No. 778,186. PATENTED DEC. 20, 1904.

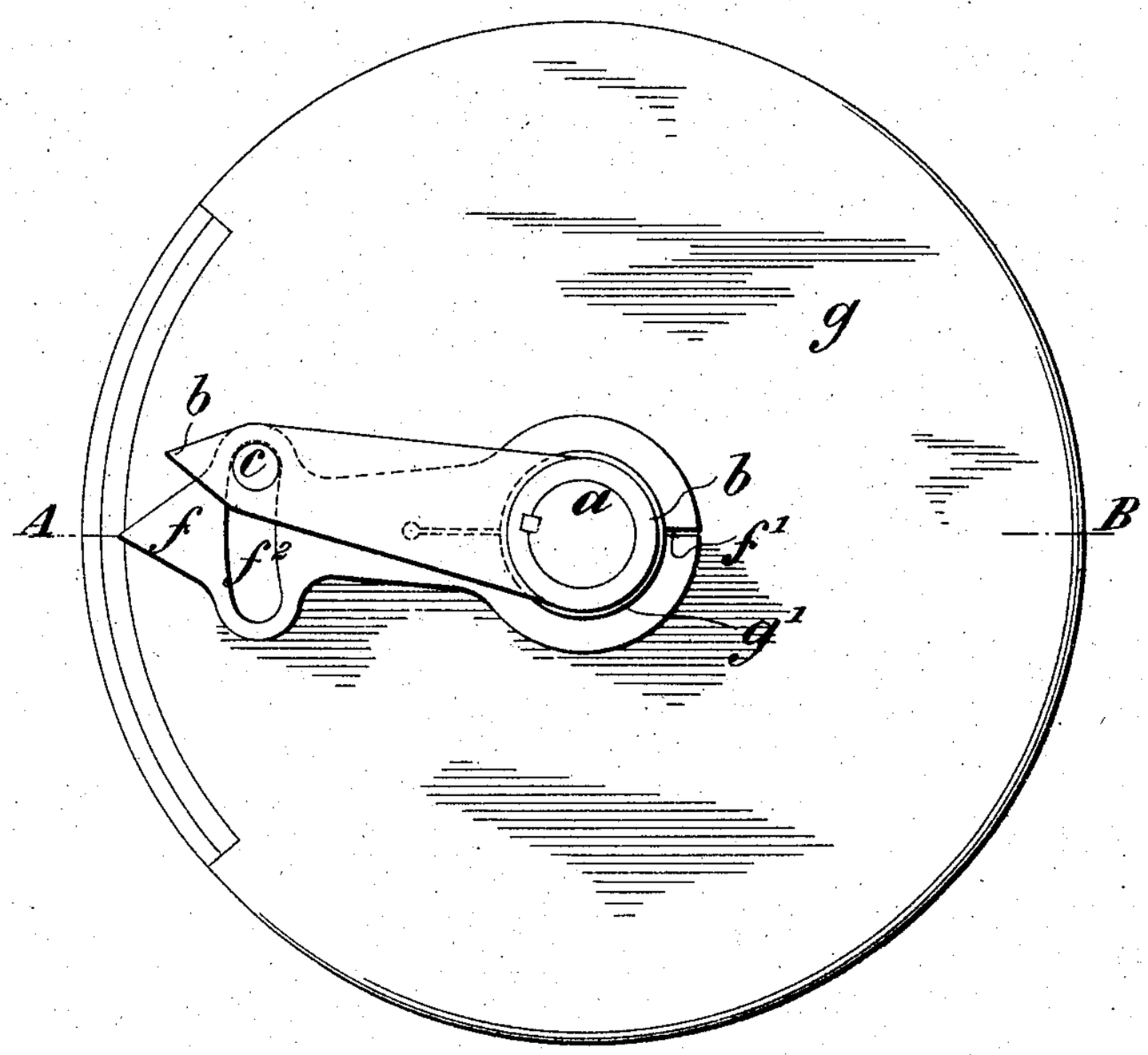
J. M. GRAY.

STEERING ENGINE CONTROLLER.

APPLICATION FILED MAR. 21, 1904.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.



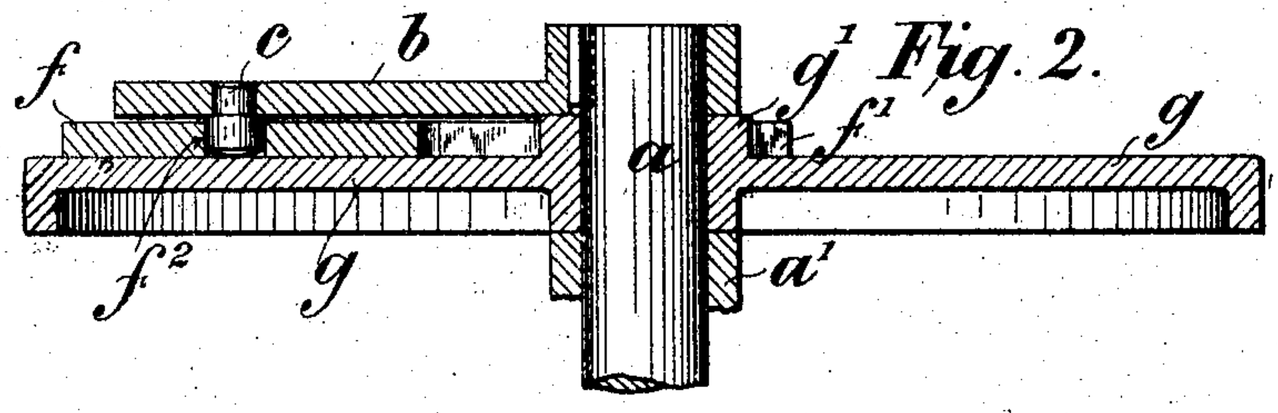


Fig. 2.

Witnesses.
Arthur Wrenn
W. Henry Samms

Inventor.
John Macfarlane Gray
Per Wilkoy & Wise
Attorney.

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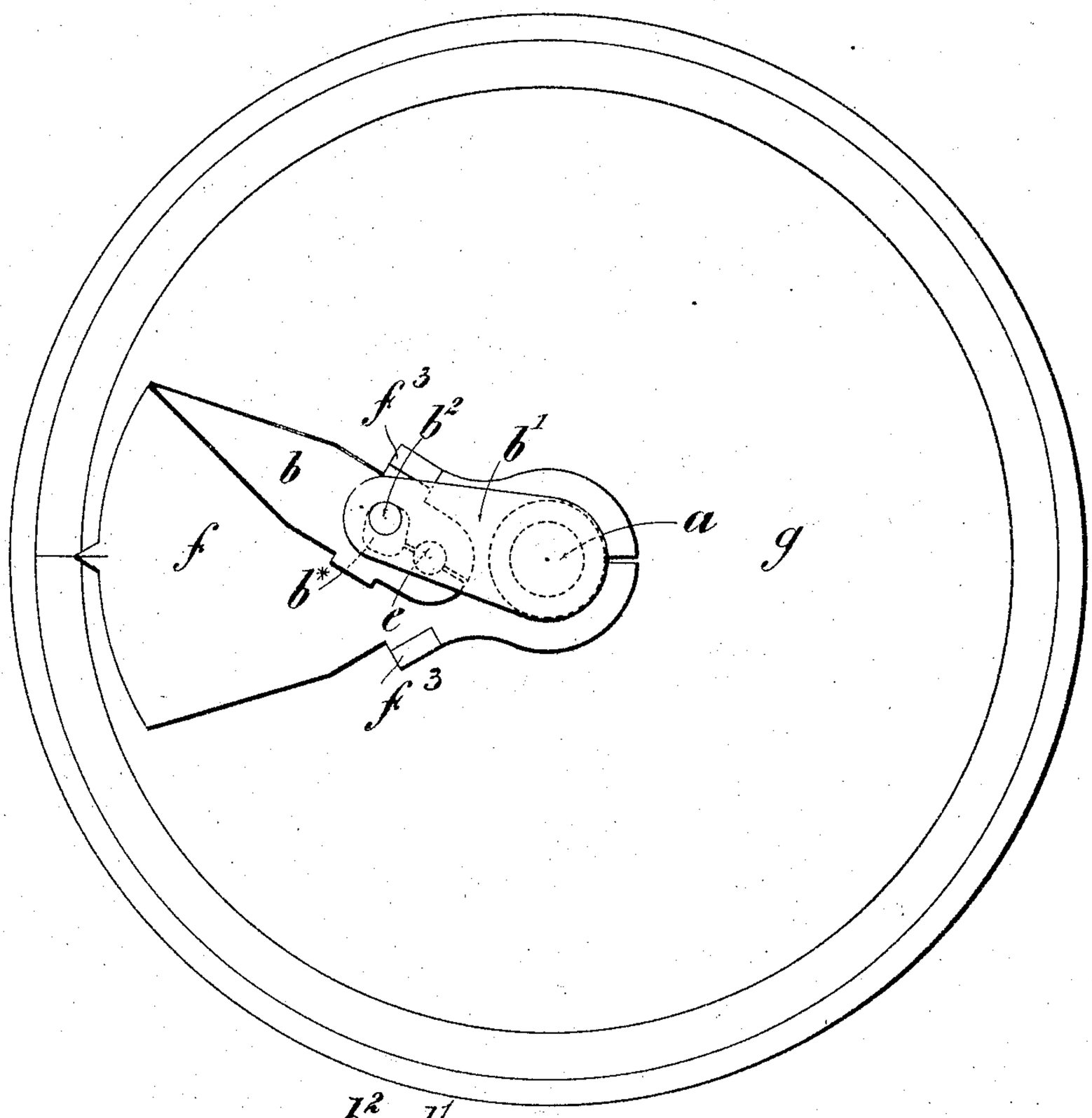
NO MODEL. 3 SHEETS—SHEET 2.

Fig. 3.



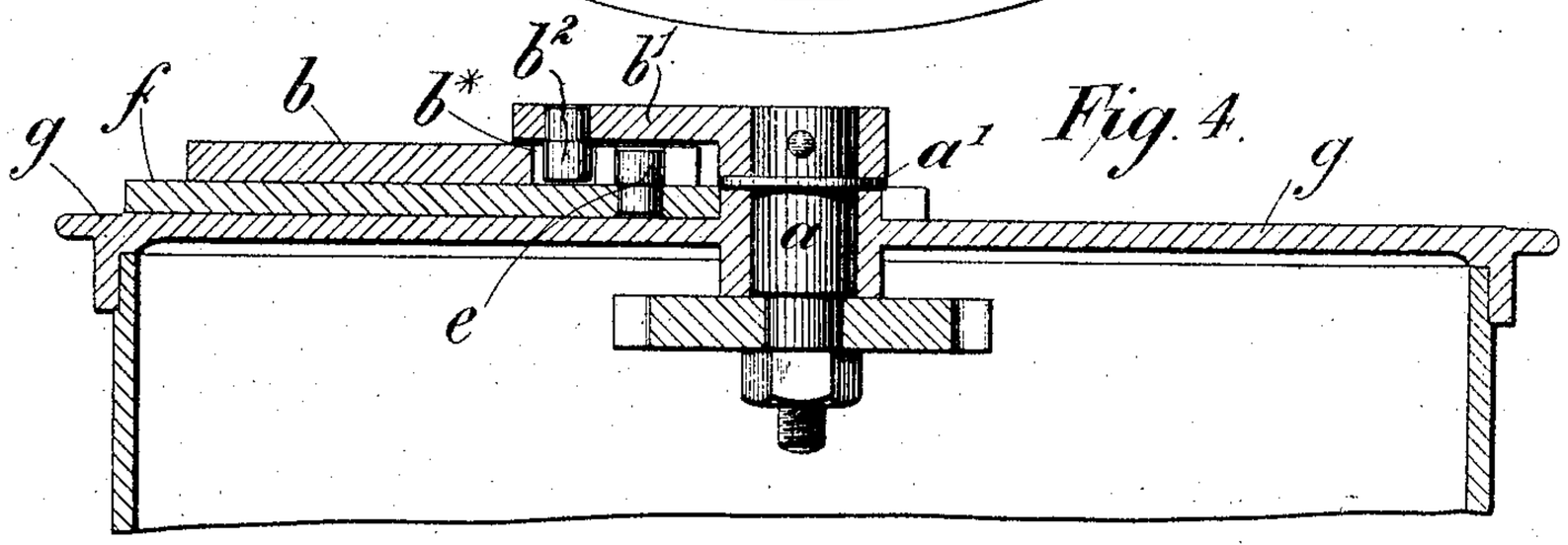


Fig. 4.

Witnesses:
Arthur Norman
W. Henry Grimes

Inventor:
John Macfarlane Gray
per Albert d. Wise
Attorney

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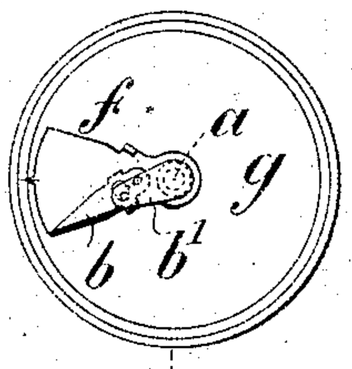
NO MODEL. 3 SHEETS—SHEET 3.

Fig. 6.



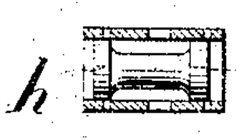
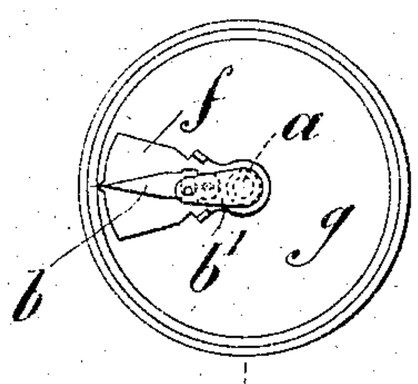


Fig. 5.



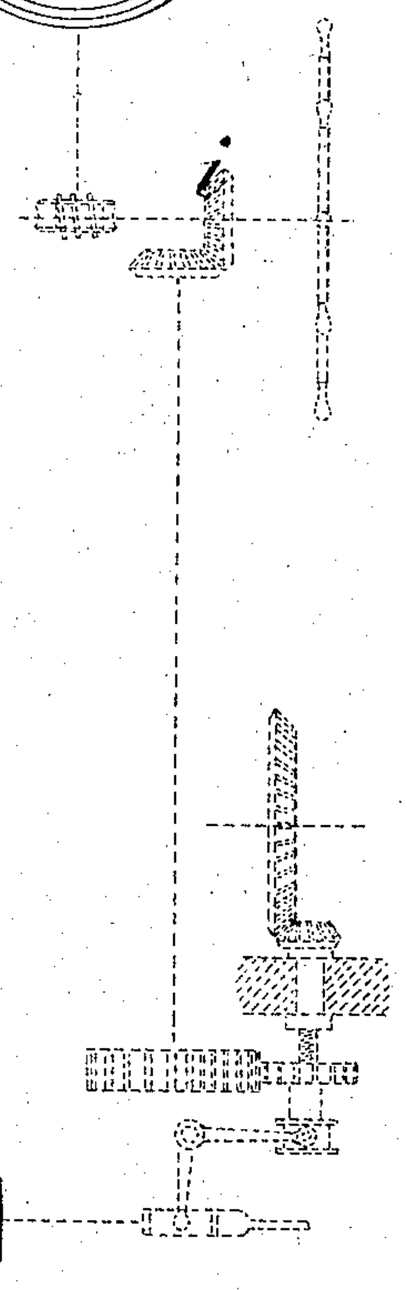
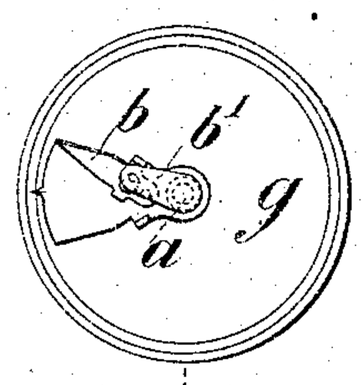
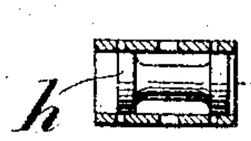


Fig. 7.





Witnesses.
Arthur Woodman
W. Henry Simms

Inventor:
John Macfarlane Gray
by W. Lloyd Wise
Attorney

No. 778,186. Patented December 20, 1904.

UNITED STATES PATENT OFFICE.

JOHN MACFARLANE GRAY, OF NOTTING HILL, LONDON, ENGLAND.

STEERING-ENGINE CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 778,186, dated December 20, 1904.

Application filed March 21, 1904. Serial No. 199,311.

To all whom it may concern:

Be it known that I, JOHN MACFARLANE GRAY, a subject of the King of Great Britain and Ireland, residing at Notting Hill, in the county of London, England, have invented Improvements in Steering-Engine Controllers, of which the following is a specification.

The object of this invention is to obtain greater precision in steering and to minimize the leakage waste when the steering-engine is not running.

The foundational fact upon which this invention is based is that when a steering-engine stops its movement by the steersman ceasing to move the steering-wheel it stops with the controlling-valve in a definite position, distant from its central position by an amount equal to just a little more than the lap on the valve, and the ports being then not quite closed continuous leakage is permitted; also, to insure promptness of action the amount of lap on controlling-valves of steering-engines has hitherto been restricted to a small amount.

Now according to this invention the controlling-valve may be made with any desirable amount of lap and mechanical means are provided whereby the steersman can by a definite movement restore the controlling-valve to its central position in which its liberal lap equally divided effectually minimizes the waste by leakage.

At the controlling-standard, where the steersman is stationed, on the steering-dial there is an auxiliary pointer centered upon the main pointer, so arranged that when the controlling-valve is to be moved from its mid-position the auxiliary pointer alone is moved at first and the main pointer does not move with the controlling-wheel until the valve has moved to the extent of its lap, when the engine should be beginning to move. With further movement of the wheel the main pointer will also move and indicate the actual position of the rudder. In this way greater precision in operating the rudder is secured. When by reversing the movement of the controlling-wheel the rudder is again brought to its mid-ship position according to the main pointer, the auxiliary pointer will be its full travel out to the other side of the main pointer, and the controlling-valve will then be nearly edge to edge upon its ports and so facilitating leakage. The controlling-wheel is then moved so as to bring the auxiliary pointer to be again central upon the main pointer, and by this return movement the controlling-valve is likewise brought to its middle position upon its ports with the lap equally divided between the two ends, and thereby leakage is minimized, the increased lap permitted by the use of the auxiliary pointer greatly contributing to this result.

The essence of this invention is the auxiliary pointer denoting the lap travel of the valve, and the invention may be carried out in different ways by substituting any other suitable mechanical equivalent for the auxiliary pointer.

Examples are illustrated by the accompanying drawings.

Figure 1 is a face view of a controller-dial with the simplest form of auxiliary pointer, and Fig. 2 is a section of the same corresponding to the line A B of Fig. 1. Figs. 3 and 4 are similar views to Figs. 1 and 2, respectively, showing a modified construction and arrangement wherein the auxiliary pointer has an exaggerated travel. Figs. 5, 6, and 7 are diagrammatic views.

Referring to Figs. 1 and 2, *a* is the spindle of the controller-index, which has hitherto been fitted with only one pointer. It is connected to the controlling-valve of the steering-engine in any suitable manner, making the backlash between the steering-wheel and the auxiliary pointer equal to the backlash between the steering-wheel and the controlling-valve. *a'* is a collar on the spindle *a*. Fixed on the spindle *a* is the auxiliary pointer *b*, which is adapted to drive the main pointer *f* by a pin *c*, that extends into a concentric slot f^2 of the main pointer. This pin is in contact with the face of the dial *g*, and its length is such as to maintain sufficient space between the auxiliary pointer and the dial to prevent driving friction between the two pointers *b* and *f*. The main pointer is split at *f'*, where it surrounds the boss *g'* of the dial *g*, and is bored out with spring on it, so that

when in its place it grips the boss g' with sufficient friction to insure that the main pointer f will not move unless pushed by the pin c. The slot f^2 is of such a length that the main pointer f is not moved until the controlling-valve has uncovered its ports and the engine is beginning to move.

In the constructional form shown in Figs. 3 and 4 the auxiliary pointer b moves, as is always preferable, with increased travel to more clearly show to the steersman the deviation from the center line. Fixed on the spindle a is an arm b', adapted to drive the auxiliary pointer b by a pin b^2. The auxiliary pointer b is formed with a slot b^*, in which the pin b^2 engages, and its inner end embraces a pin e, which is fixed in the main pointer f, so that the angular movement of the auxiliary pointer b is an exaggeration of the movement of the arm b'. The pivoting and driving of the auxiliary pointer b is arranged so as to compensate the backlash of the controlling-gear, the required play being provided by means of the slot b^*. The pivoted end of the auxiliary pointer b is split, as shown, to enable it to grip on the pin e with slight friction, just sufficient to insure that it will only move when pushed by the driving-pin b^2. When the auxiliary pointer b has moved into the position shown in Fig. 3, the controlling-valve has moved from its central position to the extent of the lap and the engine is just beginning to move. The auxiliary finger is then in contact with the driving-lug f^3 of the main pointer f, so that any further movement of the auxiliary pointer b in the same direction drives the main pointer f along with it, and the movement of the latter then represents movement of the rudder. When the main pointer f is again brought to midship or steady position, the auxiliary pointer b will be as far to the other side of the center line of the main pointer f, and the controlling-valve will then be edge to edge on its ports. The steersman, allowing time for the rudder to follow the index, will then move the steering-wheel to bring the auxiliary pointer to be central upon the main pointer f. This movement shifts the controlling-valve to its middle position in which the lap is equally divided and thereby leakage is minimized.

Fig. 5 shows a controller-dial g, furnished with auxiliary pointer b and main pointer f, diagrammatically connected to the controlling-valve h of a steering-engine, the valve being in its middle position upon its ports with the lap equally divided between the two ends, and the auxiliary pointer b being in the corresponding central position upon the main pointer f. i indicates gear for operating the valve. Figs. 6 and 7 show the valve h moved to the extent of its lap in opposite directions, the auxiliary pointer b being its full travel out to the respective sides of the main pointer f in the positions corresponding thereto.

What I claim is—

1. In a controlling device for marine steering-engines, the combination with an engine-controlling valve, of actuating means for said valve, and means arranged to be operated by said valve-actuating means and adapted to indicate the position of said valve within the extent of its lap travel, substantially as set forth.

2. In a controlling device for marine steering-engines, the combination with an engine-controlling valve, of actuating means for said valve, a controller-dial, a controller-index spindle driven from said valve-actuating means, and means arranged to be moved by said spindle and adapted to indicate the position of said valve within the extent of its lap travel, substantially as set forth.

3. In a controlling device for marine steering-engines, the combination with an engine-controlling valve, of actuating means for said valve, a controller-dial, a controller-index spindle driven from said valve-actuating means, means arranged to be operated by said spindle and adapted to indicate the position of said controlling-valve within the extent of its lap travel and a main pointer arranged to be moved by said valve-position-indicating means, substantially as set forth.

4. In a controlling device for marine steering-engines, the combination with an engine-controlling valve, of actuating means for said valve, a controller-dial, a controller-index spindle driven from said valve-actuating means, a main pointer, and a valve-position-indicating pointer arranged to be moved by said spindle and adapted to move said main pointer but capable of a limited movement independently thereof, substantially as set forth.

5. In a controlling device for marine steering-engines, the combination with an engine-controlling valve, of actuating means for said valve, a controller-dial, a controller-index spindle driven from said valve-actuating means, a main pointer mounted on a boss of said controller-dial, and a valve-position-indicating pointer arranged to be moved by said spindle and adapted to move said main pointer but capable of a limited movement independently thereof substantially as set forth.

6. In a controlling device for marine steering-engines, the combination with an engine-controlling valve, of actuating means for said valve, a controller-dial, a controller-index spindle driven from said valve-actuating means, a valve-position-indicating pointer arranged to be moved by said spindle, a main pointer, and stops on the main pointer between which the valve-position-indicating pointer is arranged to work and through one or the other of which the said pointer is adapted to move the main pointer, substantially as set forth.

7. In a controlling device for marine steering-engines, the combination with an engine-

controlling valve of actuating means for said valve, a controlling-dial, a controller-index spindle driven from said valve-actuating means, a main pointer, a valve-position-indicating pointer adapted to move said main pointer but capable of a limited movement independently thereof, and an arm arranged to be moved by said spindle and adapted to move said valve-position-indicating pointer, substantially as set forth.

8. In a controlling device for marine steering-engines, the combination with an engine-controlling valve, of actuating means for said valve, a controller-dial, a controller-index spindle driven from said valve-actuating means, a main pointer, a valve-position-indicating pointer adapted to move said main pointer but capable of limited movement independently thereof, a pivot about which said valve-position-indicating pointer can turn, and an arm arranged to be moved by said spindle and adapted to move said valve-position-indicating pointer about its said pivot-pin, substantially as described.

9. In a controlling device for marine steering-engines, the combination with an engine-controlling valve, of actuating means for said valve, a controller-dial, a controller-index spindle driven by said valve-actuating means, a main pointer mounted on a boss of said controller-dial, a valve-position-indicating pointer formed with a slot, a pivot-pin on the main pointer about which said valve-position-indicating pointer can turn, an arm mounted on said index-spindle, a pin fixed to said arm and engaging the slot of said valve-position-indicating pointer, and stops on the main pointer between which the valve-position-indicating pointer is arranged to work and through one or the other of which it is adapted to move said main pointer, substantially as set forth.

Signed at London, England, this 11th day of March, 1904.

JOHN MACFARLANE GRAY.

Witnesses:
JOHN HUGH RAMSAY FIELD,
H. D. JAMISON.