No. 646,307. Patented Mar. 27, 1900.

A. L. McCORMICK.

VESSEL INDICATOR.

(No Model.) (Application filed Feb. 15, 1897.)

Fig. 1.

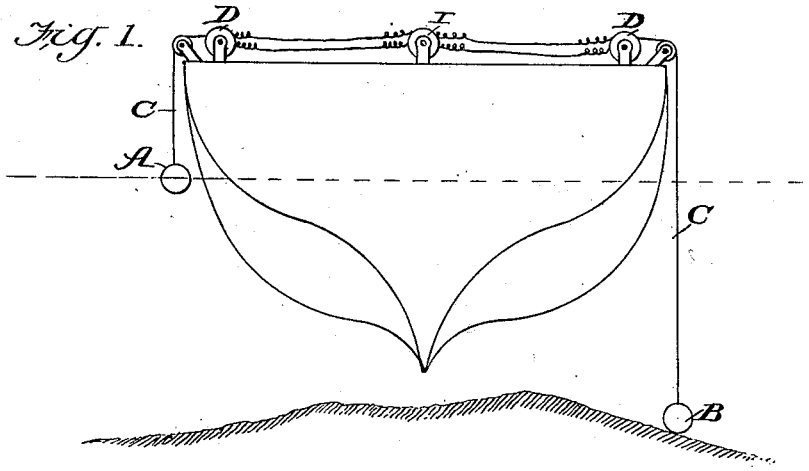

Fig. 2.

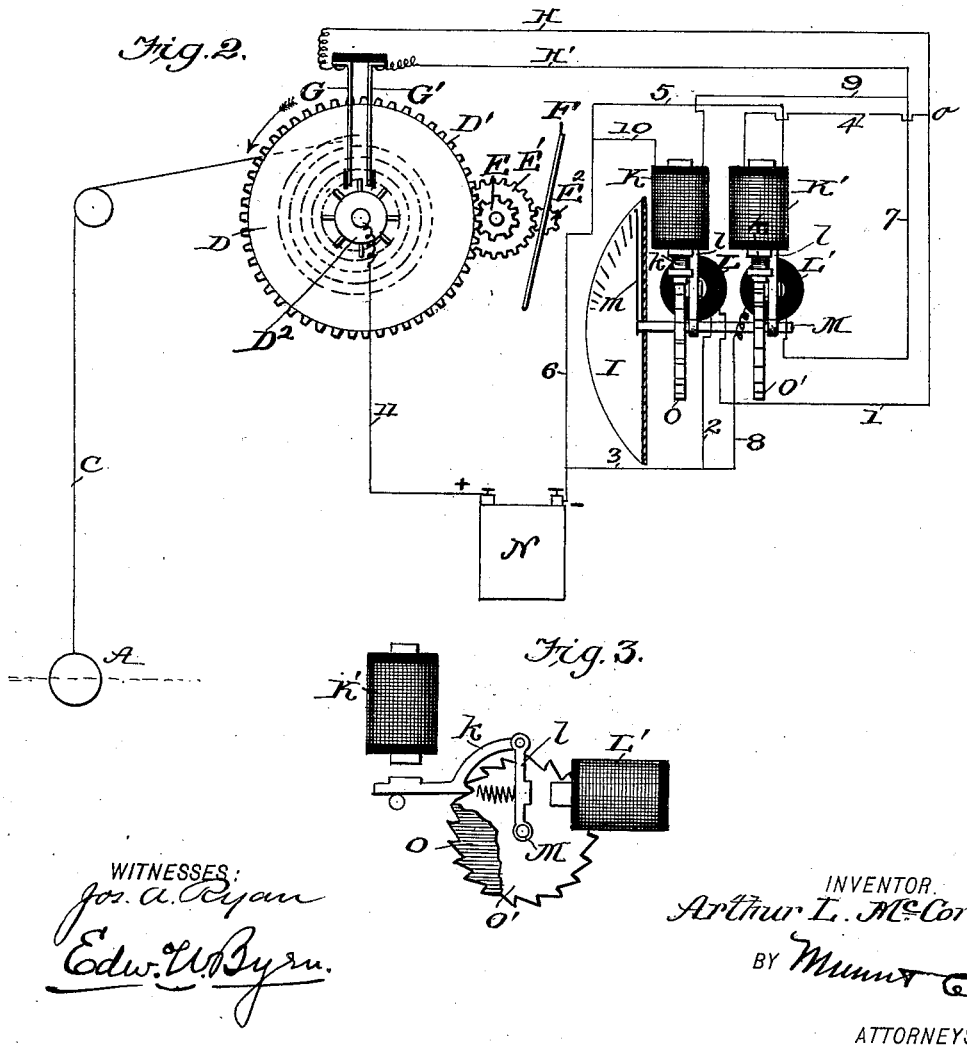

Fig. 3.

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ARTHUR L. McCORMICK, OF PORT HURON, MICHIGAN, ASSIGNOR TO BYRON J. McCORMICK, OF FLINT, MICHIGAN.

VESSEL-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 646,307, dated March 27, 1900.

Application filed February 15, 1897. Serial No. 623,564. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR L. McCORMICK, of Port Huron, in the county of St. Clair and State of Michigan, have invented a new and useful Improvement in Draft-Indicators for Vessels, of which the following is a specification.

The object of my invention is to provide a ready and convenient means for ascertaining at any moment the draft and level of a vessel while loading and unloading the same; and it consists in the peculiar construction and arrangement of devices, partly mechanical and partly electrical, for accomplishing the object, as will be hereinafter more fully described with reference to the drawings, in which—

Figure 1 is a diagram cross-section of the hull of a vessel with my devices applied. Fig. 2 is an enlarged detail view of the devices, and Fig. 3 is a side view of one pair of the operating-magnets.

In the drawings, A represents a buoyant weight resting on the surface of the water, and B is a non-buoyant weight resting on the river-bottom, either one of which forms may be used in my invention and both of which act by gravity to produce a pull on the cord C as the vessel lightens or rises from the water, the upper end of the cord C being in either case attached to a drum D, which contains a coil-spring, (shown in dotted lines,) which tends to wind up the cord on the drum when the boat settles down from the load and the cord C slackens. This movement of the drum D from the alternate pull of the weight A or B and the spring of the drum I make to work an indicator through electrical devices, as follows: Rigidly fixed to the end of this drum is a large gear-wheel D′, which meshes with a train of gears E′ E′ E^2 to work a fly-fan F, whose function is merely to retard the movement of the drum and to keep it from speeding or fluctuating from the surface action of waves. On the end of said drum's shaft there is also a rigidly-attached, but insulated, contact or commutator wheel D^2, which has a series of radial tappet-arms adapted to make electrical contact with one or the other of the two spring-contacts G G′. These spring-contacts have on their outer sides insulating-faces where the tappet-arms touch them, and on the inside they have conducting-faces. The object of this is to cause the wheel D^2 when turned in one direction to make intermittent electrical contact with one of the spring-arms, but not with the other, so as to control one set of electrical devices, and when the drum and wheel D^2 are turned in the other direction it makes electrical contact with the other spring-arm and not with the first named, so as to control another set of electrical devices, and one set of electrical devices is provided to turn an indicator-hand in one direction, while the other set turns it in the opposite direction.

N is a battery whose positive pole is connected with the commutator-wheel D^2 through wire 11 and whose negative pole is connected with spring-arms G G′ and circuit-wire H H′, which may run to any suitable distance from the drum to the indicating devices, which I will now proceed to describe.

M is a rotary shaft having rigidly attached to the same two ratchet-wheels O O′, whose ratchet-teeth point in opposite directions, as shown in Fig. 3. Each has a compound pawl composed of a radial arm *l*, swinging loosely on the shaft M and having jointed to its upper end a horizontal member *k*, bearing a tooth engaging the ratchet-wheel. Beside the member *l* there is a horizontally-arranged electromagnet L′, acting on an armature on the member *l*, and above the other member *k* is an electromagnet K′, acting on an armature of said member *k*. When magnet L′ acts, it pulls the compound pawl *l k* and turns the ratchet-wheel O′. When the magnet K′ acts, it simply lifts the member *k* of the pawl out of engagement with the ratchet-wheel and allows the other magnet L to turn the shaft M in the opposite direction.

In the operation of the device the turning-magnet L′ and releasing-magnet K work simultaneously and the turning-magnet L and releasing-magnet K′ work simultaneously. On the end of the shaft M there is a pointer *m*, turning over an indicator-scale I, which in the views is turned slightly in perspective to show it better, and when one set of magnets L′ K work the pointer turns in one direction on the scale, and when the other set of mag-

nets L K′ work the pointer is turned in the other direction. To control the action, the circuits are made as follows: When the drum D is turned in the direction of the arrow in Fig. 2, the tappets of commutator D^2 make electrical contact with spring-arm G only, and the current flows from the positive side of battery and wire 11 to wheel D^2, arm G, circuit-wire H, and dividing at *o* one part goes through wire 1 and magnet L and wires 2 and 3 to the negative side of battery, while the other part from *o* goes through wire 4, magnet K′, and wires 5 6 to the negative side of battery. In this working the magnet K′ releases the pawl of ratchet O′, while magnet L turns the shaft M and pointer *m* in a given direction. If now the movement of the drum is reversed or turned in the opposite direction to the arrow, then contact will be made through the spring-arm G′ and circuit-wire H′, and the current again dividing one part goes through wire 7, magnet L′, and wires 8 and 3 to the negative side of the battery and the other part through wire 9, magnet K, and wires 10 and 6 to the negative side of the battery. This causes the magnet K to release the pawl on the ratchet O, while the magnet L′ turns its ratchet O′ and the shaft M and pointer *m* in the opposite direction.

I am aware that a step-by-step indicator has been worked in opposite directions by electrical contacts alternately brought into action by a float, and I make no broad claim to this.

My invention is distinctive in the construction of the spring-drum in the retarding fly-fan to prevent speeding and fluctuation from the surface action of waves and also in the special arrangement of the releasing and actuating magnets.

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

1. The combination with a gravitating weight, a flexible connection, and a drum spring-actuated in one direction and having wound thereupon the flexible connection; of a commutator-wheel having radial teeth, said wheel being attached to and moving with the drum, two contact-springs G G′ projecting down to range of contact with said teeth and bearing each an insulated face, the insulated face on one spring being on the opposite side to that of the other, so that the radial teeth will make electrical contact with one spring when turned in one direction, and with the other spring when turned in the other direction, an electrical indicator, and two separate circuits one of them connecting with the indicator through the commutator-wheel and one of the springs, and the other connecting with the indicator through the commutating-wheel and the other spring substantially as described.

2. The combination of a gravitating weight, a flexible connection, a drum spring-actuated in one direction and having wound thereupon the flexible connection, a commutating-wheel connected to and moving with the drum, two contact-springs bearing insulation on opposite sides to make alternate contact with the commutator-wheel according to the direction of the movement, a retarding fly-fan geared to the drum to reduce fluctuations, and a double-acting electrical indicator with circuits as described.

3. A double-acting electric indicator comprising a shaft with two rigid ratchet-wheels having teeth pointing in the opposite direction, and a pointer-arm, a pair of electromagnets for each wheel, and a compound pawl for each ratchet-wheel consisting of a radially-swinging member with an armature arranged to be acted upon by one of the magnets, and a second member jointed to the radially-swinging member and bearing a tooth engaging the ratchet-wheel, and an armature arranged to be acted upon by the other magnet to release the pawl substantially as described.

4. A double-acting electric indicator, comprising a shaft with two rigid ratchet-wheels having teeth pointing in opposite directions, and a pointer-arm, a pair of electromagnets for each wheel, a compound pawl for each ratchet-wheel consisting of a radially-swinging member with an armature arranged to be acted upon by one of the magnets and a second member jointed to the radially-swinging member and bearing a tooth engaging the ratchet-wheel, and an armature arranged to be acted upon by the other magnet to release the pawl, and electrical circuits as described acting simultaneously upon the actuating-magnet of one pair and the releasing-magnet of the other pair substantially as and for the purpose described.

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

ARTHUR L. McCORMICK.

Witnesses:

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JNO. M. GLEASON.