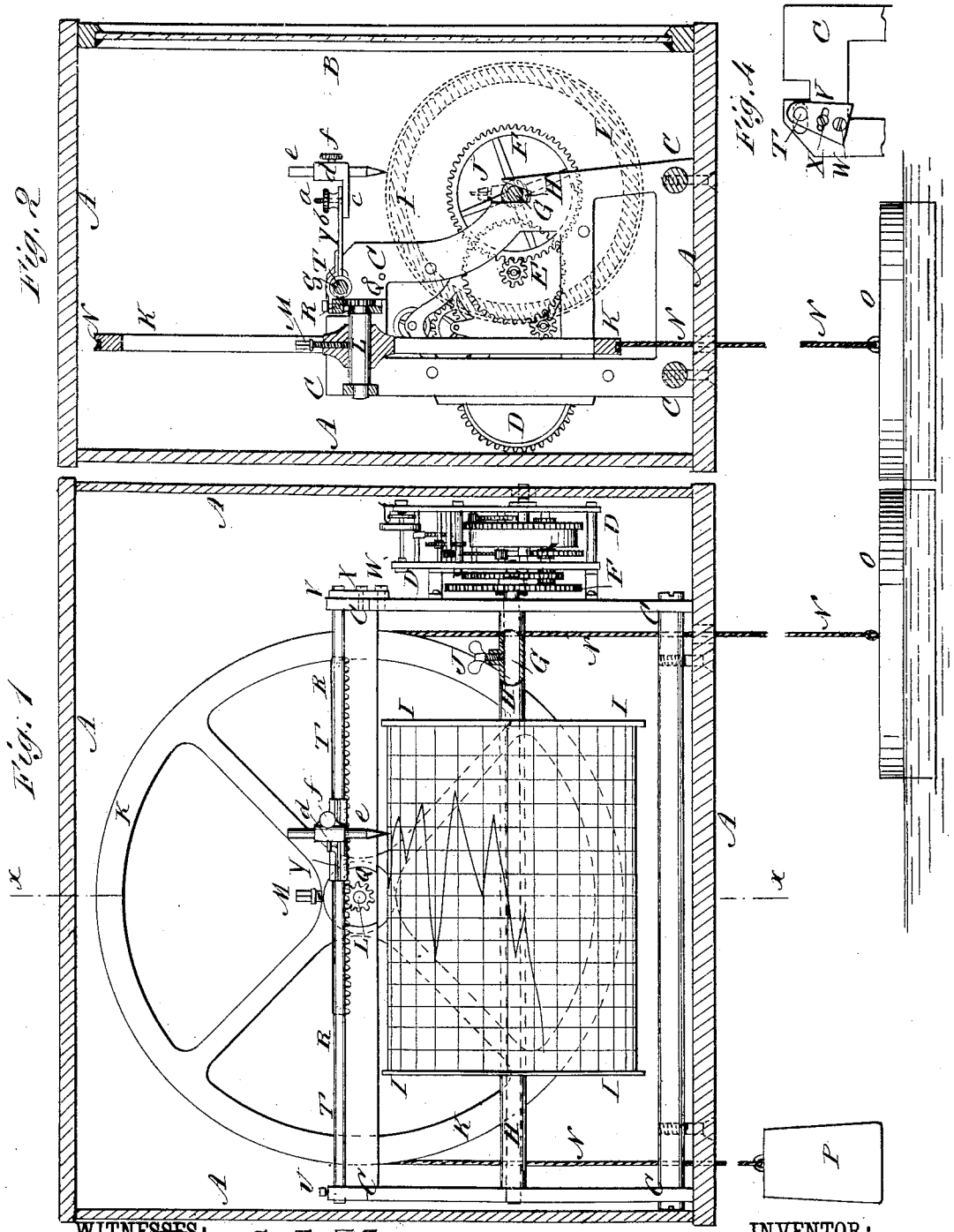
(No Model.)

T. J. LONG.

TIDE RECORDER.

No. 245,080. Patented Aug. 2, 1881.



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UNITED STATES PATENT OFFICE.

THOMAS J. LONG, OF NEW YORK, N. Y.

TIDE-RECORDER.

SPECIFICATION forming part of Letters Patent No. 245,080, dated August 2, 1881.

Application filed December 4, 1880. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. LONG, of the city, county, and State of New York, have invented a new and useful Improvement in Self-Registering Tide-Gages, of which the following is a specification.

Figure 1 is a front elevation of the improvement, the case being shown in section. Fig. 2 is a sectional end elevation taken through the line *x x*, Fig. 1. Fig. 3 is a plan view of the pencil-carrying mechanism. Fig. 4 represents a mechanism for adjusting the guide-rod.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish self-registering tide-gages so constructed as to plot continuous lines upon paper to show the variations of height of water in the ocean and in harbors, rivers, reservoirs, and other places, whether the said variations be due to tides or other causes, in such a manner as to show the stage of the water at any and every moment of time.

The invention consists in constructing a self-registering tide-gage of a paper-carrying cylinder driven by clock-work, and a pencil-carrier driven by a rack and pinion from a wheel moved by a float and weight as the height of the water varies; and, also, in the peculiar construction of the connecting, adjusting, and guiding mechanisms, as will be hereinafter fully described.

A represents a case to contain and protect the mechanism, and which is provided with a glass door, B, in front to allow the condition of the apparatus to be inspected at any time, and to give convenient access to the mechanism when desired.

To the bottom of the case A is attached a frame, C, to one end of which is attached the frame of an ordinary clock-work, D.

To the inner end of the main or driving shaft of the clock-work D is attached a small gear-wheel, E, the teeth of which mesh into the teeth of the larger gear-wheel F, attached to the projecting end of a shaft, G. The journals of the shaft G revolve in bearings in the forward part of the frame C, and upon the said shaft is placed a hollow shaft, H, to which is attached a cylinder, I. The cylinder I may be made of metal, or of wood with metal ends. The hollow outer shaft, H, is secured to the inner shaft, G, by a set-screw, J, passing in through the side of the said shaft H and resting against the side of the shaft G, so that the shaft G can be made to carry the shaft H and the cylinder I with it in its revolution. With this construction, by loosening the set-screw J the cylinder I can be adjusted to bring the proper line of the paper placed upon the cylinder I to the marker without interfering with the clock-work D E F. By varying the relative diameters of the gear-wheels E F the clock-work can be made to carry the cylinder I through a revolution in any desired time.

K is a large wheel or pulley, which is placed upon a shaft, L, the journals of which work in bearings attached to the upper central part of the frame C in such positions that the pulley K will be in the rear of the cylinder I. The pulley K is secured to the shaft L by a set-screw, M, which passes in through the hub of the said pulley K and bears against the side of the said shaft L, so that the said shaft L can be withdrawn, when desired, by loosening the set-screw M. The rim of the pulley K is grooved to receive the cord N, which passes around the said pulley and passes out through holes in the bottom of the case A.

To one end of the cord N is attached a float, O, which rests upon the water. To the other end of the cord N is attached a counterbalancing-weight, P.

To the inner end of the shaft L is attached a small gear-wheel, Q, the teeth of which mesh into the teeth of a rack-bar, R. The ends of the rack-bar R slide in bearings in the end parts of the frame C. With this construction, as the height of the water varies, the float O and weight P will turn the pulley K back and forth, and the reciprocating movement of the pulley K will give a reciprocating movement to the rack-bar R.

To the middle part of the rack-bar R are attached two eyes, S, at a little distance apart, through which passes a rod, T, upon which the said eyes S slide as the rack-bar R moves forward and back. One end of the rod T is placed in a hole in the end part of the frame C, where it is secured in place by a set-screw, U. The other end of the rod T passes through a short slot in the other end part of the frame

C, and is attached to the upper end of a bar, V, the lower end of which is pivoted to the frame C by a bolt, W. The middle part of the bar V is slotted transversely to receive the clamping-screw X, which passes through the slot of the bar V and screws into the frame C, to clamp the said bar V to the said frame C, and thus hold the end of the rod T in place. With this construction, by loosening the clamping-screw X the rod T can be adjusted parallel with the axis of the cylinder I, and can then be secured firmly in place by again tightening the screw X.

Y is a triangular plate, upon the base of which is formed a tubular eye or socket, Z, which is placed upon the rod T between the eyes S, so that the said plate Y will be carried back and forth by the rack-bar R in its movements and will be kept parallel with the axis of the cylinder I by the guide-rod T. The rod T and socket Z also serve as a hinge to the plate Y, so that the forward end of the said plate can move up and down freely.

To the forward end or angle of the plate Y is adjustably attached, by a bolt, *a*, and hand-nut *b*, the inner end of an arm, *c*, to the outer end of which is attached, or upon it is formed, a vertical socket, *d*, to receive the marking pencil or pen *e*. The socket *d* is made open and with its edges bent outward to form flanges, which flanges are drawn together to clamp the pencil or pen *e* by a clamping-screw, *f*. The plotting is done upon paper placed upon the cylinder I and secured in place by clamps, elastic bands, or other suitable means. The paper is ruled longitudinally with the axis of the cylinder to divide it into time-spaces, and transversely or around the cylinder to divide it into height-spaces. With this construction, as the cylinder is revolved by the clock-work, if the water remains at the same height, the pencil will draw a line at right angles with the axis of the cylinder; but should the height of the water increase or diminish, the pencil will be moved longitudinally with the cylinder, which movement, in connection with the rotary movement of the said cylinder, will cause the pencil to make a mark more or less inclined as the change of height in the water may be more or less rapid. With this construction, when a new sheet is applied to the cylinder the cylinder I is adjusted by loosening the screw J to bring the line where it is desired to have the plotting begin as close as possible to the point of the pencil. Then by loosening the hand-nut *b* and turning the arm *c* the point of the pencil can be adjusted with any desired nicety.

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

1. A self-registering tide-gage constructed substantially as herein shown and described, consisting of the clock-work D E F, the paper-carrying cylinder I, driven by the clock-work, the adjustable pencil-carrier *c* Y, the guide-rod T for directing the movement of the pencil-carrier, the wheel K, float O, and weight P, for giving motion to the pencil-carrier, and the pinion and rack Q R for connecting the wheel and pencil-carrier, whereby variations in the height of water can be accurately registered, as set forth.

2. In a self-registering tide-gage, the combination, with the clock-work D E F and the paper-carrying cylinder I, of the inner shaft, G, the exterior hollow shaft, H, and the clamping-screw J, substantially as herein shown and described, whereby the paper-carrying cylinder can be adjusted without interfering with the clock-work, as set forth.

3. In a self-registering tide-gage, the combination, with the pencil-socket *d* and the carrier-plate Y, of the arm *c* and the clamping-bolt *a* and nut *b*, substantially as herein shown and described, whereby the pencil can be accurately adjusted, as set forth.

4. In a self-registering tide-gage, the combination, with the rod T, that directs the movement of the pencil-carrier, of the pivoted slotted arm V and the clamping-screw X, substantially as herein shown and described, whereby the pencil-carrier can be made to move parallel with the axis of the paper-carrying cylinder, as set forth.

THOMAS J. LONG.

Witnesses:
JAMES T. GRAHAM,
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