

(No Model.)

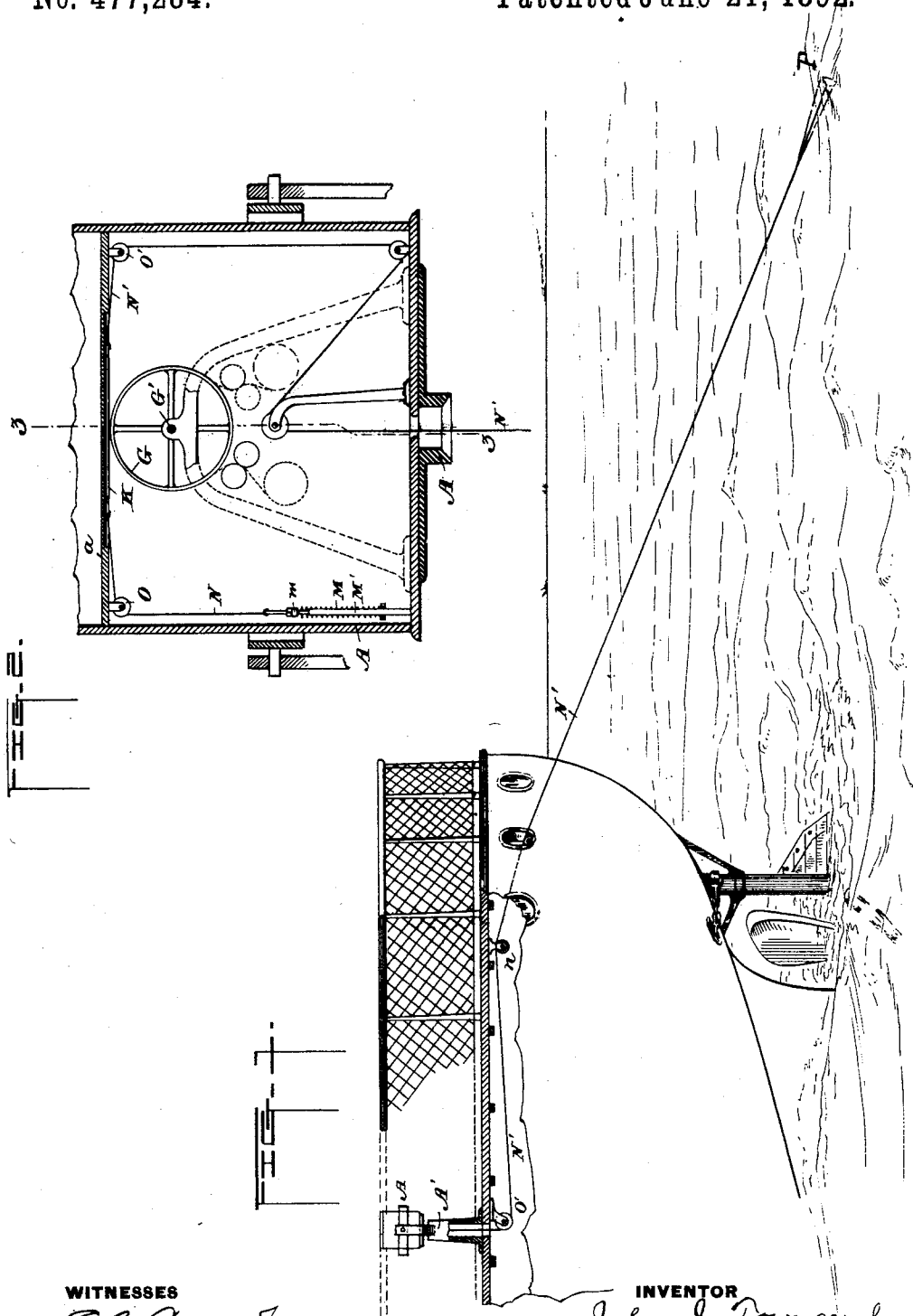
2 Sheets—Sheet 1.

J. J. TOWNSEND.

AUTOMATIC COURSE, SPEED, AND TIME RECORDER FOR VESSELS.

No. 477,284.

Patented June 21, 1892.



WITNESSES

*L. A. Conner*  
*Geo. Snyder*

INVENTOR

*John J. Townsend*  
*By Geo. D. Whitney*  
*att.*

(No Model.)

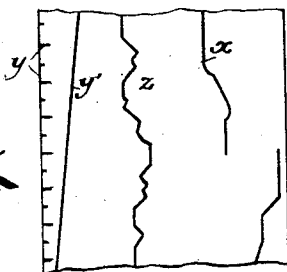
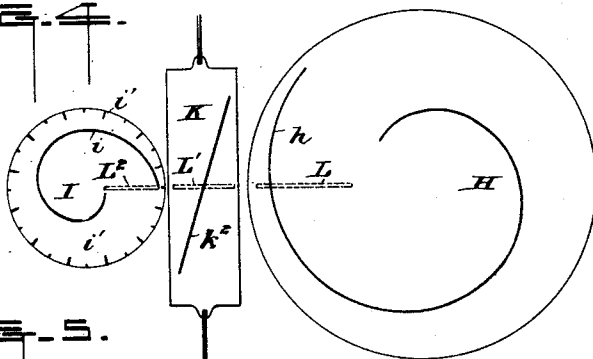
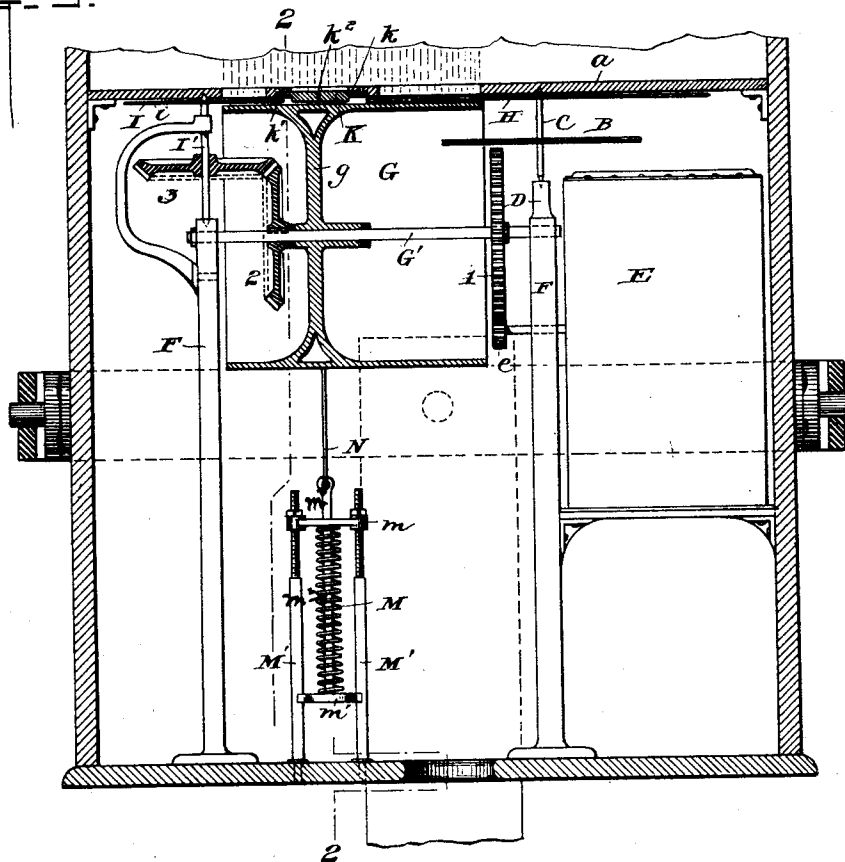
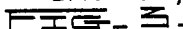
2 Sheets—Sheet 2.

J. J. TOWNSEND.

AUTOMATIC COURSE, SPEED, AND TIME RECORDER FOR VESSELS.

No. 477,284.

Patented June 21, 1892.



**WITNESSES**

L.A. Comer, Jr.  
Geo. Snyder

**INVENTOR**

INVENTOR  
John J. Townsend,  
By Geo. P. Whitman  
Atty.

# UNITED STATES PATENT OFFICE.

JOHN J. TOWNSEND, OF PORTSMOUTH, VIRGINIA, ASSIGNOR TO THE TOWNSEND MARINE INVENTION COMPANY, OF BALTIMORE, MARYLAND.

AUTOMATIC COURSE, SPEED, AND TIME RECORDER FOR VESSELS.

SPECIFICATION forming part of Letters Patent No. 477,284, dated June 21, 1892.

Application filed April 29, 1890. Renewed December 29, 1891. Serial No. 416,477. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN J. TOWNSEND, a citizen of the United States, residing at Portsmouth, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in Automatic Course, Speed, and Time Recorders for Vessels; and I do declare the following to be a full, clear, and exact description of the invention, such as 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 a part of this specification.

My invention relates to apparatus for recording the progress of a vessel, and it aims to produce a graphic representation on the same or different surfaces of the courses sailed, the time spent upon each course, and the rate of speed at any and every moment of time. In two other applications pending simultaneously herewith I have shown and described apparatus for making a graphic record of the courses and the time. The present specification has reference to an auxiliary device by which the speed is recorded also.

In the drawings, Figure 1 is a view of the after part of a vessel, partially in section, showing one form of my improved recorder. Fig. 2 is a vertical longitudinal section, on an enlarged scale, of the speed-recording mechanism, taken on line 2 2, Fig. 3. Fig. 3 is a vertical cross-section, on a still larger scale, taken on line 3 3, Fig. 2. Fig. 4 is a plan of the movable screens, and Fig. 5 is a portion of the record.

The mechanism is inclosed in a casing A, which is preferably mounted in gimbals on a pedestal A', firmly secured to the deck of the vessel. A horizontal diaphragm *a* divides the casing into upper and lower compartments. In the lower compartment is placed the magnetic needle B, mounted on a vertical spindle C, which is stepped in a bearing D in the frame F of the machine. A clock or other motor E is suitably arranged in this compartment of the casing and conveys motion by means of a pinion *e* to a spur-gear *l*, keyed on the horizontal shaft G' of the cylindrical

drum G, which is arranged to revolve in close proximity to the under side of the diaphragm *a*. The arms *g* of the drum are near to the end farthest from the spindle C, in order to give the needle B room to swing inside of the drum, as shown in Fig. 3. The spindle C carries a horizontal disk H of thin stiff material, having a spiral slot *h* cut in it, the slot making but one turn, and its ends lying nearly in the same radial line. The disk is of such a diameter as to extend over the drum G between it and the diaphragm *a*. A smaller horizontal disk or wheel I, mounted on a vertical spindle I', extends over the drum from its other end between the drum and the diaphragm. The wheel is preferably provided with a spiral slot *i* and one or more radial slots or notches *i'*, though one or the other of these may be omitted, if desired. The spindle I' is journaled in an extension of the frame F and is driven by a pair of bevel-gears 2 3, the former being secured on the shaft G'. I prefer to proportion these gears so that the wheel I shall revolve once for every revolution of the drum G, though any desired ratio may be adopted.

Between the adjacent edges of the disk H and wheel I is arranged a slide K. This is preferably supported by flanges *k*, supported in guideways *k'*, let into the under side of the diaphragm *a*, so that the bottom of the slide lies in about the same plane as the bottoms of the disk and wheel and equally close to the drum. The slide contains a straight narrow slot *k*<sup>2</sup>, running obliquely across it, preferably at about the angle shown. Instead of a straight flat slide, I may use a curved plate, mounted to oscillate concentrically with the drum or with one of the spindles or otherwise. I do not confine myself to the slide shown in the drawings.

In the diaphragm are three narrow slots arranged in line with each other and in the vertical plane of the shaft G' and running from near one end of the drum to the other. Light is allowed to pass through these slots; but it cannot reach the drum except through the slots in the disk, slide, and wheel, said slots intersecting the slots L L' L<sup>2</sup>, respectively, at all times. The light therefore strikes

upon the drum in three several points, and upon setting the drum in motion and causing it to feed a strip of sensitized paper or other suitable surface under the slots three lines will be traced upon the paper at the points where the light has passed through. The magnetic needle controlling the disk causes one of these lines  $x$  to indicate the various positions of the needle, and thereby record the courses sailed. The slots in the wheel I, which revolves regularly once in so many hours, produce on the record a series of equidistant marks  $y$ , and also a regularly-recurring diagonal line  $y'$ , the former indicating, for instance, half-hours, and the latter a period of twelve hours, or half a day.

The line  $z$ , made by the slide K, indicates the speed, and the necessary movements of the slide are produced as follows: At one side of the casing is arranged a spring M, the upper end of which abuts against a yoke  $m$ , adjustable on the uprights M'. The lower end of the spring rests on a follower  $m'$ , suitably guided on the uprights and attached to a stem  $m^2$ , that passes up through the spring and through a hole in the yoke and is provided with an eye. A cord or chain N is fastened into the eye and, rising vertically, passes over a pulley O to one end of the slide K. I do not confine myself to this precise arrangement of the spring, since any suitable spring can be used and its attachment to the slide may be greatly varied. From the other end of the slide runs a cord or chain N' to a drag P, submerged in the water surrounding the vessel. This connection can be made in various ways and any suitable drag may be used.

I have shown a simple triangular log attached to the cord and trailing in the wake of the vessel. The cord runs through one of the stern-windows, over suitable sheaves  $n$ , up through the tubular pedestal A', and over suitable wheels O' inside the casing to the end of the slide.

It is evident that the resistance of the drag varies with the speed of the vessel and that it is balanced by the tension of the spring M, which can be adjusted to the proper degree of normal compression. The slide will therefore move back and forth under the varying strains produced by the drag as the speed of the vessel changes. These movements of the slide will cause a shifting of the beam of light passing through its slot, and the result is the irregular line  $z$  of the record. The ordinate of this line measured from the line of no speed or absence of headway gives the rate of speed at the time. By grouping the three records on one strip of paper and making

them simultaneously it is possible to arrive at an exact determination of the vessel's course and speed at any given time during her voyage, the length of time the speed was maintained at a given rate, the number of times it fell below or ran above a given limit, and other similar facts of importance.

It is evident that the speed-recorder can be used apart from the course-recorder, if desired, by simply omitting the needle and the disk, or the time-wheel may be omitted, or the speed-recorder used alone.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An apparatus for recording graphically the courses, time, and rates of speed of a vessel, consisting of a magnetic needle, a clock, a submerged device offering a resistance to its passage through the water, three movable slotted screens connecting, respectively, with needle, clock, and submerged device, and a sensitized surface traveling below the screens, substantially as described.

2. The combination, with a drum, of a magnetic needle carrying a slotted disk, a wheel having one or more slots, a clock driving the drum and wheel, a slotted slide, and a drag connected with the slide, substantially as described.

3. The combination, with the casing having a slotted diaphragm, of the drum revolving below said diaphragm, the obliquely-slotted slide between the drum and the diaphragm, the spring attached to one end of the slide, and the drag attached to the other end of the slide, substantially as described.

4. The combination of the casing having the diaphragm, the guides let into the under surface of the diaphragm, the slotted slide supported by marginal flanges in said guides, the adjustable spring attached to one end of the slide, and the drag connected with the other end, substantially as described.

5. A speed-recorder for vessels, consisting of the combination, with the casing having a slotted diaphragm, of a slotted slide movable below the slot in the diaphragm, a drag connected with said slide, a sensitized surface below the slide, and suitable means, substantially as described, for moving the sensitized surface, as and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN J. TOWNSEND.

Witnesses:

W. S. UMNS,

URIC TOWNSEND.