A. Banaré,

Speed Measure.

No. 93,513. Patented Aug. 10, 1869.

Fig. 3.

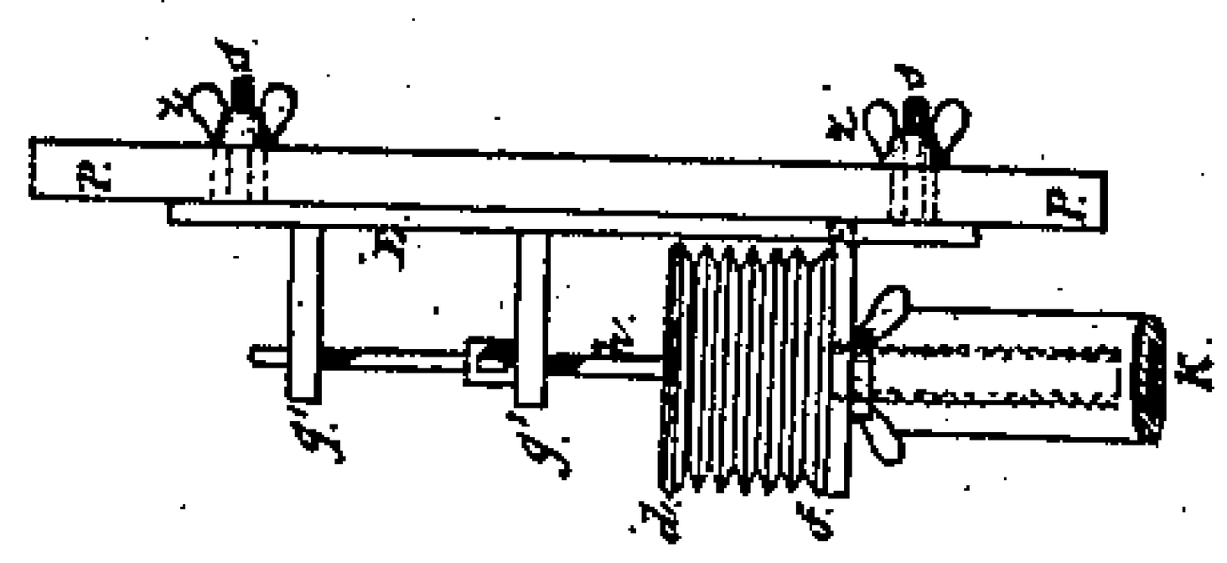


Fig. 2

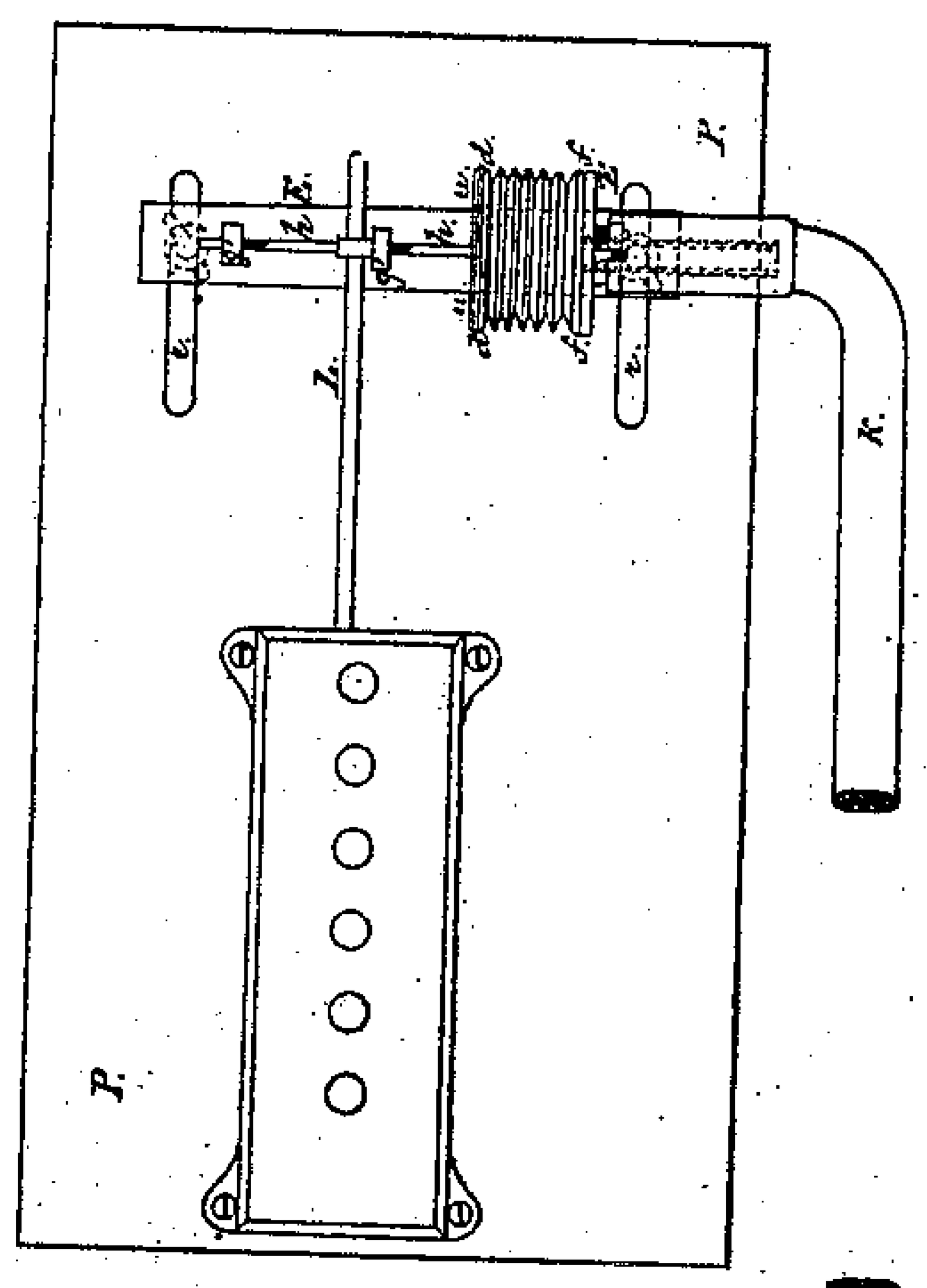


Fig. 1.

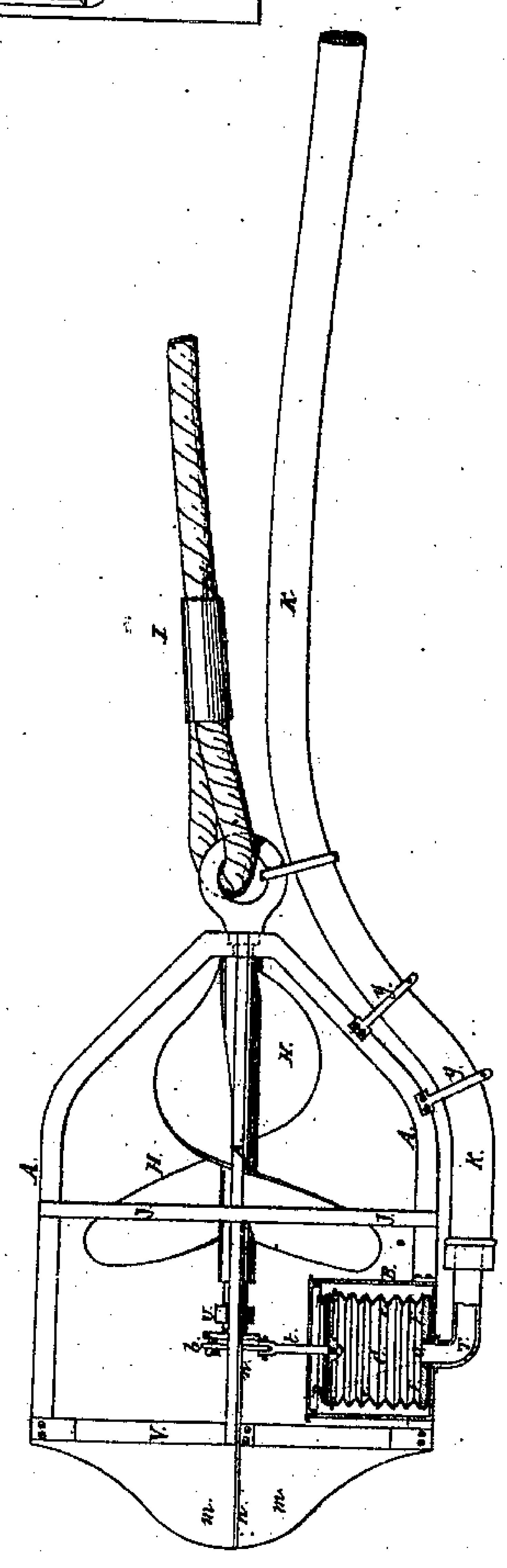
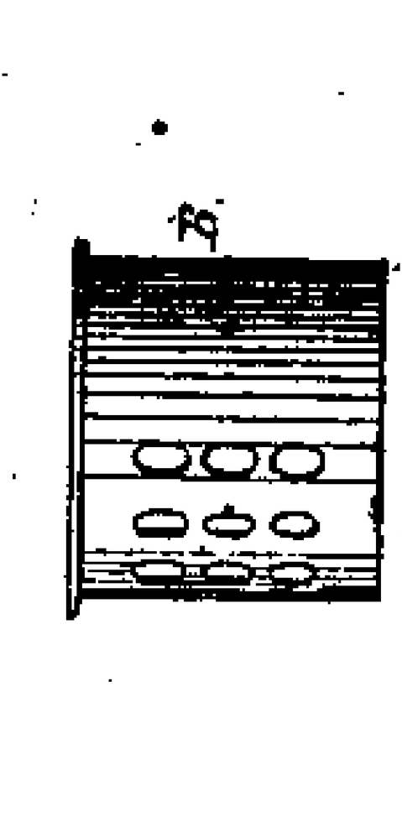


Fig. 4



Witnesses;

[signature]

[signature]

Inventor;

Armand Banare

by his attorney

[signature]

United States Patent Office.

ARMAND BANARÉ, OF PARIS, FRANCE.

Letters Patent No. 93,513, *dated August* 10, 1869.

IMPROVEMENT IN SPEED-INDICATOR FOR SHIPS.

The Schedule referred to in these Letters Patent and making part of the same.

To whom it may concern:

Be it known that I, ARMAND BANARE, of Paris, France, have invented a new and improved Atmospheric Sillometer; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings.

The apparatus which is the subject of the present application, is intended to ascertain the velocity of a current of liquid, or to be used as a ship's log, in order to indicate the distance traversed by the vessel.

It consists of the following parts:

First, a helix, which, when drawn through the water, or submitted to the action of a current of any liquid, will revolve, the number of its revolutions increasing with the velocity of the vessel or current. If the form of this helix be regular and well defined, if its pitch be exactly ascertained, and if, in addition, the shaft of the helix be kept at a certain depth in the water, and in a position always horizontally parallel to the trajectory of the vessel, independently of its pitching or rolling, the number of revolutions made by this helix can be employed to determine the distance traversed by the ship.

Second, two cylinders of the same capacity, each formed of two circular copper disks, united by a thick, flexible, and pliable rubber casing.

Let it be supposed that the first cylinder is extended or open to its full extent, that the other is contracted, its casing being folded up like that of a bellows, and that the two are connected and communicate with each other by means of a tube, arranged in such manner as to hermetically close them against the entrance of the exterior air. If, now, the two are left alone, equilibrium will be established between them; but if the former extended cylinder be compressed and flattened, the air from within it, passing through the tube, will separate the disks of the second cylinder, which, in its turn, will be distended. If, however, the first cylinder be again stretched or extended, the second will again be contracted, and it will be perceived that these results are attained by the transmission of the air to one or the other of the cylinders, through the tube, which puts them in connection with each other.

The manner in which these two parts are combined into order, to produced the desired results, can best be explained by reference to the accompanying drawings, in which—

Figure 1 is an elevation of that part of the apparatus which is immersed in the water, and contains the helix;

Figure 2 is a plan view; and

Figure 3, a side elevation of that part of the apparatus which is placed on board the vessel, and is connected with the register.

H H represent a helix, formed of two copper blades mounted upon a revolving shaft, to one end of which is secured a cord or rope, I, by which the helix is drawn after the vessel.

The helix is surrounded by four metal guards A, which are held in position by the cross-braces V U, the latter serving, at the same time, to support the shaft of the helix.

On the end of the shaft, opposite the ring whereby the apparatus is attached to the cord, and beyond the axis, is a connecting-rod, *b*, with which is connected the rod *t*, attached to the upper disk D of the cylinder C. The latter is composed, besides the disk D and bottom disk F, of a rubber cylinder, *e*, in which are embedded copper rings, which give it the form of an organ-bellows.

The bottom disk has a central opening, O, into which is screwed a copper tube, T, communicating with rubber tubing R, stiffened by means of a spiral copper wire embedded in it. This rubber tubing is from ten to fifteen metres long, and is held so as to conform to the shape of the lower guard A, by means of brackets *y*.

A brass casing, B, fig. 4, is rigidly connected with the lower guard A and the upright V, and encloses and protects the cylinder C. That part of the casing which is to receive the force of the water, is without perforations. The opposite side is, however, perforated, in order to allow free passage to the water. The other end of the rubber tubing is carried on board the vessel, (see fig. 2,) and is connected with the bottom disk *f*, of a rubber cylinder, resembling in construction the submerged cylinder, but smaller in diameter, so that its back-and-forth movement may be more extended.

Communication between the two is effected in such manner that when the tubing K is connected with the cylinder on the vessel, such cylinder is closed or contracted, while the submerged cylinder is open.

The lower disk *f* of the cylinder on the vessel is secured to a frame, E, and the upper movable disk carries a rod, *h*, which traverses the lever L of a suitable registering-apparatus, attached to the board P. The frame E is connected with the platform P by screw-bolts *s*, which extend through slots *r* on the platform, and have thumb-nuts *z*, by means of which the frame may be adjusted, in order to give more or less stroke to the registering-lever. The rod *h* passes through guides *g*, which hold it to the frame E.

The operation is as follows:

The helix, when in revolution, transmits through the intermediary of the connecting-rod, a rectilinear or reciprocating movement to the upper disk of the submerged cylinder, and the air communicates the movement to the disk *d* of the cylinder on board the vessel, the rod *h* of which disk causes the lever of the register to alternately rise and fall.

The register may be of any ordinary construction.

such, for instance, as are used with propeller-engines, to ascertain the number of revolutions of the screw.

The form of the helix is by no means arbitrary. The helix is described by two right lines, each one decimetre in length, placed normally upon the exterior surface of the shaft, and following a spiral thread, which makes one complete revolution in a metre's length. The helix is then cut away toward the front of the instrument, following a curve which is obtained by the intersection of this helix with a truncated cone, whose smaller base coincides with the section of the shaft, and whose larger base coincides with a plane at right angles to the axis, and passing through the middle of the same.

Two blades *m n*, the one horizontal, the other vertical, serve to maintain the shaft *y* horizontal, and the course of the apparatus parallel with the trajectory of the vessel, and to prevent the apparatus from twisting or turning upon the cord I.

A hoop, J, surrounds the four guards, and is intended to receive the ends of three wooden bars, each one metre and twenty centimetres in length, which are attached to the rope I, and serve to shield the apparatus from floating obstructions, weeds, &c.

The movable disks of the cylinders are hollowed out, in order to make them as light as possible, and have grooves formed in their exteriors, in which the ends of the rubber tubing are drawn, and held by wire ties.

The lever L is also made hollow, in order to decrease its weight.

A cock may be applied to the tube, which unites the smaller cylinder with the rubber tubing, for the purpose of regulating the apparatus without detaching the tubing.

In order to insure the operation of the apparatus in depths greater than one metre, I place within the submerged cylinder a spiral spring, which will counteract the pressure of the column of water.

To maintain the level of the apparatus, it may be found expedient to apply cork floats to the ring to which the cord I is fastened; and, lastly, a bell may be combined with the registering-apparatus, which will strike, for instance, at every tenth revolution of the helix.

I am aware that it is not new to impart motion to a registering-apparatus by means of a submerged helix, which is rotated by the motion of the vessel, and actuates said apparatus through the medium of atmospheric pressure, but the apparatus devised by me, constructed upon this general principle, possesses features which belong to no other one of the class that I am aware of; that is to say, it is so arranged as to float independently of the vessel, and to be dragged after it by means of a rope alone, without interfering with the continuous operation of the devices; and it is, moreover, constructed so that while maintained at a determinate depth in the water, it will pursue a course generally parallel with the trajectory of the vessel, as before explained. Therefore,

What I claim, and desire to secure by Letters Patent, is—

1. The arrangement of the revolving helix and air-cylinder, with which it is combined, in a frame, connected with the vessel in the manner specified, and consisting of guards and blades, constructed and arranged as herein described, so that the apparatus, while floating independently of the vessel, and following in its wake, may be maintained in proper position to communicate accurate movement to the register, as shown and set forth.

2. The combination, with the submerged air-cylinder, of the brass casing for the same, constructed as described, so as to protect the cylinder from the force of the water, at the same time that the water is admitted around the cylinder, as and for the purposes stated.

In testimony whereof, I have signed my name to this specification, before two subscribing witnesses.

A. BANARE.

Witnesses:
F. OLCOTT,
C. LAFOND.