3 Sheets--Sheet 1.

C. A. STEARNS.

Electric Signal-Apparatus for Steam-Vessels.

No. 165,183. Patented July 6, 1875.

Fig. 1

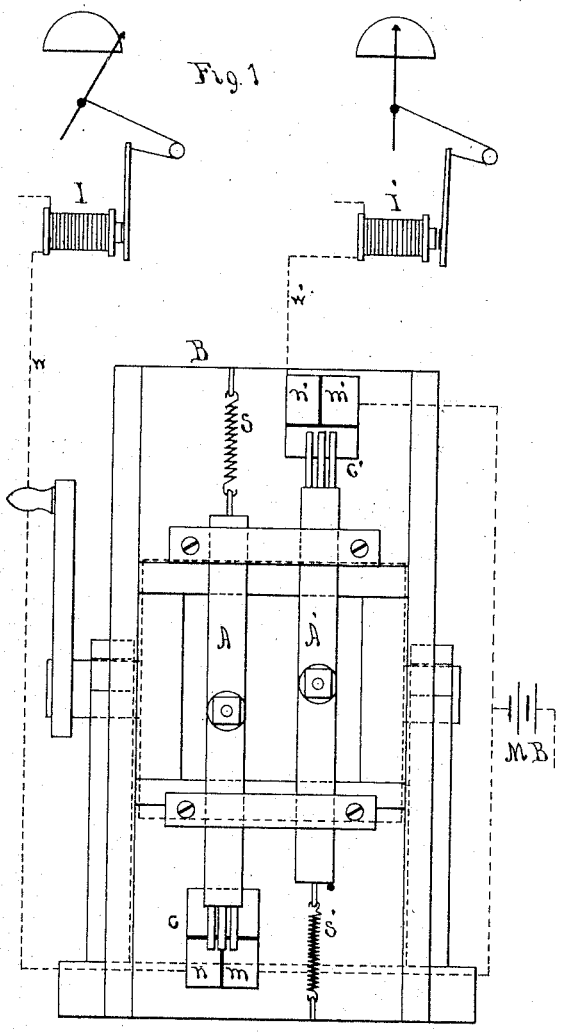
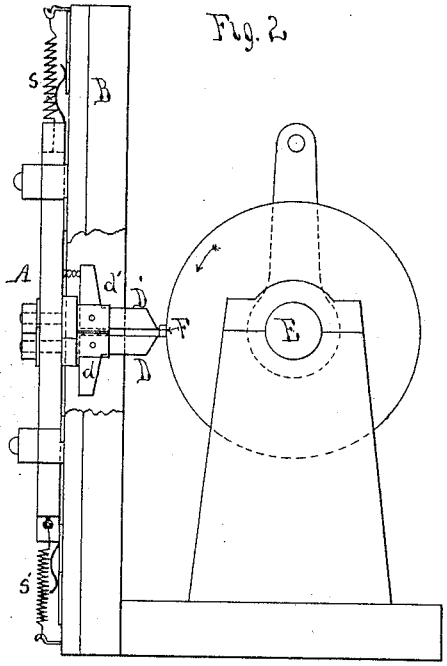


Fig. 2



Witnesses.
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3 Sheets--Sheet 2.

C. A. STEARNS.

Electric Signal-Apparatus for Steam-Vessels.

No. 165,183. Patented July 6, 1875.

Fig. 1

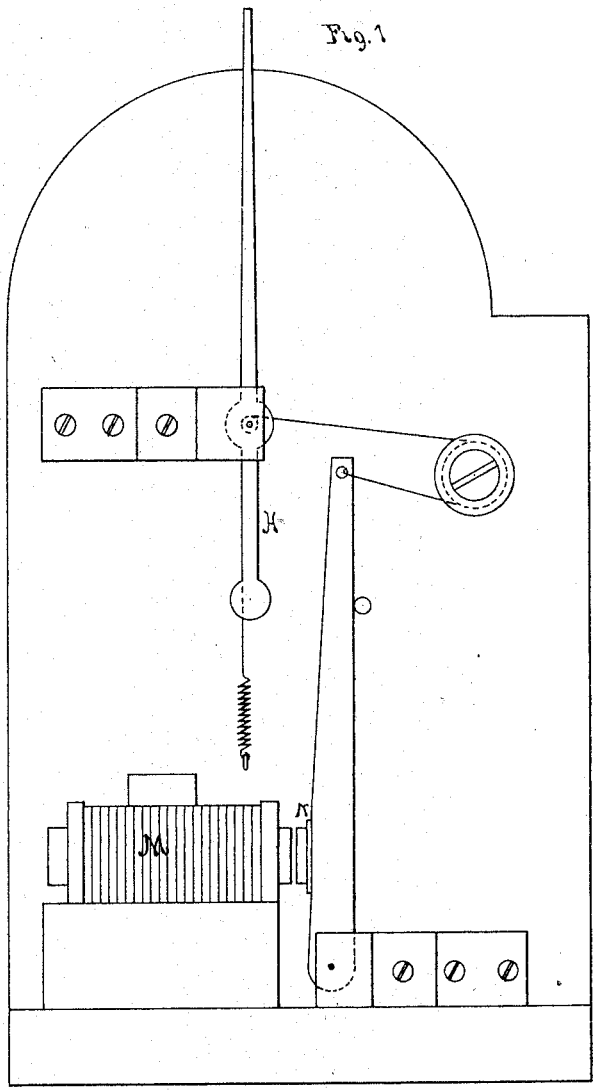
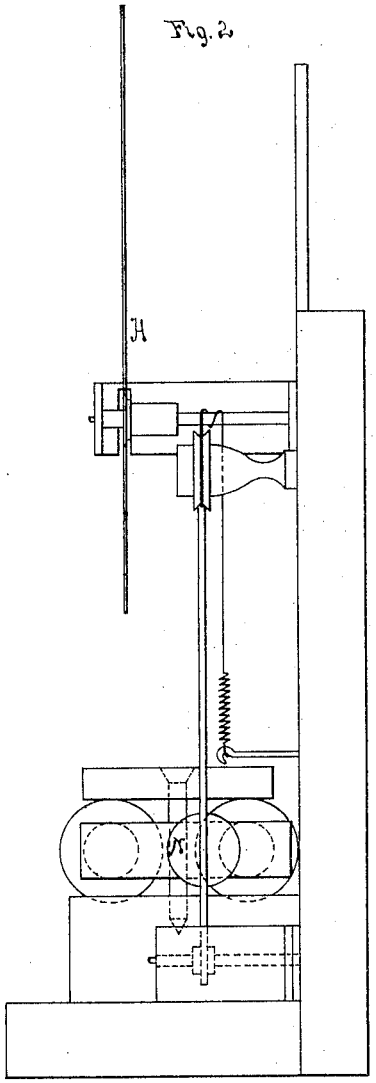


Fig. 2



Witnesses.

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3 Sheets--Sheet 3.

C. A. STEARNS.

Electric Signal-Apparatus for Steam-Vessels.

No. 165,183. Patented July 6, 1875.

Fig. 1

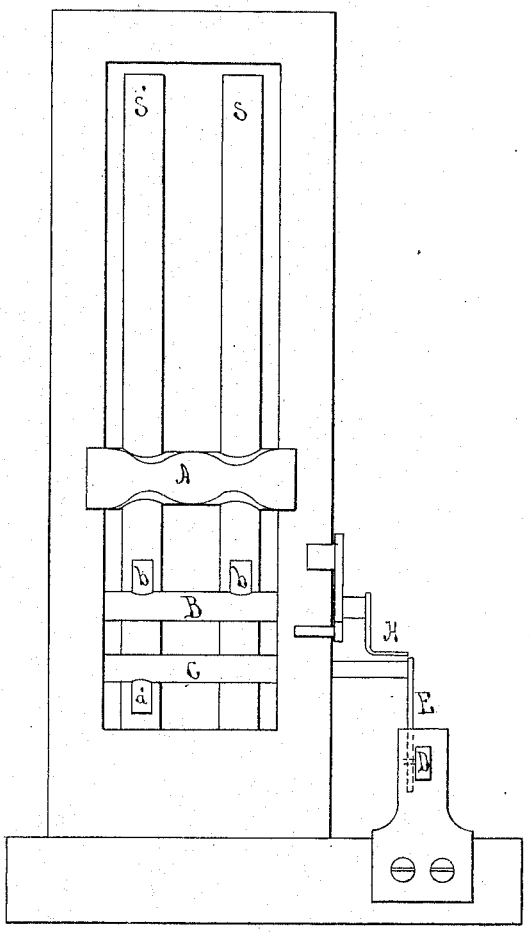
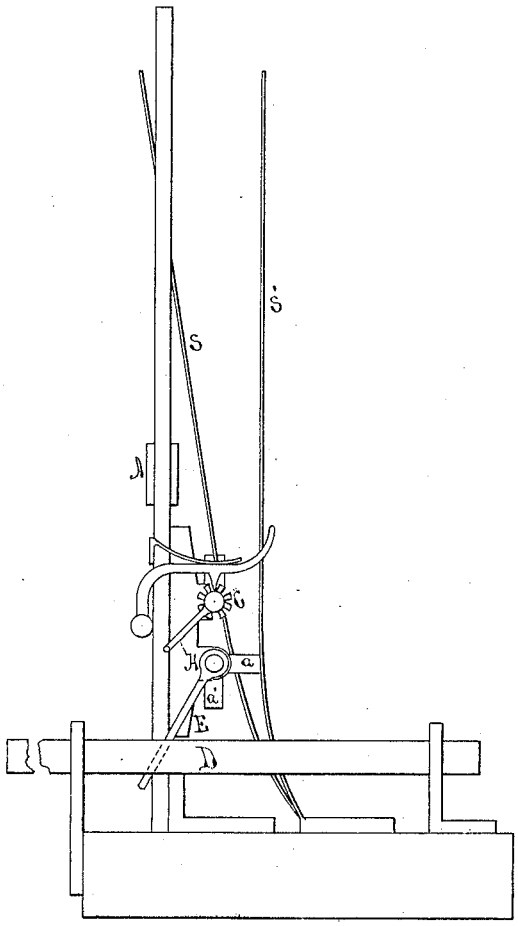


Fig. 2



Witnesses.
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UNITED STATES PATENT OFFICE.

CHARLES A. STEARNS, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HIMSELF, WILLIAM H. TORBERT, OF PHILADELPHIA, PENNSYLVANIA, AND EDMUND B. VANNEVAR AND C. H. DOLBEAR, OF BOSTON, MASS.

IMPROVEMENT IN ELECTRIC SIGNAL APPARATUS FOR STEAM-VESSELS.

Specification forming part of Letters Patent No. **165,183**, dated July 6, 1875; application filed November 27, 1874.

To all whom it may concern:

Be it known that I, CHARLES A. STEARNS, of the city of Boston, county of Suffolk, State of Massachusetts, have invented a new and useful Improvement in Electric Signal Apparatus for Steam-Vessels, of which the following is a full, clear, and exact description, reference being had to the drawings accompanying and forming part of this specification.

This invention relates to signal apparatus for indicating to the steersman in the pilot-house when the shaft is rotating, and also the direction of its rotation, so that he can know at once whether the vessel is moving forward or backward; and it consists in the combination of devices for accomplishing such result as hereinafter set forth.

In the accompanying drawings, Figure 1, Sheet I, shows the circuit-closing device, which is operated by the shaft in front view, and the arrangement of the circuits with said circuit-closer and the indicating apparatus. Fig. 2, Sheet I, shows the said circuit-closer in section. Fig. 1, Sheet II, is a front view of the indicating apparatus; and Fig. 2, Sheet II, is a side view of the same. Fig. 1, Sheet III, is a front view of the circuit-closing apparatus, which is operated by the machinery of the engine; and Fig. 2, Sheet III, is a sectional view of the same.

In these figures like letters refer to similar parts.

I will first describe the circuit-closing apparatus. The form which I prefer is operated by the shaft. It consists of two similar sliding bars, A A′, sliding vertically in a suitable frame, B, each bar having at one extremity a series of springs, C C′, for completing the electric circuit, as will hereafter be explained, and at the other end attached thereto a spiral spring, *s s′*. To the back of each of the bars, at its center, is pivoted at *d d′* a bent lever, D D′, which is allowed to oscillate freely in one direction, but, when moved in the other, will, by bearing against a shoulder, cause the sliding movement of the bar. The levers are so arranged that they move the bars in opposite directions, and their extremities are beveled off oppositely to each other. E is the shaft of the wheel or screw, and F is a projection upon the same, which strikes against the ends of the levers as the shaft rotates. When the shaft rotates in one direction the projection, striking against one of the levers, will slide over its beveled surface, and cause it to oscillate without moving the sliding bar attached thereto; but striking against the projecting end of the other lever will cause its movement and the closing of the circuit by the springs. On the reverse rotation of the shaft the other lever will be moved in the same manner. M B is a galvanic battery, one pole of which is connected to the earth, and the other to the metallic plates *n n′* under each of the levers, respectively. *m m′* are similar metallic plates adjoining the plates *n n′*, but separated from the same by an insulated space, and each of these plates is connected to the electro-magnet of an indicator, and thus to the earth.

The battery may be placed at any convenient point on the vessel.

The apparatus operates as follows: Supposing the shaft to be rotating in the direction of the arrow, and the vessel is moving forward, the lever D, which is struck by the projection on the shaft at each rotation of the same, will cause the movement of the sliding bar A, and the metallic springs C upon its extremity will connect the plates *m* and *n*, and the current will pass from the battery to the indicator I, its operating electro-magnet will be excited, and will cause the movement of the hand attached to the armature, so that an indication will be made that the vessel is moving forward. On the rotation of the shaft in the opposite direction, the lever D′ and sliding bar A′ will be moved, the circuit will be completed through *m′ n′* and indicator I′, and an indication will be given that the vessel is moving backward.

The indicating apparatus is represented in Figs. 1 and 2, Sheet II, and consists of an electro-magnet, M, whose armature N is attached to a pivoted lever, P, the upper end of which is connected by a pulley with the

shaft of the index-hand H. A spring restores the index-hand to its normal upright position, when the attraction of the armature ceases.

Other forms of indicating apparatus may be used; as, for instance, instead of two indicating-dials, a single one can be used, and the hand be turned in opposite directions, for indicating the forward and backward motion by the action of two opposing magnets. An apparatus for giving audible signals can also be used, and I therefore do not confine myself to any particular form of signal apparatus.

Instead of operating the circuit-closing apparatus by the direct action of the shaft, circuit-closing apparatus can be used which is operated by any part of the machinery having a positive motion, and which moves once for each rotation of the shaft.

In Figs. 1 and 2, Sheet III, I have shown an arrangement for operating a circuit-closer by the movement of the valve-head of that class of engine which is reversed by means of a link-motion.

In these drawings, A represents the valve-head, which slides up and down once for each rotation of the shaft, and is connected with the battery. S S′ are the two circuit-closing springs, connected, respectively, with the circuits of the forward and backward indicators. When the shaft is rotating in a forward direction the valve-head makes contact with one of these springs once during its reciprocation, as shown at S in Fig. 2, thereby completing the circuit, and when the engine is reversed, and the direction of the rotation of the shaft also reversed, the valve-head makes contact with the other spring.

This alternate change in the position of the circuit-closing springs is effected by the movement of the radius-bar of the link-motion, which is connected by an arm, E, to a shaft, C, mounted on the frame of the valve-head. This shaft has two projections, *a a′*, upon it, at right angles to each other, each of which can be made to bear against either of the springs, respectively, so as to throw it away from the valve-head by rotating the shaft a partial turn, which is effected by the movement of the radius-bar in reversing the engine.

In order to remove the circuit-closing springs out of the way of the valve-head when it is not necessary to use the signal apparatus, a shaft, B, is provided, having two projections, *b b*, thereon, which can be thrown against the springs by partially turning the shaft.

Other forms of apparatus adapted to other parts of the machinery can be devised, the principle being to close one circuit when the vessel is going forward, and another when moving backward.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

The combination of the shaft E, projection F, bent levers D D′, sliding bars A A′, plates *m m′ n n′*, battery M B, circuits *w w′*, and indicators I I′, substantially as and for the purpose set forth.

CHARLES A. STEARNS.

Witnesses:
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ALEX. L. HAYES.