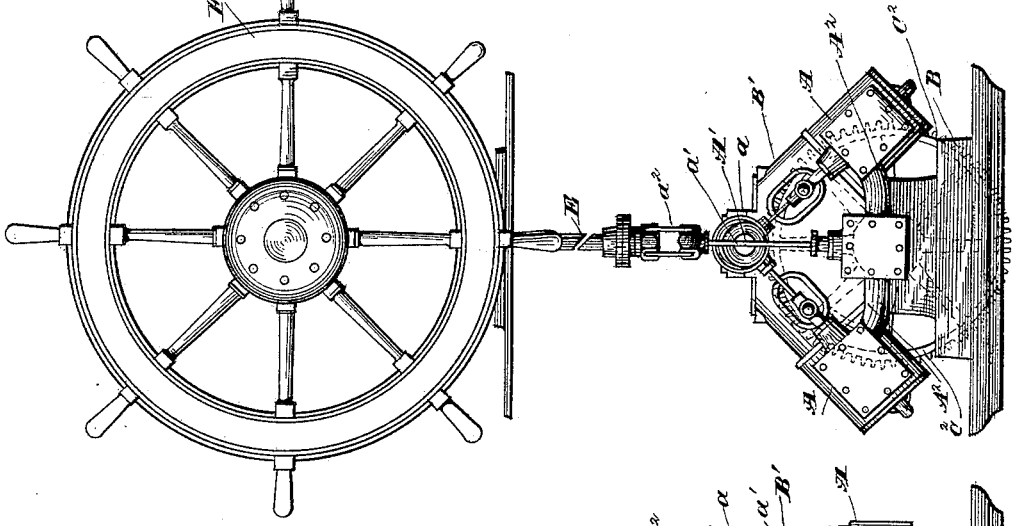
(No Model.) 2 Sheets—Sheet 1.

W. MILLER.

STEAM AND HAND STEERING APPARATUS.

No. 418,921. Patented Jan. 7, 1890.

Fig. 2.



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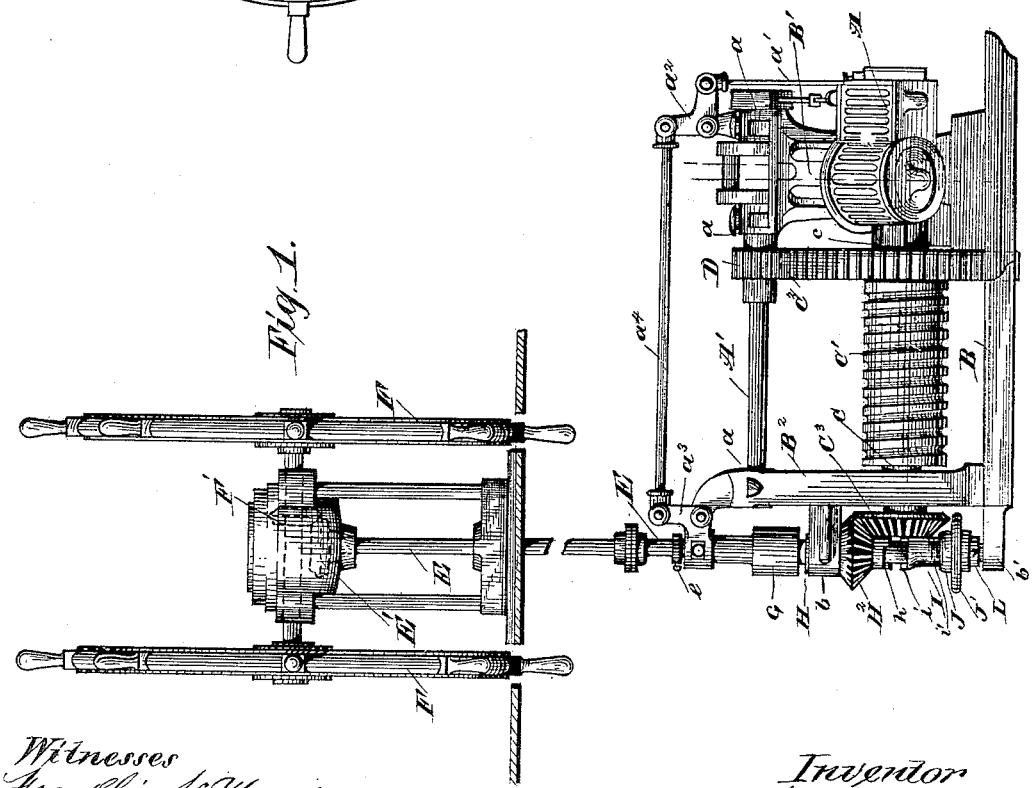

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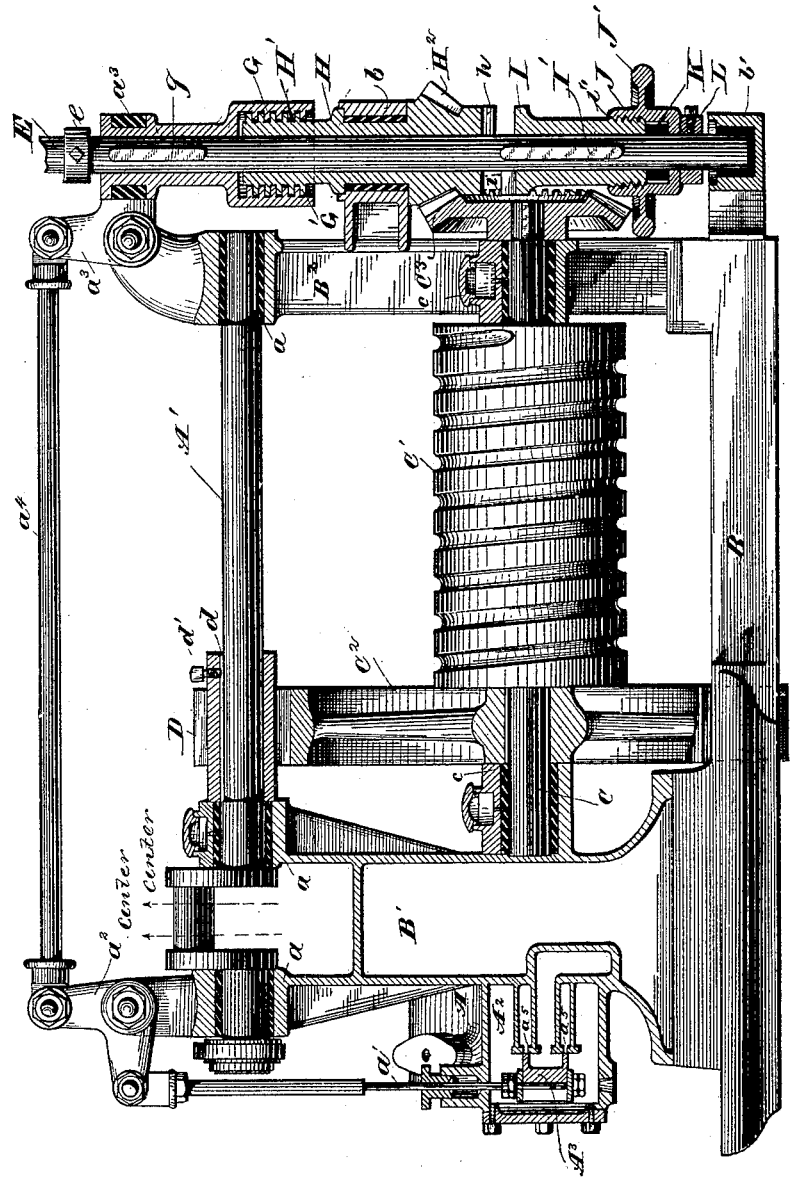
Fig. 3.



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UNITED STATES PATENT OFFICE.

WALTER MILLER, OF CLEVELAND, OHIO.

STEAM AND HAND STEERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 418,921, dated January 7, 1890.

Application filed June 10, 1889. Serial No. 313,795. (No model.)

To all whom it may concern:

Be it known that I, WALTER MILLER, a citizen of the United States, residing at Cleveland, county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Combined Steam and Hand Steering Engines; and I hereby declare the following to be a full, clear, and exact description of my invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in combined steam and hand steering engines, and is designed to provide compact, durable, and effective mechanism whereby the movements of the steering-drum may be controlled by the steering-wheel by the employment of either steam or hand power, as may be most convenient or desirable.

My invention consists in the employment of a vertical shaft directly connected with the steering-wheel to operate the engines which actuate the steering-drum, and in the employment of the same shaft to operate the steering-drum independently of the engines and solely by hand.

My invention also consists in the connecting mechanism and combination and arrangement of parts shown in the accompanying drawings, described herein, and more specifically pointed out in the claims.

In the drawings, Figure 1 is a side elevation of my invention. Fig. 2 is an end elevation, and Fig. 3 an enlarged elevation, with the working parts in central vertical section.

My mechanism consists, primarily, of a pair of twin engines A, working upon a horizontal shaft A′, and supported upon a hollow vertical frame B′ at one end of a horizontal bed-plate B, at the other end of which is a vertical frame B^2. These vertical frames B′ and B^2 are provided with horizontal shaft-bearings *a* and horizontal bearings *c* for the shaft C of the steering-drum C′, which is supported between them. A pinion D upon the shaft A′ drives the gear-wheel C^2, keyed upon the drum-shaft C. The pinion D is movably fixed upon the shaft A by means of a spline *d* and set-screw *d*′. At one end of the bed-plate B, supported by means of the vertical bearing *b* upon the frame B^2 and pedestal-bearing *b*′ on the bed-plate B, is the vertical shaft E, which communicates with the steering-wheel F above deck by means of the bevel-gears E′ and F′. (Shown in dotted lines in the upper part of Fig. 1.) Steam is admitted into the engine-cylinders A by means of a pipe A^2, connecting their steam-chests. A change-valve A^3 is placed centrally over the steam-ports a^5 in this pipe, as shown in section in Fig. 3, and operated by means of the valve-stem *a*′ and bell-cranks a^2 and a^3 with the connecting-rod a^4, mounted upon the top of the frames B′ and B^2. The outer end of the bell-crank a^3 is sleeved between collars upon the sleeve G, which is connected by a spline *g* to the vertical shaft E. The lower end of sleeve G is enlarged and internally screw-threaded at G′ to receive the hunting-screw H′ on the loose sleeve H, which is supported in bearing *b*, and is provided with the clutch-dog *h* at its lower end, and the pinion H^2, which meshes with the large gear C^3 upon the drum-shaft C.

To operate the engine by steam, the steering-wheel F is turned to the right or left, according to the direction in which it is desired to run the engine, thus transferring movement through the gears F′ and E′ to the shaft E. The sleeve G, which is connected to the shaft E by the spline *g*, then turns and is caused to raise or lower on the shaft by means of the hunting-screw connecting the sleeves G and H, and moves the outer arm of the bell-crank a^3, and, through the connecting-rod a^4, bell-crank a^2, and valve-stem *a*′, causes the valve A^3 to uncover the steam-ports a^5 and admit steam to the engine-cylinders. The upward movement of the sleeve G is regulated by the collar *e* and the lower movement by the top of the screw H′. The gear-wheel C upon the drum-shaft C, in revolving, turns the pinion-sleeve H in the reverse direction given the shaft E, and tends to restore the sleeve G and bell-crank a^3 to its former position and close the valve A^3, which it will do at once if left to itself; or the engines can be kept in motion by continuously turning the steering-wheel.

When no great power is required, the engine may be disconnected from the drum C′ by loosening the set-screw *d*′ from the pinion D and removing it from engagement with the gear C^2. Engagement may then be made between the shaft E and the drum C′ by

means of the arrangement shown at the foot of the shaft E, in which I is a removable sleeve fixed upon the shaft E by means of the spline I′ and provided with a clutch-dog *i* at its upper end corresponding to the dog *h* on the lower end of the sleeve H. The lower end of the sleeve I is threaded, as at *i*′, and engages with the screw cap J, provided with the hand-wheel J′ and turning loosely upon the shaft E. Collars K and L retain it in position on the shaft.

When it is desired to work the drum C′ directly from the shaft E, the hand-wheel J′ is turned, bringing the two dogs *i* and *h* of the clutch together and transferring the movement of the shaft E to the shaft C by means of the gears H^2 and C^3. The pinion H^2 being smaller than the gear C^3 increases the power.

I do not claim as my invention the application of the change or floating valve to the steam-pipe, nor, broadly, the application of the steam-power to a steering apparatus, nor do I confine myself to any given proportion of parts or specific form of construction; but

What I claim as new, and desire to secure by Letters Patent, is—

1. In a combined steam and hand steerer, a vertical shaft, as E, with detachable means for connecting the same with a steering-drum, as C′, a steering-wheel, as F, communicating with the upper portion of the shaft by bevel-gears, as E′ and F′, and sleeve and differential thread, as G, communicating with the steering-valve by means of bell-cranks, as a^2 and a^3, and rod a^4, substantially as and for the purpose set forth.

2. In a combined steam and hand steerer, a vertical shaft communicating with the steering-wheel by gears at its upper end connected by a hunting-screw with a change-valve operating the engines at its lower end, and provided with detachable gear-connection with the steering-drum, substantially as described.

3. In a combined steam and hand steerer, engines mounted upon a pedestal and driving a horizontal shaft, a steering-drum driven by a movable pinion upon the engine-shaft, a change-valve located between the engines, a vertical shaft mounted upon the bed-plate and geared to the steering-wheel, with mechanism connecting the valve with the shaft, whereby the valve may be operated by the steering-wheel, means for returning the valve by the revolution of the drum, combined with detachable means for operating the drum from the vertical shaft independently of the engines, substantially as described.

4. In a combined steam and hand steerer, a steering wheel or wheels, as F, communicating with a vertical shaft, as E, a main bed-plate, as B, provided with bearings for the vertical shaft and for a horizontal steering-drum provided with the bevel-gear C^3, and for a crank-shaft, as A′, with a sleeve, as H, on the vertical shaft provided with a pinion, as H^2, at its lower end, and thread, as H′, at its upper end, an internally-threaded sleeve, as G, secured with a spline, as *g*, to the vertical shaft with bell-crank connections with the steering-valve, as A^3, and a clutch-sleeve, as I, at the base of the vertical shaft for hand-steering, and a collar, as *e*, to limit the movement of the valve in steam-steering, substantially as set forth.

5. In a combined hand and steam steerer for use between decks, a vertical shaft, as E, extending to the pilot-house steering wheel or wheels, as F, for operating the shaft, a clutch, as I, at the base of the shaft connected by means of a spline, as I′, with the same, a loose sleeve, as H, on the shaft E, supported in the bearing *b*, and provided with a bevel-gear at its lower end, as H^2, meshing with a bevel-gear, as C^3, on the horizontal steering-drum shaft C, and a thread, as H′, at its upper end, in combination with means for operating the steering-engine, as A, consisting of a sleeved nut, as G, connecting with the said vertical shaft E by means of the spline *g*, and bell-cranks a^2 and a^3, with rods a' and a^4, all substantially as and for the purpose set forth.

6. In a combined steam and hand steerer, the vertical shaft E, in combination with the steering-wheels F, sleeve H, and clutches *h* and *i*, with operating-nut I, gears H^2 and C^3, and drum C′, and means for operating the steering-engine, consisting of sleeve G, spline *g*, nut G′, thread H′, bell-cranks a^2 and a^3, rods a' and a^4, valve A^3, and collar *e*, substantially as and for the purpose set forth.

7. In a combined hand and steam steerer, a vertical shaft E, a pinion loosely sleeved on the shaft and supported in the bearing *b* by a collar and provided with a threaded extension H′ at its upper extremity and with clutch-dogs on its lower extensions, a drum-shaft, as C, and bevel-gear, as C^3, meshing with the pinion H^2, a sleeve, as I, connected with the shaft E by the spline I′, dogs on its upper extremity, as *i*, and a threaded lower extremity, and nut J, in combination with means for connecting the shaft and steering-engine, substantially as set forth.

8. In a combined steam and hand steerer, a vertical steering-shaft, as E, in combination with means for operating the slide-valve of an engine, consisting of the sleeve G, connected by a spline, as *g*, to the shaft, and provided with the nut G′ at its lower end, the sleeve H, loosely sleeved on the shaft E and supported in the bearing 6, provided with the thread H′, adapted to mesh with the nut G′, bell-cranks a^2 and a^3, with connecting-rods a' and a^4, collar E, and detachable means for operating the steering-drum from the shaft when the steam is cut off, substantially as described.

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