

(No Model.)

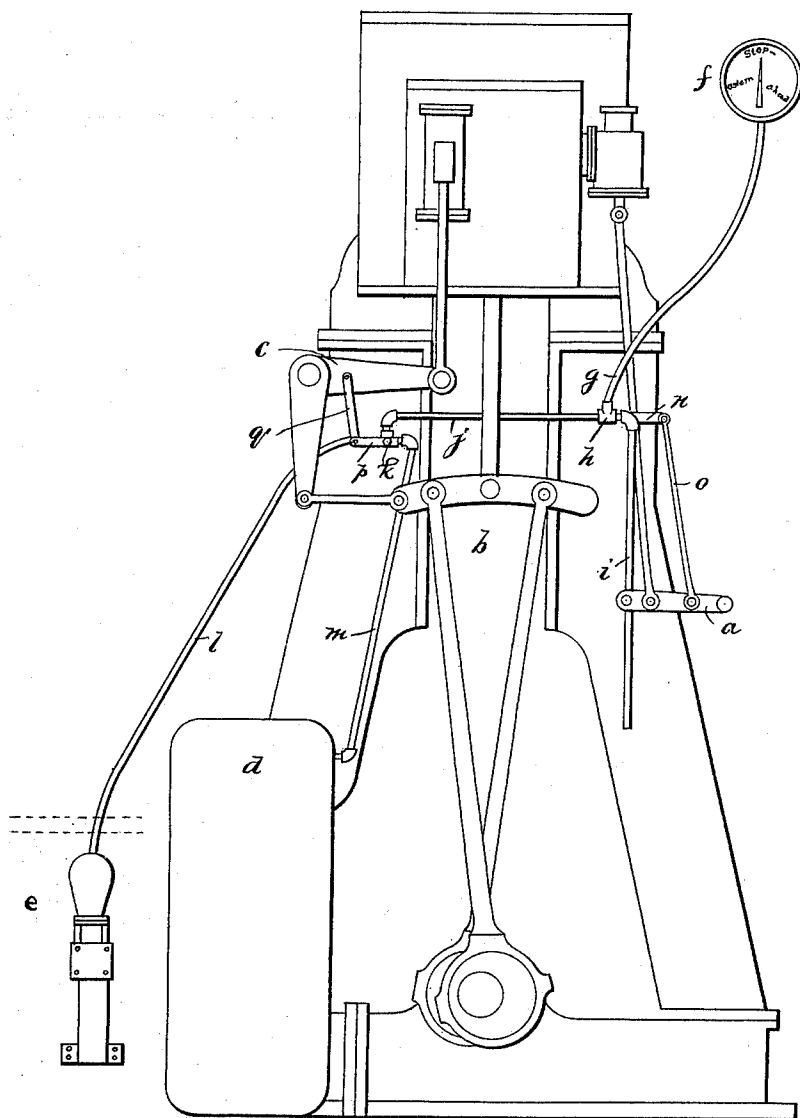
2 Sheets—Sheet 1.

S. D. THURSTON.
INDICATING SYSTEM.

No. 509,459.

Patented Nov. 28, 1893.

Fig. 1.



WITNESSES:

E. C. Ruffy
Hubert E. Peak

INVENTOR

Spencer D. Thurston

BY

O. E. Ruffy
ATTORNEY.

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Fig. 2.

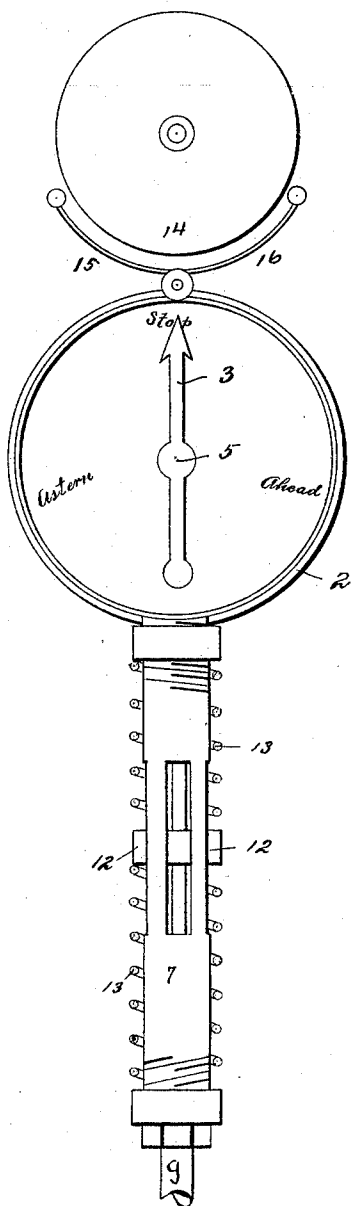


Fig. 3.

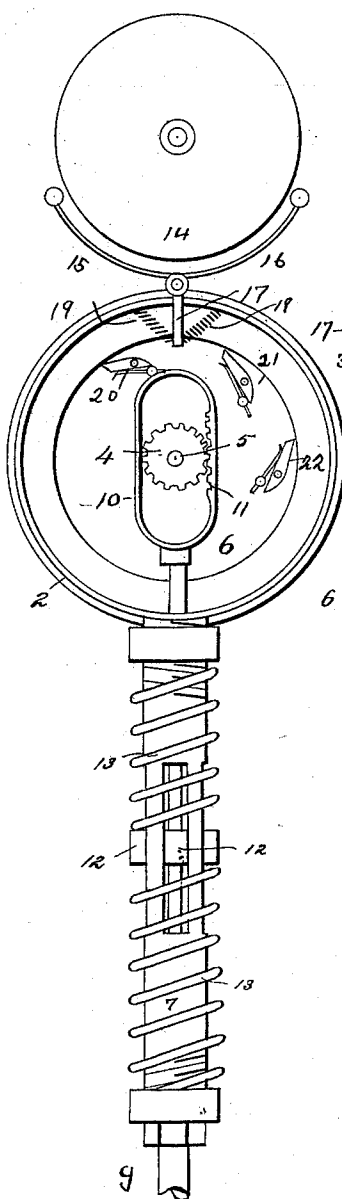
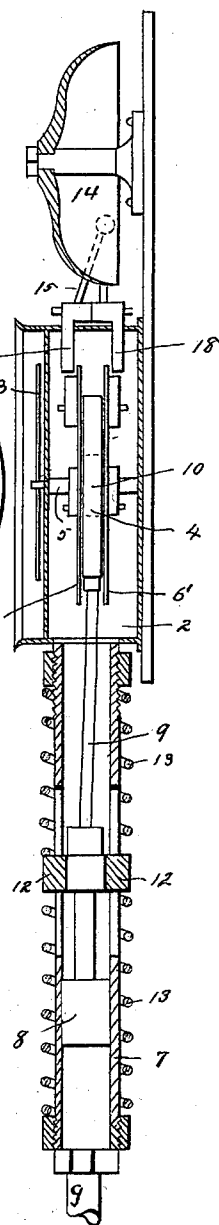


Fig. 4.



WITNESSES:

E. C. Duffy
Hubert Steck

INVENTOR

Spencer D. Thurston

BY

O. E. Duffy
ATTORNEY.

UNITED STATES PATENT OFFICE.

SPENCER D. THURSTON, OF CAMDEN, NEW JERSEY.

INDICATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 509,459, dated November 28, 1893.

Application filed January 14, 1893. Serial No. 458,418. (No model.)

To all whom it may concern:

Be it known that I, SPENCER D. THURSTON, of Camden, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Indicating Systems; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form part of this specification.

This invention relates to certain improvements in indicating systems and more particularly to improved indicating or annunciator systems for steam ships.

The object of the invention is to provide an improved system, whereby the reversal, stoppage or forward movement of the engine is automatically indicated at a desired point on the vessel.

The invention consists in certain novel features of construction and in combinations of parts more fully described hereinafter and particularly pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a diagrammatical view showing part of a marine engine and the present invention applied thereto. Fig. 2 is a sectional elevation of the indicator or annunciator. Fig. 3 is a similar view to that of Fig. 2 showing other portions of the annunciator in section and in elevation respectively. Fig. 4 is a longitudinal section of the annunciator taken in a plane at right angles to the planes of the sections of Figs. 2 and 3.

Considerable difficulty is sometimes experienced in managing or piloting steam vessels when the captain or pilot gives orders to the engineer in rapid succession, and does not know whether his previous order has been obeyed in giving the next order, or when he does not remember his previous order. This invention is intended to automatically indicate in the pilot house (or elsewhere if desired) every start, reversal or stoppage of the engine, and at the same time indicate such action by an audible alarm so that the pilot's orders will be answered and that without imposing any extra action or attention on the part of the engineer.

In Fig. 1 any ordinary engine is shown such as a marine engine. *a*, indicates the throttle lever. *b*, indicates the reversing mechanism, including the links *c*. *d*, indicates the condenser of the engine. *e*, indicates the pump of the engine. *f*, indicates a suitable annunciator or indicator located where desired in some portion of the ship, preferably, in the pilot house. The face of this annunciator is provided with certain characters or words to indicate "ahead," "stop," "back" or "astern." These words are located on the face of the annunciator. This annunciator is so constructed as to be operated by differences in pressure as hereinafter more fully described and this invention is not limited to any particular peculiar construction of annunciator, although a specific construction is herein shown and claimed. The connecting tube *g*, extends from the operating mechanism of the annunciator to the engine, and within its length is provided with a three way cock *h*, one duct thereof opening to the outer atmosphere through pipe *i*; the pipe *g*, opening into another duct thereof; and the third duct thereof connected by pipe *j* to one duct of a second three way cock *k*, having one duct connected by a tube *l*, to the air chamber of pump *e*, or some other source of pressure, as a steam pipe shown by dotted lines. The remaining duct of the cock *k* is connected by tube *m* to the condenser *d*, wherein there is normally a partial vacuum or less than atmospheric pressure. The three way cock *h*, controlling the outlet to the atmosphere has its valve stem operating arm *n*, connected by a link *o*, to the throttle lever *a*, so that when said lever is in its normal position and the engine is working the outlet to the atmosphere through the tube *i*, will be closed and the tubes *g* and *j* will be in communication. When the throttle lever is moved to stop the engine the valve of the cock *h* is turned to close communication between tubes *g* and *j*, and tube *g* is opened to the atmosphere, thereby permitting the parts of the annunciator in the pilot house to assume their normal positions with the finger or indicating finger thereof over "Stop." The operating arm of the three way cock *k*, is connected by a link *q*, to one of the links *c*, of the reversing mechanism of the engine so that when said link is in the go ahead position,

the three way cock will close communication through tube *l*, to the air chamber of the pump, but will place the tube *j*, in communication with the tube *m*, and the condenser and the reduced pressure will permit the springs to force the operating parts of the annunciator so that the finger thereof will indicate "ahead." When the engine is reversed, and the link *c* moved to its opposite position the valve of the cock *k* will be shifted to close tube *m* and place tubes *j* and *l* in communication, and the high pressure in the pump forces the parts of the annunciator to move the finger to "Astern."

From the foregoing description and the drawings it will be readily understood that when the person directing the movements of the vessels sounds an order to the engineer as soon as this order is obeyed it will be indicated in the pilot house or elsewhere and the person in charge knows when his orders are obeyed and whether the engines are working or not and in which direction and furthermore all indications are made without any extra action or thought on the part of the engineer, but entirely automatically by the action of the engine or parts in stopping, starting or reversing.

While specific constructions are herein described for carrying out this invention, such as three way cocks and peculiar connections for operating them, yet I do not wish to limit myself to these exact constructions and arrangements as they are specifically described herein, merely as the preferred way of carrying out my invention.

I do not wish to limit myself to the employment of any particular construction of annunciator in connection with this system, but in Figs. 2, 3, and 4, I illustrate the form of annunciator I prefer to use. In these figures 2, indicates a case provided with the face over which the indicating finger 3, travels and which is provided with the characters indicating astern, stop, and ahead. The shaft carrying this indicating finger is provided with pinion 4, rigid thereon. This shaft 5, is also provided with the two disks 6, 6', rigid thereon within the case preferably located on oppositesides of the gear 4. 7, indicates a cylinder extending down from said case and rigidly secured at its upper end, thereto. The tube *g*, opens into the lower end of this cylinder. 8, indicates a piston in said cylinder having its piston rod 9, extended upwardly and at its upper end provided with the rigid loop 10, surrounding the gear 4, and provided with vertical gearing 11, on one side thereof engaging and meshing with said gear. The piston rod 9, is provided with lateral lugs or projections 12, projecting out through longitudinal slots in the cylinder 7, above the piston therein and located between the inner ends of two springs 13, 13, embracing the periphery of said cylinder and at their outer ends bearing against stops on the cylinder so that if said piston is moved up or down it will

act against the upper or the lower spring. 14, indicates a gong mounted above the case. 15, 16, indicate two clappers suitably pivoted beneath the gong so as to move independently. These clappers are located on opposite sides of the gong and the clapper 15, is provided with a toe 17, extending down beside the disk 6, while the clapper 16, is provided with a toe 18, extending down beside the disk 6'. The two clappers are also provided respectively with springs 19, holding them in their normal positions. The disk 6 is provided with the spring pawls 20, 21, 22, arranged on the side thereof and preferably pointing in the direction the disk turns when the finger is moving to "Astern." These disks are in the drawings shown so arranged that when the finger is over "Stop" the toe 17 will be located between the pawls 21, and 22. Hence if the person in the pilot house rings two bells to start the engine back the tube *g*, will be thrown into communication with a source of pressure and the piston 8, will be forced up against the tension of the upper spring 13, moving the loop 10, up and by means of the gearing 4, 11 and shaft 5, rotating the indicating finger around to the word "Astern." As the shaft 5, rotates the two pawls 20, and 21 will in succession trip the toe 17 and thereby sound the gong twice in the pilot house in answer to the pilot's order to the engineer. If the order "stop" should now be given by say one bell from the pilot to the engineer, the tube *g*, will be opened to the atmosphere when the engineer obeys the order thereby permitting the piston 8, and spring 13, and other parts of the annunciator to return to their normal positions with the finger on the word "Stop." In moving back the pawl 23 on the side of the disk 6', will engage the toe 18, and sound the gong 14, once in answer to the pilot's order. The construction and arrangement of these pawls and parts operated thereby is such that every order of the pilot to the engineer will be answered in the pilot house by the same number of bells, when the engineer obeys the order.

It is evident that various changes might be resorted to in the forms, constructions and arrangements of the parts described without departing from the spirit and scope of my invention. Hence I do not wish to limit myself to the construction herein disclosed.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. An indicating system for steam vessels comprising a pressure annunciator, a duct therefrom having branches, respectively, to the atmosphere, to a source of pressure, and to a chamber wherein the pressure is less than that of the atmosphere, means, substantially as described, controlling said branches whereby said duct can be successively thrown into communication with the atmosphere, said source of pressure, or said chamber, substantially as described.

2. An indicating system for steam vessels

comprising a pressure operated annunciator, a connection therefrom having branches, respectively, communicating with the atmosphere, a chamber or portion of the engine wherein there is excessive pressure, a chamber wherein the pressure is less than that of the atmosphere, and valves controlling said branches and connected with and operated by movable portions or parts of the engine, as and for the purposes set forth.

3. An indicating system comprising an annunciator or indicator, a tube from the operating parts thereof having branches to bodies of fluid under different pressure, valves controlling said branches so that the branches can be successively thrown into continuity with the main tube, and connections between said valves, respectively, and the mechanism controlling the stopping and starting of an engine, and the reversing mechanism of the engine, substantially as described.

4. In an indicating system, the combination of a pressure operated annunciator, of a steam engine, a tube from said annunciator having an opening to the outer atmosphere, a valve controlling said opening and connected with and operated by the throttle lever of the engine, said tube having branches connected with a pump cylinder or chamber, and with a condenser chamber, respectively, a valve controlling said branches, and connections from the reversing mechanism of the engine to said last mentioned valve for operating the same, substantially as described.

5. In an indicating system, the combination of an annunciator operated by differences in pressure, connections for placing the operating mechanism of the annunciator into communication with sources of different pressure, and mechanisms controlled by operating parts of a steam engine for successively placing said annunciator in communication with said sources of different pressures, when the direction of movement of the engine is changed or the engine is stopped or started, substantially as described.

6. An annunciator having the spring controlled piston, the shaft carrying the indicating finger and geared to and rotated by the reciprocation of said piston, the gong the separate spring controlled clappers, and the disks on said shaft having pawls to engage said clappers, substantially as described.

7. In an annunciator, the combination of a shaft controlling the indicating means, a gong and its sounding mechanism, and a disk on said shaft provided with projections, such as pawls, arranged to operate said sounding mechanism to sound the gong a certain number of times for each position assumed by the indicating means, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

SPENCER D. THURSTON.

Witnesses:

J. E. VAN KIRK,
GEO. W. QUIGLEY.