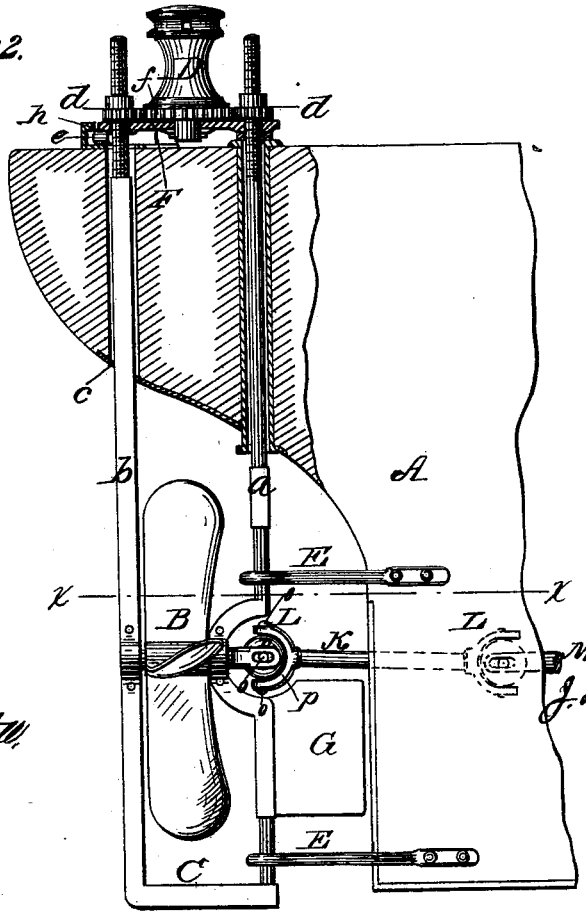


Fig. 2.



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2 Sheets—Sheet 2.

J. H. CARPENTER.

STEERING PROPELLER.

No. 189,603. Patented April 17, 1877.

Fig. 3.

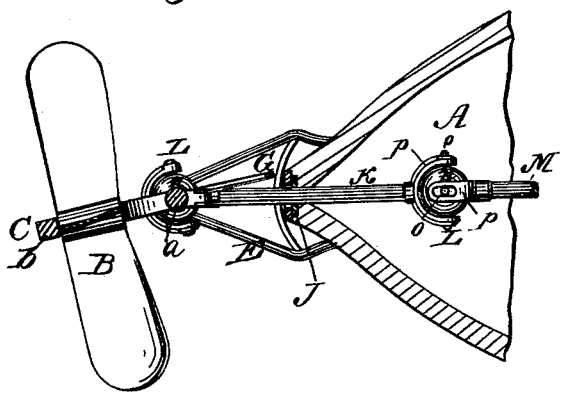
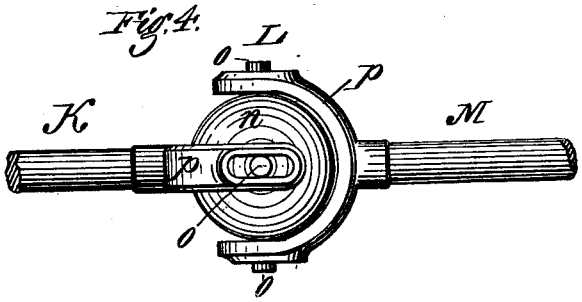


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES H. CARPENTER, OF NEW YORK, N. Y., ASSIGNOR OF ONE-FIFTH HIS RIGHT TO GEORGE NEWTON, OF ST. LOUIS, MO.

IMPROVEMENT IN STEERING-PROPELLERS.

Specification forming part of Letters Patent No. **189,603**, dated April 17, 1877; application filed February 16, 1877.

To all whom it may concern:

Be it known that I, JAMES H. CARPENTER, of New York, in the county of New York and State of New York, have invented certain Improvements in Screw-Propellers, of which the following is a specification:

The object of my invention is to provide a strong and simple method of mounting a screw-propeller so that it may be adjusted vertically and swung laterally, and at the same time the horizontal position of its axis maintained; and to this end the invention consists in mounting the screw-shaft in bearings in a swinging frame, which latter is sustained by its fulcrum-post, and also by a traversing-carriage at its rear end; in providing said frame with screw stems and nuts, by which it may be raised and lowered; in connecting the screw-shaft with the engine-shaft by means of a short shaft passing through a vertical slide in the stern of the vessel, and connected at its ends by universal joints to the other two shafts; in providing the swinging frame, in advance of the screw, with a rudder or blade, which assists in steering the vessel, and also directs the water from the outboard side of the vessel to the screw; and in the peculiar construction of the universal joints employed.

Figure 1 is a plan view of the stern of a vessel provided with my improvement; Fig. 2, a longitudinal vertical section of the same; Fig. 3, a horizontal section on the line *x x* of Fig. 2, looking downward; Fig. 4, a view illustrating the construction of the universal joints.

A represents the hull of a vessel, and B the screw-propeller, secured upon a short shaft, having its ends mounted in bearings in a strong metal frame, C, which latter is provided with and sustained by a vertical fulcrum post or arm, *a*, and a vertical rear arm, *b*. The fulcrum post or arm *a* passes up through a bearing in the hull, and forms a pivot or center, on which the frame C can swing laterally, while the arm *b* passes up through a curved slot, *c*, made in the hull, in order to admit of the arm swinging with the frame. The upper ends of the arms *a* and *b* are provided with screw-threads and sustained by pinion-nuts *d* mounted thereon, as shown, so that by turning the nuts the frame and screw may be raised and lowered as occasion requires. The nuts do not bear upon the deck, but upon a carriage, F, which has its inner end mounted on the arm or post *a* as a center, and its outer end sustained by rollers *e*, which serve to sustain the arm *b* and admit of its being moved laterally with ease. On the carriage F I mount a capstan, D, provided with a cog-wheel, F, gearing into the two pinion-nuts *d*, as shown, so that the turning of the capstan will operate the two nuts alike.

On the deck I mount a curved track for the rollers of the carriage to travel upon; and in order to prevent the rollers from being lifted or displaced, I propose to provide the track with a flange, *h*, extending up over the ends of the rollers, as represented in Figs. 1 and 2. In order to produce the lateral movement of the frame and screw I prefer to connect the steering-gear with the rear end of the carriage F, as shown, so that it will draw the same to and fro, and thereby shift the rear arm *b* of the frame; but, if preferred, devices may be connected with the arm *a*, or otherwise connected with the frame to produce the desired movement of the same.

For the purpose of sustaining the lower end of the frame C, and giving the same the required rigidity when the screw is in action, rigid arms E are secured to the hull, and arranged to clasp around round bearings on the bar *a* of the frame, as clearly represented in Figs. 2 and 3. On the front side of the frame C, which stands some distance in rear of the stern, there is rigidly secured a blade or rudder, G, as shown in Figs. 2 and 3, so that when the frame and screw are swung to either side of the vessel the forward edge of the rudder is swung outward on the opposite side. The rudder thus arranged materially aids in steering the vessel, and also directs the water from the outboard side of the vessel directly against the screw, the action of which latter is thereby improved and rendered more effective.

For the purpose of driving the screw, I pass through a vertical slide, J, in the stern a short shaft, K, and connect the ends of the same by universal joints L with the screw-shaft

and the engine-shaft, M, respectively, as shown in Figs. 2 and 3. This arrangement admits of the screw being readily raised and lowered and swung to either side, with its axis in a horizontal position, without any material loss of power. As shown in Figs. 2, 3, and 4, the universal joint consists of a metal sphere, *n*, provided with round studs or trunnions *o*, which bear in slots in the ends of arms *p*, formed on the ends of the shafts, the shafts being each provided with two of the arms curved so as to partially encircle the ball, and the arms of the two shafts being arranged at right angles to each other, as shown. This arrangement admits of the screw being driven in all its various positions, and permits the intermediate shaft to adjust itself to the varying distance between the screw and the engine-shafts, caused by the raising and lowering of the screw and the expansion and contraction of the shaft, so that it is not necessary to use sleeves or other sliding joints to admit end play of the shafts. The ball-joint, constructed, as shown, with the slotted arms, is also free from danger of cramping, rusting fast, or being disabled by obstructions in the water. The thrust of the screw is received entirely by the frame C, and hence no difficulty will be experienced on account of the bend in the line of shafting. In order, however, to render the action of the screw easy, and to prevent the parts from binding, a suitable box or bearing will be provided in the front side of the frame to receive the entire thrust of the screw. In order to sustain the intermediate shaft, adjustable boxes or bearings of any suitable character may be used in the hold of the vessel, the boxes being preferably arranged to move in a curved path coincident with that in which the shaft swings as the screw is raised and lowered.

I am aware that various plans have been devised for adjusting propeller-screws vertically, and that various arrangements have been designed to admit of their swinging laterally; but, in practice, they have all been found unsuitable for use on large sea-going vessels—some being insecure, others too complicated and delicate, others because the screw could not be retained in its proper vertical position, and still others because the screw required to be driven by an engine on deck. By my method of construction I overcome all the difficulties hitherto experienced, and admit of the screw being retained in its vertical position, and at the same time adjusted both vertically and laterally, and driven with ease and smoothness. The arrangement also enables me to drive the screw, having both the lateral and vertical adjustments, from the usual engine-shaft in the hold—a result which has not been hitherto attained. By throwing the thrust of the screw entirely on the frame, instead of on the shaft, as usual, I am enabled to drive the latter successfully and easily, notwithstanding its divergence from a straight line.

By placing the rudder on the forward part of the frame, in advance of the screw, it is given a full bearing in the water, and the action of the screw facilitated by the water directed against it by the rudder, so that the vessel may be turned quickly and in a small area.

I am aware that universal joints of various kinds have been employed to connect laterally-swinging propellers with their driving-shafts, and that among others was one in which the body was composed of two hollow hemispheres containing coupling devices; but I am not aware that any one has hitherto used the sphere with the outside studs and the slotted arms working thereon. The slotting of the arms forms an essential feature of my construction, for the reason that it prevents any possible cramping or binding of the parts, and because it admits of a steadier and more uniform motion being imparted to the screw than could otherwise be done.

Having thus described my invention, what I claim is—

1. The combination of a screw-propeller, B, and a laterally-swinging frame, C, provided with a pivotal post or arm, *a*, and with a rear sustaining-arm, *b*, supported independently of the pivotal arm, substantially as shown.

2. The swinging screw-carrying frame C, having the threaded arms *a* and *b*, provided with the sustaining-nuts *d*, substantially as shown.

3. In combination with a vessel, A, a screw-supporting frame, C, provided with a fulcrum or pivot arm, *a*, and a rear sustaining-arm, *b*, sustained by a wheeled carriage, F, substantially as shown.

4. The combination of the frame C and carriage F with the pinion-nuts *d* and gear-wheel *f*, mounted on the carriage, as shown.

5. The combination of the vertically-adjustable and laterally-swinging frame C, the screw *b* mounted therein, and the rudder G, attached to the frame in advance of the screw, so as to rise and fall therewith, and retain its position in relation thereto.

6. The combination of a vertically-adjustable screw, mounted in permanently-horizontal bearings, an engine-shaft, located in the hold of the vessel, and a connecting-shaft passing through a slide in the stern of the vessel, and attached at its ends by universal joints to the screw and the engine-shaft, respectively, substantially as shown and described.

7. A vertically-adjustable and laterally-swinging screw, B, connected with and driven by a horizontal engine-shaft in the hold of the vessel, substantially in the manner shown and described.

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