2 Sheets—Sheet 1.

C. R. SIMEY.

Steam Steering Mechanism.

No. 231,626. **Patented Aug. 24, 1880.**

Fig. 1.

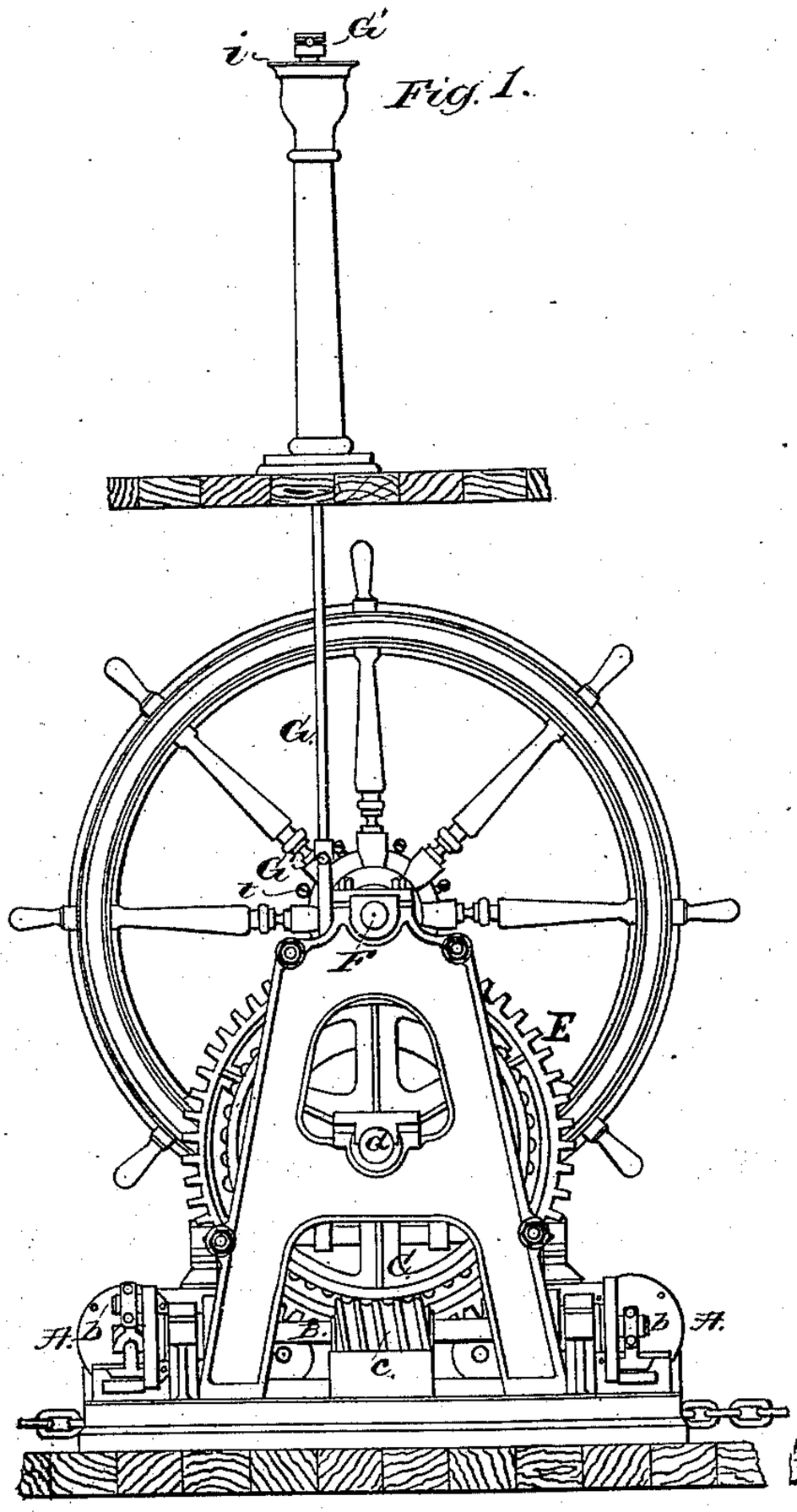


Fig. 2.

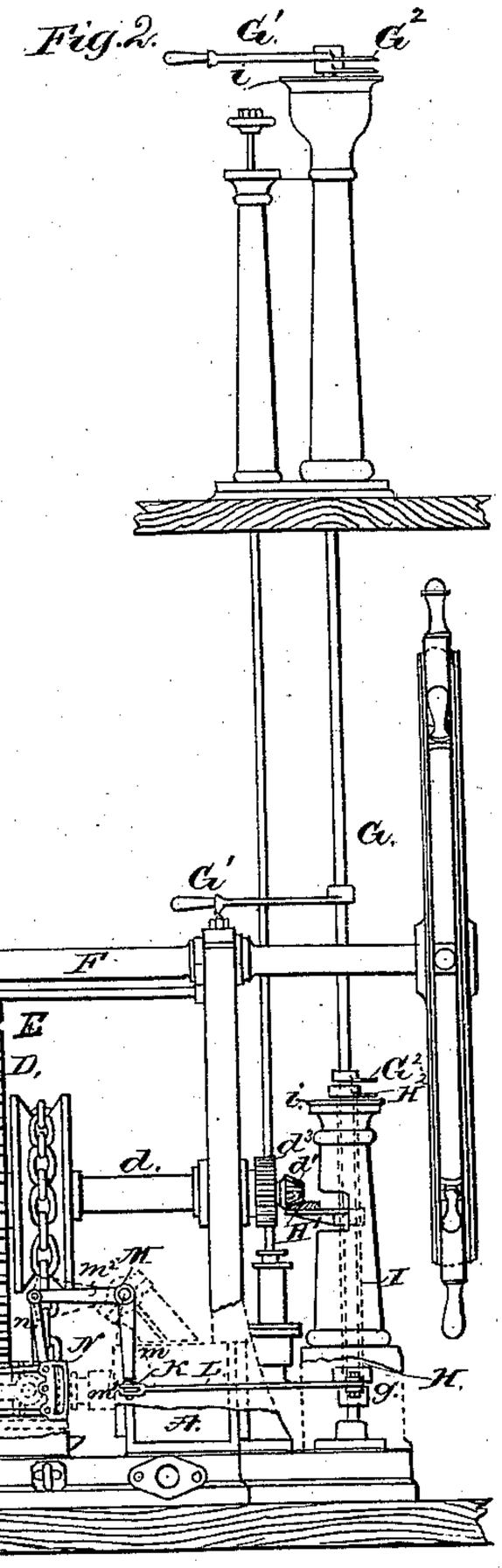
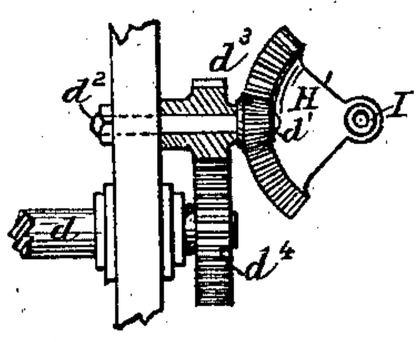


Fig. 8



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2 Sheets—Sheet 2.

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Steam Steering Mechanism.

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FIG. 3.

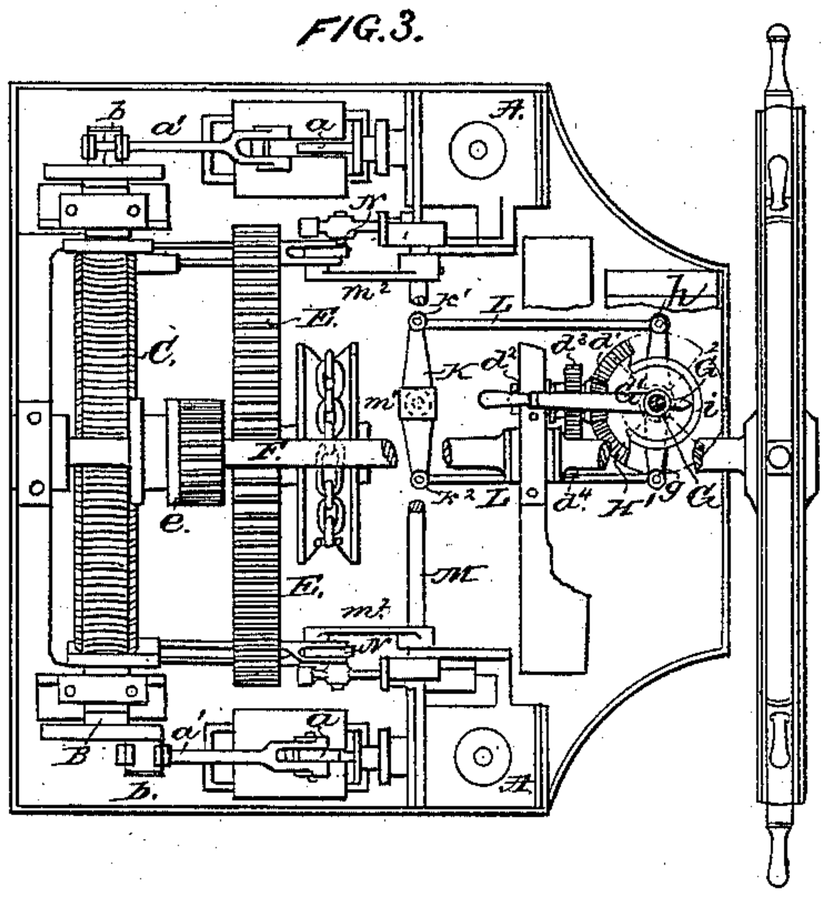


FIG. 7

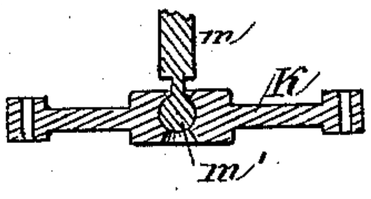


FIG. 4.

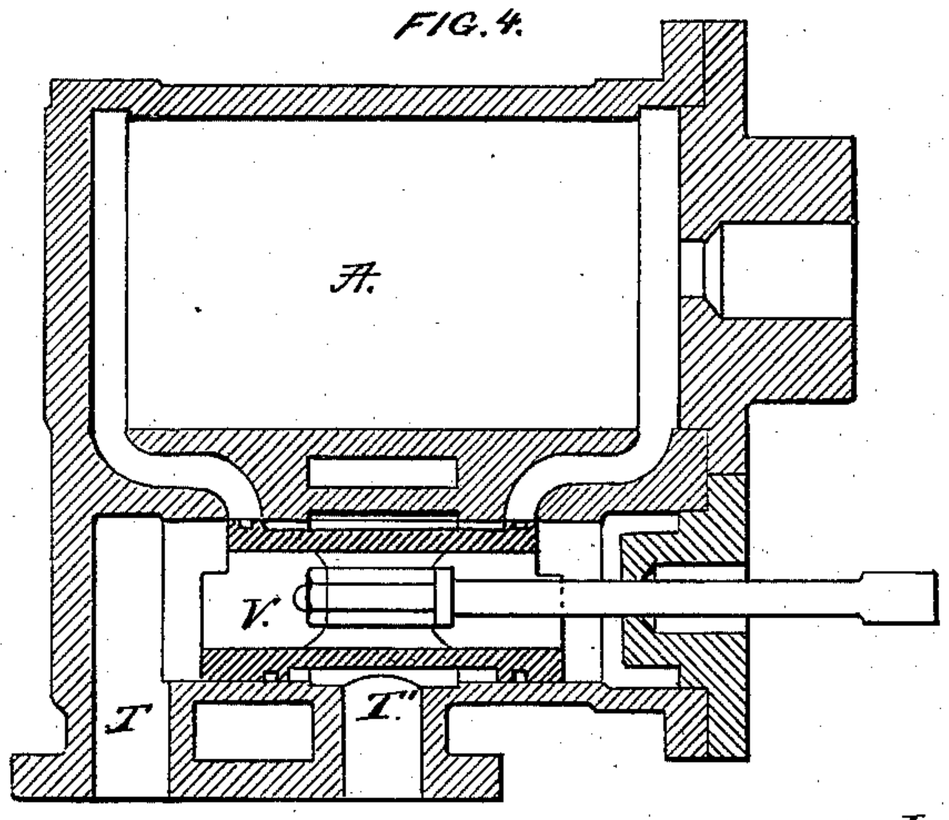


FIG. 6.

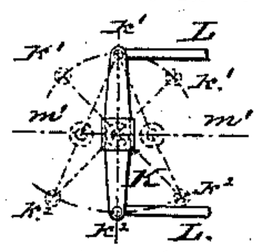
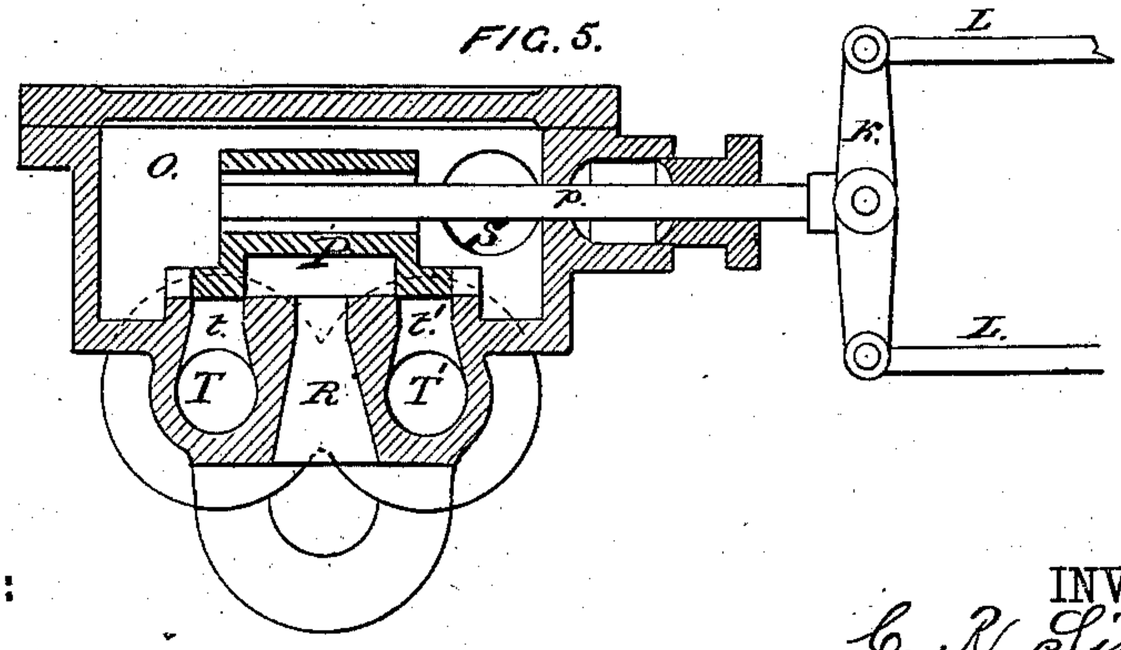


FIG. 5.



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CHARLES R. SIMEY, OF SUNDERLAND, ENGLAND.

STEAM STEERING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 231,626, dated August 24, 1880.

Application filed March 6, 1880. (Model.) Patented in England April 22, 1879.

To all whom it may concern:

Be it known that I, CHARLES ROSS SIMEY, of Sunderland, in the county of Durham, England, have invented a new and Improved Steam Steering Mechanism, upon which I have obtained Letters Patent in the Kingdom of Great Britain bearing date the 22d day of April, A. D. 1879, and numbered 1,586; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a rear elevation. Fig. 2 is a side elevation. Fig. 3 is a plan view, showing the steam steering-gear and my improvements in connection with the reversing-gear. Fig. 4 is a longitudinal section, on an enlarged scale, of a cylinder with piston-valve. Fig. 5 is a longitudinal section of a reversing-valve. Fig. 6 is a diagram showing the movement of the lever cross-head K. Fig. 7 is a detailed sectional view through the lever cross-head K at its point of connection with the end of lever *m;* and Fig. 8, a plan view, in detail, of the gearing for connecting the chain-wheel shaft and index-rod.

My invention relates to the steering-gear; and it consists of improved self-acting apparatus constructed and arranged to shut off the steam when, or just before, the helm attains the desired position. The position to be given to the helm is indicated by a pointer moved by the steersman, the actual movement of the helm being indicated by another pointer moved in turn by the machine itself, and the steam being automatically shut off when these two pointers coincide, as hereinafter fully set forth.

A A denote horizontal steam-cylinders; *a*, their piston-rods, and *a'* connecting-rods to cranks *b* on a shaft, B.

c is a worm keyed on shaft B and gearing with a worm-wheel, C, on the shaft *d*, on which is keyed the chain wheel or barrel D.

The wheel C is coupled with shaft *d* by a clutch, to enable it to be disconnected when the steam-power is not used and the vessel is steered by hand, in which case a sliding pinion, *e*, keyed on the hand steering-wheel shaft F, is thrown into gear with a spur-wheel, E, fast on the chain-wheel shaft *d*, the same lever C^2 serving to operate both the clutch C' and the pinion *e*.

G is a vertical shaft mounted in suitable bearings just behind the hand steering-wheel, and to one side of the shafts *d* and F. Upon this shaft are fixed one or more handles, G', and pointers G^2, and at its lower end is fixed a lever-arm, *g*.

H is a short tubular spindle, through which the shaft G passes, both G and H passing through and being supported by hollow post I or brackets, as desired, supporting a dial, *i*, over which the pointers move.

H' is a segment of a beveled toothed wheel fixed on spindle H, and passing, in case of a post being used, through an opening in the post.

d' is a bevel-pinion that gears with segment H', the pinion *d'* being part of and constructed with the wheel d^3, mounted on a stud, d^2, fixed at one side of the chain-wheel shaft *d*, the wheel d^3 gearing with a wheel, d^4, on said shaft *d*. The proportions of the wheels and pinions are such that the segment H' is made to travel through a quarter of a circle by the rotation of the chain-wheel in moving the rudder from hard-a-starboard to hard-a-port, and vice versa.

H^2 is a pointer fixed on the upper end of spindle H, and *h* is a lever-arm, equal in radius to *g*, fixed on its lower end.

K is a lever cross-head, equal in length to *h* and *g* together, and connected at its opposite ends *k' k²*, by links L L, with the arms *h g*, respectively. This cross-head is pivoted by a ball-and-socket joint, *m'*, at the middle of its length to the end of the valve-rod if a reversing-valve is used, or, as in the example illustrated in the figures now described, to the end of a lever, *m*, fixed on a weigh-shaft, M, mounted in suitable bearings, m^2 m^2 being two lever-arms fixed on the same weigh-shaft M, and connected by draw-rods *n n* with the links N, of the ordinary reversing-gear.

In case of a reversing-valve the cross-head is pivoted directly to the rod *p* of said reversing-valve P, which it controls in the same way that it controlled the link motion in the former arrangement. This valve P, which may be an ordinary D-slide, is contained in a separate chest, O, and works over ports *t t'*, connected by pipes with passages F F', respectively, in

the piston-valve chest. (Shown in Fig. 4.) When two cylinders are employed the pipes connecting ports *t t'* and passages T T' are made to connect both of the corresponding ports and passages, so that a single throttle-valve and its actuating mechanism will be required for both engines.

S is the steam-pipe, and R the exhaust.

It will be readily seen that when port *t* is uncovered steam enters through T and piston-valve V to either end of the cylinder A and exhaust round the piston-valve and through F' *t'*, and that when port *t'* is uncovered by valve P the direction of the steam is reversed, thus reversing the engine.

It will be readily understood that the valve V may be operated by an eccentric upon the driving-shaft of the engine in a well-known manner, and the valve P is operated by the gearing and hand-levers of the machine.

The operation is as follows: When the handles G' and pointer G^2 are moved by the steersman one way or the other over the dial *i* the lever *g* is moved to a corresponding angle or extent, and the beam K is oscillated on *k'* as a center and caused to describe an arc, as shown approximately in the diagram, Fig. 6, thereby moving the center *m'* and consequently raising or lowering the link N to start and run the engine in the required direction. The shaft *d*, driven by the engine, being geared by pinion *d'*, shaft d^2, wheels d^3 d^4, and segment H' with spindle H, rotates the latter in the same direction as that in which the spindle G is moved, thereby moving arm *h* until it comes diametrically opposite to arm *g*, and moving the end *k'* of the beam K on k^2 as a center, causing it to describe such an arc, as shown in Fig. 6, as will bring the center *m'* back to the position it formerly occupied, shut off the steam at the proper moment, and return the link motion to its mid-gear position for running the engine one way or the other.

Though I prefer to use valve-gear of the piston class actuated by a single eccentric and valves without lap or lead, still I do not limit myself to the arrangement described, as the same result is attained when the lever cross-head is pivoted to the rod connected to the lever-arm on the weigh-shaft having other lever-arms, each connected to the slot-link of the ordinary reversing-gear, hereinbefore set forth.

The inner spindle, G, can be worked from the upper deck by a forked rod or by means of idle-wheels so arranged as to span over or pass up at one side of the hand steering-wheel shaft.

The hollow spindle H can be carried up in a similar manner to show the position of the helm on the upper bridge, if desired.

The rudder is worked by the gear until it reaches the same angle with the center line of the ship as the tiller stands. The machine then stops. The steersman can consequently put the tiller to the angle he wishes the rudder to occupy, and he can then leave it to work his engine-room telegraph if necessary.

The advantage of operating the rudder-chains from the driving-shaft of an engine, instead of connecting them directly to the cylinder piston-rod, will be readily seen when employed in connection with the mechanism for automatically shutting off the steam to place and hold the rudder in any desired position, as a single stroke of the piston will move the rudder but a short distance, while in the other case a single stroke of the cylinder only is required to move the rudder over its entire course, and the rudder will not stand without brake being applied when it is put to starboard or port, as one end of the cylinder is then full of steam and the other is empty. For the same reason, when the rudder-chains are attached directly to the cylinder piston-rod the consumption of steam will be excessive, as one end of the cylinder must be emptied in order to move the rudder the smallest possible distance.

Having thus fully described my invention, what I claim is—

1. In a steam steering apparatus, the combination of the spindles G H, hand-lever G', pointers G^2 G^2, arms *g h*, links L, lever cross-head K, connected with the main valve of the engine by mechanism substantially as described, segment H', and intermediate gear-wheels for connecting the driving-shaft of the engine with the hollow spindle H, substantially as and for the purpose described.

2. In a steam steering apparatus, the combination of a steam-engine and its connections with a worm-shaft, a worm-wheel, sliding clutch, spur-wheel, and chain-wheel connected to a horizontal shaft, a tiller-wheel shaft arranged parallel with and above the chain-wheel shaft, provided with a sliding pinion, and a lever pivoted to the frame of the machine and connected to the clutch and pinion, these parts being combined and arranged to operate the chain-wheel and rudder either by hand or by steam, substantially as described.

The above specification of my invention signed by me this 21st day of January, 1880.

CHARLES ROSS SIMEY.

Witnesses:

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COLLIN SMART.