

APPLICATION FILED SEPT. 25, 1912.

2 SHEETS SHEET 1.

1,103,916.

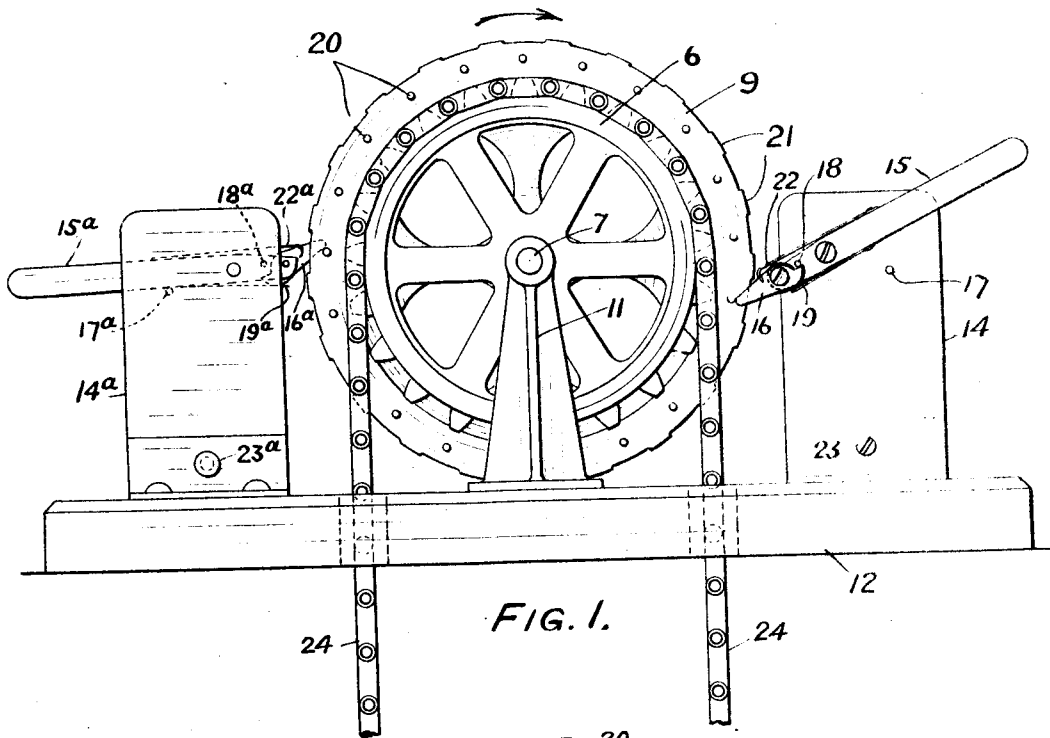


FIG. 1.

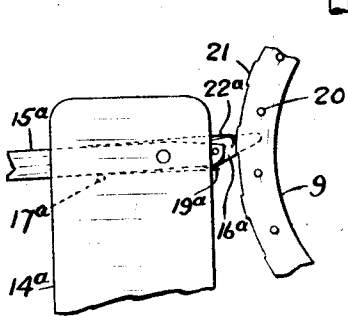


FIG. 3.

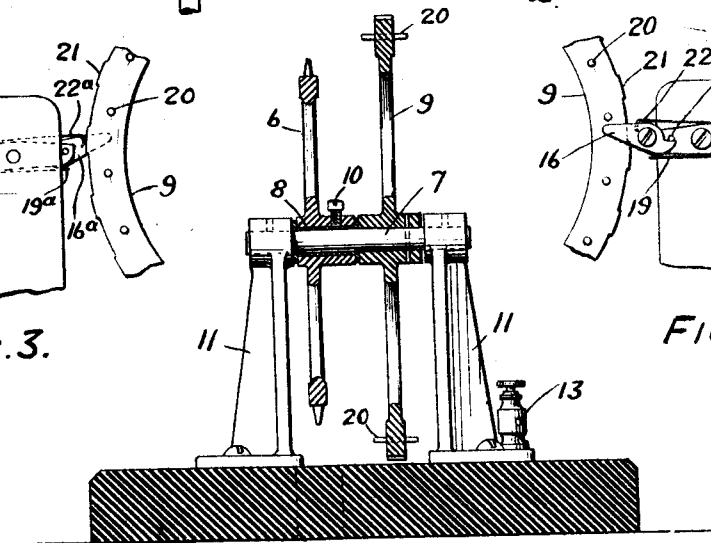


FIG. 2.

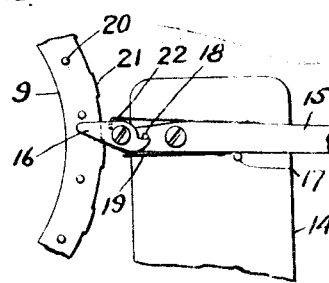


FIG. 4.

WITNESSES:

Robt. R. Kitchel.
Wm. Gilligan

INVENTOR

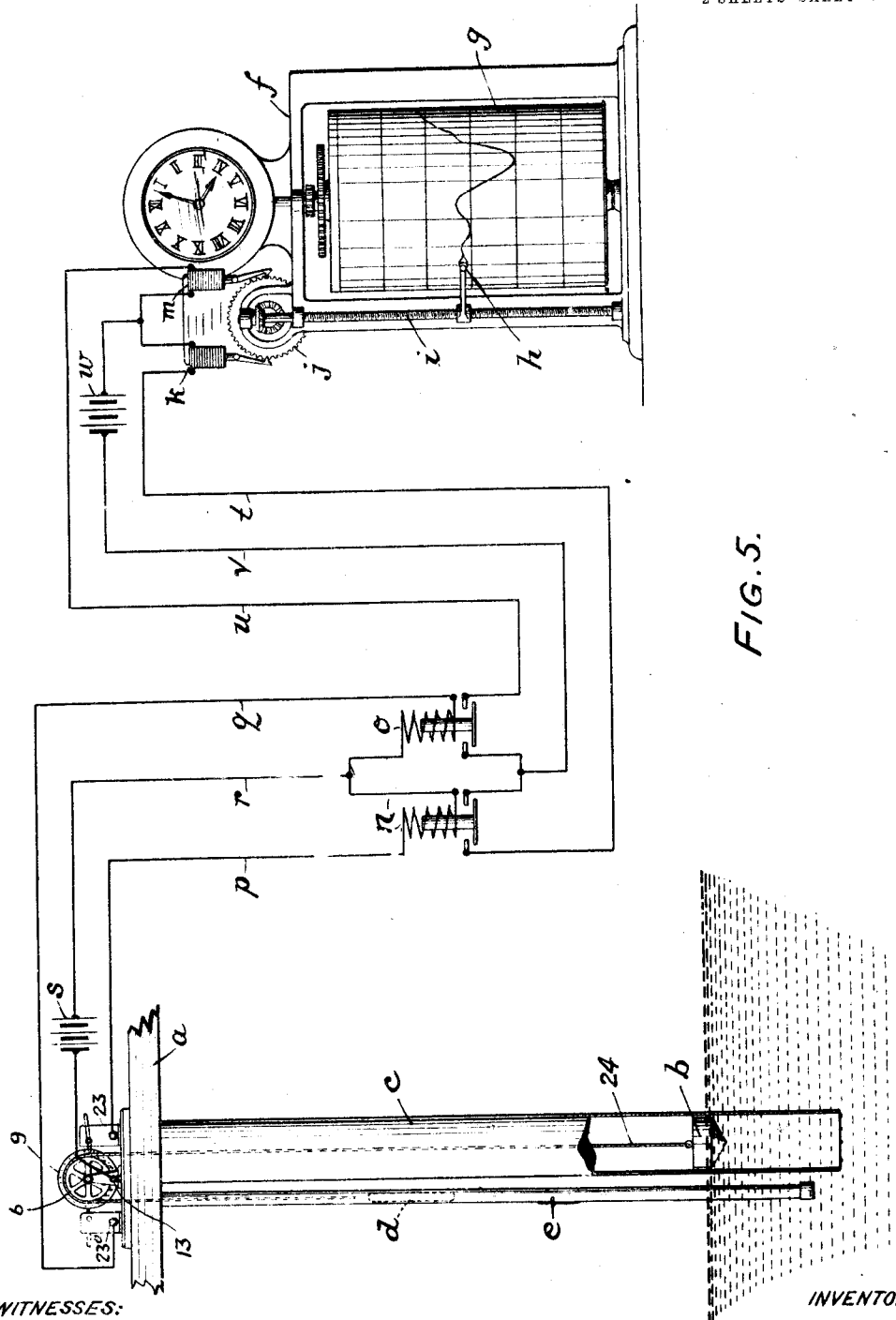
George E. Lawrence
BY
a - JUSTIN B. STOUTGLTON.
ATTORNEY.

G. E. LAWRENCE.
ELECTRIC MAKE-AND-BREAK DEVICE.
APPLICATION FILED SEPT. 25, 1912.

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Patented July 14, 1914

2 SHEETS-SHEET 1.



WITNESSES:

W. H. Kitchel.
H. M. Gilligan.

INVENTOR

George E. Lawrence
BY
Augustus B. Coughlin.
ATTORNEY.

UNITED STATES PATENT OFFICE.

GEORGE E. LAWRENCE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HYDRO MANUFACTURING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ELECTRIC MAKE-AND-BREAK DEVICE.

1,103,916.

Specification of Letters Patent.

Patented July 14, 1914.

Application filed September 25, 1912. Serial No. 722,228.

To all whom it may concern:

Be it known that I, GEORGE E. LAWRENCE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electric Make-and-Break Devices, of which the following is a specification.

My invention relates to those devices which have for their object the make-and-break of an electric circuit.

Specifically my invention provides for the momentary and positive make-and-break of one electric contact by continuous or irregularly interrupted revolution in one direction and the momentary and positive make-and-break of another contact by similar revolution in the opposite direction, by which various results may be attained, such for instance, as the operation of an automatic water-level recording device at a distance, it may be of several miles, from the point at which the water-levels are taken.

By my invention a rotating body or wheel which may turn or run in either direction with an intermittent or continuous movement is caused to close circuits for short intervals of time and again break them, thus avoiding waste of electrical energy, and these circuits may be employed for duplicating, at a distance, the movements of the wheel or body.

I will describe my invention in connection with a water-level recording instrument, although it will be understood that I do not in any way limit my invention to that use.

My invention will be clearly understood from the following description and the accompanying drawings, in which—Figure 1, is a front elevation of my improved make-and-break device. Fig. 2, is a vertical cross-section through same. Figs. 3 and 4 are portions of a front elevation showing normal position of electric contact trips, and Fig. 5, is a diagrammatic view of a water level recording apparatus embodying my invention.

In the drawings 6 is a sprocket wheel mounted on a shaft 7 and insulated therefrom and from contiguous parts by the bushing 8 of non-conducting material.

9, is a contact wheel attached to the shaft 7.

10, is a set screw by which the sprocket wheel is held from rotation on the shaft.

The shaft 7 is carried by brackets 11, mounted on a base 12, of non-conducting material, one of said brackets carrying also the binding post 13 which is in electric connection with the contact wheel 9.

14 and 14^a are metal supports projecting from the base 12 on either side of the contact wheel. Pivoted on these supports are trip levers 15, 15^a which have pivoted at their inner, shorter ends, trips or dogs 16 and 16^a of non-conducting material. The outer, longer arms of the trip levers 15 and 15^a normally rest upon stops 17 and 17^a, so that the trip levers lie in practical alignment on either side of the center of the contact wheel. The dogs or trips 16, 16^a have outwardly projecting tails which are normally held against stops 18, 18^a by springs 19, 19^a, as shown in Figs. 1 and 4. The inner ends of the trips 16, 16^a project toward each other and lie in the path of pins 20 which project from the faces of the rim of the contact wheel. The outer periphery of the contact wheel has cut away portions, leaving raised contacts or teeth 21 located angularly midway between the pins 20. Contact springs 22, 22^a, carried by the trip levers 15, 15^a, project inwardly toward the contact wheel, and are of such length that they just escape making contact with the raised contacts 21, when the trip levers are lying at rest on stops 17, 17^a. However, when one of the trip levers is turned on its pivot, from the position of 15, in Fig. 4, to that in Fig. 1, the arc described by the end of the contact spring allows it to wipe one of the raised contacts 21, as will be described, thereby making temporary electrical contact between binding post 13 and binding posts 23 or 23^a, on the supports 14, 14^a.

As shown in Fig. 1, the chain 24 acting on the sprocket wheel 6, turns the contact wheel 9 in, for example, the direction of the arrow, and one of the pins 20 operating on the trip 16 has turned lever 15 as shown. In its movement so far, the contact spring 22 has turned through the above mentioned arc, but no contact was made as the contact wheel at the instant presented a cut away portion to the contact spring. A slight further turn of the contact wheel beyond that shown in Fig. 1 will allow the trip 16 to pass the pin 20, the long arm of the trip lever being of just sufficient weight to bring it quickly to

rest on stop 17 and in this return motion of the trip lever, the contact spring returning through the above mentioned arc, finds a raised contact 21 presented to it and momentarily closes electric connection between binding posts 13 and 23. In the meanwhile a pin 20 on the opposite side of the contact wheel, has operated on trip 16^a. In this case, however, the trip is merely turned on its pivot until it is freed from the pin 20, when spring 19^a, returns it to its normal position against stop 18 and no electric connection is made. In the reverse rotation of the contact wheel exactly similar action takes place, only in this case trip lever 15^a is turned and contact spring 22^a closes the electric connection between binding posts 13 and 23^a, trip 16 meanwhile turning on its own pivot.

In the use to which this device may be put as exemplified in Fig. 5, it is mounted on the stationary frame work *a*, arranged above the water, whose level it is desired to record. One of the reaches of the chain 24 carries a float *b*, resting on the surface of the water. An open ended pipe *c* protects chain and float from surging and outside influences. The other reach of the chain 24 carries a counterweight *d* and is similarly protected by a pipe *e*.

f, is a convenient form of chronograph, consisting of a paper carrying cylinder *g* rotated by clockwork and a recording pencil *h*, carried on a worm *i* which is rotated by a ratchet wheel *j*.

k, *m*, are solenoids carrying pawls which operate on either side of the ratchet wheel *j*. The chronograph may be located in the office or in any similarly convenient place which may be at a distance of several miles from the point where the water level is being measured, and the solenoids *k*, *m*, may be connected electrically with the binding posts on my make-and-break device in the following manner: *n* and *o* are relays having one of the ends of their coils connected by conductors or wires *p* and *q*, with the binding posts 23, 23^a. A wire or conductor *r*, leads from the binding post 13, through a battery or source *s* to the opposite ends of the coils of the relays *n* and *o*. The contacts which are bridged by the circuit closers of the cores of the relays are connected by wires or conductors *t*, *u*, and *v* with the solenoids *k*, *m*, and the wire *v*, leads through the relay battery or source *w*. By this arrangement, when the water level rises or falls, the float *b* is raised or lowered, turning the contact wheel 9 in one direction or the other, and making a temporary circuit through wires *p* and *r*, or wires *q* and *r*. This electric pulsation or circuit of short

duration is relayed on to either solenoid *k* or *m*, which acts to rotate the ratchet wheel *j*, and either raise or lower the position of the recording pencil *h*. As the level of the water continues to rise or fall, successive contacts are made on one side or other of the contact wheel, and electric pulsations carry the action to the chronograph, and move the pencil up or down. The step by step motion of the contact wheel is in this way exactly duplicated in the distant ratchet wheel of the chronograph, and may be made to act at variations of one-half inch in the level of the water, or less if desired. The speed of passage of the contact spring 22 or 22^a, in its contact arc depends upon the weight of the long arm of its trip lever, which may be made just sufficient to give the desired length of contact of the spring with the raised contacts 21.

Having now fully described my invention, what I claim is:

1. An electric make-and-break device comprising the combination of a wheel revoluble in two directions and having on its rim contact teeth spaced apart, a pair of pivotal levers having contacts clearing said teeth when the levers are in normal position, and complementary projections on the wheel and movable dogs on the levers whereby upon rotation of the wheel one of said levers is turned and released to make momentary wiping contact and the other lever remains at rest in its normal position, substantially as described.

2. An electric make-and-break device comprising the combination of a revoluble wheel having on its rim contact teeth spaced apart, a pivotal lever tending to return to normal position and provided with a contact clearing said teeth when the lever is in normal position, and means operated by the revolution of the wheel and adapted to turn said lever with its contact between and clear of said teeth, and then to release said lever and permit it in returning to normal position to wipe its contact over and past a tooth.

3. An electric make-and-break device comprising a toothed contact wheel rotatable in two directions, a vibratory contact normally out of range of the wheel and provided with means for causing it to wipe a tooth of the wheel, and means inoperative when the wheel turns in one direction and operative when the wheel turns in the other direction to shift the contact and release it and permit it to automatically wipe a tooth, substantially as described.

GEO. E. LAWRENCE.

Witnesses:

A. B. STOUGHTON,
CLIFFORD K. CASSEL.