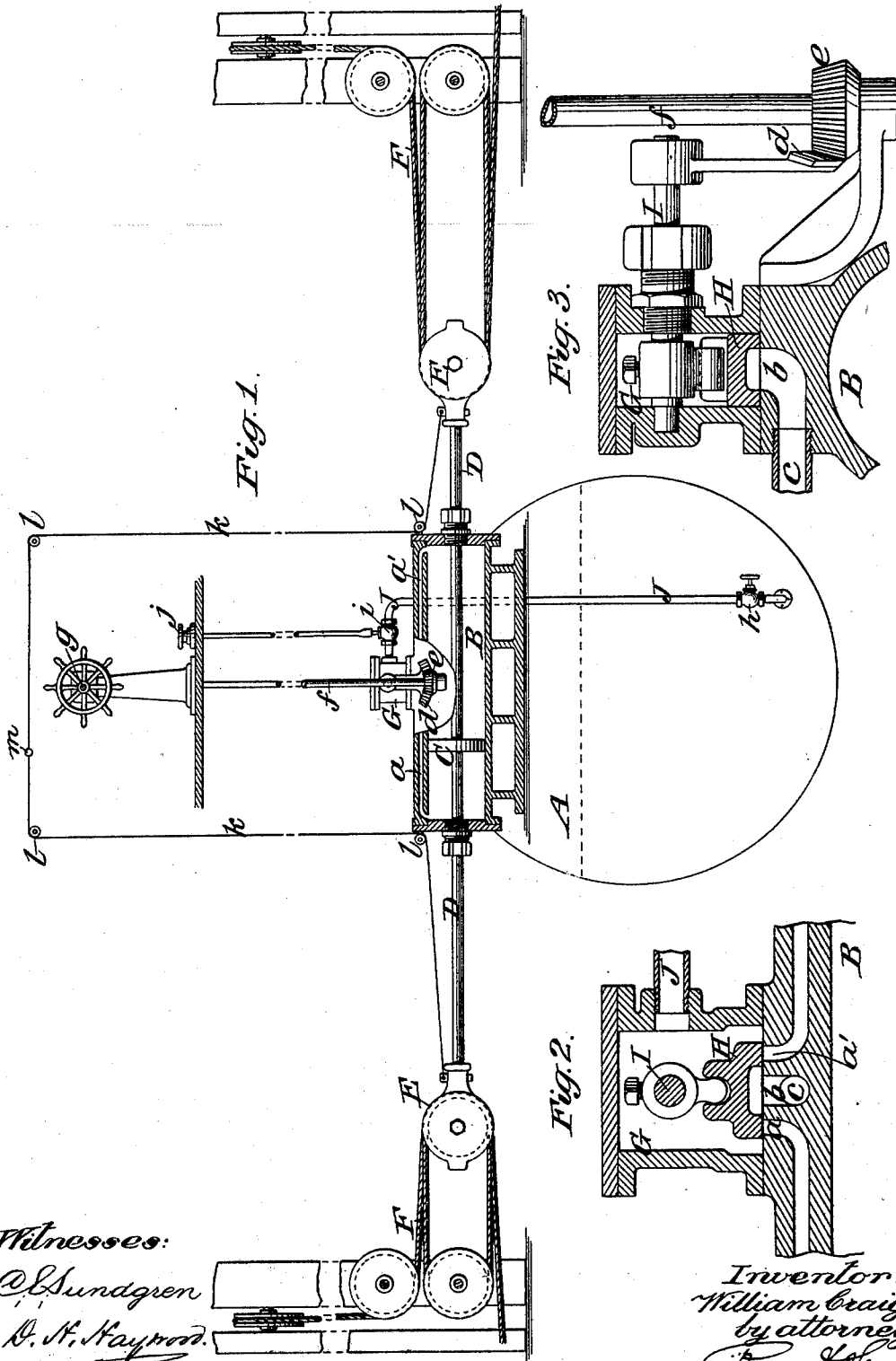


(No Model.)

W. CRAIG.
STEERING ENGINE.

No. 509,511.

Patented Nov. 28, 1893.



Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM CRAIG, OF BROOKLYN, NEW YORK.

STEERING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 509,511, dated November 28, 1893.

Application filed December 21, 1892. Serial No. 455,865. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM CRAIG, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Steam Steering Apparatus, of which the following is a specification.

The object of my invention is to employ power from a steam boiler for steering vessels in a more effective manner than heretofore practiced and to render the employment of such power practicable with a simpler engine than has been heretofore used for the purpose.

In carrying out my invention instead of taking steam directly into the steering engine, I employ the water from a steam boiler as a means of transmitting the force of the steam therein to the engine, or in other words, I connect the supply or induction pipe of the engine with the water space of the boiler instead of with the steam space thereof. In this way by means of the water in the engine I am enabled to hold the rudder firmly in any position to which it may be brought, a result which owing to the elasticity of steam and the condensation which is more or less unavoidable, it is impossible to obtain when steam is used in a steering engine.

The engine employed for the purpose of my invention may be of any suitable kind. That which I have selected for the purpose of illustration is of the simple direct-action kind having its piston-rod projected through both ends of the cylinder to make connections with the rudder and having a simple three-ported slide valve for the induction and eduction of the water to and from one and the other end of the cylinder as required for the movement of the piston.

Figure 1 represents an elevation partly in section of a steam boiler, a steering engine and its steering rope connections and a steering wheel for controlling the working of said engine. Fig. 2 represents a longitudinal section of the valve-chest, the valve and ports of the steering engine. Fig. 3 represents a transverse section corresponding with Fig. 2 showing also a portion of the gearing between the steering wheel and the engine valve.

Similar letters of reference designate corresponding parts in all the figures.

A is the steam boiler which may be a boiler specially intended for working a steering engine but which, in a steam vessel, may be the boiler or one of the boilers used for supplying steam for the propulsion of the vessel.

B is the cylinder of the steering engine which may be located in any position in the vessel in suitable relation to the boiler and the steering gear.

C is the piston and D the piston rod projecting through both ends of the cylinder and having at each end sheave blocks E for the reception of the steering ropes F. These ropes may be arranged to run in any well known or suitable manner, directed by pulleys, to the rudder or tiller. As the particular connections employed between the piston rods and the rudder form no part of my invention it is not necessary here to describe them further than to say that I prefer to use a system of pulleys by which the necessary amount of motion may be given to the rudder with a very short stroke of the piston so that the engine cylinder need not be of great length.

G is the valve-chest from which ports *a a'* lead to opposite ends of the cylinder B and a port *b* communicates with the eduction pipe *c*.

H is the slide valve constructed to lap the ports *a a'* on both sides as shown in Fig. 2, that it may close both said ports effectually at the same time. This valve is represented as operated by a rock-shaft I passing through one side of the chest G and having on one end outside of the chest a toothed sector *d* which is geared with a bevel gear *e* on the lower end of an upright shaft *f* which is geared in any suitable manner with a hand wheel *g* like an ordinary steering wheel though of smaller size and which is arranged in the wheel house or other part of a vessel appointed for the steersman. The hand wheel and the mechanism just described between it and the valve H, constitute a hand gear for operating the said valve.

J is the induction pipe which forms communication between the lower part or water space of the boiler and the valve-chest G of the engine. This pipe is represented as furnished with a stop valve *h* near its connection with the boiler and a stop valve *i* near its connection with the valve-chest, the latter

valve being furnished with a handle *j* which is within convenient reach of the steersman.

The eduction pipe *c* of the engine may lead either to the hot well of the engine or the suction chamber of the boiler feed pumps whence the water collected from said pipe may be pumped back again into the boiler. The rope connections between the piston rod and the tiller are such that when the rudder is amidships the piston is at the center of its stroke and when the piston is at one or the other end of its stroke the rudder is hard a port or hard a starboard.

In order to indicate to the steersman the position of the piston and thereby to indicate the position of the rudder there may be near the wheel *g* an indicator of any suitable kind with which the piston is connected in any suitable manner, as for instance, a cord *k* connected with opposite ends of the piston rod and running over pulleys *l* as shown in Fig. 1, a knob or ball *m* on said cord constituting the index.

To move the rudder in either direction it is only necessary for the steersman to handle the wheel *g*, to operate the valve in such manner as to admit water to one or other end of the cylinder and allow it to escape from the other end thereof, and when the piston has moved far enough to give the rudder the required position it is only necessary for him to bring the valve *H* to the position shown in

Fig. 2 to close both ports *a a'* and so shut the water in the cylinder on both sides of the piston. As the water so shut in is incompressible it positively locks the piston and the rudder until it is desired again to move the latter when the valve must be moved to admit the water from the boiler to the proper end of the cylinder and allow the escape of water from the other end thereof.

By my improvement I avail myself of the full force due to the pressure of the steam in the boiler to operate the rudder and I use the resistance of the water to hold the rudder in any desired position; and as the water from the cylinder may be returned to the boiler with but little loss of heat the operation may be performed very economically.

What I claim as my invention is—

The combination in a steam steering apparatus, of a cylinder and piston, a valve and a hand gear therefor to control induction and eduction ports communicating with opposite ends of said cylinder, a steam boiler, a pipe forming communication between the water space of the said boiler and said valve, and connections between the piston and the rudder at opposite ends of said cylinder, all substantially as herein set forth.

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Witnesses:

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