No. 623,454. Patented Apr. 18, 1899.

J. D. WILLIAMSON, JR.

REGULATING VALVE FOR STEERING GEAR.

(Application filed Jan. 10, 1899.)

(No Model.) 3 Sheets—Sheet 1.

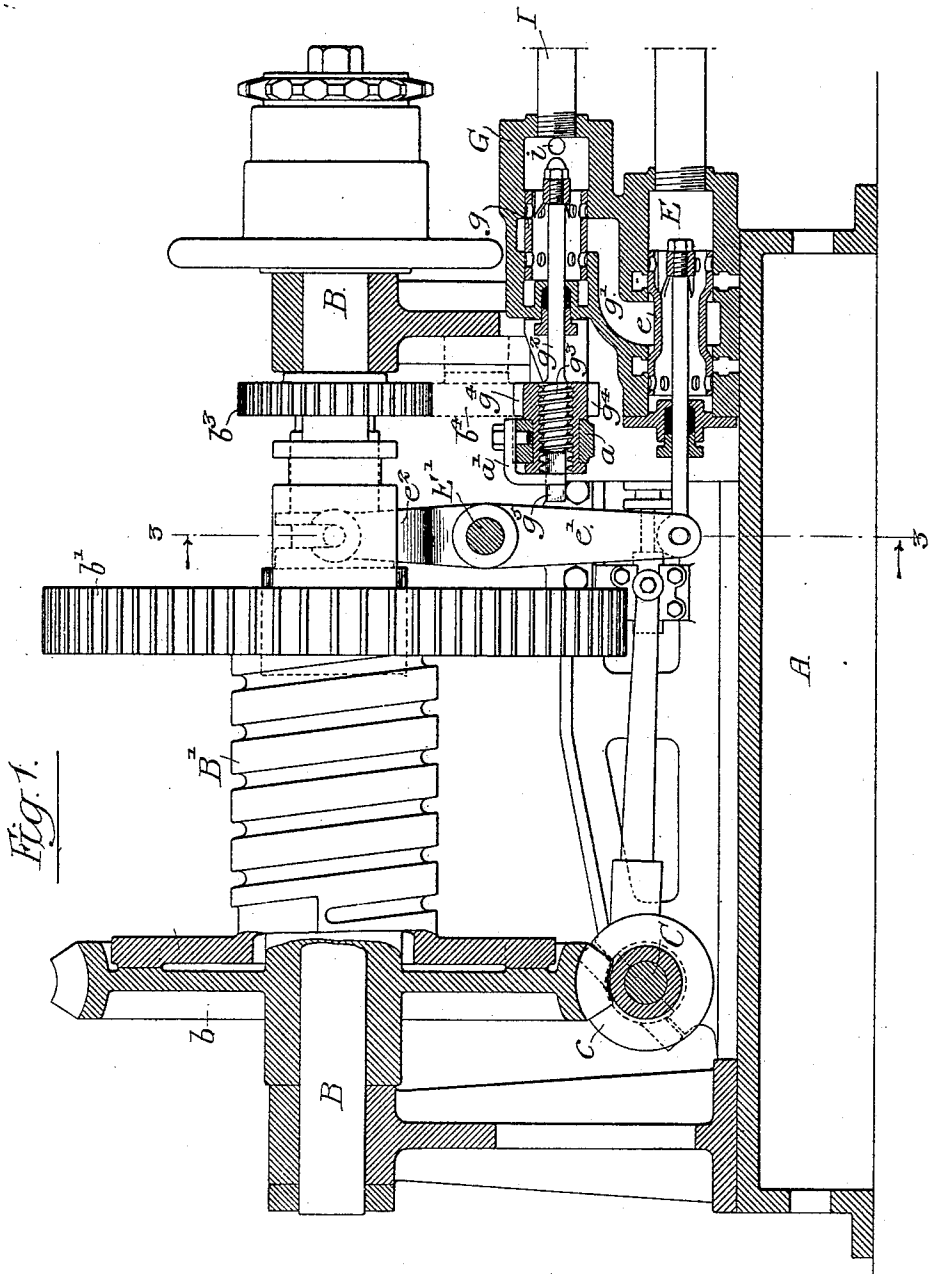


Fig. 1.

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Inventor:
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Fig. 2.

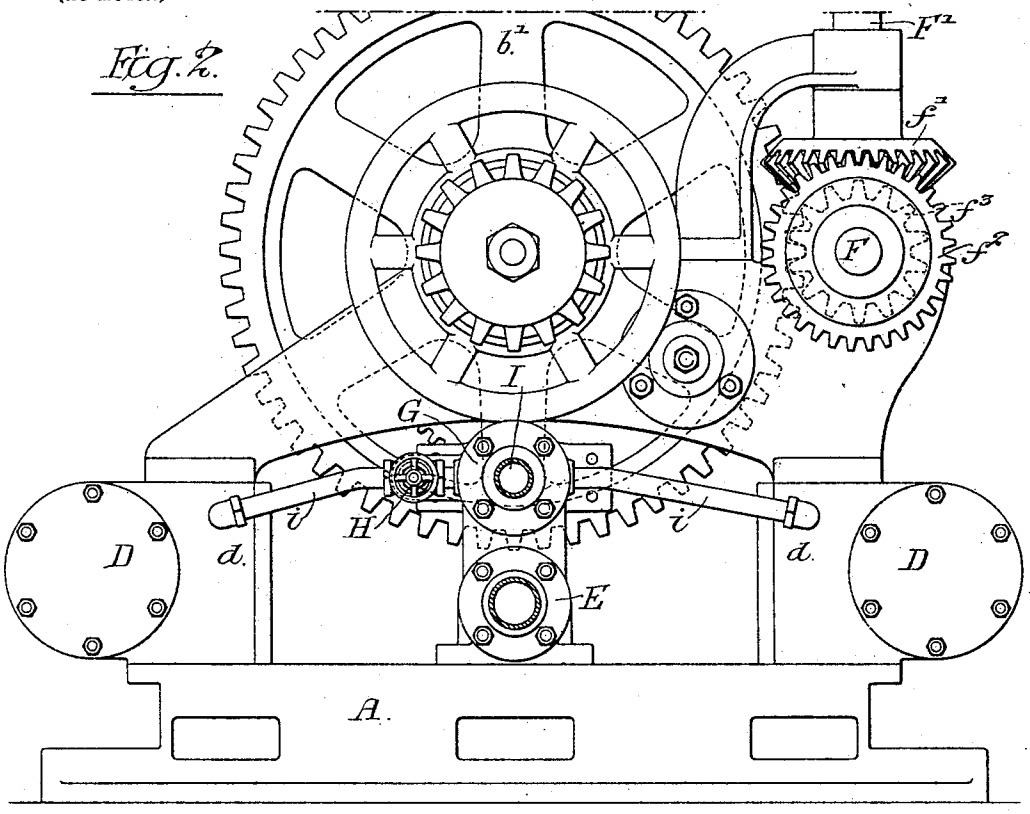
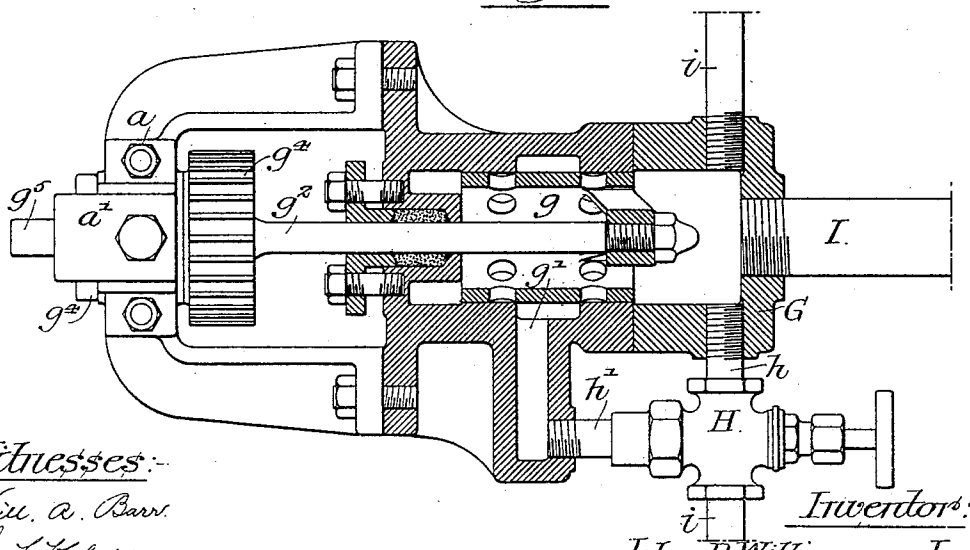


Fig. 4.



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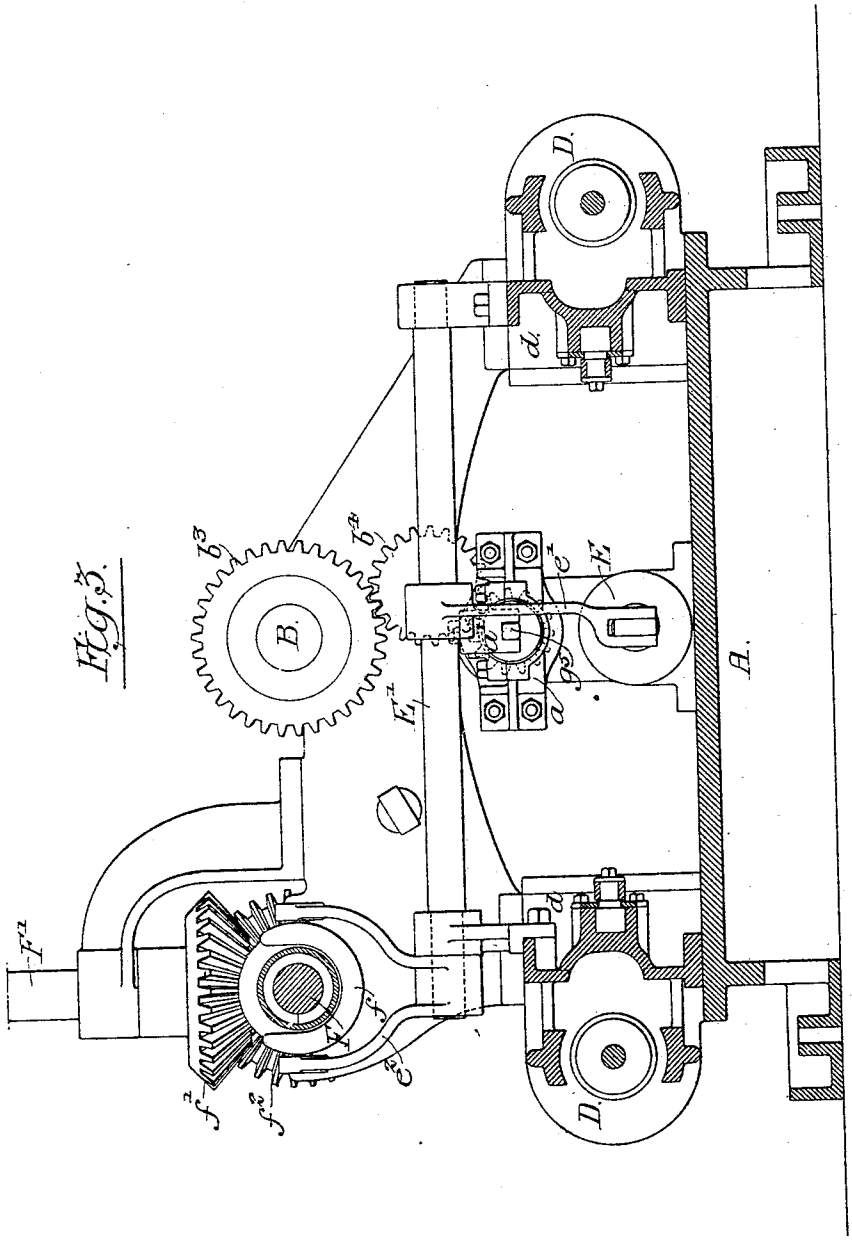
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REGULATING VALVE FOR STEERING GEAR.

(Application filed Jan. 10, 1899.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN D. WILLIAMSON, JR., OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE WILLIAMSON BROTHERS COMPANY, OF SAME PLACE.

REGULATING-VALVE FOR STEERING-GEAR.

SPECIFICATION forming part of Letters Patent No. 623,454, dated April 18, 1899.

Application filed January 10, 1899. Serial No. 701,774. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. WILLIAMSON, Jr., a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Regulating-Valves for Steering-Gears, of which the following is a specification.

The object of my invention is to regulate the admission of steam to the operating-valve of a steering-engine to prevent the too-sudden starting of the engine when the steering-wheel is operated at the central position of the rudder.

The great difficulty with steering-engines of the ordinary construction is the too-sudden opening of the operating-valve by the quartermaster throwing the steering-wheel over too far when starting the engine, thereby giving such a large admission of steam when the rudder is in the central position and when the engine has comparatively little work to perform that it causes the engine to jump and give undue strain to the working parts and also causes the waste of steam.

By my invention the admission of steam to the operating-valve is controlled by an automatic valve operated by the drum, the valve opening as the drum is turned. The automatic valve is closed at the center position; but sufficient steam is allowed to pass the valve to start the engine at any desired speed.

In the accompanying drawings, Figure 1 is a side view, partly in section, of a steering-engine, illustrating my invention. Fig. 2 is an end view. Fig. 3 is a section on the line 3 3, Fig. 1; and Fig. 4 is a sectional view of the automatic regulating-valve.

A is the frame of the steering-engine, and adapted to bearings on this frame is a drum-shaft B, on which is a rope-drum B'. This rope-drum is connected to a worm-wheel b on the shaft B, which gears with a worm c on a crank-shaft C, having cranks connected to the piston-rods of pistons adapted to the cylinders D D. The cylinders are provided with the ordinary slide-valve chests d d.

E is the operating-valve, connected to the steam-supply and to the cylinders D D. This valve is constructed as shown in Fig. 1, having a ported casing and a cylindrical valve e, the valve-rod of which is connected to an arm e' on a rock-shaft E'. This rock-shaft has a forked arm e^2, engaged by a sleeve f on a shaft F, geared by bevel-wheels f' f^2 to an operating-shaft F', leading from the steering-wheel.

On the shaft F is a screw-thread, to which is adapted a thread on the sleeve f, so that the sleeve will be moved in one direction by turning the shaft; but the sleeve f has a pinion f^3 geared to the gear-wheel b' on the drum, and as the drum revolves the sleeve is moved on the shaft in a direction opposite to that above described, so that the valve is opened to admit steam to turn the drum; but the drum in turning tends to close the valve.

The above-described mechanism is common in steering-engines heretofore made by me.

My present invention is as follows: G is my improved automatic regulating-valve, having a casing connected to the casing of the operating-valve E, in the present instance made integral with it. I is the steam-inlet pipe entering at the back of the casing. g is a cylinder-valve having ports adapted to aline with the passage g', leading to the operating-valve. The valve-rod g^2 has a screw-threaded portion g^3, adapted to a screw-threaded hub of a gear-wheel g^4, mounted in a bearing a on the frame of the engine. The rod has a squared portion g^5 at its outer end, and a forked plate a', secured to the bearing, extends over the bar and prevents it from turning. On the drum-shaft B is a gear-wheel b^3, which meshes with an intermediate wheel b^4 on a stud projecting from the frame of the machine. This intermediate wheel meshes with the gear-wheel g^4, so that as the drum-shaft B is turned the gear-wheel g^4 is also turned, imparting a longitudinal movement to the valve g in its casing, allowing more or less steam to flow to the operating-valve. When the rudder is in the center position, the regulating-valve is closed, and as the drum is moved to shift the rudder the valve is gradually opened by the turning of the drum, and when the drum is turned to bring the rudder to the center the valve is gradually closed.

Sufficient steam to start the engine is admitted through a by-pass, which I prefer to

construct as follows: H is a hand-valve of the usual construction. h is a pipe leading from the back of the valve-casing G to the valve H, and h' is a pipe leading from the valve H to the passage g', communicating with the operating-valve, so that there is always sufficient steam to start the engine. $i\,i$ are pipes leading from the back of the valve-casing or from the steam-supply pipe I to the valve-chests d d to balance the valves in the chests.

By the introduction of a regulating-valve, as shown, in the steam-passage leading to the operating-valve, and operated automatically by the drum or drum-shaft of the engine, all undue strains on the working parts are avoided and steam is saved to a considerable extent, as only sufficient steam to just run the engine at center position of rudder is supplied through the by-pass. All additional steam necessary to do the work of pulling the rudder hard over from center position must pass through the regulating-valve.

As the regulating-valve is operated by the engine, it does not add any additional friction or labor when the engine is operated by the hand steering-wheel.

In some instances the valve g may be so set in the casing G that there will be sufficient leaking to start the engine, thus dispensing with the by-pass.

It will be understood that my invention can be applied to any of the ordinary forms of fluid-operated steering-engines without departing from the invention.

I claim as my invention—

1. The combination in a steering-engine, of the drum, engines for operating the same, a controlling-valve operated from the steering-wheel, and a regulating-valve in the fluid-passage leading to the controlling-valve and connections between the drum and the regulating-valve whereby said valve is operated automatically thereby, substantially as described.

2. The combination in a steering-engine, of a drum, engines for operating the same, a controlling-valve operated from the steering-wheel, a regulating-valve in the fluid-supply passage leading to the controlling-valve and geared to and operated by the drum, a by-pass around said valve for the passage of a limited amount of steam to start the engines when the controlling-valve is opened, substantially as described.

3. The combination in a steering-engine, of a drum, an engine controlling the drum, a controlling-valve connected to the steering-wheel, an automatic-regulating-valve casing, a valve therein, and a screw-threaded valve-rod, a gear-wheel having a screw-threaded hub adapted to the thread on the rod, and geared to the drum-shaft, substantially as described.

4. The combination in a steering-engine, of a drum, its shaft, a driven shaft geared to the drum-shaft, an engine for driving said driven shaft, a controlling-valve connected to the steering-wheel and controlling the flow of fluid to the engine, an automatic regulating-valve geared to the drum-shaft, a steam-supply pipe entering the back of the regulating-valve casing, a by-pass pipe extending from the back of the said casing to the passage leading to the controlling-valve, and a hand-valve in said by-pass, substantially as described.

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

JOHN D. WILLIAMSON, JR.

Witnesses:

WILL. A. BARR,

JOS. H. KLEIN.