

Means for Propelling and Steering Vessels.

Patented July 14, 1874.

[illegible]

A diagram showing a mechanism with two links of lengths d and d' and two pivots c and c' . The links are connected at a point e and f . The pivots are labeled c and c' . The links are labeled d and d' . The pivots are labeled c and c' . The links are labeled d and d' . The pivots are labeled c and c' .

This technical drawing illustrates a mechanical assembly, possibly a pump or engine component, shown in a cross-sectional view. The main housing is labeled 'A' and contains several internal components. A piston rod (K) is shown extending from the left, passing through a seal (D) and a guide (C). The piston rod is connected to a connecting rod (L), which is further connected to a crankshaft (M). The crankshaft is shown in a cross-section, with the crank pin (N) and the crank web (O) visible. The crankshaft is mounted on a base (P). The drawing also shows a detailed view of the piston rod (K) and connecting rod (L) assembly, with labels for various parts such as the piston pin (K), connecting rod (L), and the crank pin (N). The drawing is a technical illustration, likely from a patent or a technical manual, showing the internal structure and components of the machine.

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IMPROVEMENT IN THE MEANS FOR PROPELLING AND STEERING VESSELS.

Specification forming part of Letters Patent No. **153,126**, dated July 14, 1874; application filed April 8, 1874.

To all whom it may concern:

Be it known that I, JESSE C. SMALL, of Providence, in the county of Providence and State of Rhode Island, have invented certain Improvements in Apparatus for Steering and Propelling Vessels, of which the following is a specification:

Figure 1 of the accompanying drawings is a top view of a portion of a vessel with my improvements applied. Fig. 2 is a central longitudinal vertical section of the same. Fig. 3 is a transverse vertical section taken in line *xy* of a portion of the same. Fig. 4 is a top view; and Fig. 5 is a transverse section of parts in detail of my improvements.

The object of the present invention is to effect certain new and useful improvements in the method employed for propelling and steering vessels, it being more particularly applicable to barges, lighters, open boats, &c.

These improvements consist, mainly, in a pair of propeller and rudder blades, connected so as to turn and be vibrated by shafts connected so as to be operated by a driving-shaft, the said blades being formed to project laterally on one side of their stems, and to incline vertically under the bow or stern of a vessel, and arranged to be raised and lowered to accommodate them to varying depths of water, and to turn automatically by the passage of the vessel, so as to present the blades at the desired angle to the water to obtain the requisite sculling movement to propel the vessel; also, of so arranging and operating the said blades, as will be duly explained, to serve as rudders to steer the vessel without interfering with the propelling action of the blades. These improvements consist, further, in clutches or blocks connected with the blade-chain pulleys, and formed with bunters to noiselessly receive the action of dogs of adjustable sleeves connected with, so as to turn the stems of, the rudders and propellers, the said clutches or blocks being formed on the front to receive and hold the dogs in position when the machinery is not in motion, together with the construction, arrangement, and combination of minor operating mechanical devices, all of which I will now proceed to describe.

In the drawings, A represents the stern por-

tion of a vessel's hull cut away on the under side of the stern, or otherwise constructed, and formed with transverse slots *a a'*, one forward of the other, through its deck B, to receive and allow the action of propeller and rudder stem-sockets C C' connected with, so as to depend from, standards or sockets attached to, so as to be turned either way, or rocked by longitudinal shafts E E', arranged parallel to each other, and whose forward ends extend through suitable bearings F F' and G G', and are each provided with collars or sleeves having cranks *c c'* pivoted to horizontal connecting-rods *d d'*. The rod *d'* of one of the shafts is pivoted to the bottom, and the rod *d* of the other shaft is pivoted to the top of a central vertical arm, *e*, pivoted to a rear crank, *f*, of a driving-shaft, H, held in suitable bearings, and connected with a crank, N, to receive motive power. The stem ends of the shafts E E' or axles of the sockets D D' turn in suitable bearings or plummer-boxes *h* attached to the deck B. The standards or sockets D D' are each formed with an upper socket-stem or journal, *i*, to receive and allow the turning of ratchet or chain pulleys I I' that have formed on, or connected with, the top of their forward portion a clutch formed by two side plates or blocks, *k k'*, extending forward from about the center to the front of the pulley, and curved on the inside and beveled inward at the rear to fit and turn around an adjustable sleeve, *l*, held by a screw, or otherwise readily adjusted to, or released from, the stem K K', that has a seat on the top of the socket-stem *i*, of a rudder or propeller blade, K'' K'''. The clutches are notched out on the front, or the blocks *k k'* are sufficiently apart, as at *m'*, Fig. 4, to admit or release a dog, *m*, projecting laterally from the sleeve *l*. Each of the blocks *k k'* is provided with a rubber, cork, or other elastic or yielding bunter or plug, *n n'*, adjusted by screws *o* turning in the rear of the block, for the purpose of taking up the wear on the bunter, which extends longitudinally through the block, and on its front receives the action of the dog as it is turned by the stem. The propeller and rudder stem K K' are arranged so as to incline slightly in a longitudinal direction under the stem or bows, according to their location, and the blades K'' K''' are

formed to project on one side of the stems K K', so as to take more solid water and to perfect the operation of the propeller and rudder on the water, it having been found by experience that in making the stem perfectly vertical or perpendicular with its shaft, and forming the blade to project either equally or unequally on both sides of the stem, it is impossible to produce the desired result—that is, an effective method of steering and propelling a vessel by the same blades. The pulleys I I' are connected by endless chains, rods, or ropes M M' that pass around the outside of pulleys s s' s'' s''', supported by a connecting beam or plate, g, of the bearings F F', with ratchet or chain pulleys r r' located on the lower portion of the stem or body of a capstan-wheel, L. The bearings F F' are adjustable, and held in position to retain a proper tension on the chains or ropes, &c., M M', by means of springs u u' surrounding the shafts E E', and abutting at one end against the bearings F F', and at the other end against adjustable collars t t', each attached by a screw or otherwise to the shafts E E'.

The machinery for operating the blades may be properly incased to protect it from injury.

The operation of my invention is as follows: Power being applied to the driving-shaft H vibrates or rocks the shafts E E', thereby carrying the rudder and propeller blades K'' K''' back and forth laterally across each other. The passage of the vessel causes the blades to turn naturally at the end of each stroke and take at the beginning of the next stroke a diagonal position, thus producing a sculling motion that imparts the desired propulsion of the vessel. By turning the capstan L the chains or ropes, &c., acting on the pulleys I I', turn the clutches, so as to bring one of the bunters of each clutch against one side of each of the dogs m, so as to turn them, and, consequently, the stems of the rudders and propellers with which they are connected. The clutches or blocks k k' are arranged on the pulleys in such positions in regard to each

other that when one blade is turned by its clutch in a longitudinal direction the other blade is turned by its clutch at or near a right angle with it, and the vessel brought directly around, or is steered in any direction, according to the extent and direction in which the blades are turned by the action of the clutches on the dogs of the stems. The steering operation is performed by the blades K'' K''' without the least interruption to their propelling action. The construction of the blades on one side of their stems and at an inclination with their shafts gives them more solid water to act in and insures their effective operation, as hereinbefore described. When the machinery is motionless the stems K K' are raised and turned, so as to bring their dogs m in the slots or spaces m' between the forward ends of the blocks, where they are securely held to prevent the movement of the blades. By raising or lowering the adjustable sleeves l, which are released or held by a screw or otherwise, the blades may be readily adapted to deep or shallow water.

Having thus fully described my improvements, what I claim as my invention, and desire to have secured to me by Letters Patent, is—

1. The combination of the plate g, having the pulleys s s' s'' s''', with the shafts E E', having adjustable collars t t' and intermediate spring u', operating substantially as described.

2. A capstan, L, having double chain-pulleys r r', in combination with endless chains M M', pulleys s s' s'' s''', adjustable bearings F F', springs u u', shafts E E', and rudder and propeller blades K'' K''', all arranged and operating substantially as and for the purposes described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JESSE C. SMALL.

Witnesses:

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