J. R. St John.

Speed Measure.

No. 8,085. Patented May 13, 1851.

Fig. 2.

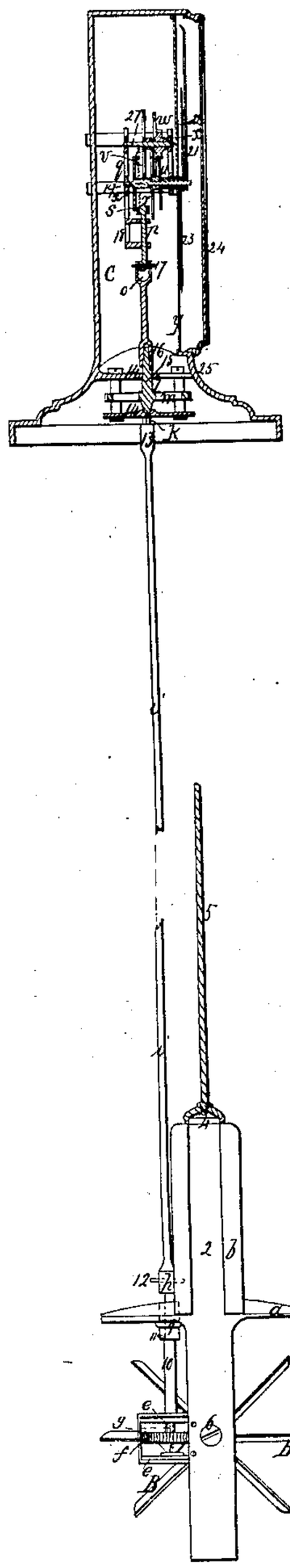


Fig. 1.

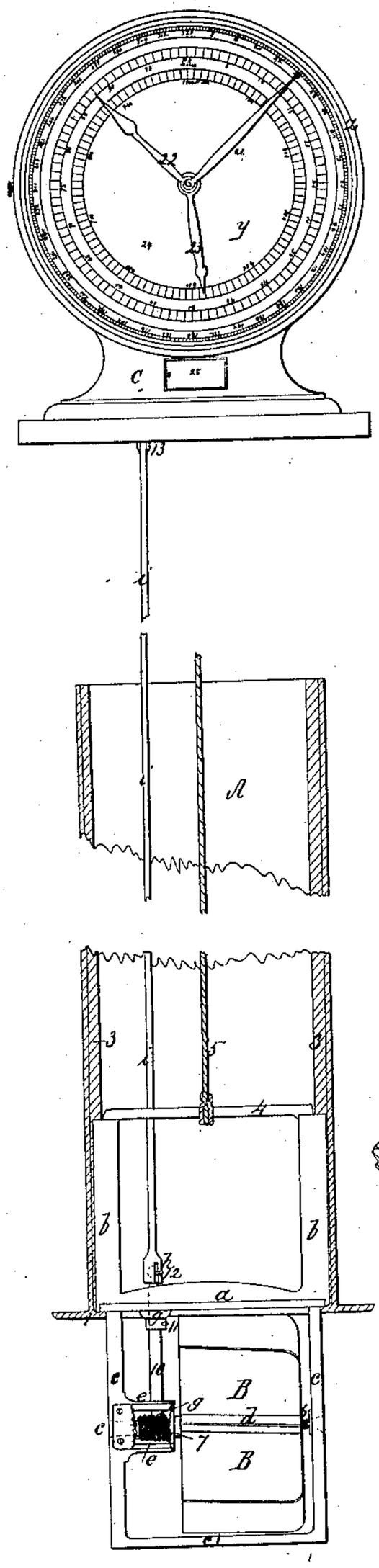


Fig. 3.

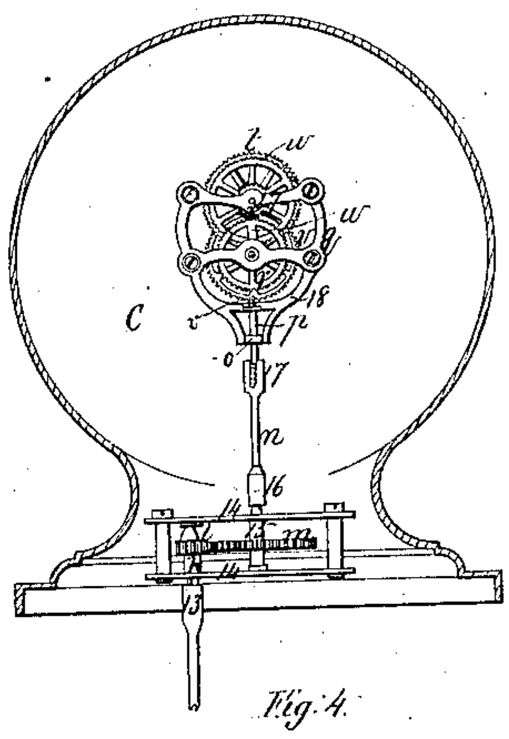


Fig. 4.

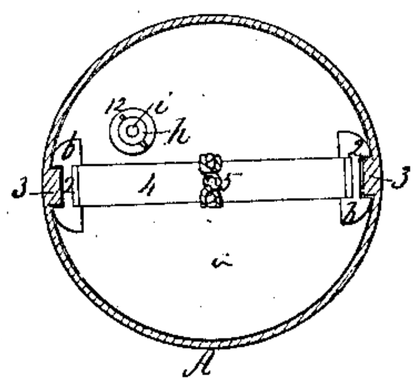
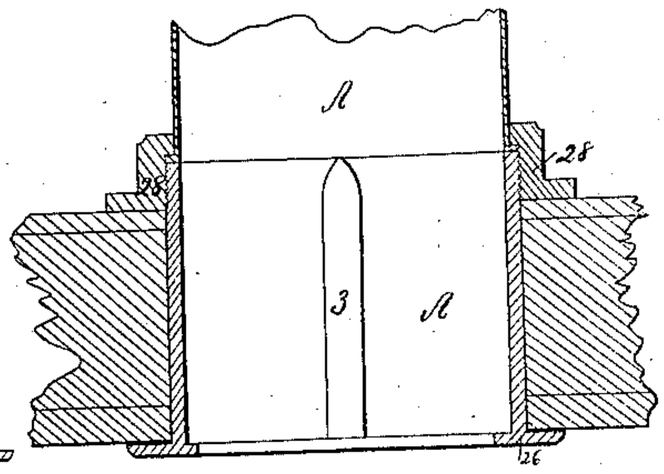


Fig. 5.



Witnesses;
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UNITED STATES PATENT OFFICE.

JOHN R. ST. JOHN, OF NEW YORK, N. Y., ASSIGNOR TO JAS. RENWICK, GEO. F. BARNARD, AND E. B. ST. JOHN.

METHOD OF SUPPORTING THE VANES OF AQUATIC VELOCIMETERS.

Specification of Letters Patent No. 8,085, dated May 13, 1851.

To all whom it may concern:

Be it known that I, JOHN R. ST. JOHN, late of the city of Buffalo, but now of the city of New York, engineer and printer, have invented, made, and applied to use certain new and useful improvements in the application, arrangement, and combination of well-known mechanical means for the purpose of denoting and showing the rate of speed compared with time and also registering the distance a ship has run in or through the water, which improvements I term collectively "St. John's Aquatic Velocimeter."

These improvements comprise, first, the means of fixing the mechanism in place for use, and detaching the same, at will, for examination or repair, and refixing it again for use, without reference to the then situation of the ship; second, the certainly denoting, and registering, the number of miles the ship has run through the water; thirdly, the means of so detaching the working parts from the register, at will, that the latter shall not operate, when the ship is at anchor in a tide way; fourthly, the fitting the acting parts, so that they are protected from the effects of any vertical motion, either of the ship or the water; these improvements effecting all these objects, by means, for which I seek Letters Patent of the United States, to be issued to James Renwick, LL. D., George F. Barnard, and Edward B. St. John, all of the city of New York, as the assignees of me, the said John R. St. John, and as the trustees of the holders of certificates of shares, issued by them, as stock, of the St. John's Compass and Log Manufacturing Company, of the city of New York; agreeably to a deed of trust executed by me the twenty-sixth day of May 1849, and that the said improvements are fully and substantially set forth, and shown, in the following description, and in the drawing annexed to, and making part of this specification, wherein the central Figure 1 is an elevation of the velocimeter wheel, and a section of the pipe, inclosing the connection to the recording clock work, the registering face of which is also shown in this figure; Fig. 2 is a section of the clock work, and a side elevation of the velocimeter wheel, (these two figures include the connection from the velocimeter wheel to the clock work); Fig. 3 is a front elevation of the clock work, with the recording face removed; Fig. 4 is a plan of the pipe, and parts near the velocimeter wheel.

The same letters, and other marks of reference, apply to the same parts in all the figures, and the parts are all drawn and shown to a scale, of about one-third of what I believe will be found the most convenient size, in use.

A is a pipe, or tube, of any fit metal, commencing from the deck, or from any convenient point above the water line, in any convenient perpendicular position in the ship forward of the run; end prolonged downward, so as to terminate with a water tight joint, on the outside of the ship's bottom; and in the inside of the orifice, the pipe A is fitted with a strong bead, or ring flanch 1, that serves as a seat for a metal circular plate, *a*, which prevents any indirect current of water into or out of the tube A and has an upper frame *b b*, the sides of which have grooves 2, 2, that receive ribs 3, 3, on each side, in and the whole length of the tube, or pipe A. These ribs and grooves are set fore and aft of the ship, and guide the apparatus into, or out of, the proper place for work; the cross piece 4 of the frames *b*, *b*, having a rope, rod, or chain, 5, by which the whole frame is to be lowered, or raised, at will. Below the orifice, the plate *a*, has two hanging standards, *c*, *c*, and a foot piece, *c*, *l*. These and the frames *b*, *b*, above, are all to be made solid with the plate.

Between the standards *c*, *c*, two screw centers 6, 6, carry the ends of the principal shaft, or arbor, *d*, on which are set eight paddle blades B, B. These are placed on the shaft *d*, not parallel with the axis, but at such an angle of deflection, in proportion to their length, that a progress of four feet, in a direct line through the water, shall give the blades B, exactly one complete rotation, and no more.

At *e*, *e*, two flanges, cast solid with one of the standards *c*, form the top and bottom of a box; this is inclosed with a strip of metal, screwed on the sides of the standard, and has a hole to pass the shaft *d*, which, within the box is fitted as a single thread worm wheel 7, that gears into a corresponding tooth wheel *f*, with forty teeth, set on a pivot stepped arbor 8, in the bottom of the box, with a square 9, on its top,

taking a socket in the lower end of a short vertical arbor 10, as shown by dotted lines in Figs. 1 and 2. The arbor 10 goes through the top of the box *e* and through the plate *a* of the frame, beneath which a set collar *g* and pin 11 keep the shaft 10 from rising off the wheel *f*. Above the plate *a* the arbor 10 has a pin 12, that takes a two part slot in a socket *h*, at the lower end of a vertical rod *i*. This is prolonged up through the tube A and finishes at top with a square key socket 13, which receives the square end of a short arbor *k*, set in a two part frame 14, 14; this is fixed in the lower part of the clock work case.

The arbor *k* carries the leading pinion *l*, of twelve teeth. This gears into a leading wheel *m* of sixty-six teeth, set on a spindle 15, which goes through the upper frame plate 14 and finishes with a short square, having a round end above it. These parts receive the socket piece 16 of the coupling rod *n*, fitted to the top of the spindle 15, so that the coupling rod *n* may be just lifted and turned to set the register hands above, and yet not be entirely detached off the spindle 15. The top of the rod *n* is formed as a ball socket *o*, with a pin 17, to attach or detach the lower end of the first clock work arbor *p*. Above this the back plate *q* of the clock frame is lengthened down, with two bracket pieces 18, through which the rod *p* passes, receiving on its top the beveled runner pinion *r*, of ten teeth, fitted to gear into the beveled face wheel *s*. This has sixty teeth and is set on an arbor *x*, which backs on the plate *q* and goes forward, carrying the next pinion, and the canon pinions and tubes between that and the face; and outside the face, carries the hand 21. This hand counts rods up to one mile. Next the wheel *s*, a pinion 19, of eight teeth, is made with the arbor *x* and gears into the wheel *t*, of eighty teeth, fixed on an arbor 27, above, and carrying, on the same arbor, a pinion of eight teeth, that gears into a wheel *v*, of eighty teeth, on the canon arbor. This arbor goes through the clock face, finishing just within the point of the arbor *x*, and carries the hand 22, which counts miles up to one hundred in number. The canon arbor is fitted with a pinion of sixteen teeth, that gears into a wheel *w*, of eighty teeth. This wheel rotates freely on the arbor 27, with a hub that is formed as a pinion *x*, of thirty teeth, which gears into a wheel *u*, of sixty teeth. This is set on the second canon arbor, which goes through the face, just short of the first canon arbor, and carries the hand 23, which counts tens of miles, up to one thousand miles.

y is the dial plate, and three sets of divisions. *z* is the bezel, carrying 24, the glass over the dial, and at 25 an opening and door is shown, by which the fingers can be introduced to reach the socket 15, to set the hands in unity, at the time the ship is taking a departure, and thereby avoid removing the glass and bezel and yet set the hands in unity, without touching them.

The parts are shown as in a vertical metal box placed on a pedestal, but the whole may be placed on or in a box or frame of wood or metal, as taste or convenience may dictate.

To make a water tight joint at the bottom of the vessel, the lower part of the tube A may be made separate from the continuous part above, in the manner shown in Fig. 5, which is a section at a right angle to Fig. 1, and shows a pipe with a flange 26 below the outside planking of the ship and the pipe A coming above the inside planking, where a screw thread is cut on it to take a union nut 28, the lower part of which has an external flange to take the inner planking, and the upper part an internal flange to overlie the screwed part of the pipe, taking a flange turned outward, on the lower end of the next upper length of pipe, between the inner flange of the nut 28 and the top of the screwed part, so that the outer flange 26 is held firmly against the outer plank and the two lengths of pipe A are held firmly together by the same connection or union screw. In this figure the rib 3 is shown as only in that part of the pipe, that goes through the bottom of the ship, and is shown as tapered at the top, to pass and receive the grooves 2 in the sides of the frames *b*, without the necessity of having ribs in the upper part of the tube, as the frame, when lowered by a rod or bar can be directed to place the grooves over the tapered tops of the ribs, which, entering the grooves in the descent, at once seats the mechanism in place for use.

The operation and timing of the parts and the proportions of the gearing having been stated, it will be seen that forty turns of the worm 7 will give the wheel *f* one turn in one hundred and sixty feet, or thirty-three turns in one mile; the pinion *l*, of 12 teeth going at the same speed will give the leading wheel of sixty-six teeth, six turns in a mile, and this giving the runner pinion *r*, of ten teeth, the like number of turns, will give the wheel *s*, of sixty teeth, with the arbor *x* and hand 21, one entire rotation in one mile; the pinion 19, of eight teeth, going at the same rotation, gives the wheel *t*, one-tenth of a rotation, and the pinion of eight teeth gearing to the wheel *v* of eighty teeth, gives that and the canon arbor and hand 22 the one-hundredth part of a rotation; the pinion of sixteen teeth, gearing to the wheel *w*, of eighty teeth, gives that the one five-hundredth of a rotation, and this, with its hub pinion *x*, of thirty teeth, gives the wheel *u* and second canon arbor with the

hand 23 the one-thousandth of a rotation for each turn of the mile wheel.

The divisions for one mile, being marked as rods, gives also furlongs and quarters; so that the distance run through the water can be ascertained to a fraction of a mile, if so required, by the dots between the divisions.

It will be understood that the distance run in a given time will be ascertained by comparing the hands on the dial with a clock or watch, thus practically giving the rate of the ship, in miles per hour, by mere inspection.

It is well known that many attempts have been made to apply machinery for the purpose of ascertaining the rate of speed at which a ship has moved through the water in a given time and it is believed the best of which is known as "Massey's log." This, so far as known, is a box containing machinery, which is towed through the water by the ship, and is liable to uncertainties, because a fast ship, in a short sea, will frequently jerk it out of the water when it is in operation the motion of the water and of the ship is always changing the angle of the tow line and on hauling on board it is also liable to injury by striking the vessel when sending or pitching heavily. Another log has been made, fitted to be placed under the counter of the ship, where it is in the eddy water the ship draws after her, and becomes uncertain in its rotation, besides being open to all the former objections, when hauling into or out of place, for use; and others have been contrived in various ways; but I do not know of any mechanical apparatus for ships' use that is so placed beneath the bottom of the ship as to be clear of all ordinary accidental interference, by fitting the vanes or paddle blades B into a frame, constructed with grooves to slide on ribs in a tube or pipe, the bottom of which supports the frame by a bead or flange, surrounding a disk *a*, carrying the frame *b*, that cuts off or prevents the effects of any vertical motion of either the ship or the water on the paddle blades B, to destroy the accuracy of the instrument, and fitted to act on the line of motion, so that the motive parts of the velocimeter can be withdrawn for any needful purpose and again replaced for use; nor do I know of any similar instrument for these purposes that is made to operate as a standing register of the whole distance a ship has actually run, either with or without a direct reference to time, during any portion of the distance, by the operations of the vanes or blades B through a rod in the tube A upon a registering set of clock work wheels and hands, which the herein description and drawing shows as registering fractions up to one mile, and from one mile to one hundred and thence to one thousand; so that by increasing the number of wheels and pinions the registry may be extended to any desired distance; and I do not mean to limit myself to the stated extent of the numerical registry, or to the sizes and proportions of the parts, but to vary these as may be needed; nor do I mean to be limited to the mode shown of fitting the moving parts, but to add any mechanical means for lessening friction and wear whenever and wherever practical use may evince the propriety of so doing.

It will, of course, be understood that the motion of the ship is estimated as when moving in still water, and that any known currents are to be added when in favor of the ship and deducted when against her.

Having thus described my invention and set forth the means I employ and the differences between my invention and those that are known to have preceded it, I do not intend to claim any of the parts herein described as taken separately, (all are well known and in common use,) but

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

The attaching the disk or plate *a* to the sliding frames *b* and *c*, which frame *c* carries the shaft *d* of the paddle blades B, when said frame and plate are fitted to be lowered into or raised out of a tube A, in such a manner that when in place for use the plate *a* prevents any indirect current of water from ascending into or descending out of the tube A to disturb or destroy the accuracy of the instrument, leaving the paddle blades B subject only to the direct action of the vessel's progress through the water, substantially as described and shown.

In witness whereof I have hereunto signed my name, in the city of New York, this seventh day of December, in the year one thousand eight hundred and forty-nine.

JNO. R. ST. JOHN.

Witnesses:
WM. SERRELL,
LEMUEL W. SERRELL.