

No. 648,218.

Patented Apr. 24, 1900.

A. PIEDFORT.
STEERING MECHANISM.

(Application filed Feb. 8, 1900.)

(No Model.)

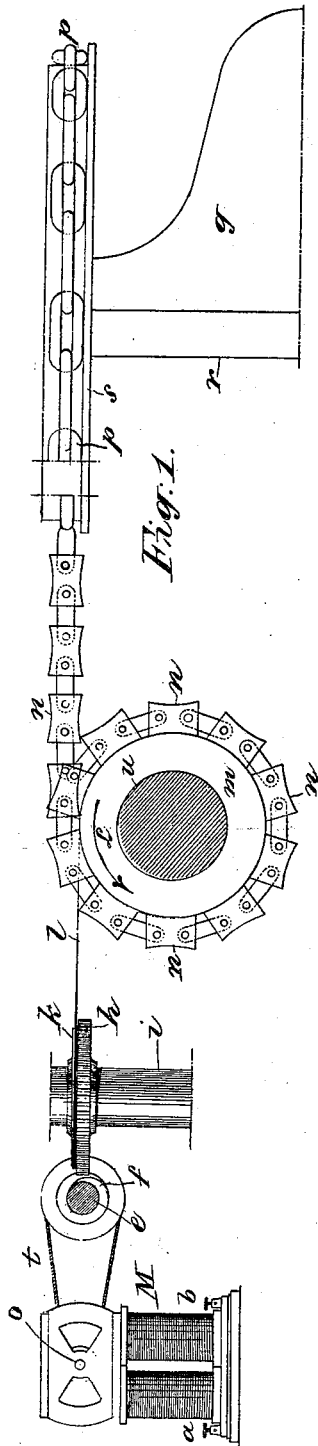


Fig. 1.

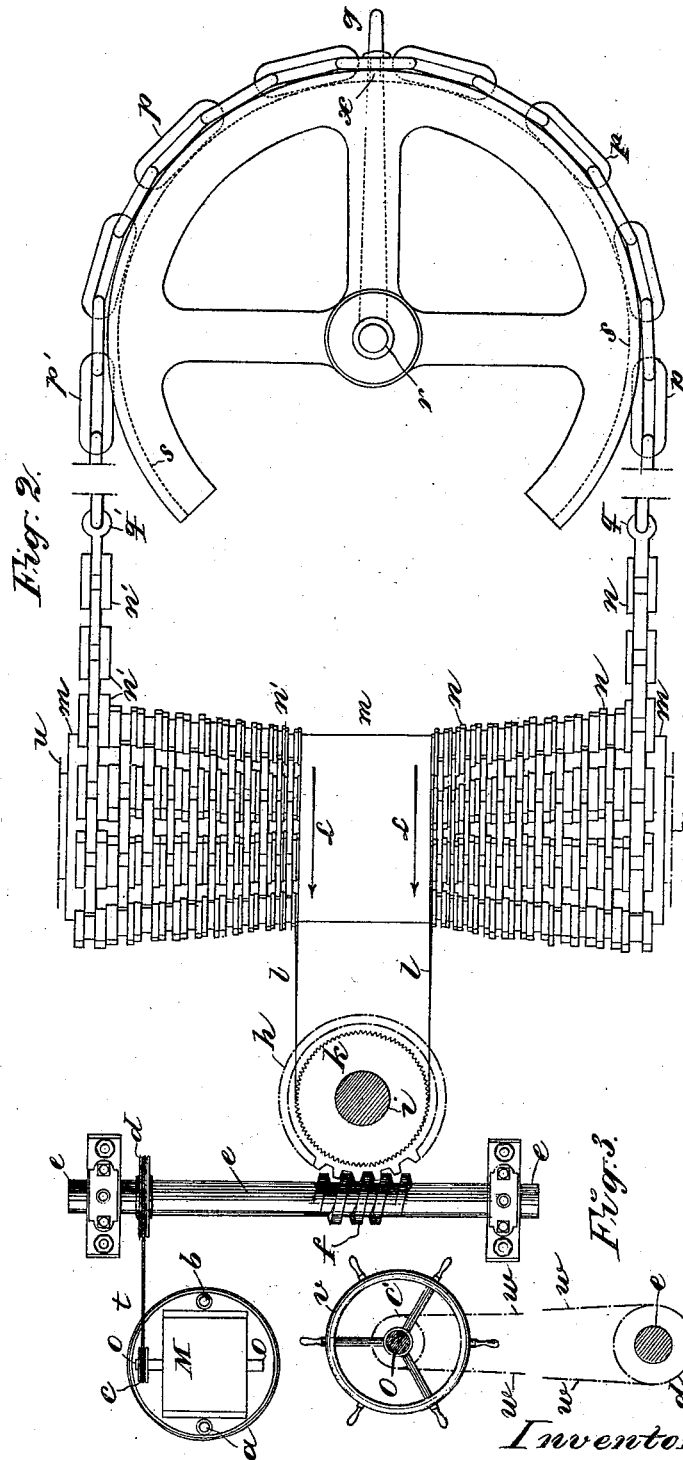


Fig. 2.

Fig. 3.

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STEERING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 648,218, dated April 24, 1900.

Application filed February 8, 1900. Serial No. 4,499. (No model.)

To all whom it may concern:

Be it known that I, ALFRED PIEDFORT, a citizen of the French Republic, residing at Paris, France, have invented certain new and useful Improvements in Steering Mechanisms, of which the following is a specification.

This invention relates to steering mechanisms or gear for vessels, and has for its object to provide a gear whereby the rudder of a vessel may be controlled and operated from a distance with very little effort, whatever may be the weight or size of the rudder or the conditions. The operating-gearing in which the present invention is embodied permits of operating the rudder, no matter what may be the conditions or the size of the vessel, without the aid, necessarily, of a motor. In the present case it is supposed that the steersman operates the rudder through the medium of an electric motor; but of course it may be operated by the steersman through an ordinary steering-wheel.

In the accompanying drawings, Figure 1 is a side elevation of the steering mechanism represented as actuated by an electric motor capable of being reversed, and Fig. 2 is a plan of the same. Fig. 3 is a view illustrating the operation of the steering mechanism by hand with the aid of an ordinary steering-wheel.

On the upright stock *r* of the rudder *g* is fixed a wheel or drum *s*, about which passes a chain *p*, fixed at its middle *x* to the drum. The ends of this chain extend back and are coupled at *q* and *q'*, respectively, to two like multiplying-chains *n* and *n'*, wound about a drum or cylinder *m*. These multiplying-chains make each a number of turns about the cylindrical drum *m*, winding from the outer ends of the latter inward, and each of said chains is constructed so as to gradually decrease in cross-section or diameter from the outer to the inner end, as shown, their lesser extremities being attached, respectively, to the ends of a slender chain *l*, the bight of which passes about a sprocket-wheel *k*, keyed on an upright shaft *i*. It may be said here that the multiplying-chains decrease gradually in size from their points of attachment to the chain *p* to their points of attachment to the chain *l*. The shaft *i* is rotated through the medium of a worm-wheel *h* there-

on and a worm *f* on a shaft *e*, this latter shaft being driven from the arbor *o* of the motor *M* through a belt *t* and sheaves *c* and *d*.

The journals *u* of the drum *m* are rotatively mounted in suitable bearings, and the drum is rotated continuously in the direction of the arrow *L* by any motor—as the engine which drives the vessel, for example. The rotative movement of the drum *m* will be uniform and may be about sixty revolutions per minute, and its surface will be smooth, so that the chains can slip or slide freely thereon. The links of the said chains (see Fig. 1) may be made to fit on the convex surface of the cylindrical drum. The chain *l* can be somewhat slack and its operation on the multiplying-chains will be the same.

Fig. 3 shows how an ordinary steering-wheel *v* may be employed in lieu of a motor *M* to rotate the shaft *e* in either direction desired. In this view the arbor *o'* of the steering-wheel carries a sheave or pulley *c'*, which is connected with the sheave or pulley *d* by a belt *w*. The pulleys *c'* and *d* may be sprocket-wheels and the belt *w* a chain.

It will be understood that this invention is not limited to the use of the wheel or wheel-segment *s* with the single chain *p* secured at its middle thereto. There might of course be two distinct chains *p*. It is only essential that the chains *n* *n'* shall be properly coupled to the rudder or its tiller, so that the rudder may be swung from side to side or held at steady by the chains *n* *n'*, the operation being in this respect the same as that of the ordinary tiller ropes or chains.

The principle of operation of the apparatus is as follows: As the drum *m* rotates continuously in a direction tending to wind up the chains *n* *n'*, it will be obvious that by turning the wheel *k* in the direction to draw the chain *n* tight about the drum *m* the chain *n'* will be correspondingly slackened and the chain *n* will act to turn the rudder *g* in one direction; but if the wheel *k* be turned in the opposite direction the chain *n'* will be drawn tight about the drum and the chain *n* slackened, thereby turning the rudder in the opposite direction. Thus with a slight effort on the part of the steersman the heaviest rudder may be handled in a heavy sea.

Having thus described my invention, I claim—

1. In a steering gear or mechanism, the combination with the chain *p*, connected with the rudder, and the constantly-rotating drum, of the multiplying-chains connected to the respective ends of the chain *p* and wrapped about said drum, said multiplying-chains gradually decreasing in cross-section from their points of attachment to the chain *p*, the slender chain *l*, having its extremities connected to the respective, inner and reduced ends of the multiplying-chains, and its bight embracing a wheel *k*, the said wheel *k*, and means for rotating the wheel *k* in opposite directions.

2. In a steering gear or mechanism, the combination with the constantly-rotating drum *m*, of the two like multiplying-chains *n* and *n'*, wound about said drum, said chains being tapered longitudinally, or of gradually-decreasing size from end to end and connected at their larger ends with the rudder, the wheel *k*, the chain *l* about said wheel and connected

at its respective ends with the inner and reduced ends of the chains *n*, *n'*, and means for rotating the wheel *k* in opposite directions.

3. In a steering mechanism, the combination with the rudder having on its stock a wheel *s*, the said wheel, and the chain *p*, about and secured at *x* to said wheel, of the drum *m*, the like longitudinally-tapered chains *n* and *n'*, wrapped about said drum and attached at their respective larger ends to the ends of the chain *p*, the upright shaft *i*, the wheel *k* thereon, the worm-gearing for driving the shaft *i*, a motor for driving the said worm-gearing, and the chain *l*, about said wheel *k* and connected at its respective ends to the reduced ends of the chains *n* and *n'*.

In witness whereof I have hereunto signed my name, this 22d day of January, 1900, in the presence of two subscribing witnesses.

ALFRED PIEDFORT.

Witnesses:

MAURICE DE LOPPIND,
ALPHONSE LEROUX.