J. C. McALLISTER.

Steam-Steering Apparatus.

No. 211,034. Patented Dec. 17, 1878.

FIG. 1.

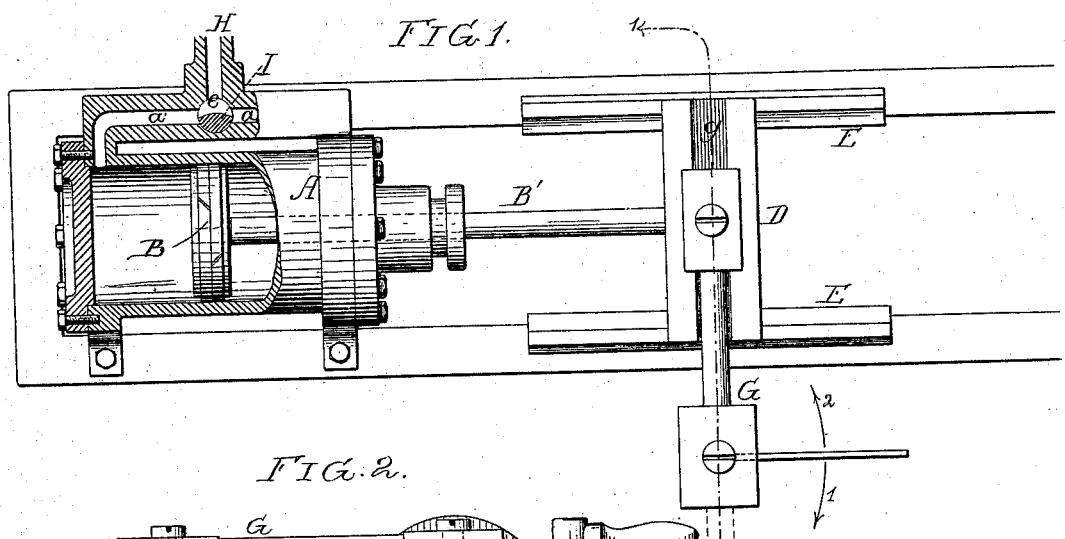


FIG. 2.

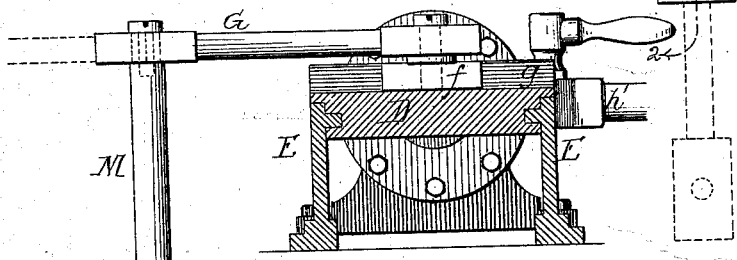


FIG. 3.

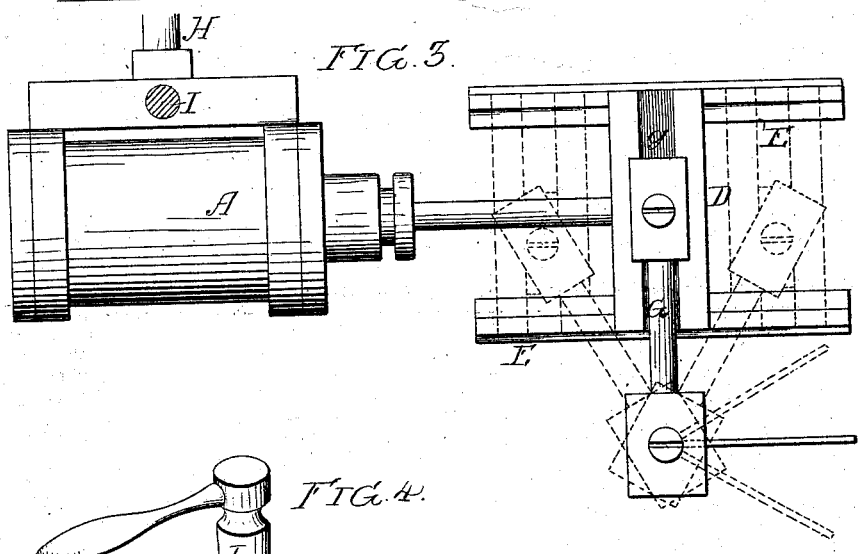
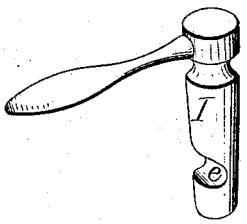


FIG. 4.



Witnesses.

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UNITED STATES PATENT OFFICE.

JAMES C. McALLISTER, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN STEAM STEERING APPARATUS.

Specification forming part of Letters Patent No. **211,034**, dated December 17, 1878; application filed September 20, 1878.

To all whom it may concern:

Be it known that I, JAMES COOK MCALLISTER, of Philadelphia, Pennsylvania, have invented a new and useful Improved Steering Apparatus, of which the following is a specification:

The object of my invention is to combine with the tiller of a rudder a direct-action steam-engine of such a character that it can be caused to operate and retain the rudder of the vessel without shocks or jars and at the expense of a very small amount of steam.

In the accompanying drawings, Figure 1 is a plan view, partly in section, of my improved steam steering mechanism; Fig. 2, a vertical section on the line 1 2, Fig. 1; Fig. 3, a diagram, and Fig. 4 a detached view, of the valve.

A is the cylinder of the engine; B, the piston; B′, the piston-rod; D, the cross-head, adapted to guides E E, and G the tiller, the end of which has a pin carrying a block, *f*, which is adapted to a slot, *g*, in the cross-head D.

The cylinder and guides are attached to a suitable base-plate, which may be secured to the deck of a vessel in a position demanded by that of the rudder-post M and tiller.

The valve consists in the present instance of an ordinary tapering plug, I, the seat of this valve being at the point of communication of the interior of the steam-pipe H with two passages, *a a′*, the former communicating with the cylinder at the front end of the same on one side of the piston, and the passage *a′* communicating with the cylinder at the rear end of the same on the opposite side of the piston.

A recess, *e*, is cut in the side of the plug-valve at such a point as to form a communication between the steam-pipe and the passages *a a′*.

When the engine is prepared for active duty there is always steam on both sides of the piston, the usual exhaust-opening being absent, the water of condensation being withdrawn from the cylinder from time to time through ordinary pet-cocks, such as are used on all steam-engines.

The position of the piston within the cylinder will depend upon the difference between the sizes of the two communications which the recess of the valve presents between the steam-pipe and opposite ends of the cylinder. Thus, if the valve be adjusted, as shown in Fig. 1, so that these communications are similar in size the piston will stop midway between the opposite ends of the cylinder, and the rudder will be held in a central position.

Steam being on both sides of the piston, the latter, as long as the valve retains the position shown in Fig. 1, must be confined between two equal supplies or cushions of steam.

If the valve, however, be adjusted to such a position that the communication between the steam-pipe and passage *a′* shall be larger than that between the steam-pipe and passage *a*, the piston will move toward the front end of the cylinder, and the rudder will be moved in the direction of the arrow 1, Fig. 1, the block *f* on the tiller sliding laterally in the slot *g* in the cross-head as said tiller is moved.

If the communication between the steam-pipe and the passage *a* be the largest, the piston will be forced toward the rear end of the cylinder, and the rudder will be moved in the direction of the arrow 2, Fig. 1.

The extent to which the rudder is moved will depend upon the length of time that the communication between the steam-pipe H and the passages *a a′* remains unequal, while the suddenness with which the movement of the rudder is effected will depend partly upon the extent to which the valve I is moved in one direction or the other and partly upon the rapidity with which such movement is effected.

While the movement of the piston, and consequently of the tiller and rudder, due to the operation of the valve, is determinable, it is necessarily accomplished without accompanying jars or shocks, owing to the presence of steam on both sides of the piston.

It is not necessary in carrying out my invention to adhere to the valve shown and described, as other valves capable of performing the desired duty will readily suggest themselves to those familiar with machinery of the class to which my invention relates.

In some cases—such, for instance, as when a large and heavy rudder has to be operated—two cylinders similar to that shown in Fig. 1 may be employed, the tiller in this case being duplex, as shown by dotted lines in Fig. 1, and the two valves being operated in unison, and being so set as to cause the required movements of the two pistons in opposite directions.

Two single-acting cylinders may also be used in connection with the duplex rudder, one steam-passage, *a*, communicating with one cylinder, while the other passage, *a'*, communicates with the other cylinder.

I claim as my invention—

The mode herein described of operating the rudder of a vessel—that is to say, by connecting the tiller to a piston or pistons arranged in a cylinder or cylinders and constantly subjected to the action of two opposing volumes of steam, which are not exhausted from the cylinder or cylinders while the apparatus is in operation, the relative force of the volumes of steam being governed by the relative sizes of the communications between said volumes of steam and the supply-pipe, all substantially as specified.

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

J. C. McALLISTER.

Witnesses:
J. B. DICKESON,
HARRY A. CRAWFORD.